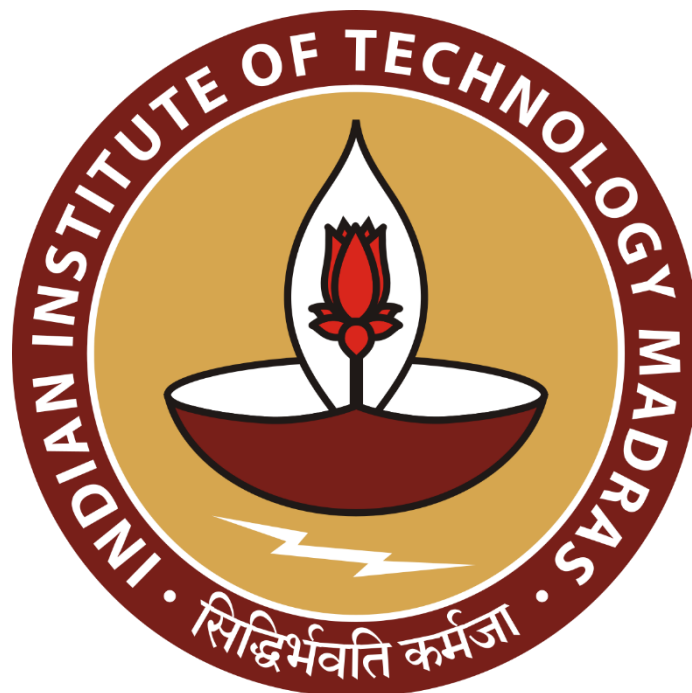# Analysing Customer Behaviour to Optimize Stock Levels

A Proposal report for the BDM capstone Project

Submitted by

Name: VIJAYAGEETHA.V

Roll number:23F1000049

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

Declaration Statement

I am working on a Project Title "Analysing Customer Behaviour to Optimize Stock Levels". I extend my appreciation to **Reliance Digitals**, 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 analysed 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.

Signature of Candidate: Vijayageetha.v

Name: VIJAYAGEETHA.V

Date:01-07-2024

1   Executive Summary and Title

The Business Data Management Capstone project is a project proposal submitted as part of the BS in Data Science and Application offered by the IIT Madras. The objective of this proposal is to address a business problem through the application of data science techniques.

This project focuses on enhancing the customer experience and operational efficiency at **Reliance Digital**, Thanjavur. By addressing brand recognition, inventory management, and customer retention, the project aims to faster growth and improve market presence through data-driven strategies and operational improvements.

For this project, primary data were collected from a Reliance Digital store in Thanjavur-Tamil Nadu, which offers over 50+ electronic products and appliances to both individual consumers and businesses. The store aims to provide a comprehensive shopping experience for all electronic needs.

The expected outcome is a more efficient inventory management system that accurately predicts demand, reduces carrying costs, minimizes stockouts, and ultimately enhances customer satisfaction and company profitability. This framework enables Reliance Digital to adapt swiftly to market trends and maintain its competitive edge in the dynamic electronics retail sector.

2   Organisation Background

Reliance Digital, a leading electronics retailer, is a part of Reliance Retail Ltd., established in 2007. With a wide range of electronic products and services, the company aims to provide a superior shopping experience through innovation and quality. Operating in numerous locations across India, Reliance Digital is committed to enhancing customer satisfaction and operational excellence.

The store operates on a Business-to-Consumer (B2C) model, with a dedicated team ensuring the seamless functioning of its operations. Established to cater to the growing demand for high-end quality electronics, the Reliance Digital store in Thanjavur has become a trusted destination for consumers seeking premium products such as televisions, laptops, mobile phones, home appliances, and entertainment systems.

This approach has enabled the store to maintain a strong market presence, ensuring customer satisfaction through data-driven strategies and efficient inventory management.

3   Problem Statements

3.1   **Problem Statement 1:**   Inefficiency in Identification of Stockouts and Overstock

- The inability to effectively identify instances of stockouts and overstock leads to missed sales opportunities

3.2   **Problem Statement 2:**   Rapid Technological Advancements

- That products can quickly become outdated. This makes it challenging for stores to keep their inventory current and avoid obsolescence, leading to potential financial losses.

3.3   **Problem Statement 3**   Adapting to E-commerce Trends

- With the rise of e-commerce, physical stores need to adapt by integrating online and offline sales channels. Failure to do so can result in a fragmented customer experience and loss of sales to online competitors.

4   Background of the Problem

The challenges faced by Reliance Digital in Thanjavur are pivotal to its operational efficiency and customer satisfaction, necessitating a detailed examination of the following issues:

Reliance Digital struggles with effectively identifying instances of stockouts and overstock. This inability results in missed sales opportunities when popular products are unavailable and increased holding costs or potential wastage due to excess inventory. The electronics industry experiences rapid technological advancements, causing products to quickly become outdated. This dynamic environment poses challenges for Reliance Digital in maintaining current inventory and avoiding obsolescence, which can lead to financial losses. Amidst the growing popularity of e-commerce and severe competitions from various industry players in the same

field, physical stores like Reliance Digital must integrate online and offline sales channels seamlessly. The failure to adapt to these evolving consumer preferences can lead to a fragmented customer experience and loss of sales to online competitors who offer convenience and a broader range of products.

5   Problem Solving Approach

Details about the methods used with Justification:

To address stockout and overstock issues, implement advanced inventory management systems that provide real-time tracking of stock levels, automated alerts for low stock, and predictive analytics for demand forecasting based on customer behaviour.

Details about the analysis tools with Justification:

For the analysis of the sales data, we have selected: Microsoft Excel, Google Sheets, and Python. Each tool brings specific capabilities and advantages to the analysis process. Microsoft Excel and Google Sheets offer a user-friendly interface and powerful data manipulation functionalities. These tools provide a range of features to clean and format data. Python, we can leverage its rich ecosystem of libraries such as Pandas and NumPy to perform advanced statistical analysis.

Details about the Intended Data Collection with Justification:

To account for variations in customer behaviour, we will analyse weekdays and weekends separately. As weekend customer counts tend to be higher, it is crucial to consider the distinct demand patterns and avoid stock shortages by adjusting inventory levels accordingly. By analysing historical sales data alongside external factors such as seasonality and market trends, we can predict demand fluctuations and adjust stock levels accordingly. This proactive approach mitigates the risk of understocking popular items and reduces excess inventory costs.

With the formatted and pre-processed data, we will create sales graphs and trend lines. These visual representations will provide a clear four understanding of sales patterns over time, highlighting fluctuations, seasonal trends, and potential areas for improvement. Rigorous analysis of the sales data will involve identifying patterns, trends, and correlations within the dataset. This exploration will provide valuable insights into customer preferences, peak sales

periods, popular product categories, and other factors influencing sales and inventory management decisions.

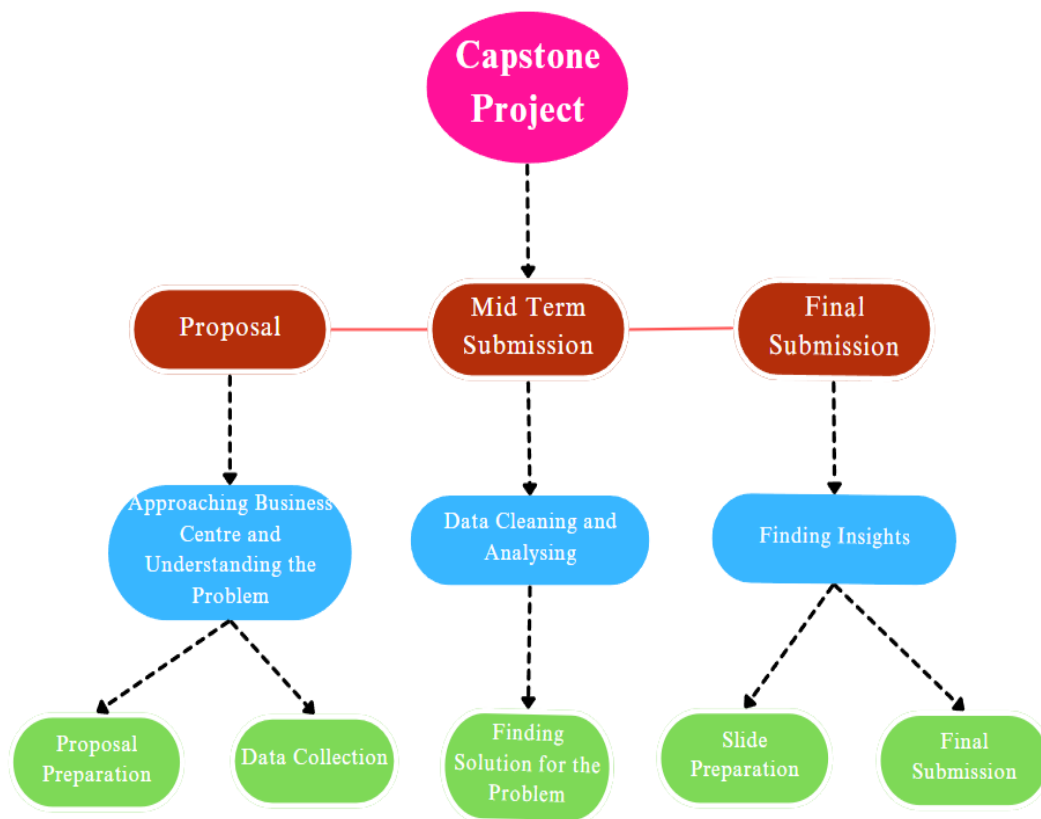# 6   Expected Timeline

6.1   Work Breakdown Structure:

Figure 1: Expected timeline for completion of project

6.2   Gantt chart:

GANTT CHART

TASKS

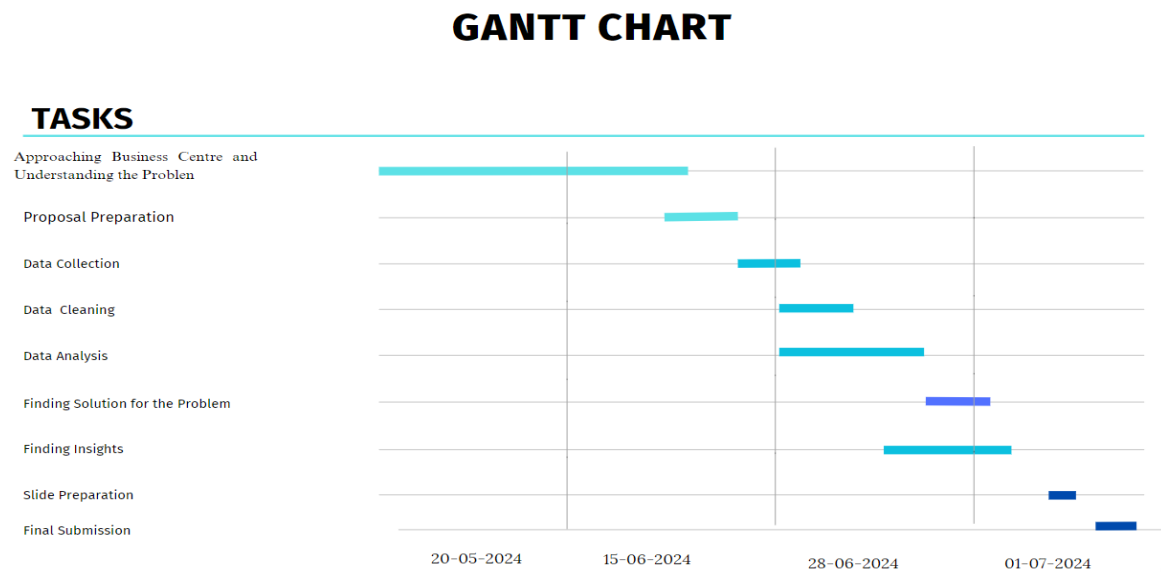
Figure 2: Gantt Chart

7   Expected Outcome

The analysis of customer behaviour in Reliance Digital is expected to yield several valuable outcomes that will contribute to improving business operations and overall performance. By implementing advanced data analysis techniques and leveraging primary data collected from the store, the project aims to enhance the inventory management system at Reliance Digital, Thanjavur. Accurate demand forecasting will enable the store to anticipate stock needs, reducing the risk of stockouts and overstock situations. Understanding customer buying patterns and seasonal trends will help maintain optimal inventory levels, ensuring popular items are always available for purchase.

This will lead to improved inventory turnover, minimizing excess inventory, reducing holding costs, and mitigating the risk of product obsolescence, particularly in the fast-evolving innovative directed electronics sector. Enhancing the shopping experience at Reliance Digital, the project aims to ensure products are readily available when customers need them, increasing customer satisfaction, sales offer, after sales service, loyalty, and retention.

These outcomes will position the store as a leader in the competitive electronics retail market, driving long-term growth, cost savings and profitability.