Optimizing Supply Chain Efficiency and Product Portfolio for an agricultural and retail business

A Proposal report for the BDM capstone Project

Submitted by

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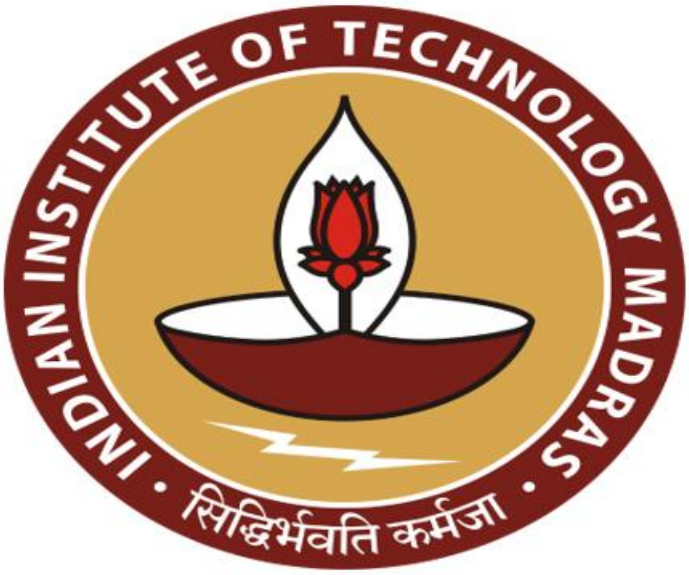

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Declaration Statement

I am working on a Project Title "Optimizing Supply Chain Efficiency and Product portfolio for an agricultural and retail business unit". I extend my appreciation to **Pure O Natural**, 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. If 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**)

Name: Govindula Acharya Abhisht

Date :03/03/2025

1 Executive Summary and Title

Title: Optimizing Supply Chain Efficiency and Product portfolio for an agricultural and retail business.

Summary:

Pure O Natural is an agricultural and retail business that operates 50 stores, selling fresh vegetables, fruits, dairy products, and a selected range of groceries. The company aims to deliver high-quality products to its customers at a fair price.

The company is facing challenges in keeping up with rapidly changing consumer demands. Its selected product range, rising competition, and inefficiencies in inventory management make it difficult to respond swiftly to customer needs. Moreover, a lack of sufficient market data hinders timely decision-making, potentially affecting customer satisfaction and overall profitability.

This project proposes using data analytics along with targeted customer surveys to better understand consumer behavior. I will analyze sales trends and map shipment records to each sales cycle, helping identify which products are fast-moving and which may need re-evaluation. This approach will allow pinpoint gaps in inventory and assess the product mix more effectively.

The insights from this analysis are likely to drive improvements in both inventory management and product refinement. As a result, Pure O Natural can optimize its product assortment and respond more agilely to market trends. This will lead to enhanced customer satisfaction, improved operational efficiency, and ultimately, better profitability.

2 Organization Background

Pure O Natural is an agricultural and retail business founded in 2003 by Siva Cherukuri, Ravuri Narayana, and Kosaraju Prasad. Over the past 21 years, the company has grown remarkably, establishing itself as a trusted name for providing fresh, high-quality vegetables, fruits, and dairy products. The organization is deeply committed to providing fresh products at fair prices.

It has branches in Hyderabad, Vijayawada, and Vishakapatnam. One of its stores is in A.S. Rao Nagar, Hyderabad, managed by G. Naveen. This store operates daily from 9:00 AM to 9:00 PM and is supported by a dedicated team of 9 employees, all working together to maintain the brand's high service standards.

The organization’s core values of quality and fair prices drive its operations. By consistently prioritizing customer satisfaction and seeking new ways to improve operational efficiencies, Pure O Natural continues to grow and remain a trusted partner in its community, successfully navigating the challenges of an ever-changing market landscape.

3 Problem Statement

3.1 Problem statement 1

Pure O Natural's retail supply chain depends mainly on wholesalers and farmers, often leading to delays between stock supply and retail sales. These inefficiencies can result in stock shortages or overstock, negatively impacting business operations. The delay in stock availability affects the retail process in significant ways:

1. The right product may not be available at the right time, resulting in missed sales opportunities and dissatisfied customers.
2. Even if some products are in stock, they may not be in demand at that specific period, causing inventory inefficiencies.
3. External factors such as unpredictable supplier performance, seasonal market shifts, adverse weather, and transportation challenges further complicate the process.

3.2 Problem statement 2

Pure O Natural sells a chosen variety of products, but there is a gap in understanding customer preferences and service expectations. Since there is no systematic customer
feedback, inventory levels cannot be correlated with demand and the overall shopping experience cannot be enhanced. With no knowledge about consumer needs, product availability and service levels can fail to keep pace with customer expectations, potentially resulting in customer dissatisfaction.

4 Background of the Problem

4.1 Supply Chain Optimization

Pure O Natural's supply chain is severely challenged because it relies so heavily on the local suppliers and farmers. This dependency introduces considerable variability in the quality and timing of incoming shipments. There are a some internal problems such as outdated inventory management systems, delays in integrating demands with supplier schedules and general operational inefficiencies. External problems include unpredictable supplier performance, seasonal market fluctuations, adverse weather conditions, and transportation challenges further complicate stock procurement. These factors often result in either stock shortages or surplus inventory, directly impacting the ability to meet customer demand promptly.

4.2 Product collection Optimization

Although Pure O Natural provides a selected range of vegetables, fruits, dairy products, and groceries, it will be challenging to adapt when customer preferences change. It is unable to offer the products quickly based on the customer's requirement. There are a few internal problems such as inflexible operational processes which don't adapt to new trends and lack of customer feedback affect timely adjustments to the product collection. External problems include increased competition from other businesses, shifting customer tastes. These internal and external pressures make it difficult to maintain a balanced inventory that both attracts customers and sustains the profitability of the company.

5 Problem Solving Approach

5.1 Supply chain optimization

The approach begins by aligning the incoming supplier data, which is recorded 2-4 times per month, with daily sales records to create distinct shipment cycles. Within each cycle, key performance indicators such as the sell-through rate and inventory turnover are calculated by comparing the quantity received against the units sold. This measure provides a clear view of product performance, revealing patterns of stock shortages or surpluses.

Next, simple moving averages and trend analysis are applied to the daily sales data to smooth out fluctuations and expose consistent demand patterns. Visual tools such as line charts and scatter plots are utilized to correlate shipment dates with peaks and troughs in product sales. These visualizations help in identifying whether delays in receiving stock or mismatches between supply and demand are contributing to inventory inefficiencies.

Comparative analysis is then performed across multiple shipment cycles to determine which products consistently exhibit high sell-through rates versus those that accumulate excess inventory. Based on these insights, actionable recommendations are formulated. These include adjusting shipment quantities, refining the timing of stock orders, and establishing a regular inventory review process. This data-driven and methodical approach ensures that decisions are grounded in tangible insights derived from the available supplier and sales data, ultimately aiming to reduce lead times and improve overall supply chain efficiency.

Short-term solutions will focus on re-engineering order processes and enhancing coordination with suppliers. Long-term strategies involve developing robust data analytics capabilities to continuously monitor

supply chain performance and optimize inventory management. This targeted approach aims to reduce lead times, improve supply consistency, and ultimately drive higher operational efficiency.

5.2 Product collection optimization

The approach begins by aggregating the data of incoming suppliers and related sales data by product category. Each shipment's product list is compared with sales performance during the subsequent cycle to calculate key metrics such as sell-through rate and product turnover. This quantitative analysis identifies which items consistently perform well and which lag, effectively categorizing products into fast-moving and slow-moving groups.

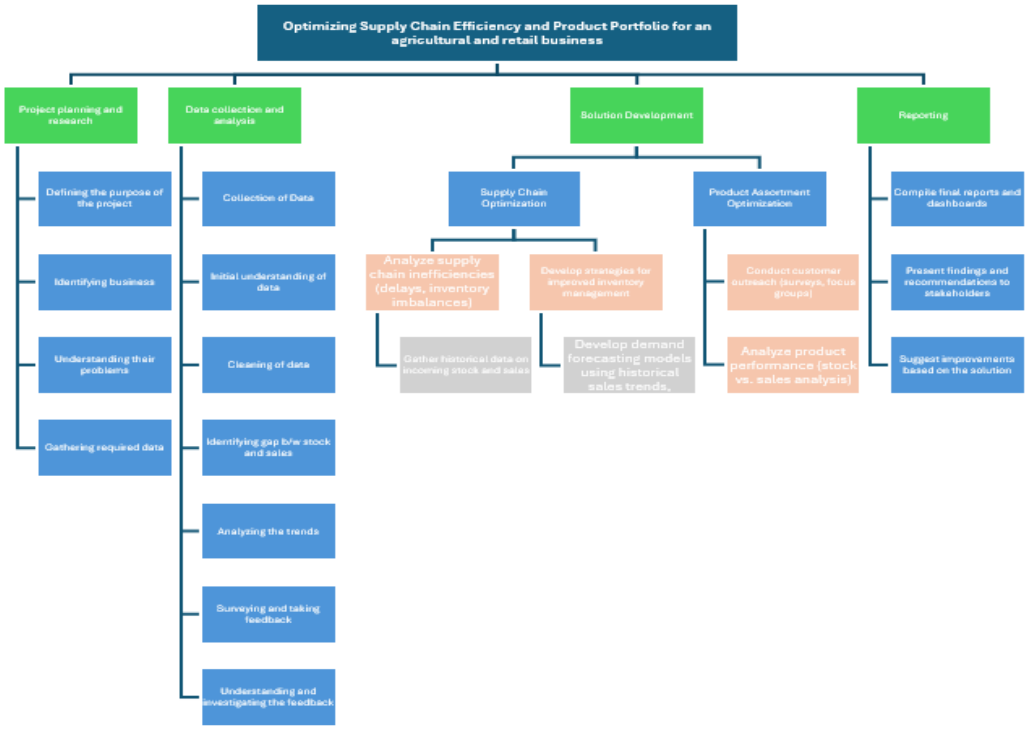
In addition to the numerical evaluation, targeted customer outreach is planned such as brief surveys or focus group discussions to gather qualitative insights into customer preferences regarding product variety, quality, and pricing. These insights help explain the sales trends observed and provide context for adjustments in the product portfolio.

Microsoft Excel will be used as the primary analysis tool. Pivot tables and visual charts provide illustrations of trends and performance across different product segments. This enables the identification of patterns over multiple shipment cycles, highlighting potential misalignments between the offerings and actual consumer demand.

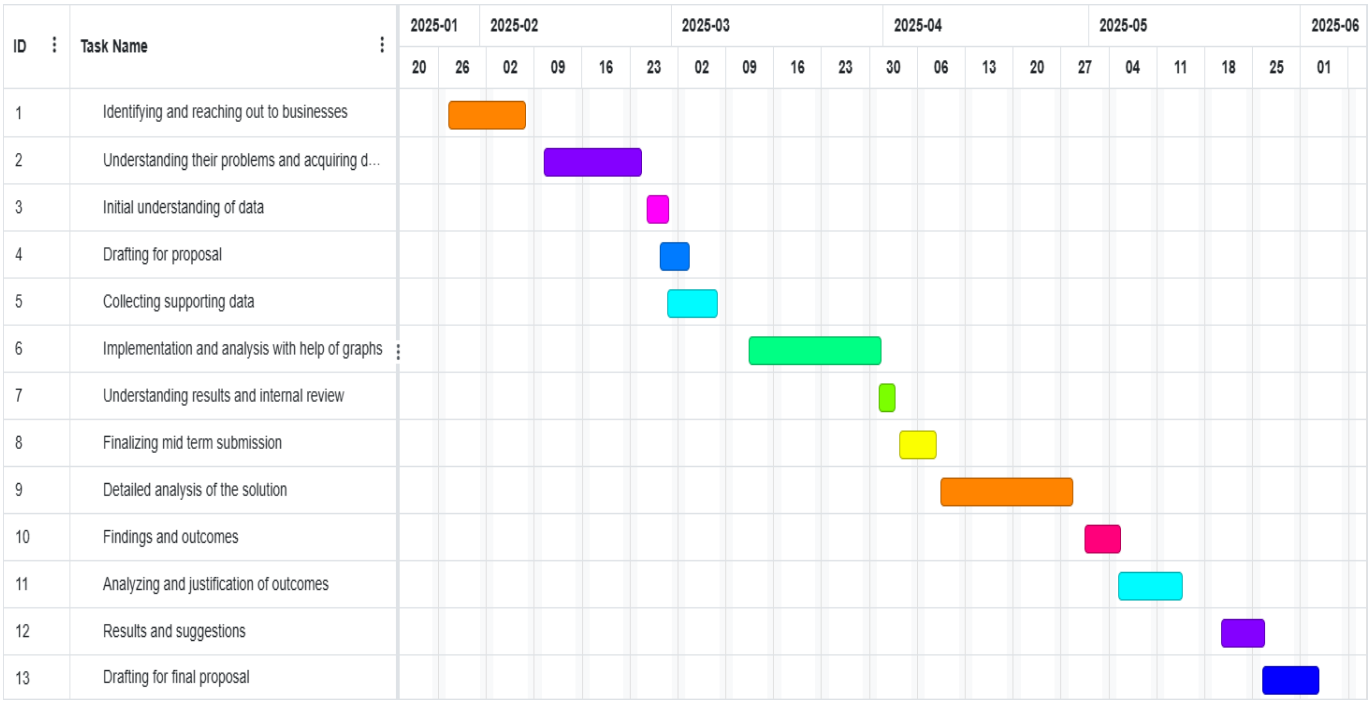
Based on this analysis, recommendations will be formulated to adjust the product collection. For instance, increasing the order quantities for high-demand items, reducing or discontinuing products with persistently low sell-through rates, or even introducing new complementary products will be considered. This data-driven and customer-informed approach ensures that the product collection is continuously aligned with market trends and consumer needs, maintaining competitiveness in the market.

6 Expected Timeline

6.1 Work Breakdown Structure:



6.2 Gantt chart



7 Expected Outcome

The supply chain optimization approach is expected to significantly improve inventory management and product availability. By aligning shipment cycles with daily sales data, key metrics such as sell-through rate and inventory turnover will be accurately monitored. This process is expected to avoid stock shortages and

overstocking problems, leading to more timely replenishments and shorter lead times. As a result, customers are likely to experience consistent availability of products when needed, enhancing overall satisfaction and reducing lost sales opportunities.

The product collection optimization approach is designed to refine the selected products to better match changing customer preferences. By analyzing sales performance during each shipment cycle and integrating feedback from customer outreach activities, underperforming items can be identified and addressed. This approach is expected to guide adjustments such as increasing orders of high-demand products and reducing those with consistent low sell-through rates. Ultimately, these measures could lead to a product collection that is more responsive to market trends and consumer demand.

These integrated improvements in supply chain efficiency and product collection are projected to drive higher sales, improved operational efficiency, and enhanced profitability, positioning Pure O Natural as a more agile and customer-focused business in the competitive retail landscape.