

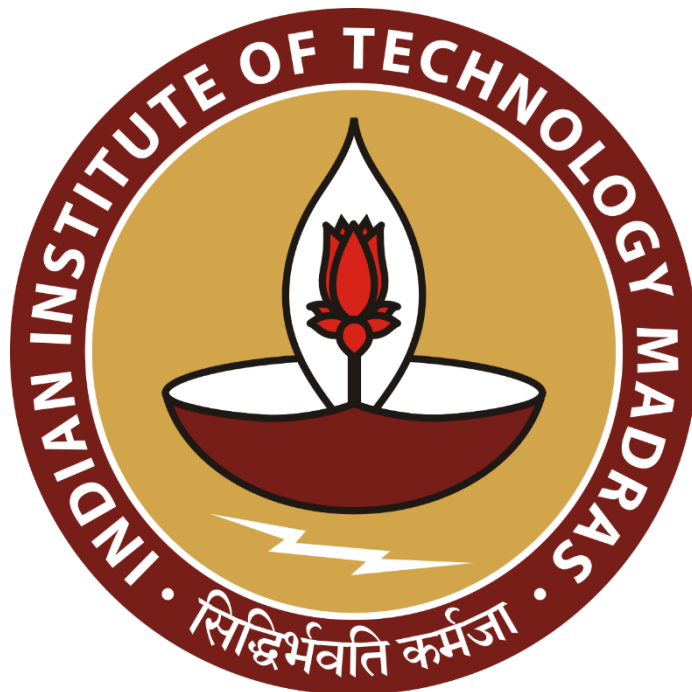
Optimizing Inventory Management and Supply Chain Efficiency

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled “Optimizing Inventory Management and Supply Chain Efficiency”. I extend my appreciation to Katha Coffee and Bakehouse, 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 from 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 principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards 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: 

Name: Anirudh Thimmaraju Penumatcha

Date: 26/03/24

1 Executive Summary and Title

The project focuses on a Coffee and Bakery house located at Banjara hills, Hyderabad. The business is B2B and deals in the segment of F&B. The primary issue that the organization is facing is Increased expenditure on inventory and other resources without a substantial increase in sales or turnover rates.

By analyzing key data sources including inventory levels, turnover rates, invoices, purchase orders, and supplementary data such as supply chain and POS data, the goal is to identify inefficiencies contributing to the increased spending on resources.

The analysis will focus on understanding current inventory management practices, evaluating supplier performance, and forecasting demand to optimize inventory levels and reduce costs

Some possible approaches to this data analysis include:

- Descriptive Analysis to visualize collected data and gain a concise understanding
- Pareto analysis to categorize inventory items based on importance and prioritize resources
- Inventory Turnover analysis to evaluate the management efficiency
- Supplier Performance analysis to get an overview of procurement efficiency.

With the findings from this project, Katha Coffee and bakehouse can enhance operational efficiency, streamline procurement processes, and improve profitability.

2 Organization Background

The company that I am collaborating with for this project is Katha Coffee and Bakehouse, an artisanal coffee house with a specialty menu, offering a fusion of coffee and bakery cultures around the world with Indian cuisine. The coffee shop holds a seating capacity of 50 across 3 levels and 5 seating areas to suit the needs of all types of social gatherings. Katha acts as a hub for budding artists on the weekends, often hosting art shows, music listening sessions and open mic nights.

Katha was co-founded by Aditya Jaiswal and Pravistha Nadella on September 26th 2022, and opened for service in early 2023. The organization currently has 20+ employees, with plans to open another branch in Hyderabad by the end of 2024.

3 Problem Statement

- Katha faces Inventory management inefficiencies, leading to increased expenditure on resources and revenue loss due to stockouts or excess inventory.
- Inconsistent supplier performance and lack of negotiation leverage result in higher purchasing costs than market standard. Hindering Katha's ability to maintain optimal inventory levels.
- Katha faces a lack of visibility into its supplier chain, making it difficult to identify inefficiencies in the procurement processes. This impacts the current inventory optimization efforts and jeopardizes their ability to meet market demands.

4 Background of the Problem

The main obstacle faced by Katha is over spending on resources due to inventory management and supplier reliability.

Suboptimal demand forecasting practices hinder their ability to accurately predict customer demand and resource availability, impeding their ability to set favorable reorder points, leading to inventory imbalances and potential stockouts. Additionally, the organization's dependence on fixed suppliers with varying performance, reliability levels and no alternative sources introduces further complexities.

Internally, the organization faces limitations in bargaining power when negotiating with suppliers, resulting in unfavorable pricing terms and conditions. This restricted bargaining power further exacerbates cost pressures and undermines the ability to optimize procurement processes. Moreover, delayed order processing adds to the internal challenges faced by the shop.

Externally, seasonal demand and price variations introduce volatility into the market, making it challenging to anticipate fluctuations in customer demand and adjust inventory levels accordingly. Furthermore, Katha faces uncertainty due to unpredictable supplier lead times, which can result in delays in receiving essential supplies and inventory replenishment. The limited access to alternative suppliers exacerbates this issue, sometimes even forcing Katha to procure resources from retail stores, for significantly higher prices.

5 Problem Solving Approach (400 Words)

Firstly, data will be collected from different sources provided by the organization, such as inventory levels, turnover rates, invoices, and purchase orders. This data will then be extracted and cleaned of errors or missing values and transformed into a format where it can be used for further analysis and visualization.

Secondly, a series of data driven analysis will be performed to properly understand the depth of the situation. Exploratory Data Analysis, such as Descriptive analysis will be utilized to gain a comprehensive understanding of current inventory levels, procurement processes, and sales patterns. Subsequently, key inventory metrics will be calculated to assess performance and identify areas for improvement. Perform Pareto analysis to categorize inventory items based on their importance and value to the business. By classifying items into categories such as high-value, moderate-value, and low-value, the shop can prioritize resources and focus attention on managing high-value items more effectively. And finally to assess the inventory management effectiveness, we can calculate inventory turnover ratios and trends. By optimizing inventory turnover rates and reducing excess inventory, the shop can minimize carrying costs and improve overall profitability.

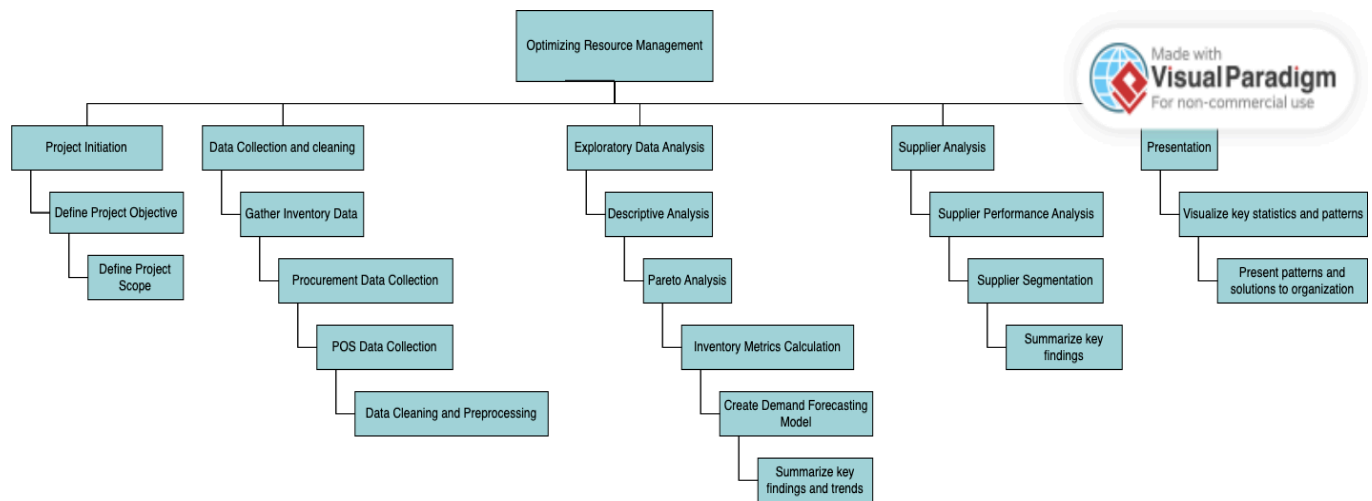
Further analysis will be done on this data over time to identify patterns. Using this, a Demand Forecasting mechanism will be developed to accurately predict future demand and provide suggestions to align inventory levels accordingly. Then, we investigate underlying factors that may have contributed to the inventory management challenges. This may involve examining additional data from supply chain and POS data on procurement lead times, sales forecasts accuracy, or demand variability.

Thirdly, to address the Supplier underperformance, supplier performance analysis will be conducted to evaluate supplier reliability, delivery timeliness, and product quality. Understanding the pricing and procurement strategies of similar organizations like Katha will help get a better view of the industry standard pricing. Based on this analysis, top-performing suppliers will be identified and prioritized, while underperforming suppliers will be addressed through renegotiation or alternative sourcing strategies.

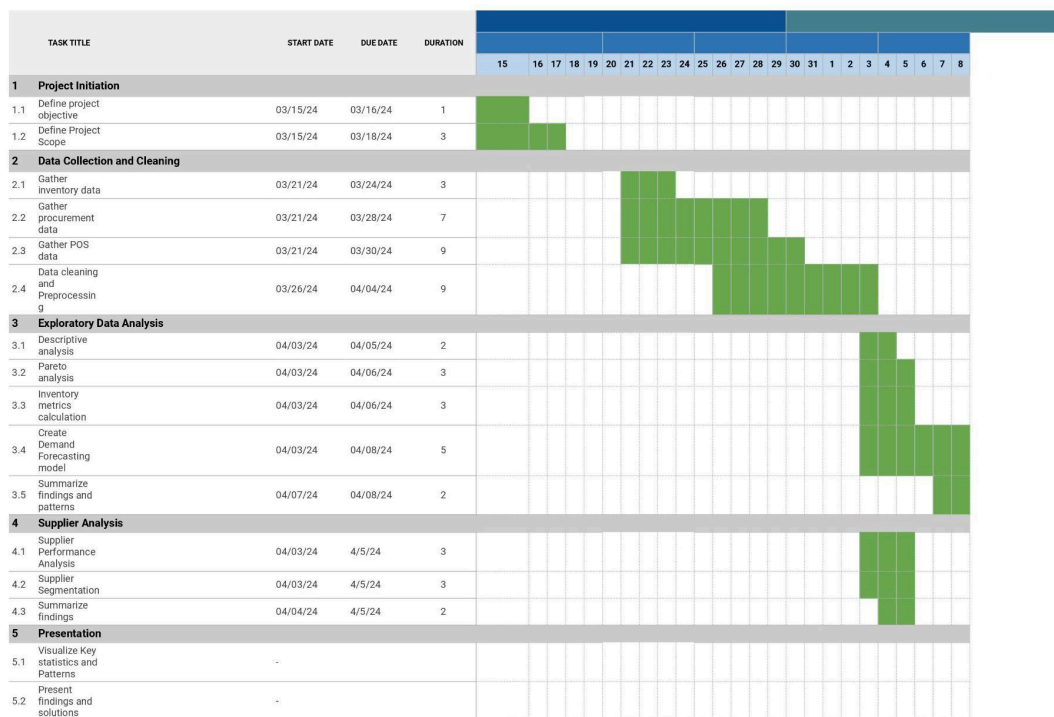
Finally, we summarize the findings from the analysis in clear and concise reports, accompanied by visualizations such as charts, graphs, and dashboards. This way, we can communicate key insights and recommendations to management, inventory managers, and procurement teams.

6 Expected Timeline

- Work Breakdown Structure



- Gantt Chart



7 Expected Outcome

The expected outcome of this project is to equip Katha Coffee and Bakehouse with data-driven insights and strategic recommendations to optimize its inventory management practices, enhance supplier relationships, and improve overall supply chain efficiency. By conducting thorough data analysis, including exploratory data analysis (EDA), supplier performance analysis, and demand forecasting, the project aims to address key challenges such as inventory imbalances, stockouts, and excessive resource spending. The implementation of inventory optimization strategies, informed by data-driven insights, will enable the shop to maintain optimal inventory levels, minimize carrying costs, and meet customer demand efficiently. Additionally, initiatives to improve supplier performance and reliability, based on supplier analysis findings, will enhance supply chain resilience and mitigate risks associated with supplier dependencies. The integration of demand forecasting mechanisms into inventory management processes will further enhance the shop's ability to anticipate demand fluctuations and align inventory levels accordingly. Overall, the expected outcome of this project is to empower Katha Coffee and Bakehouse with the tools and strategies needed to drive operational efficiency, improve profitability, and sustain long-term growth in a competitive market landscape.

For your reference, see the guidelines, rubrics, and live session videos. This is not part of the report. Remove this page before submission.

Ref:

Videos:

Lecture-1: <https://youtu.be/RPGFybqNL1Q>

Lecture-2: <https://youtu.be/xKwBQLIP9sk>

Lecture-3: <https://youtu.be/N7PQRuXKcdY>

Lecture-4: <https://youtu.be/zV-PGq715lw>

Playlist: <https://www.youtube.com/playlist?list=PLNmIFfYWEPbQivebUOOIYudty1PlqIXHP>

Documents:

<https://drive.google.com/drive/folders/1iIEVBSuKfC1BGJ8-0OOz3HXrY9HE3MLa?usp=sharing>

The document is prepared by Dr. Aaditya Chandel and Dr. Ashwin Baliga.