**Inventory & Sales Optimization for Bakes & Cakes**

**A Proposal report for the BDM capstone Project**

Submitted by

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# Contents

## Declaration Statement

I am working on a project titled “Inventory & Sales Optimization for Bakes & Cakes. I extend my appreciation to Bakes & Cakes, 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.

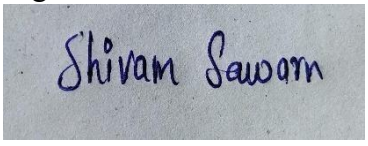
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the 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 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:

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Date: 03/03/2025

## 1 Executive Summary and Title

The project focuses on Bakes & Cakes, a small B2C bakery shop located inside the NIT Rourkela campus, Rourkela, Odisha. The shop serves students, faculty, and visitors, offering cakes, cookies, chocolates, chips, and other ready-to-eat snacks.

Bakes & Cakes currently faces challenges related to inefficient inventory tracking, fluctuating product demand, and limited visibility into sales trends. These issues lead to frequent overstocking, stockouts, and product wastage, ultimately impacting profitability. The lack of a systematic data collection process further prevents the shop from gaining insights into productwise performance and seasonal demand variations.

To address these challenges, fresh sales and inventory data will be collected over a period of 6 weeks, recorded weekly. This data will capture product-wise sales, stock inflow, wastage, and special event-driven demand spikes. Analytical techniques such as trend analysis, basic demand forecasting, and inventory optimization (EOQ and Reorder Point models) will be applied to derive actionable insights.

The expected outcome is to reduce excess inventory, minimize wastage, improve product availability, and enhance profitability by enabling data-driven inventory management and sales planning.

## 2 Organization Background

Bakes & Cakes is a small bakery shop established in 2015, located inside the NIT Rourkela campus. Owned and operated by an individual entrepreneur, the bakery serves a diverse customer base, including students, faculty, and visitors. The shop offers a wide range of products such as cakes, cookies, chocolates, chips, and other ready-to-eat snacks. Over time, it has become a popular destination within the campus for both regular treats and special occasions. One of Bakes & Cakes key strengths is its ability to offer customizable products, especially personalized cakes for birthdays, events, and celebrations held within the campus. This flexibility has helped the bakery build a loyal customer base. However, despite its popularity, the shop currently manages its inventory and sales records manually, without a structured data management system. This reliance on manual processes has led to frequent challenges such as overstocking, product wastage, and missed opportunities to capitalize on high-demand periods. Through this project, Bakes & Cakes aims to adopt a data-driven approach to manage its inventory, improve operational efficiency, and enhance profitability.

## 3 Problem Statement (Listed as objectives) (50-75 Words)

3.1 Problem statement 1: Bakes & Cakes lacks a structured system to track inventory levels and product movement, leading to frequent overstocking, stockouts, and wastage. This project aims to develop a data-driven inventory tracking process to improve inventory control and reduce wastage.

3.2 Problem statement 2: There is no mechanism to identify product demand trends across weeks or during special campus events, leading to unplanned stockouts. The project will analyze weekly sales data to uncover demand patterns and improve demand forecasting for better stock planning.

3.3 Problem statement 3: The bakery lacks visibility into product-wise profitability, resulting in pricing and stocking decisions based on intuition rather than data. This project will analyze product-level costs, sales, and wastage to identify high-profit and low-profit items for better decision-making.

## 4 Background of the Problem

Bakes & Cakes, a small bakery located within the NIT Rourkela campus, faces several operational challenges due to the lack of a structured inventory and sales management system. Currently, inventory tracking is done manually, often relying on visual checks and the owner's personal experience rather than systematic data collection. This leads to overstocking of low-demand items and frequent stockouts of popular products, directly impacting both customer satisfaction and overall profitability.

The bakery also lacks any form of demand analysis, further complicating the situation. Sales fluctuate based on academic schedules, holidays, and campus events, but Bakes & Cakes has no tools or data to anticipate these variations. As a result, the bakery frequently misses sales opportunities during peak demand periods and suffers from excess wastage during slower weeks.

In addition, the bakery has no clear understanding of product-level profitability. Decisions related to pricing, promotions, and product offerings are made based on intuition rather than data, making it difficult to identify which products contribute most to revenue and profit. Combined, these inefficiencies tie up working capital, reduce profit margins, and increase waste, creating a cycle of operational and financial inefficiency. This project aims to address these issues through systematic data collection, analysis, and the implementation of simple yet effective sales and inventory management practices.

## 5 Problem Solving Approach

Solving Bakes & Cakes's inventory and sales-related challenges requires a systematic and datadriven approach that not only addresses current inefficiencies but also builds a simple, sustainable framework the business can continue using independently after the project ends. This approach will focus on understanding the root causes of the issues, applying practical data analysis techniques, and proposing solutions that are easy to adopt for a small business.

1.Understanding the Problem and Collecting Data:
The first step involves spending time at Bakes & Cakes to understand the existing inventory practices, ordering methods, and sales recording processes. To establish a data foundation, a simple tracking system will be introduced, capturing weekly product inflow, sales, stockouts, and wastage data. This real-time data collection over several weeks will help uncover the actual patterns behind stock imbalances and demand fluctuations.

2.Analyzing Data for Trends and Patterns:
With the collected data, basic exploratory data analysis (EDA) will be conducted to visualize sales trends, identify fast-moving and slow-moving products, and detect demand spikes linked to campus events or weekends. This analysis will help establish how current purchasing and stocking decisions align — or misalign — with actual demand.

3.Forecasting and Inventory Optimization:
To reduce both overstocking and stockouts, simple demand forecasting models will be applied using moving averages and seasonal trend analysis. This will help predict weekly demand for key products, allowing more informed purchasing decisions. Alongside this, inventory control techniques like Reorder Point (ROP) will be recommended to establish reorder triggers based on real consumption data, ensuring critical items are restocked before running out.

4.Product Profitability Analysis:
Beyond inventory levels, the project will also focus on analyzing product-wise profitability. By combining cost data, selling prices, sales volume, and wastage figures, a profitability matrix will be created to highlight which products contribute most to profits — and which contribute to unnecessary losses. This insight will guide better product selection, pricing adjustments, and targeted promotions.

5.Implementing and Reviewing Recommendations:
Once insights and recommendations are generated, they will be presented to the owner in the form of easy-to-use templates and visual dashboards (built using Excel or Google Sheets). The owner will be trained on how to maintain and update the system regularly, ensuring that Bakes & Cakes transitions from guesswork-based decisions to data-informed operations.

This combination of hands-on data collection, basic analytics, and owner-friendly tools ensures that the solutions are not only effective but also practical and sustainable for a small business like Bakes & Cakes.

# 6 Expected Timeline

## 6.1 Work Breakdown Structure:


## 6.2 Gantt chart

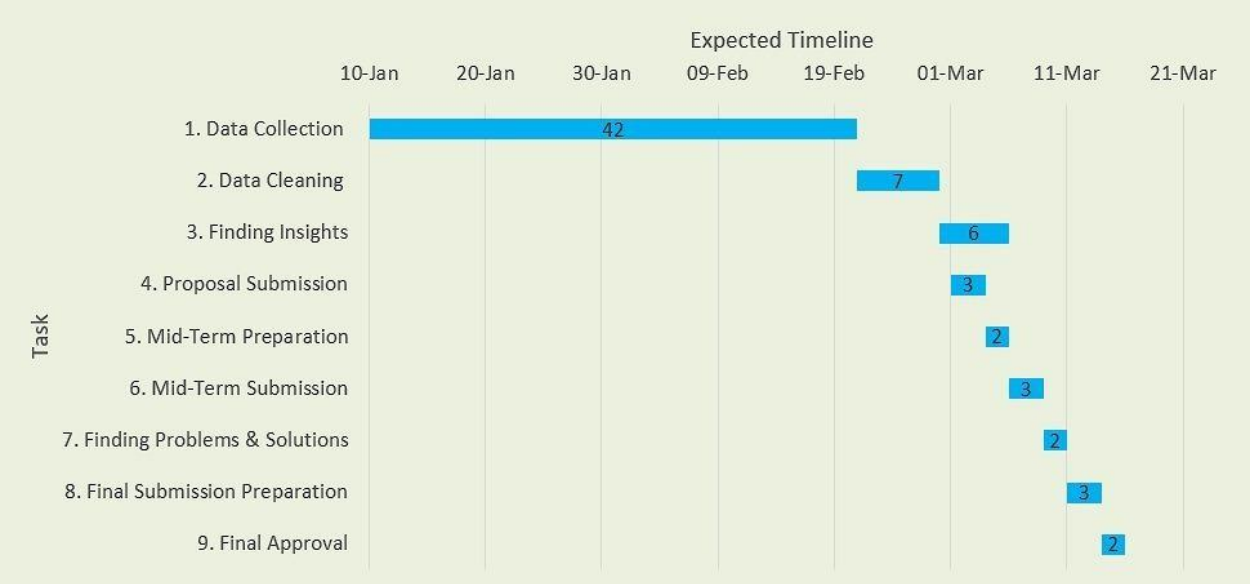


*Figure 1 Expected timeline for completion of project.*

# 7 Expected Outcome

7.1 Better inventory planning and better understanding of which products are more sold. By collecting and analyzing product-wise sales data over a period of six weeks, the project will highlight fast-moving products that need regular replenishment and slow-moving products that either need reduced ordering or promotional offers to clear. This demand based inventory planning will help Bakes & Cakes optimize stock levels, ensuring essential products are always available while reducing unnecessary purchases.

7.2 What are the main reasons behind returns and what products have a high return percentage.
Tracking product returns and wastage will help identify specific items that are frequently discarded due to quality issues, low demand, or incorrect forecasting. By analyzing the reasons behind returns, the bakery can improve product quality, adjust portion sizes, or reconsider stocking certain items, leading to better resource utilization and lower operational losses.

7.3 A better idea about the demographic distribution of customers.
The data collection process will also capture basic customer information and purchasing behavior patterns, allowing Bakes & Cakes  to understand who their core customers are — students, faculty, or visitors — and what products appeal most to each group. This insight can drive targeted offers, customized promotions, and tailored product recommendations, helping the bakery build stronger customer relationships and improve sales.