

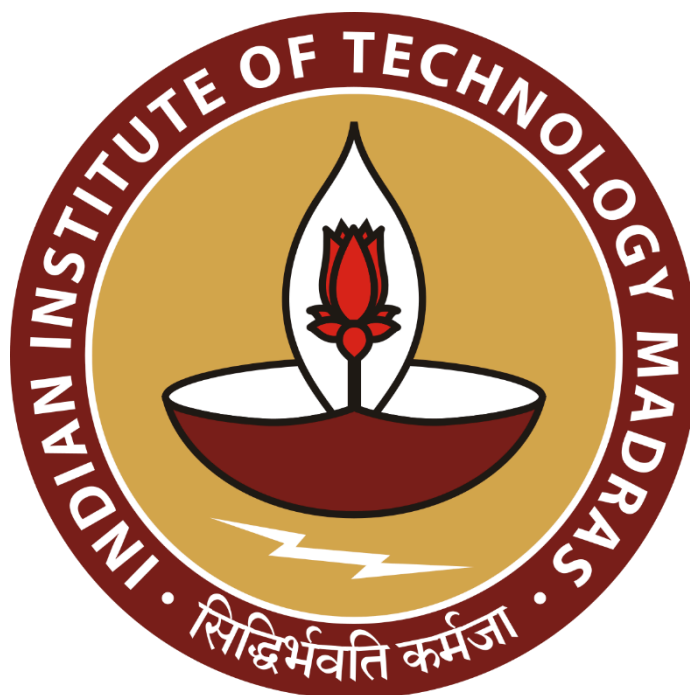
# **Data-Driven Insights into Credit Sales and Customer Dynamics in a Jewellery Store**

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

Submitted by

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## **Declaration Statement**

I am working on a Project titled “**Data-Driven Insights into Credit Sales and Customer Dynamics in a Jewellery Store.**” I extend my appreciation to **Shri Giriraj Ji jewellers**, 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. 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 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:-

A handwritten signature in black ink that reads "Astitva Ag". The signature is written in a cursive, flowing style. The first name "Astitva" is written in a larger, more prominent script, and "Ag" is written as a smaller, simpler addition at the end. There are some horizontal lines and dots below the signature, possibly indicating a line for a name or a date.

**Name : - Astitva Agarwal**

**Date : - May 10 , 2025**

# 1 Executive Summary and Title

This project is based on Shri Giriraj Ji Jewellers, a small, unorganized jewellery business located in Rajau Paraspur, Bareilly, Uttar Pradesh. The business follows a **B2C** model serving rural and farming communities with a wide range of **gold and silver ornaments**. Being in operation for more than **seven years**, all transactions are recorded manually through **handwritten bills**, with no digital recordkeeping in place.

The key challenges faced by the business is caused by the **partial payments** from the customers and **installment plans** offered by the business. In installment - based purchase customers tend to delay the payments for weeks and months, during this delay the price of gold or silver often rises, resulting in **financial losses for the business**. If business owners restrict installment based purchase faces a significant **drop in sales volume**.

The issues will be addressed by first **digitizing handwritten billing records**, analyzing customer payment patterns, evaluating the impact of exchange offers, and recommending data-driven strategies to reduce financial losses and better inventory management with revised installment plans.

Through this analysis, the business can gain clearer insights into its payment cycles, **customer behavior**, and sales trends, enabling more informed decision-making and improved financial planning.

## 2 Organization Background

Shri Giriraj Ji Jewellers is a rural, unorganized jewellery business located in **Rajau Paraspur, Faridpur Road, Bareilly, Uttar Pradesh (243123)**. The shop has been operating since 2018 and primarily serves local customers from farming and village communities. The shop operates daily from 11:00 AM to 7:00 PM. It functions as a business-to-consumer (B2C) enterprise, offering a variety of gold and silver ornaments, some popular selling items are listed here: - Anklets (Payal), Nose pins, Rings, Silver Belts, necklaces and pendants.

The business operates in a traditional setting, with all records maintained through handwritten bills and manual bookkeeping. There is **no digital setup** for billing, inventory or customer management. As a result, the shop owner faces several challenges in tracking delayed payments, understanding customer behavior, and sales trends throughout the year.

Despite these constraints, the shop continues to attract customers due to its product variety, product quality assurance and business owner's behaviour. The business uses flexible offers and discounts for their loyal customers.

### 3 Problem Statement

1. **Analyzing customer purchase behavior and credit-based sales :** - Many customers purchase jewellery on credit and repay through delayed installments. These delays, combined with fluctuating gold and silver prices, often lead to revenue loss for the business. This study aims to analyze these patterns to understand their financial impact and guide more effective credit and exchange policies.
2. **Detecting seasonal demand trends for better stock planning and inventory management :** - In the jewellery business there are high valued items and they have a vast variety, the business experiences fluctuating demand, often resulting in overstocking of low-demand items and understocking of high-demand ones.

### 4 Background of the Problem

Shri Giriraj Ji Jewellers operates in a rural, unorganized retail environment, serving customers from nearby farming and village communities. While the shop has sustained its operations for over seven years, it faces challenges due to its manual handwritten billing system. One of the core business issues is related to payment flexibility offered to customers, specifically in the form of installment-based purchases.

#### **Installment-based purchases : -**

Since the business operates in rural areas the customers tend to purchase the ornaments on installments basis, they pay a small upfront amount, with the remaining balance settled for weeks and months, now the customers delay the payment periods for several months during this time market prices for gold and silver may fluctuate, frequently increasing. As a result the business bears a loss on items sold. At the same time, discontinuing installment options causes a noticeable decline in overall sales, as most customers rely on flexible payments due to economic constraints.

#### **Customer purchase trends : -**

In the jewellery business there are a variety of customer types. Some customers purchase ornaments for functions like marriage, while others purchase on occasion of festivals and some for daily wear, so these cause multiple trends which need to be analysed, but without digital setup, it is near to impossible to track these customer purchase behaviour trends.

Additionally, the business allows product exchanges, where old jewellery is traded for new items with a balance amount settled in cash or installments. However, without any analytical tracking or digital system, the owner is unable to assess the impact of such exchanges on revenue, customer loyalty, or pricing effectiveness.

These limitations have highlighted the need for a data-driven understanding of sales, payments, and profitability.

## 5 Problem Solving Approach

### 5.1 Methods used with Justification

The project uses a data driven approach to identify and improve inventory efficiency and profitability for Shri Giriraj Ji Jewellers .

The primary focus is to digitalize the handwritten bills and analyze patterns for sales , exchange value , trends of delayed payments periods etc . The core analytical methods include :

- **KPI Analysis** : KPIs define the key parameters in the data that have a significant impact on the analytics . In our study we can evaluate aspects like Inventory Turnover Ratio , Average Transaction Value for a particular category , best-Selling Items by Category .
- **Qualifier Algorithm & Forecasting** : A qualifier algorithm could be used to identify segment customers , Product Prioritization etc factors like high moving , slow moving , **random demand**. Predicting future trends and demands , Seasonality effects on each product category based on historical sales data .
- **Customer Profiling** : Creating detailed profiles of target customers to understand their preferences , installment payment behaviour , repeated purchases and Exchange Impact Evaluation to assess revenue variation caused by jewellery trade-ins

These methods will help generate insights for decision-making and customer policy adjustments.

### 5.2 Intended data collection with Justification

The data intended to be collected for analysis :

**Handwritten sales bills** : The business owner has maintained sales bills from late 2020 to 2024 ( Due to covid pandemic lockdown the data for 2020 and 2021 have some months with no entries). Each bill contains key fields including bill number, customer name, date, item name, category (gold/silver), weight, rate per gram, making/labour charges, total amount.

**Customer installments payment entries** : This data has entries for customers date-wise installments entries which includes customer name , dates, amounts paid in each installment, and any delays.

Since the business doesn't have any purchase data maintained with them , they have shared with the researcher the **formula for calculating the cost price** or profit (in jewellery different products have different profit percentages and making charges ) for different categories of products .

After Digitizing the data it would be stored and will be processed using Microsoft Excel / Google Sheets .

### 5.3 Analysis tools with Justification

To derive insights from the collected data, various analysis tools will be used:

- **Microsoft Excel / Google Sheets** – For digitizing ,Initial data cleaning, trend identification, and basic calculations will be performed here due to its accessibility and ease of use.

- **Python (Pandas, Matplotlib, and Seaborn)** – Essential for deeper analysis, including customer profiling, trend identification, and exchange impact evaluation . Matplotlib and Seaborn provide custom visualizations of sales and payment patterns.
- **Scikit-learn & Statsmodels:** Scikit-learn will support customer segmentation (Ex:- K-Means), product categorization (fast/slow movers), and predictive analytics. Statsmodels will be used for time-series forecasting through ARIMA and seasonal trend modeling for demand shifts.
- **Power BI / Tableau** – Visualization of KPIs such as Inventory Turnover Ratio, Average Transaction Value, Best-Selling Items by Category and more .

Using these tools ensures precise, automated, and visually interpretable results .

## 6 Expected Timeline

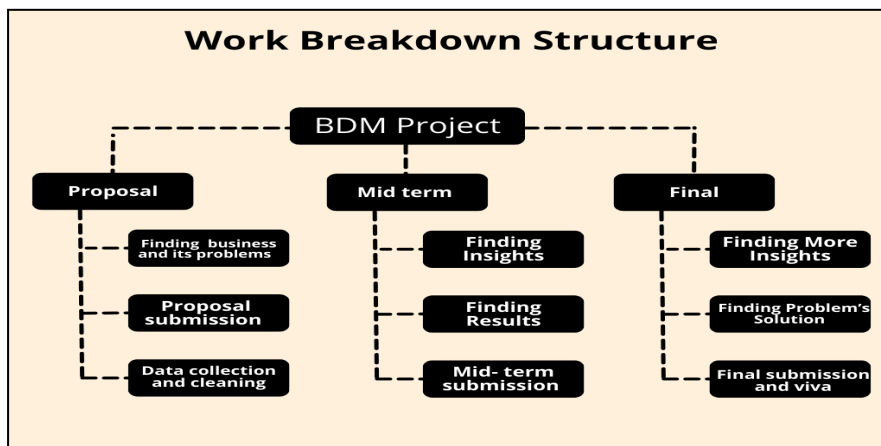


Figure 1 Work Breakdown Structure of BDM Capstone project.

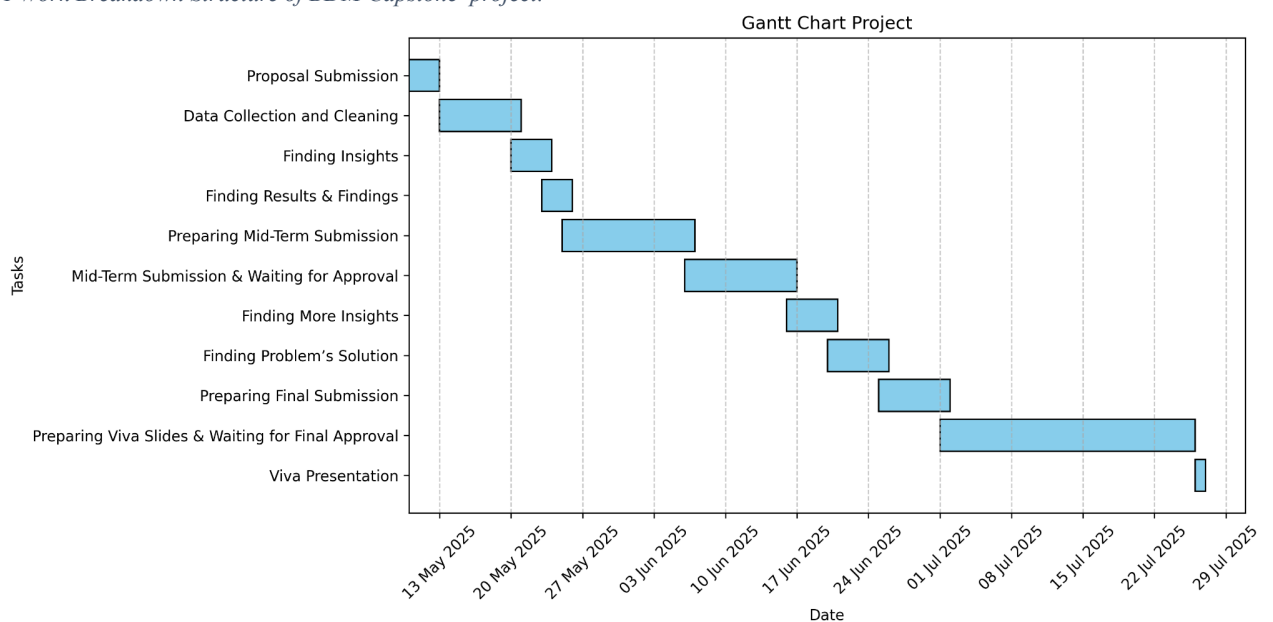


Figure 2 Expected timeline for completion of BDM Capstone project ( Gantt Chart ).

## 7 Expected Outcome

The primary outcome for this Research project is the **Analysis of sales Trends and Customer Dynamics** from **Shri Giriraj Ji Jewellers**.

By performing the data-driven analysis on the provided data , the business will be able to understand:

- **Improved inventory planning**

By implementing the approaches mentioned above , the business will have a better understanding of which products are fast-moving and which ones are slow-moving . Since there is a wide range of products available , this will help business in better inventory planning, ensuring that high-demand products are always in stock while minimizing excess inventory of slow-moving items. This will ultimately lead to a **reduction in storage costs** and optimization of inventory.

- **Revenue impact caused by delayed payments**

Analyzing the customer behaviour on purchase of products having high margin and low margin which are paired with installments plan in respective time period of year , informing business owner for more informed decisions on which products are profitable or loss bearing for the installments plan .

- **Informed trends in exchange product items**

Currently, the business doesn't have any rough estimation for exchange items since the owner does not maintain any record for old items but from the sales bills , informed decisions can be made from the outcomes which can be further clubbed with other offers and discounts to maximize profit and increased sales .

This project will provide **data-driven insights** . Based on findings, **recommendations should be made** for potential offers or strategies . The research project is expected to guide the business toward more structured recordkeeping and improved financial planning for a **future transition to digital systems**.