



**Enhancing Global Competitiveness in Machinery
Manufacturing: A Strategic Case Study of Macse Enterprises**



A Proposal report for BDM capstone Project

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Declaration Statement

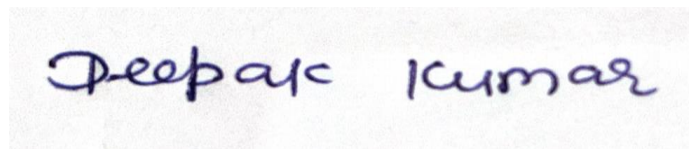
I am working on a Project titled **“Enhancing Global Competitiveness in Machinery Manufacturing: A Strategic Case Study of Macse Enterprises”**. I extend my appreciation to **Macse Enterprises**, for providing the necessary resources that enabled me to conduct my project.

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 from 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. If 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.



Signature of Candidate: **(Digital Signature)**

Name: Deepak Kumar

Date: 20/01/2025

2.Executive Summary:

The project focuses on a manufacturing company located at Ambika Vila, Gandhi Path, East Ram Krishna Nagar, Patna, Bihar - 800020. The business is B2B and deals in the segment of Machine. The major business issues that the Macse Enterprises faces are challenges of declining sales and inventory stock, primarily for its nail and notebook machines. These issues came from raw materials shortages, seasonal fluctuations and market competition.

The approach towards helping the company for sales of these machines is through partnerships with local raw materials suppliers, better logistics supply and customer offers. This way the company aims to stabilize its operations and increase profitability. Data-driven insights from Exploratory Data Analysis (EDA) will guide decision-making, ensuring measurable impacts. Expected outcomes include a 20% increase in revenue, improved inventory turnover by 30% and a boost in local production capabilities in Bihar.

3.Organization Background:

MACSE Enterprises is a for-profit corporation and manufacturing business headquartered in Patna, Bihar. Founded in 2016 by Rahul Kumar and Akash Kumar, the company initially specialized in producing commercial *Atta Chakki* (flour mill) and oil extraction machines. Over time, it expanded its operations to include trading and manufacturing additional machinery, such as nail-making and notebook-making machines.

Registered as a partnership firm, MACSE Enterprises began with a modest portfolio but gradually diversified its offerings. Despite its growth, the company faces operational challenges, including reliance on out-of-state raw material suppliers. This dependency results in high logistics costs and cash flow disruptions. Today, the company employs 30 workers and generates an annual turnover of ₹3–4 crore. While its product range continues to evolve, MACSE Enterprises aims to address supply chain inefficiencies to sustain scalability and competitiveness in the machinery sector.

4.Problem Statement:

4.1. Low Customer Retention:

The company faces significant challenges in retaining customers, resulting in increased churn rates, higher customer acquisition costs (CAC), and long-term revenue erosion. Failure to address this issue risks further profitability declines and competitive disadvantage.

4.2. Low Profit Margins:

Organizations struggling with low profit margins often face challenges such as high Cost of Goods Sold (COGS), ineffective pricing strategies, and an unoptimized product mix. To address this, a data-driven approach is required to analyze contribution margins by product/service, pricing elasticity, competitor benchmarking, and overhead cost allocation.

5. Background of the problem:

Through discussions with manager and preliminary research, it was identified that **Macse Enterprises** is struggling with low customer retention and declining profit margins, impacting its long-term sustainability.

One major factor contributing to low customer retention is the lack of post-sales engagement and service support. Many customers prefer machinery suppliers who offer comprehensive after-sales services, maintenance support, and flexible financing options, which Macse Enterprises has not fully optimized. Additionally, limited brand awareness and weak customer relationship management (CRM) practices have resulted in repeat customers shifting to competitors who offer more personalized services.

Regarding low profit margins, Macse Enterprises faces high Cost of Goods Sold (COGS) due to expensive raw materials, inefficient supply chain management, and a suboptimal product pricing strategy. The company has not fully leveraged data-driven pricing models, leading to instances where machinery is underpriced, reducing potential revenue, or overpriced, discouraging potential buyers. Additionally, the company's current product mix does not fully align with customer demand, causing excess inventory and increased operational costs.

Competitor analysis suggests that industry leaders have successfully tackled these challenges by implementing dynamic pricing strategies, optimizing supplier contracts, and enhancing customer engagement through digital marketing and loyalty programs. To address these issues, Macse Enterprises needs to adopt a data-driven approach, leveraging insights from customer feedback, pricing elasticity, supply chain efficiency, and competitor benchmarking to improve profitability and customer retention.

6. Problem Solving Approach:

6.1. Data Collection and Integration:

To address low customer retention and profit margins, Macse Enterprises will collect and integrate data from multiple sources to enable data-driven decision-making. This includes analyzing sales records, customer feedback, supplier invoices, inventory logs, and market trends. A centralized data management system will be implemented with a CRM for customer tracking, a cloud-based database for data integration, and automated tools for real-time updates. Additionally, free customer management software, such as self-service scheduling, billing and order tracking, and automated reminders, will enhance customer experience and retention.

6.2. Details About the Analysis Tools with Justification:

To analyze customer retention issues and low profit margins at Macse Enterprises, Python (Jupyter Notebook) and MS Excel will be used for data cleaning, analysis, and visualization. Jupyter Notebook, with Pandas and NumPy, will handle data cleaning by addressing missing values, duplicates, and inconsistencies. After cleaning, the data will be exported to MS Excel for analysis using Pivot Tables and formulas to identify cost drivers, customer behavior, product profitability, inventory turnover, and purchase frequency. Finally, Excel charts and graphs will visualize trends in sales, costs, and profits using line graphs, supplier performance with bar charts, and product mix profitability with pie charts

7.Expected Timeline:

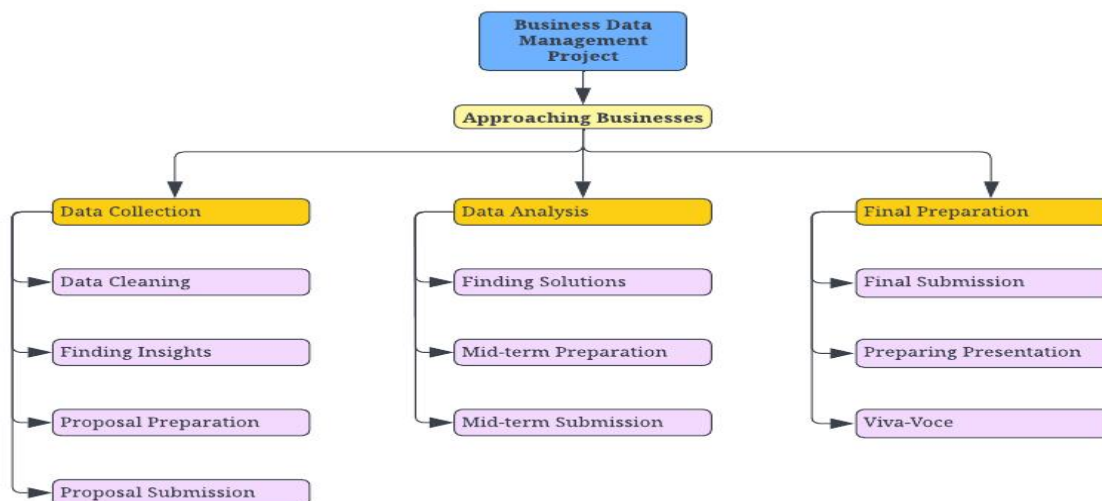


Fig 1: Work Break down structure

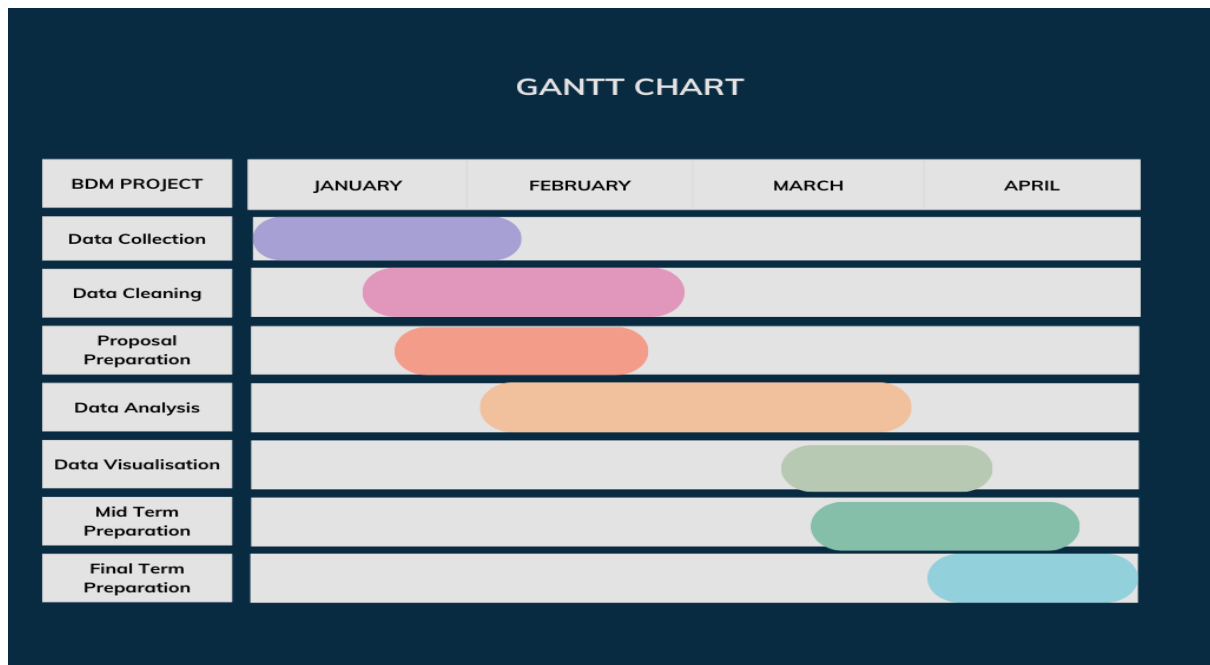


Fig 2: Gantt Chart

8.Expected Outcome:

8.1. Improved Customer Retention

Enhancing after-sales service and implementing a robust CRM system will boost customer satisfaction, driving a projected 15-20% increase in repeat purchases, while digital marketing and loyalty programs will strengthen brand awareness and attract more long-term customers, and self-service tools, scheduled maintenance, and proactive communication will help reduce customer churn by minimizing drop-off rates.

8.2. Increased Profit Margins

Implementing dynamic pricing models based on competitor benchmarking and pricing elasticity will enhance profit margins expected by 10-15%, while supplier negotiations, inventory forecasting, and cost analysis will reduce procurement and storage costs expected by 20%, and contribution margin analysis will optimize the product portfolio by identifying high-profit products and eliminating low-value inventory, driving higher revenue generation.

8.3. Enhanced Operational Efficiency

A centralized CRM and automated tools will enhance sales tracking, supplier performance, and customer interactions, while improved supply chain decisions will optimize inventory turnover and reduce excess stock and waste.

8.4. Business Growth & Long-Term Sustainability

By adopting a structured data-driven approach, Macse Enterprises can make strategic decisions, gain a competitive edge over traditional businesses, and achieve sustainable growth through cost optimization, pricing strategies, and enhanced customer engagement.