

**Payment Pattern Analysis and Optimization of Inventory  
for a Packaging Machines supply Company**

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

Submitted by

Name: Suneha Datta

Roll number: 23f1002574



IITM Online BS Degree Program,  
Indian Institute of Technology, Madras, Chennai  
Tamil Nadu, India, 600036

## Contents

1. Executive Summary and Title	4
2. Organization Background	4
3. Problem Statement	5
3.1 Problem Statement 1	5
3.2 Problem Statement 2	5
4. Background of the Problem	5
5. Problem Solving Approach	5-6
6. Expected Timeline	6-7
6.1 Work Breakdown Structure	7
6.2 Gantt Chart	7
7. Expected Outcomes	7-8

### **Declaration Statement**

I am working on a Project Title “Payment Pattern Analysis and Optimization of Inventory for a Packaging Machines supply Company”. I extend my appreciation to **S.S. Engineering Services**, 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.

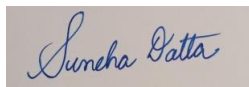
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the 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: Suneha Datta

Date: 3.3.2025

# **1 Executive Summary and Title**

## **Title: Payment Pattern Analysis and Optimization of Inventory for a Packaging Machines supply Company**

The project focuses on a packaging based company located at Mahestala, Kolkata. The business is B2B and deals in the segment of industrial end packaging providing supply of fully and semi-automatic packing machines, machine spare parts, packing materials like Polypropylene straps and self-adhesive tape along with after sales service.

The major business issues that the company is facing are related to the due outstanding payments from clients leading to a large number of overhead inventory stock purchase affecting financial stability and overall operational optimization. It creates unwanted cash constraints sometimes in order to maintain client relations in the long run.

The issues will be addressed by analyzing the sales and stock data via different analytical approaches to obtain a valuable outcome. The sales data will be intricately speculated to find insights for segregating clients based on payment behavior, to highlight chronic defaulters, evaluating cash flow vs inventory purchase ratio, credit risk scoring and correlation assessment. The solutions hence obtained will be presented through graphical pictorals and descriptive details of analysis.

The expected outcome helps the organization reduce the money blockage in terms of inventory, which helps to increase the profitability of the organization.

## **2. Organization Background**

The company that I am working with is S.S. Engineering Services, which is a packaging machines and spare parts supplying, along with service providing company, based in Mahestala, Kolkata. The company was founded in 2005 by the now tenacious director of the company, Mr. Subrata Datta, with a starting capital of INR 35000, one helping employee, and a small self-owned office with zero customer base. Initially the company faced various challenges like absence of trained employees, customer procurement, machines delivery issues and many more. However over the past 20 years of efficient service providing to the clients and top-notch semi-automatic and fully automatic packaging machines supplying, the company has been able to become partners with industry-leading companies like Khadims India Ltd., Indian Eastern railway, Tata Tea Group, Ananda Bazar Patrika, and many others. Currently the company has a monthly turnover of INR 80,00,000 with around 18% ebitda and 4 fully trained employees at work. The company now is running not only profitably but also getting new clients due to gained market popularity.

### **3. Problem Statement**

- Problem Statement 1: The S.S. Engineering Services company is trying to maintain proper annual cash flow but the clients are deferring to make payments within the stipulated time as promised, because the clients are trying to defend the outstanding giving assurance of new future orders, which makes the company burdened with outstanding revenue leading to poor profitability throughout the year.
- Problem Statement 2: The S.S. Engineering Services company is trying to keep the inventory purchase aligned with the actual demand but is compelled to buy inventory with company's own holding costs because it has to meet future just-in-time demands that crop up suddenly which makes the company financially inefficient and encumbered.

### **4. Background of the Problem**

The company has set some timeline for the clients by which they must return the payments of the supplied packaging machines or the packaging materials like Polypropylene straps, but some clients do not adhere to the timeframe mentioned in the official documents and do on call negotiations to consider their new orders on the basis of whole year client engagement with the company. This causes the revenue to be in a pending state which results in the company's loss of the interest generated on the outstanding payments. In order to maintain long-term client association, the company is compelled to accept verbal promises of new orders. Therefore, whenever the company tries to purchase new inventory, sometimes it has to buy it using the in-hand costs rather than the outsourced profits, thus leading to poor cash flow. Also, since the inventory takes time to be manufactured and delivered to the company from the manufacturer, the company has to purchase it beforehand, even if there is no current order, as it cannot provide just-in-time supply of machines, but in view of the new promised orders by outstanding revenue holding clients. These results in poor optimization of cash flow as well as inventory management owing to financial instability. Even if additional interest is asked from the clients for taking extra time, then the profit margins will increase annually but the client relations will be affected adversely since the best interest rate on the outstanding is not known. Although that would not suffice the uncertainty and inefficiency but it would guarantee better profits.

### **5. Problem Solving Approach**

The problem which is being dealt with is not only challenging but also requires a keen and systematic approach. It will be tackled through a data-driven solution that will try to find insights from the company's data to find out hidden trends. The process of approach includes the following steps:

**Data Collection and Preprocessing:** This is the most important step, since based on this, the next as well as the overall analysis will be conducted. At first, the annual sales data and the annual inventory stock data are collected from the company. Then the data is analysed to find any unwanted values or inconsistent values. It is checked whether the data contains any missing values or any duplicate entries. After which the data is properly cleaned and formatted in a workable format for further analysis. An initial look out is done on the data to ensure integrity.

**Exploratory Data Analysis:** The data is then analysed to get the descriptive statistics of the variables present in the data. The overall revenue outstanding is calculated and the percentage annual interest loss is also computed. Different correlations amongst the variables are judged to gain valuable insights. The absolute defaulters are found out after speculating the numbers present in the sales data. Stock data is then analysed to match the trends found in the previous analysis. The actual demands and their time are seen in order to calculate the stock vs outstanding ratio and the perfect interest rate to suit the company's needs. This step is highly necessary since most of the calculations are done in this step to understand the main features present in the data provided.

**Graphical Analysis:** Next, the data is fit with various charts and models to find underlying trends and patterns in the client payment behaviour as well as the inventory management done throughout the year. The visual representations will be used to showcase the insightful investigations found from the data given.

**Solutions Formulating:** The analysis done is then judged intricately to find whether the results are providing the necessary solutions that the company seeks for. After which the solutions hence got are properly accumulated together and a structured report is documented. The full report, starting from the problem statement formulation to the solution suggestion, is then captured in the form of a well-designed presentation to demonstrate to the company members.

It can be stated that the solutions hence suggested will try to solve the financial challenges faced by the company and thus help to mitigate the issue by providing optimization of stocks as well as the annual revenue collection.

## **6. Expected Timeline**

### **6.1 Work Breakdown Structure**



- To drive insights for finding an optimum interest rate to be applied on the delayed payment handing clients so that both customer relations as well as company's timely revenue collection is maintained.
- To find the timeline of fixed annual orders as well as the estimated time of just-in-time demand to help proper inventory management and investments.
- To estimate the annual net outstanding which is being kept in the market and not becoming an in-hand profit making revenue which is not only incurring overhead costs but also affecting the company's functionalities.
- To capture the percentage of revenue loss of the company annually from the absolute defaulters of company's financial policies, giving it a benchmark for further client dealings and machine supplies.