# Demand Forecasting for a Screen-Printing Company

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

Submitted by

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Declaration Statement

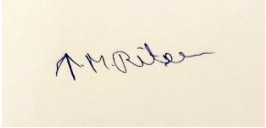
I am working on a Project Titled - Demand Forecasting for a Screen-Printing Company. I extend my appreciation to Sri Meenakshi Screen Printing for providing the necessary resources that enabled me to conduct my project.

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 

Name: RITEESH TM

Date: 13/06/2025

## 1. EXECUTIVE SUMMARY:

This Business Data Management (BDM) project focuses on analyzing order data from Sri Meenakshi Screen Printing, a small-scale manufacturer of Thamboolam cloth bags catering to both business and individual customers. The business currently faces challenges in predicting monthly demand, identifying high-value customers, and understanding geographic order patterns, which affects its ability to improve revenue and plan resources efficiently.

The goal of this project is to uncover trends in seasonal demand, segment customers based on order value and frequency, and analyze which locations contribute most to total orders. These insights will help the company make better decisions in procurement, marketing, and customer retention, ultimately supporting revenue growth.

The analysis is based on real historical data provided by the business. Tools used include Microsoft Excel for data cleaning and summary calculations, and Python (pandas, matplotlib, seaborn) for deeper analysis and advanced visualizations. Descriptive statistical techniques such as total and average order volumes, customer frequency analysis, regional aggregation, and monthly trend analysis are applied.

By combining business context with data-driven insights, this project aims to support Sri Meenakshi Screen Printing in scaling its operations, focusing on profitable regions and clients, and making smarter planning decisions. This work is part of the Business Data Management course in the IIT Madras BSc Online Degree program.

## 2. ORGANIZATION BACKGROUND:

Sri Meenakshi Screen Printing is a Madurai-based manufacturer and supplier of Thamboolam cloth bags, catering to both business and individual customers across Tamil Nadu.Registered in 2011, the company has over a decade of experience in providing high-quality bags for traditional and special occasions such as weddings, engagements, puberty ceremonies, housewarmings, baby showers, and more.

In addition to cloth bag manufacturing, the company also offers services in offset printing, screen printing, and ID card printing. Known for their durable, lightweight, and customizable bag designs, they have served thousands of satisfied customers over the years.

The company operates with a team of approximately 10 employees and delivers products to a diverse customer base, including jeweller shops, handloom stores, textile retailers, and individual clients. While exact revenue figures are confidential, the company processes several hundred orders each month, reflecting steady sales performance and healthy business growth.

With the ability to customize bags in various sizes, colours, and specifications, Sri Meenakshi Screen Printing has positioned itself as a trusted supplier in the local printing and packaging industry. Although the business maintains order and fulfillment records in Excel, it currently lacks a structured data-driven approach to analyze sales trends, customer segments, and regional demand patterns. This project aims to fill that gap by uncovering insights from historical order data that can support more informed and revenue-oriented business decisions. The 7-day target delivery period is considered the company's Service Level Agreement (SLA).

## 3. PROBLEM STATEMENT:

### 3.1 Seasonal Demand Forecasting

Problem: The business does not perform seasonal demand analysis, which results in poor forecasting and inconsistent procurement decisions.

Objective: The objective is to analyze monthly and seasonal order volume trends to enable proactive planning for inventory and resource allocation.

### 3.2 High-Value Customer Identification

Problem: The company lacks a data-driven method to identify and retain its most valuable customers.

Objective: The objective is to segment clients based on order frequency and volume, allowing the business to focus on retention strategies for the most profitable customers.

### 3.3 Regional Demand Analysis

Problem: The company does not analyze how order volumes vary by customer location, limiting its ability to target high-demand regions for growth.

Objective: The objective is to examine region-wise demand patterns to support informed decisions in marketing, logistics, and business expansion.

## 4. BACKGROUND OF THE PROBLEM:

4.1 Background – Seasonal Demand Planning

While Sri Meenakshi Screen Printing has maintained stable business for years, its order volumes fluctuate month-to-month. However, these fluctuations are not analyzed for forecasting. Procurement of raw materials like cotton cloth is done reactively, leading to shortages during peak months and excess inventory during lean periods. Without seasonality analysis, the business cannot plan resource usage efficiently.

4.2 Background – High-Value Customer Identification

The business receives orders from both individual and business clients but does not track client loyalty or volume-based contribution. Without client segmentation, all customers are treated the same, missing an opportunity to prioritize repeat buyers or bulk-order clients. Understanding which clients contribute most to revenue is key for improving retention and customer relationships.

4.3 Background – Regional Demand Blind Spots

Although orders are taken across Tamil Nadu, no structured analysis is performed to assess which areas generate the most business. Without regional insights, the company cannot target high-demand regions for promotions, optimize delivery plans, or explore new markets. This limits growth and expansion potential.

## 5. PROBLEM SOLVING APPROACH:

5a. Methods Used with Justification

To address Sri Meenakshi Screen Printing's business challenges, this project adopts a descriptive analytics approach using a combination of Microsoft Excel and Python. The analysis is based on existing fields such as order dates, client names, client types, quantity of bags, and delivery locations.

Seasonal demand forecasting will be performed by aggregating monthly order volumes in Excel and visualizing them through line charts. This will help the business anticipate high and low demand periods and make informed procurement decisions. High-value customer identification will involve grouping clients by total order quantity and frequency using both Excel and Python. Python will be used to rank and segment customers more effectively, helping the business prioritize its most profitable relationships. Geographic analysis will be conducted by summarizing order quantities by delivery location. While Excel will handle basic grouping and visualization, Python will enhance the analysis by generating clearer regional charts using libraries like matplotlib and seaborn. This approach ensures that valuable insights are derived from the data using familiar tools, while also introducing automation and advanced visuals where appropriate.

5b. Intended Data Collection with Justification

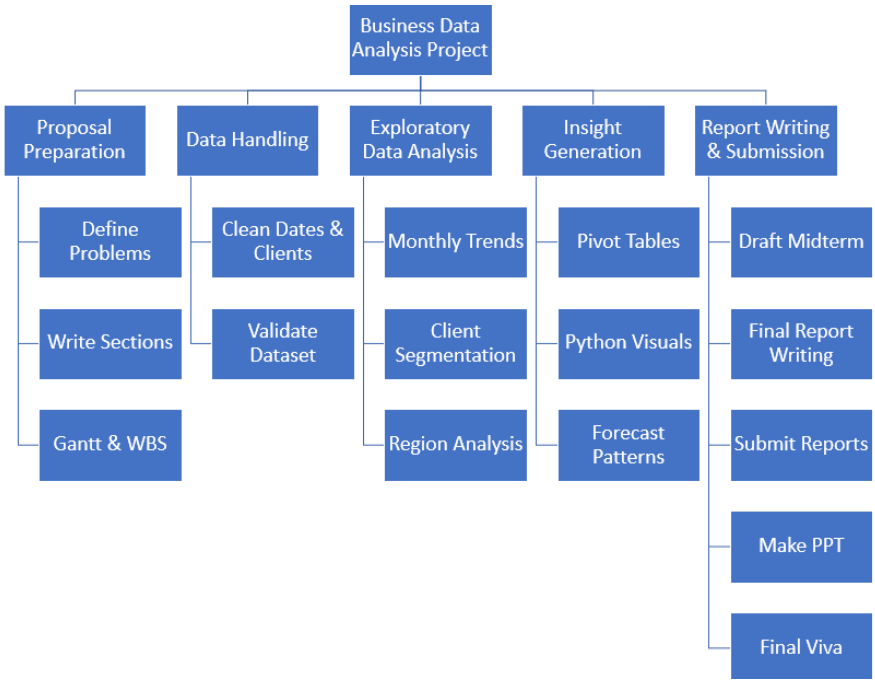
The business has already provided an Excel file containing all relevant fields, including order dates, quantities, client names, and locations. No new data collection is required. Basic data cleaning will be performed to correct inconsistencies in client names, dates, or location spellings. This will be done using both Excel for simple corrections and Python for more systematic validation where necessary. The original structure of the dataset will not be changed, ensuring that the business can replicate the analysis in the future without relying on new tools or data fields.

5c. Analysis Tools with Justification

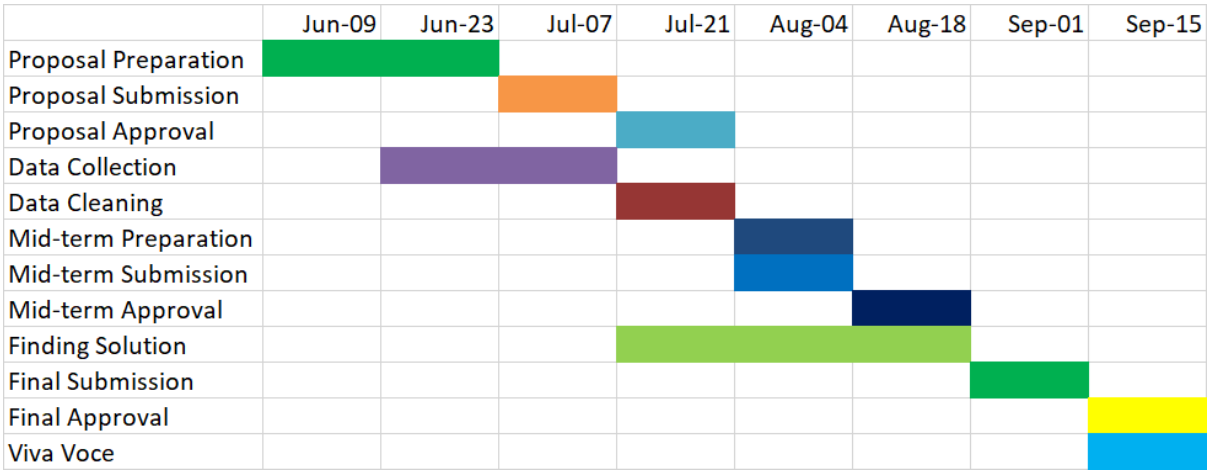
Microsoft Excel and Python will be used together for the analysis. Excel will be used for Pivot Table creation, filtering, conditional formatting, and generating basic charts such as line graphs and bar charts. These tools will allow the business to explore trends in order volumes, client behavior, and regional demand. Python will be used for advanced visualization and segmentation tasks, such as ranking top clients, creating custom region-wise charts, and automating multi-variable comparisons. The combination of Excel's simplicity and Python's flexibility provides a balanced solution that is both accessible and powerful for small business decision-making.

## 6. EXPECTED TIMELINE:

### 6a Work Breakdown Structure (WBS):




### 6b Gantt chart:



## 7. EXPECTED OUTCOME:

- Enable accurate forecasting of seasonal demand trends by analyzing historical order data, allowing for improved inventory control, reduced wastage, and better raw material procurement aligned with expected order volume.
- Identify and segment high-value customers based on order frequency and volume, helping the business to prioritize these clients for repeat engagement, thereby improving retention and driving recurring revenue.
- Provide region-wise sales insights by analyzing geographic demand patterns, supporting targeted marketing and delivery optimization to expand reach and increase revenue in high-performing areas.
- Empower the business to transition from reactive to proactive decision-making by leveraging descriptive analytics tools, resulting in improved planning, streamlined workflows, and more efficient resource allocation.
- Strengthen overall revenue performance by integrating data-driven planning into everyday operations using tools like Excel and Python, without requiring major changes to the existing system.