Endeavoring to Improve the Profit Margin of a Jaggery Manufacturing Company

A Proposal report for the BDM capstone Project

Submitted by

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Contents

Declaration Statement

I am working on a Project Title “**Endeavoring to Improve the Profit Margin of a Jaggery Manufacturing Company**”. I extend my appreciation to **Ponnar Sankar**, for providing the necessary resources that enabled me to conduct my project.

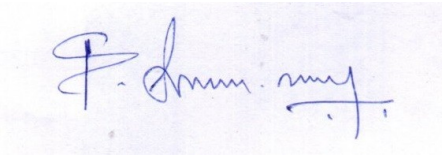
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

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: (**Digital Signature**)

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04-10-2024

1 Executive Summary and Title

The Business Data Management Capstone Project is a component of the Diploma in Data Science program at IIT Madras. The project focuses on a small jaggery powder manufacturing company located in Selur Sellapampalayam, Paramathi Velur, Namakkal, Tamilnadu, 637208. The business operates in the B2B sector, producing jaggery powder that is taken to local market, where prices are determined based on the quality of the jaggery powder.

The major business issues the company faces include price fluctuations driven by unpredictable market demand and inconsistent jaggery yeilds caused by seasonal changes in sugarcane quality. These factors directly impact profitability, as the business has limited control over pricing and production cycles. The fluctuating yields and market prices lead to periods of reduced profit and even losses.During period of reduced market demand, the company is forced to sell jaggery powder at lower prices, further reducing profitability.

This project aims to analyze production data, market trends, and seasonal variations to identify patterns that will enable the business to better align its production output with market demand. Techniques such as regression analysis and demand forecasting will be used to provide insights into optimizing production schedules and improving resource allocation.

The expected outcome of this report aims to address the business's key challenges by identifying production bottlenecks and providing data-driven recommendations. These insights will help the business reduce inefficiencies and improve its overall profitability.

2 Organization Background

Ponnar Sankar, A Traditional Jaggery Manufacturing Company is located in Selur Sellapampalayam, Paramathi Velur, Namakkal, Tamil Nadu, 637208, Google-Map. It is a well-known manufacturing company situated in the hub of the Kaveri delta region. Established by Mr. Mani in the early 2000s, the company initially used sugarcane from its own farm and later expanded to purchasing sugarcane as market demand for jaggery grew. At the moment, the mill employs ten hardworking people and has a net worth of ₹15 lakhs. The group of experts contributes to the mill's operations in a variety of ways, including grinding, packing, quality control, and administrative duties. Operating within the B2B sector, the company is classified as a small and medium-scale enterprise it sells jaggery directly in local market named Vivasaigal Vellam Sakarai Virpanai Sandai, Pilikalpalayam, Google-Map where prices are driven by product quality and seasonal demand. Ponnar Sankar's mission is to provide high-quality jaggery while supporting local agriculture. Its vision is to become a leading supplier of jaggery across Tamil Nadu, enhancing agricultural sustainability and local livelihoods.

3 Problem Statement

The company is currently facing the following issues:

3.1 Inconsistent Jaggery Yields : Seasonal variations impacts sugarcane quality result in unpredictable jaggery yields, affecting the company's ability to maintain consistent production levels.

3.2 Unstable Market Pricing : Fluctuations in market prices cause inconsistent revenues, making it difficult for the company to implement a stable pricing strategy.

3.3 Unpredictable Market Demand : Sudden shifts in market demand, particularly during festivals, complicate production planning and inventory management, leading to either overproduction or shortages.

4 Background of the Problem

The Jaggery Manufacturing Company faces several operational challenges that impact its profitability and production efficiency. The key problems are inconsistent jaggery yields, unstable market pricing, and unpredictable market demand.

Major cause of problems

● Inconsistent jaggery yields due to seasonal variations in sugarcane quality, leading to unpredictable production levels.

● Unstable market pricing driven by fluctuating demand, especially during festival seasons, reducing revenue consistency.

● Lack of real-time pricing adjustments results in missed opportunities to capitalize on market shifts.

Internal problems

● Inconsistent production planning due to unpredictable sugarcane quality impacts the company’s ability to meet market demand.

● Inflexible pricing strategies prevent the company from responding dynamically to changing market conditions.

●Limited forecasting tools lead to inefficient resource allocation during high- and low demand periods.

External problems

● Market volatility during festivals creates unpredictable demand for specific types of jaggery, complicating production decisions.

● Seasonal variations in sugarcane quality, especially during rainy and winter seasons, cause fluctuating yields and affect production output.

● Competition from other local producers affects pricing power and forces the company to compete on price rather than quality.

5 Problem Solving Approach

5.1 Methods Employed

Data collected from the company, including daily production, sugarcane procurement, and sales, will be processed using tools available in Ubuntu, such as LibreOffice Calc for data management and Python for advanced analysis.

●To gain insights into production and market behavior, the data will be visualized through various charts (bar charts, trendlines) using tools like LibreOffice Calc or Python libraries (Matplotlib, Seaborn). These visualizations will highlight seasonal fluctuations and market-driven pricing trends.

●Descriptive statistics (mean, median, minimum, maximum, and standard deviation) for key variables such as sugarcane quality, jaggery yield, sales prices, and total output will be calculated using Python. These statistics will help identify patterns and deviations that occur seasonally.

●LibreOffice Calc Pivot Tables will be employed to summarize data and identify key areas where profitability can be maximized, including yield optimization and market demand forecasting.

5.2 Data Collection Techniques

●Daily production and sales data will be collected and organized using LibreOffice Calc. The data will include fields like Date, Sugarcane Purchased, Jaggery Produced, Batches Processed, Market Prices, and Revenue.

●Each batch of jaggery will be categorized by season, yield, and market pricing, which will provide insights into how seasonal changes impact production efficiency and profitability.

●Analyzing trends in seasonal fluctuations in production and price changes during festival seasons will enable better decision-making for inventory and resource management.

5.3 Analysis Tools with Justification

After gathering data on production, jaggery yield, and market prices, the following tools will be used for in-depth analysis:

●LibreOffice Calc: This open-source tool will be used for data collection, cleaning, and organizing. Pivot tables will be created to summarize production trends and profitability.

●Python (Pandas, Matplotlib, Seaborn): Python will be used for advanced statistical analysis and visualizations. Forecasting models for jaggery yields and market demand will be implemented using Python libraries.

●Gnuplot or Matplotlib: Visualizations will help identify production trends, yield fluctuations, and market pricing. These insights will inform decision-making to align production with demand.

●LibreOffice Writer & Impress: These tools will be used to document findings, generate reports, and create presentations for communicating analysis results to stakeholders.

6 Expected Timeline

6.1 Work Breakdown Structure:

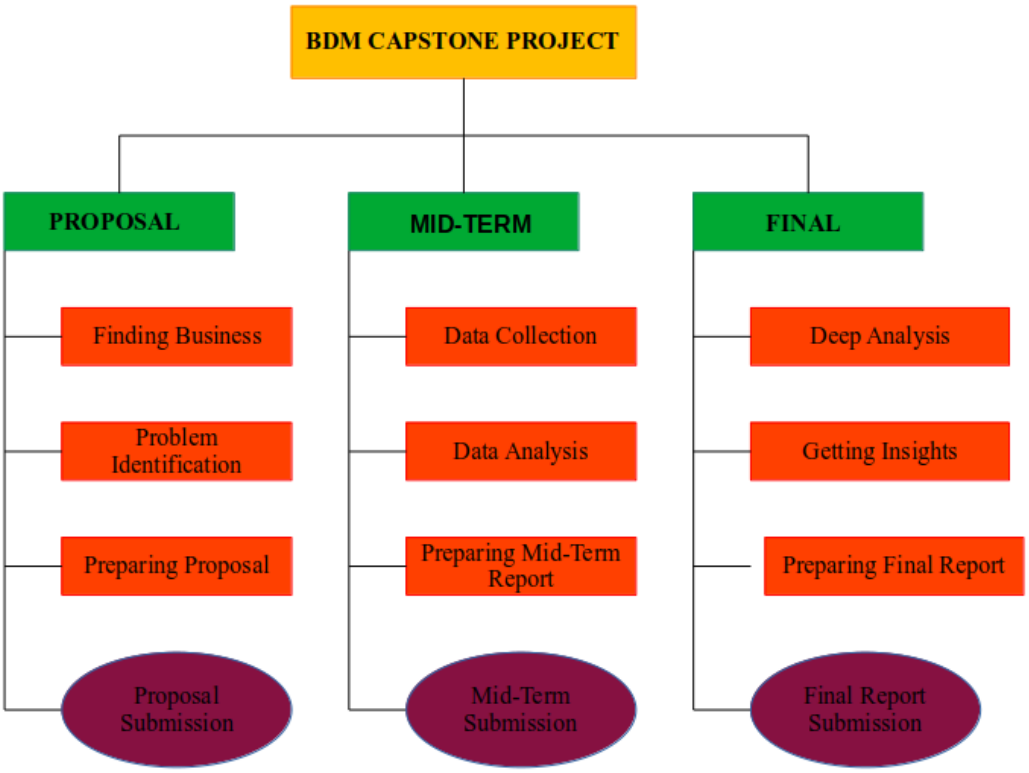

Figure 1: Work Breakdown Structure of project.

6.2 Gantt Chart:

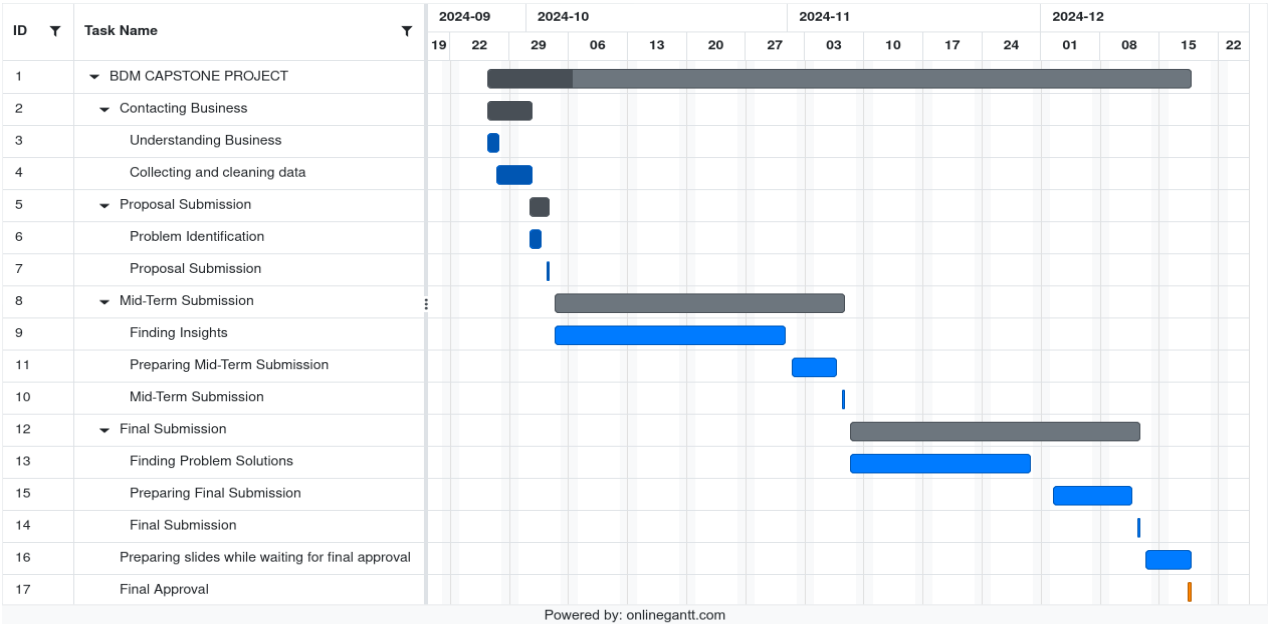

Figure 2 Expected timeline for completion of project.

7 Expected Outcome

The expected outcomes of the Business Data Management Capstone Project for Ponnar Sankar, can be summarized as follows:

- Optimized Production Scheduling: By analyzing data on seasonal sugarcane variations, the company can better plan production, ensuring consistent output even during low-yield seasons. This will reduce wastage and enhance resource management.

- Dynamic Pricing Adjustments: Based on real-time market demand data, Ponnar Sankar will implement dynamic pricing strategies, allowing them to capitalize on peak demand periods like festivals, while avoiding price drops during slower seasons.

- Improved Demand Forecasting: Using historical data, the company will forecast market demand more accurately, aligning production levels to meet high-demand periods while minimizing overproduction during off-peak times. This will optimize inventory and increase profitability.