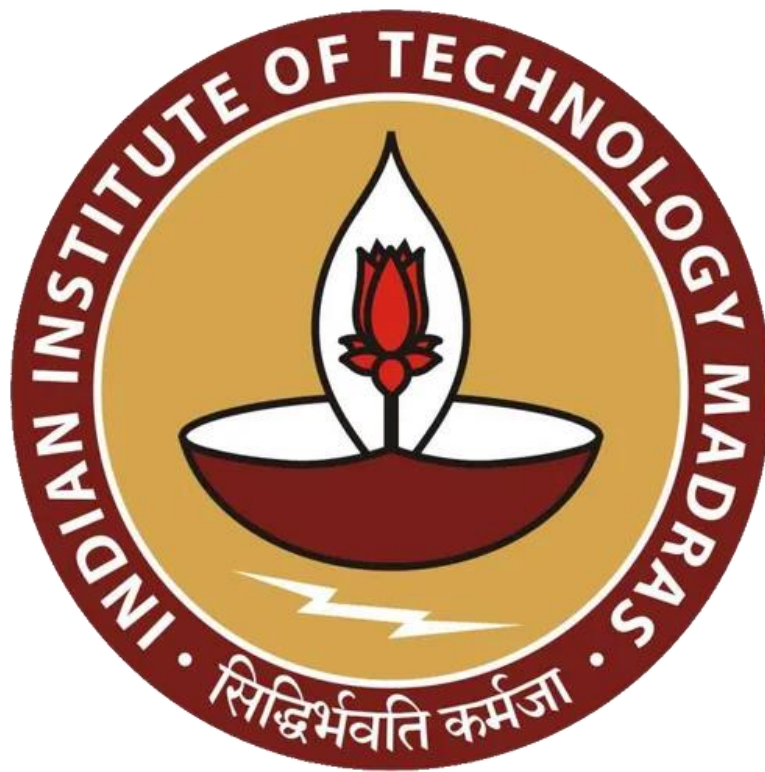# Optimizing inventory management and minimizing operational cost for enhancing business efficiency of a Cafeteria

A Proposal report for the BDM capstone Project

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(BS) DEGREE IN DATA SCIENCE AND APPLICATIONS

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Declaration Statement

I am working on a Project Title "Optimizing inventory management and minimizing operational cost for enhancing business efficiency of a Cafeteria". I extend my appreciation to TULASI BAKERY, for providing the necessary resources that enabled me to conduct my project.
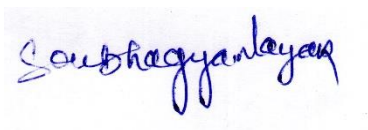
I hereby assert that the data presented and assessed in this project report is genuine and precise tothe utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

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.

Soubhagya Nayak

Executive Summary

'Tulasi Bakery' is a small cafeteria situated at College chaka , near Bhadrak Autonomous college, Bhadrak. It is a B2C business that only deals with customers in the field of 'Food Service'.

The issue that the bakery is facing is in tracking the inventory and keeping the amount of inflow and outflow of stocks. The wide variety of materials used fast paced nature of the cafeteria makes the inventory management a difficult task. This problem has led to the wastage of food materials , operational inefficiency and discrepancy in stocks.

The main objectives are implementing a efficient approach to inventory management, accurately tracking and quantifying inventory and identifying cost saving methods for enhancing the business efficiency and maximizing profits. By using tools such as Excel and Python the cafeteria can enhance the data processing and decision making leading to the optimization of stock levels and minimizing wastage.

The expected outcome consists of enhanced operational efficiency, reduced food wastage , minimized operational costs and customer satisfaction.

Organization Background

Started in 2022, under the sole proprietorship of Mr. Jaganath Barik, 'TULASI BAKERY' is a well known local cafeteria located in College chaka near the prestigious Bhadrak autonomous college.

The cafeteria has a total of 3 well trained staff members including chef, delivery boy and helper. Along with that Mr. Jaganath Barik also stays in the shop and manages the billing process and takes customer reviews.

Services provided by them are:

Dine in and Takeout Services:
     They provide services to both customers who are willing to eat in   and who are willing to take their orders to eat somewhere else.

Collaboration with popular home delivery food platforms:
     They are in collaboration with popular online home delivery online food platforms like 'Zomato' , 'Swiggy' , 'ONDC' and so on in order to increase its reach so as to provide service to more customers and maximize its sales.

Take marriage and birthday orders:

They take special orders for marriages and birthdays.

Free Home Delivery Services:

They also offer free home delivery services within a range of 2 kilometres.

'**TULASI BAKERY**' grew its popularity through **word of mouth** marketing due to its wonderful services and food quality. Customers can place order by calling on 8328803834,7894466349.

Problem Statement(s)

Mr.Jaganath Barik the business owner was quite satisfied by the profits and the customer retention. All of which was possible due to the high quality food and excellent customer service. The major problem that the shop faced was inventory management due to the diverse variety of materials being involved.

Problems faced by the cafeteria are:

I) **Tracking Inventory:** The fast-paced nature of the cafeteria and varying
 demands of customers make inventory management a complex task.
 So keeping track of a big amount of materials with specific shelf lives
 became a huge issue leading to wastage and discrepancy in stock
 levels.

II) **Classifying the Inventory Materials and Quantifying their Usage:**

As the owner has rough estimations of stock levels, there are items that aren't classified and can have discrepancy in their stock level , which can lead to wastage. By classifying inventory we can reduce wastage.

III) **Minimizing Operational Cost:**

For not having an efficient inventory management and proper knowledge of stock levels the resources aren't properly used leading to financial loss.

Background of the Problems

I) **Tracking Inventory:**

Inventory tracking becomes a challenging task due to the wide variety of items used like cake frosting, whipping cream, base, raw chocolate, , vegetables ,sauces, condiments, cheese and other dairy products. Some items like bakery items (items used in baking stuff) have proper bills and other than it those items that are

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purchased locally like vegetables, dairy products etc. doesn't have proper documentation which makes tracking difficult. Also, the not so stable cost of vegetables like tomatoes pose more complexity and ultimately affecting the profit.

II) <u>Classifying the Inventory Materials and Quantifying their Usage:</u>

As mentioned earlier the dependency of owner is too high on the rough estimates for almost all of the items which leaves the unclassified items highly vulnerable to over or understocking , leading to wastage of food and ultimately affecting the profit. So classifying the inventory materials would benefit the shop would reduce the amount of wastage.

III) <u>Minimizing Operational Cost:</u>

For not having an efficient inventory management system and proper classification of inventory items, the operational cost increases. So by making an efficient inventory management system the unnecessary expenses can be avoided which will decerease the operational cost and ultimately increase the profits.

Problem Solving Approach

To solve the inventory management issues face by the cafeteria , a diversified data driven and systematic problem solving approach is required. This problem solving approach includes a mix of variety of methods, strategies of data collection and analysis tools and each of them are justified for their role in having an efficient inventory management and minimizing the operational costs as much as possible.

1. **<u>Methods Used:</u>**
   For solving the inventory management issue , the bakery will have to adopt a data driven approach and employy <u>ABC analysis</u> utilizing sales data and customer consumption patterns. This approach will help in identifying the frequently ordered items , prioritizing important items, categorizing inventory based on sales which will enhance the inventory management , stop stock discrepancies and reduce the wastage of food and ultimately increasing the profit.

2. **<u>Data Collection:</u>**
   The data collection for inventory management includes collecting the (i)Sales data, (ii)Sales data(Historical), (iii)Stock and Inventory data and (iv)Quantity used data.
   <u>On Expanding:</u>

(i)`Sales data`:It represents the total number of items sold for each item in the menu.

(ii)`Sales data(Historical)`:It represents the number of items sold in previously , this will help to analyse sales and demand patterns and will also help to predict future demands.

(iii)`Quantity used data`:It represents the rough approximations of quantities of raw materials provided by the owner used for preparation of menu items.

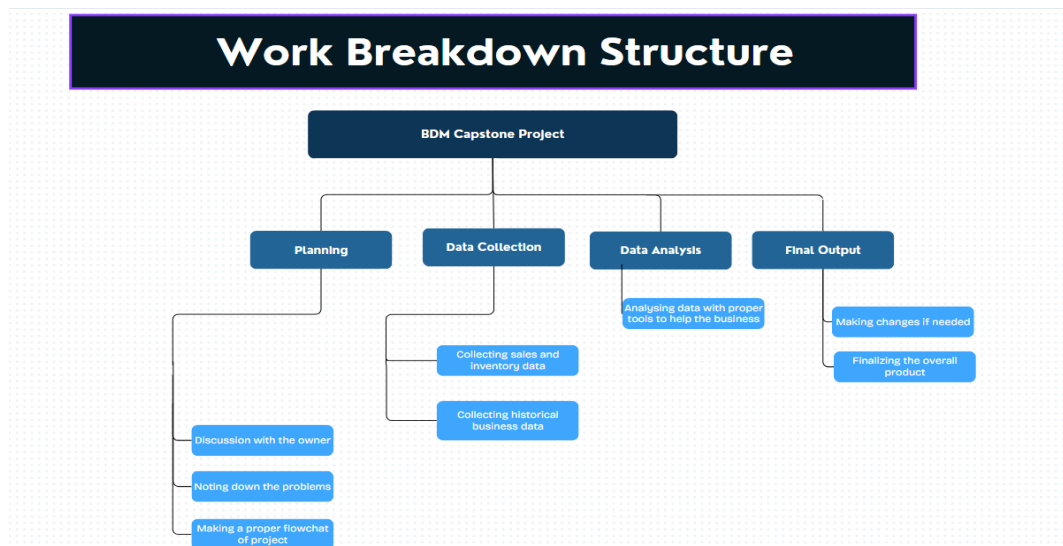(iv)`Stock and Inventory data`:It represents the values of all items that are purchased.

This data collection approach will help in identifying demand and consumption patterns and will enhance the inventory management to optimize stock levels and reduce wastage .

3. Tools for analysis:

- **Microsoft Excel**: Excel will be used as the main tool for analysing the data due to its easy user friendly interface. It allows to input , organize , store information regarding to the inventory , do calculations , manipulate data , generate tables and graphs. The graphing and table features are one of the most important features of Microsoft Excel as it allows to visualize trends and patterns of consumption which in return allows summarization of data and analysis.
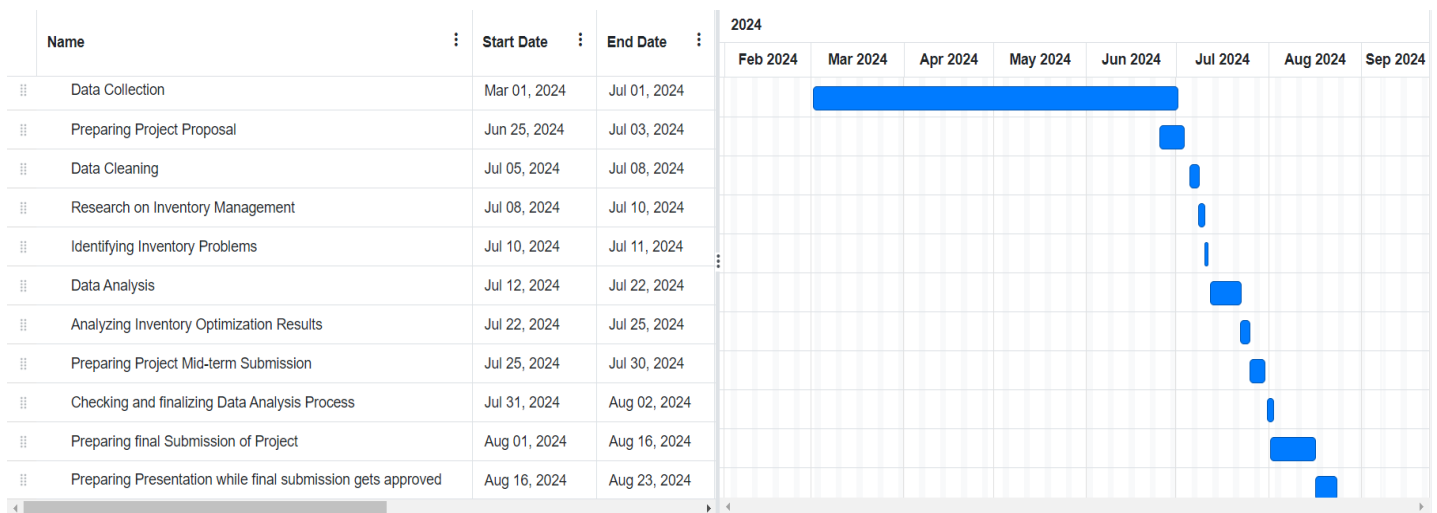
The combination of these methods, data collection and analysis tools will create an efficient inventory management system that will allow the cafeteria to make data driven decisions , reduce wastage , reduce stock discrepancies , minimize operational costs and increase the profits. This will also increase the customer satisfaction and ensure the long term success of the business in the current competitive market.

Expected Timeline

The Project is broken down into the following parts as mentioned in the above Work Breakdown Structure diagram.

➢ Gantt chart

The project is anticipated to be completed within the projected timeframe, aligning with the project cycle of August-September 2024. The workflow follows the structure outlined in the Gantt chart.

Expected Outcomes

The expected outcome of this project is to enhance the cafeteria's inventory management system and business performance thereby increasing customer satisfaction and reduce stock discrepancies and wastage.This project will also help the business in minimizing its operational costs and prevent wastage of food.This will ensure that the stay profitable in the market for a long term.