Data Analysis for Optimizing Sales and Inventory at Sharma Paneer Bhandaar

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project Title “Data Analysis for Optimizing Sales and Inventory at Sharma Paneer Bhandaar”. I extend my appreciation to **Sharma Paneer Bhandaar**, 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: Sagandeep Kaur

Name: Sagandeep Kaur

Date: 10 December 2024

1 Executive Summary

The project “Data Analysis for Optimizing Sales and Inventory at Sharma Paneer Bhandaar” focuses on a medium-sized dairy shop named ‘Sharma Paneer Bhandaar’, a family-run dairy shop in North-West Delhi. The business is predominantly B2B. The store is located in my neighborhood and the owner was compliant enough to share the data. The products for which data is being collected are cottage cheese, two types of dough, soybean nuggets and peas - items ordered in bulk.

The shop has served its loyal customers for years with quality and variety. However, managing the inventory and maintaining profitability remains a challenge due to fluctuating demand, price sensitivities, and wastage.

After reviewing the data and discussing with the owner, the identified issues faced by the business are:

1. Reduce wastage and predict demand
2. Develop a bundling strategy for complementary products to boost sales.
3. Optimize sales on underperforming days through targeted marketing.

The report aims to address inventory mismanagement and sales volatility at Sharma Paneer Bhandaar through data-driven analysis. The project intends to reduce wastage by 20% and increase sales by 15%. Python and Excel are utilized for data visualization and forecasting. Key milestones include inventory analysis and customer trend study.

The proposed solutions will focus on improving record-keeping practices, which will not only address the shop’s cash flow problems but also provide the necessary data to predict future demand trends. The goal is to gain insights from the data to improve daily operations and increase revenue.

2 Organization Background

Business Name: Sharma Paneer Bhandaar
Owner's Name: Mr. Jai Prakash Sharma
Address: Old Shani Bazar, Holi Chownk, Alipur, Delhi

The project focuses on a small dairy shop located in Alipur, Delhi. It is situated in the marketplace and it has been a supplier to business clients (B2B) and direct customers (B2C). The shop operates from 8 AM to 10 PM, with a lunch break from 2 PM to 4 PM. This store was established in 1998 by Mr. Jai Prakash Sharma, who moved from a small village in Rohtak, Haryana, to Delhi.

Mr. Sharma and his family manage daily operations, the store and the delivery of the products. They have an additional one worker. The business mainly supplies Paneer (cottage cheese) to nearby areas.

The annual revenue of the shop is estimated at Rupees 25 lakh. Its current assets are valued at ₹2 lakh, while monthly expenses amount to ₹50,000.

The brother of the shop owner also runs a similar business. The shop owner was previously engaged in the hospitality industry. Due to these reasons, the owner has a strong client-relationship and well-established reputation.

3 Problem Statement

1. **Efficient Inventory Management**:

   During the festive season, the owner often wrongly predicts the quantity for the next day. Dairy products have a shelf life of a couple of days. Over-estimating leads to product spoilage and under-estimating causes loss in business.

2. **Boost Sales through Targeted Marketing:**
   The absence of a strategic approach to product bundling reduces the potential for maximizing revenue. By identifying and promoting complementary products, the aim

is to increase sales through targeted bundling of complementary products and strategic marketing campaigns aimed at increasing customer engagement on underperforming days.

4 Background of the Problem

Since the shop operates in a Business to Business (B2B) setting, the products are ordered in huge volumes. Season demand surges are difficult to predict for the owner for some products. The owner will lose business, if he underestimates the demand. Incorrect predictions can lead to over-ordering, resulting in product spoilage, or under-ordering, causing stock outs and lost sales.

On 7th August and 14th August, the purchase was more, which indicates that the owner knew the demand on 8th and 15th would rise. But the quantity was not properly predicted, so it increased the risk of spoilage and loss of business. As a result, on 16th August, there was more spoilage of Peas and Soybean Nuggets.
For both dough and cream, the purchase should have been more on 14th August to manage the demand on 15th August.

There were days when demand was high but still, there was a wastage of products because of fluctuating demand. The products expired before there was a surge in demand.
Sales patterns highlight uneven distribution, with certain days like Monday and Thursday contributing significantly to profits, while others, such as Wednesday, show minimal activity. This disparity points to untapped potential for leveraging targeted promotions to boost engagement and sales on underperforming days.

Furthermore, while high-margin products like Cottage Cheese generate most of the revenue, other products like Soyabean Nuggets and Peas make negligible contributions, requiring strategies to diversify revenue streams. The lack of a structured approach to marketing and inventory control impacts customer satisfaction, profitability, and operational efficiency.

5 Problem Solving Approach

To tackle the challenges faced by Sharma Paneer Bhandaar, I propose a structured, data-driven approach tailored to each problem, by analyzing the data for sales, purchases, and inventory using Excel, descriptive formulas and visualization tools. The tools and techniques used for each of these challenges are outlined below.

For the first issue of demand forecasting and inventory management, the business often faces difficulties in accurately predicting inventory levels, especially during high-demand periods such as festivals. To solve this, I will use Day of Inventory and Stock Turnover Ratio on historical sales data, inventory records, spoilage trends. Also, I will visualize data trends through line charts and histograms in Excel or Python for better understanding. This will improve forecasting accuracy, and it will reduce inventory wastage by at least **15%** od total stock and boost revenue through better stock availability.

Based on these insights, the business can implement a discount system for products with a near-expiry date. This practical solution will increase the cost savings. This technique is not used in the neighboring shops yet. By introducing these discounts, the shop will gain a competitive edge in the market. For this, identification of products near the expiry, using sales data, customer purchase history, through inventory tracking is required. This will increase customer retention by 10%.

The second challenge is developing a bundling strategy for complementary products. To identify complementary items, I will use correlation. I plan to analyze customer purchase data to identify other complementary product pairs and then create bundled offers, such as discounts when customers purchase both items together. These bundles will be promoted during festivals and high-demand periods to boost sales and enhance customer satisfaction.

I will analyze weekday sales trends, using pivot tables and bar charts, to understand customer preferences and identify opportunities for growth. Targeted marketing campaigns, offering

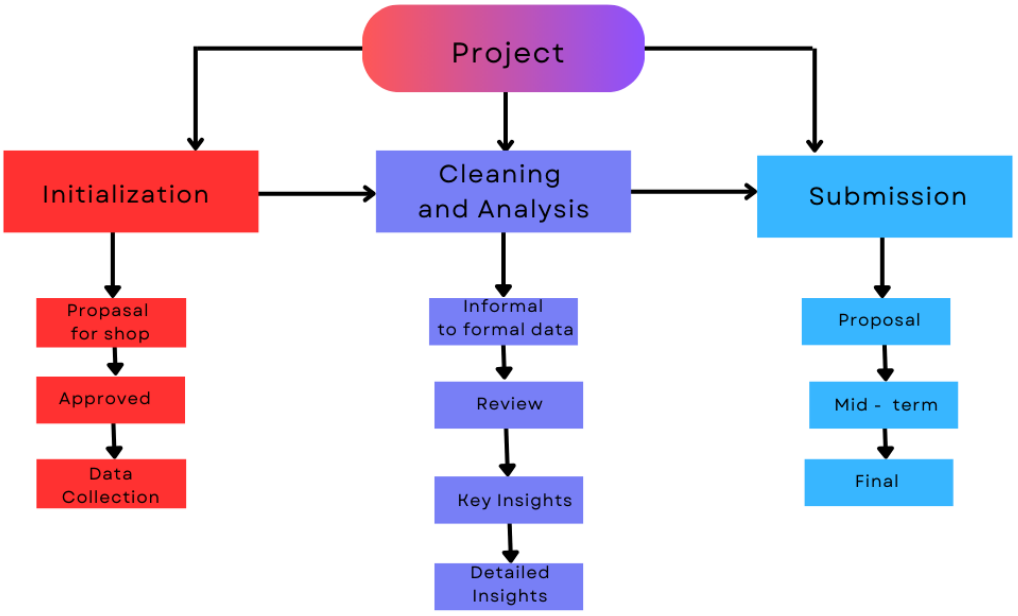
special discounts on these low-sales days. It will boost weekday sales by 20%. Price Elasticity of Demand will help in focusing on relevant products.

Keeping a record of daily sales trends, especially in the lead-up to festivals or known busy periods, will improve our understanding of how much stock is needed.

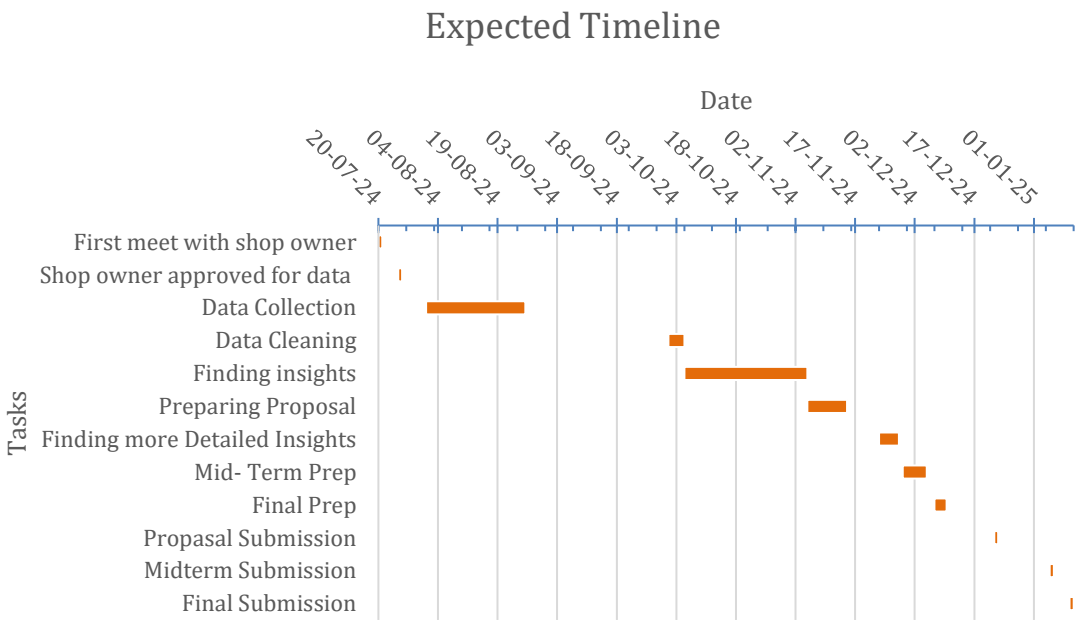
By implementing these solutions, Sharma Paneer Bhandar can enhance inventory management, improve product sales, and stabilize revenue throughout the week.

6 Expected Timeline

6.1 Work Breakdown Structure:



6.2 Gantt chart:



Expected timeline for completion of project.

7 Expected Outcome

1. **Improved Demand Forecasting and Inventory Management**: Through trend analysis, better predictions can be made. The owner will have a clear idea of demand patterns, especially during the festive season. This will lead to less overstocking and reduced waste, as the shop will only order what is needed.

2. **Increased Sales through Product Bundling**: Introducing a bundling strategy for complementary products like Gulab Jamun Dough and Rasgulla Dough will drive higher sales by encouraging customers to purchase both products together. This approach can boost overall revenue and enhance customer satisfaction.

3. **Enhanced Sales on Underperforming Days**: Targeted marketing campaigns based on data analysis of low-sales days (e.g., Wednesdays) will help increase sales. By focusing on high-margin products and offering discounts or promotions, the business can improve sales during off-peak times and optimize profitability throughout the week.