Analytical Study of Inventory Management and Customer Retention at XYZ Computers

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled "**Analytical Study of Inventory Management and Customer Retention at XYZ Computers**". I extend my appreciation to **XYZ Computers**, for providing the necessary resources that enabled me to conduct my project.

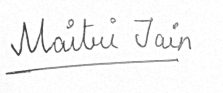
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

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 of Candidate: 

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1 Executive Summary

XYZ Computers is a small-scale Electronics retailer operating in both B2B and B2C segments. The business deals in printer supplies, hardware components and computer peripherals including cartridges, patch cords, and power adapters.

The major business challenges include:

- Inefficient inventory management leading to overstocking/understocking.
- Inability to compete with online e-commerce platforms like Amazon due to post covid digitalization and limited promotional offers.
- Financial losses from product returns and warranty claims.

This project will analyze the historical sales, stock and debtors data from April 2024 to January 2025 using:

- Time series analysis for sales patterns.
- ABC analysis to prioritize high-value inventory items, optimize stock levels, and reduce costs.
- Customer segmentation to tailor loyalty programs, improve retention, and target high-value B2B/B2C customers effectively.

The analysis encompasses over 300 unique products across multiple categories, with data collected from various suppliers including Prodot, Vision Classic, and P.C Forms.

2 Organization Background

XYZ Computers is a reputed electronics retailer established in the late 1990s. Over the years, it has developed a strong presence in the regional market, offering a diverse range of computer hardware and accessories. The company is managed by an experienced entrepreneur with extensive industry expertise. The business has been a cornerstone in the local electronics market for over two decades. Specializing in printer supplies, hardware components, and computer peripherals, XYZ Computers serves both B2B (Business-to-Business) and B2C (Business-to-Consumer) segments, catering to individual consumers and corporate clients alike.

With a team of five dedicated employees, the business prides itself on offering high-quality products sourced from reputable suppliers such as Prodot, Vision Classic, and P.C Forms. Over the years, XYZ Computers has built a strong reputation for reliability, customer-centric service, and competitive pricing. Despite challenges such as inventory management inefficiencies and increasing competition from e-commerce platforms, the business remains committed to adapting and thriving in a dynamic market.

3 Problem Statement

1. **Inefficient Inventory Management**: Overstocking of slow-moving items and understocking of high-demand products lead to revenue loss and cash flow issues.
2. **Online Competition**: Lack of promotional offers (e.g. bank discounts) compared to e-commerce platforms like Amazon results in customer attrition and reduced foot traffic.
3. **High Return Rates**: Financial losses due to incompatible products and damaged goods impact profitability and customer satisfaction.

4 Background of the Problem

The electronics retail sector has faced major challenges after COVID, especially for small businesses like XYZ Computers. Inside the business, there are issues with poor inventory management, like keeping too much of slow-selling items and not enough of popular products. This happens because the business doesn't use data to predict demand or coordinate well with suppliers leading to extra stock worth lakhs of rupees every month.

Outside the business, the move to online shopping after the pandemic has made things harder. Big e-commerce platforms like Amazon offer bank discounts (e.g. 10% cashback) and bulk pricing, which small shops can't match. This has caused a drop in customers visiting the store, especially those looking for cheaper deals.

Another major issue is the high rate of product returns, which occur due to compatibility issues, defective items, or inadequate warranty coverage from suppliers. These problems impact profits and customer satisfaction, as the business often has to sell returned items at a loss or cover replacement costs.

Main reasons for these problems:

- Inside the business: Manual stock tracking, poor restocking plans, and unorganized supplier deals.

- Outside the business: Online shopping dominance, lack of bank offers for small shops, and customers expecting easy returns.

These problems show why the business needs better ways to manage stock, keep customers happy, and reduce losses.

5 Problem Solving Approach

5a. Details about the Methods Used with Justification

The project will use quantitative methods to address the business challenges:

1. ABC Analysis: To categorize inventory into A, B, and C groups based on sales contribution. This method is justified as it helps prioritize high-value items and reduce overstocking of low-demand products.
2. Reorder Point Calculation: To determine optimal restocking levels using historical sales and stock data. This approach guarantees that inventory is replenished on time, minimizing the risk of stockouts and ensuring smooth operations.
3. Return Analysis: To identify patterns in product returns using historical data. This helps reduce future returns and improve customer satisfaction.
4. Exploratory Data Analysis (EDA): To uncover trends and patterns in sales, inventory, and return data. EDA will help identify key insights that can inform decision-making, such as seasonal trends, customer preferences, and supplier performance.
5. Dashboard Creation: To visualize key metrics and provide actionable insights. Dashboards will be created using tools like Power BI or Tableau to monitor inventory levels, supplier performance, and customer behavior in real-time.

Justification: These methods are chosen because they are data-driven, scalable, and directly address the retailer's challenges of inventory inefficiency, return losses, and competition from online platforms. EDA and dashboards will provide deeper insights and enable real-time monitoring, which is critical for making informed decisions.

5b. Details about the Intended Data Collection with Justification

The following quantitative datasets will be collected and analyzed:

1. Sales Data: To identify top-selling products, customer purchase patterns, and return trends.
2. Stock Data: To monitor inventory levels, turnover rates, and reorder needs.
3. Debtor Data: To segment customers and design loyalty programs for repeat B2B clients.

Justification: These datasets are essential for understanding the root causes of inventory inefficiency and return losses. They provide a comprehensive view of the business's operations and enable data-driven decision-making.

5c. Analysis Tools and Justification

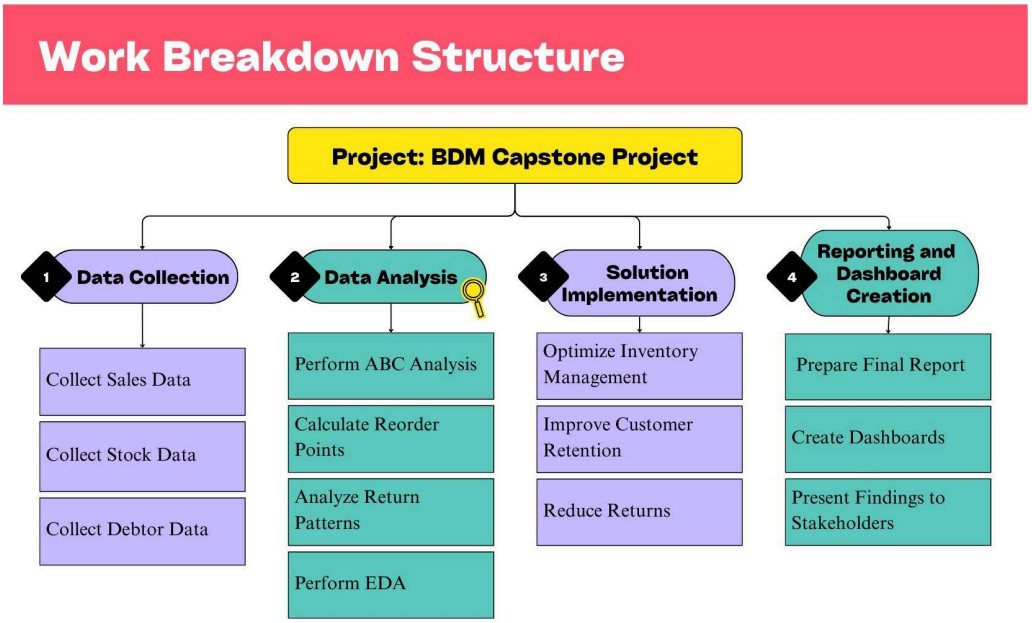
The following tools will be used for data analysis:

1. Excel: For ABC analysis, reorder point calculations, and basic dashboards. Excel is chosen because it is user-friendly, widely accessible, and sufficient for the retailer's current needs.
2. Python : For advanced analysis like predictive modeling (e.g., forecasting demand or predicting returns). Python is justified if the dataset is large or complex.
3. Power BI/Tableau : For creating interactive dashboards to visualize inventory levels, supplier performance, and customer behavior.

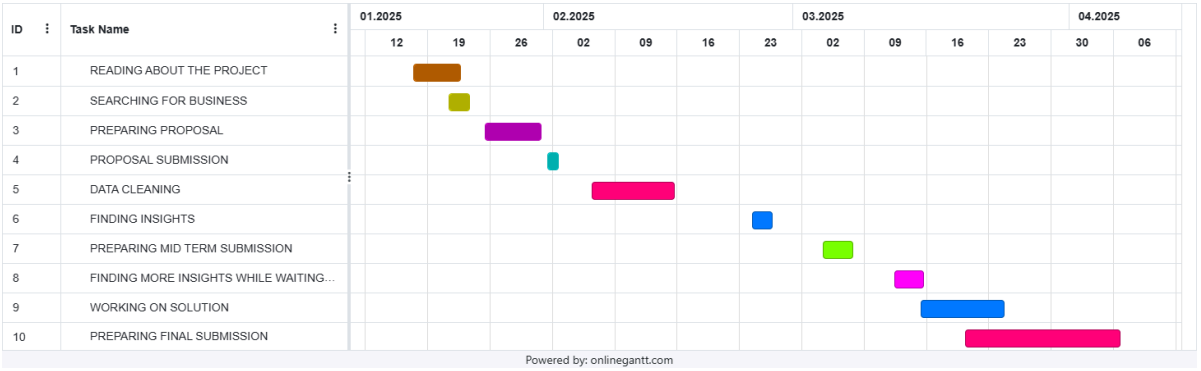
Justification: These tools are selected because they are cost-effective, scalable, and align with the retailer's technical capabilities. Excel is the primary tool, while Python and Power BI are optional for more advanced analysis.

6 Expected Timeline

6.1 Work Breakdown Structure:



6.2 Gantt chart:



7 Expected Outcome

The proposed solutions aim to deliver the following outcomes:

1. **Optimized Inventory Management**: By implementing ABC analysis and reorder point calculations, the business will reduce excess stock of slow-moving items and prevent stockouts of high-demand products. This will free up capital and improve cash flow.
2. **Improved Customer Retention**: Loyalty programs and dynamic pricing strategies will encourage repeat purchases from B2B and B2C customers, helping the business compete with online platforms.
3. **Reduced Returns and Losses**: Compatibility alerts and return analysis will minimize product mismatches and identify root causes of returns. Supplier negotiations will reduce warranty-related losses, improving profitability.
4. **Data-Driven Decision Making**: Dashboards and visualizations will provide actionable insights into inventory levels, supplier performance, and customer behavior, enabling better planning and resource allocation.

Overall, these outcomes will help the business operate more efficiently, retain customers, and reduce financial losses, ensuring sustainable growth in a competitive market.