Navigating Price Volatility: Optimizing Edible Oil Inventory Management for Rahil Enterprise

A Proposal report for the BDM capstone Project

Submitted by

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Contents

Declaration Statement

I am currently working on a project titled "*Navigating Price Volatility: Optimizing Edible Oil Inventory Management for Rahil Enterprise.*" I extend my sincere appreciation to Rahil Enterprise for providing the necessary resources that enabled me to conduct this 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 from primary sources and carefully analyzed to ensure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been thoroughly explained in this report. The outcomes and inferences derived from the data accurately depict the findings acquired through comprehensive analytical procedures.

I am committed to adhering to the principles of academic honesty and integrity, and I am open 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. Therefore, I affirm that I have not engaged in any form of collaboration with other individuals, and all 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 undertaken for course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate: (Digital Signature)

Name: Azarudin Bihari

Date: 22/04/2024

1. Executive Summary

This project focuses on the challenges Rahil Enterprise faces in managing its edible oil stock due to changing prices in India. Rahil Enterprise, run by Mr. Samir Bihari in Banaskantha District, Gujarat, supplies edible oils from companies like Adani Wilmar and Gokul Refoils & Solvent Ltd.

The main problem is that the prices of edible oils change a lot. These changes are affected by factors around the world and within India. For example, the prices of important oils like soybean and palm oil can go up or down because of international markets, the weather in countries that produce these oils, and how much oil is being bought and sold globally.

In India, the government can change taxes on imported oils, which affects the prices. Also, how much oil is available in the country and how the monsoon season affects local oilseed crops can make prices unstable.

To deal with these issues, this project uses detailed data analysis to study past price changes and come up with better ways for Rahil Enterprise to manage its oil stocks. The goal is to help the company make more money by reducing the negative effects of price changes, lowering the chances of losing money, and making sure there are always enough oils in stock to meet customer needs. By using data to guide decisions, Rahil Enterprise can handle market changes more effectively.

2. Organization Background

Rahil Enterprise is located in Banaskantha District, Gujarat, and started its business in 2018. They distribute more than 15 types of edible oils to customers within a 60-kilometer area. Their customers include bakery owners, restaurant managers, supermarket operators, and retail stores.

The business operates from a 4000-square-foot godown and has two employees who handle loading, unloading, and deliveries using an Isuzu D-Max pickup truck. They use Tally Prime software to manage their accounts and operations efficiently, keeping track of finances and inventory.

Rahil Enterprise is registered with the Food Safety and Standards Authority of India (FSSAI) and operates under the Goods and Services Tax (GST) rules. This ensures they follow all industry regulations, maintain service standards, and effectively manage distribution.

Figure 1: Image of the godown from the outside

In this business, there are many competitors selling similar edible oils, and it's important for Rahil Enterprise to stay competitive by offering good service and quality products.

3. Problem Statement

Rahil Enterprise sells more than 15 types of edible oils in both 15kg and 15-liter tins. However, they are particularly concerned about managing the top 6 best-selling edible oils due to the following challenges:

1. **Reducing the Impact of Price Changes**
The fluctuating costs of purchasing these top-selling oils affect Rahil Enterprise's profits.

2. **Minimizing the Risk of Losses**
Rapid drops in prices for these key inventory items can lead to financial losses for Rahil Enterprise.

3. **Maintaining Optimal Stock Levels**
Ensuring there's always enough stock of these top-selling oils to meet customer demand without overstocking and risking losses when prices drop.

4. Background of the Problem

Rahil Enterprise is facing significant challenges related to the prices of edible oils:

1. **Global Price Changes**
The prices of edible oils like soybean and palm oil fluctuate a lot worldwide. When these prices increase, Rahil Enterprise earns less profit.

2. **Weather Impact**
Bad weather in countries that produce palm oil can disrupt production, causing prices to go up and down. This uncertainty makes it difficult for Rahil Enterprise to plan their inventory.

3. **Global Supply and Demand**
Changes in the global supply and demand of edible oils affect prices in India. Rahil Enterprise must adapt to these market shifts when managing their inventory.

4. **Government Regulations**
Changes in Indian government policies, such as import tax adjustments, directly impact domestic prices of edible oils. Lower import taxes have recently helped Rahil Enterprise save costs.

5. **Oil Reserves**
The availability of edible oil reserves in India influences market prices. Rahil Enterprise needs to monitor these reserves to make informed decisions about purchasing and stocking levels.

6. **Monsoon Dependence**
Indian oilseed production heavily relies on the monsoon season. Insufficient rainfall can lead to lower production and higher prices, posing challenges for Rahil Enterprise's inventory planning.

5. Problem Solving Approach

To tackle the inventory management challenges faced by Rahil Enterprise, I will adopt the following approach:

1. **Data Collection**
   - Gather financial data from the past two fiscal years for the top 6 best-selling edible oil products.
   - Utilize Excel or Google Sheets to organize and plot this data to identify trends.
2. **Market Analysis**
   - Research historical events impacting international and domestic markets, including import-export trends and agricultural data.
   - Collect information on global factors such as international prices, weather conditions, and global supply-demand dynamics.
   - Explore domestic factors like government policies, stock levels, and the impact of monsoon rains on local production.
3. **Data Correlation**
   - Correlate the collected financial data with the identified market factors to understand their influence on edible oil prices.
   - Analyze how fluctuations in international prices, weather conditions, government policies, and domestic production impact Rahil Enterprise's purchase costs.
4. **Visualization and Trend Analysis**
   - Visualize the trends observed in the financial data and market factors using Excel, Google Sheets, or Python libraries like matplotlib.
   - Identify patterns and correlations between the variables to gain insights into the drivers of price fluctuations.
5. **Regression Modeling**
   - Develop regression models using Python libraries like pandas, numpy, and scikit-learn to predict future purchase costs based on historical data and market factors.
   - Utilize regression analysis to quantify the impact of global and domestic factors on edible oil prices and derive actionable insights.
6. **Insights and Strategy Development**
   - Based on the findings from the regression analysis and trend analysis, formulate strategies for Rahil Enterprise to mitigate the impact of price fluctuations on inventory management.
   - Provide recommendations on optimizing stock levels, responding to market dynamics, and adapting to changes in global and domestic environments.

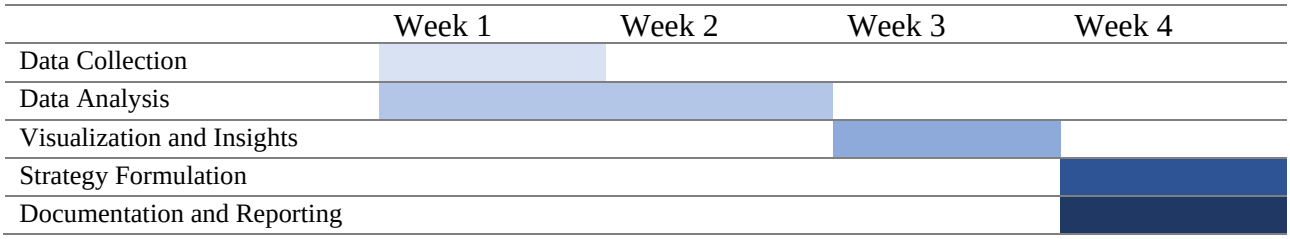
6. Expected Timeline

6.1 Work Breakdown Structure

1. **Data Collection (1 week)**
   - Gather financial data for top 6 edible oil products
   - Research historical market events and trends

2. **Data Analysis (2 weeks)**
   - Organize and clean collected data
   - Conduct correlation analysis between financial data and market factors
   - Develop regression models
3. **Visualization and Insights (1 week)**
   - Visualize trends and correlations using Excel, Google Sheets, or Python libraries
   - Extract actionable insights from data analysis
4. **Strategy Formulation (1 week)**
   - Develop inventory management strategies based on insights
   - Prepare recommendations for Rahil Enterprise
5. **Documentation and Reporting (1 week)**
   - Compile project findings into a comprehensive report
   - Present recommendations to Rahil Enterprise

6.2 Gantt Chart



7. Expected Outcome

This project aims to deliver practical solutions for Rahil Enterprise to handle price fluctuations in inventory management effectively.

The expected outcomes include:

1. **Improved Inventory Practices**
Implementing strategies to adjust stock levels based on price forecasts, reducing the risk of overstocking or shortages.
2. **Accurate Cost Predictions**
Developing models to forecast future purchase costs, aiding in informed decision-making and budgeting.
3. **Risk Reduction**
Providing specific recommendations to minimize losses from sudden price drops, ensuring better financial stability.
4. **Increased Profitability**
Optimizing purchasing decisions to enhance profitability despite market fluctuations.