Improving Inventory Management and Customer Engagement Using Data Analysis for Big Basket

A Proposal report for the BDM capstone Project

Submitted by:

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Contents

Declaration Statement

I am working on a Project Title **"Improving Inventory Management and Customer Engagement Using Data Analysis for Big Basket".** I extend my appreciation to **Kaggle**, 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: (Digital Signature)

Name: Arjita Singh Kushwaha

Date: 01-02-2025

1 Executive Summary and Title

This project focuses on data analysis of Big Basket which is an online grocery retail operates primarily as B2C organization as the company directly sells products like household items and groceries to customers through online platform.

This case study mainly focuses on understanding customer behaviour and enhancing the product performance to increase operational efficiency and customer satisfaction by analyzing Big Basket's customer purchase behaviour and product data to find patterns and improve customer engagement. In order to perform analysis the datasets containing customer purchase activity and products has used.

This project aims to provide actionable insights in order to enhance customer satisfaction, optimize product availability and improve marketing strategies. Although these solutions address a small fraction of the company’s broader operations.

2 Organization Background

The organization whose data I collected is BigBasket. BigBasket is one of the India's Largest online grocery store. The company was founded by five entrepreneurs- Hari Menon, Vipul Parekh, Abhinay Choudhari, VS Sudhakar and VS Ramesh in December 2011. It is headquartered in Bengaluru and currently owned by TATA Digital.

As per the current records, the organization serves millions of customers in urban and semi-urban areas, operates in more than 30+ cities in India and delivers around 15 million orders per month.

Over the years, Big Basket boasted their product catalog of over 18,000 items which offers everything from fresh fruits and vegetables to groceries, personal care items and private label products like Fresho, Royal and Tasties. Over one-third of the company's revenue comes from its private label products. The Company uses around 85% of fresh dairy products, fruits and vegetables from farmers and has a strong logistic network with around 20 warehouses and 60 dark stores.

3 Problem Statement

3.1 Inefficient Stock Allocation/Inventory Management: As customer demands keeps changing with seasons, months and days, many products are underutilized and low performing which leads to wastage of resources and becomes challenging to optimize the supply chain to ensure the availability of product.

3.2 Limited Customer Engagement: Customers are tends to buy the same products repeatedly because of lack the of efforts to get them to explore more products. Sales are low on certain days and seasons. The absence of personalized product recommendations limits customer engagement.

4 Background of the Problem

1. It is difficult to predict and know which products to stock because of customer demand changes based on days, months and seasons which leads to some items being overstocked and others sold out quickly. for example, sales increases during weekends, while there is noticeable drop on Mondays. likewise, some months like August and September has high demand while there is slower sales on other months.

There is a frequent customer demand fluctuation as demand changes as per the customer preferences and events like festivals, for example during festive seasons, fruits and vegetables has higher demand. On the other hand, packed goods sell less during that time. The certain variation in demand makes difficult to plan out the stock accurately. Products can be remain unsold for long period creates wastage. Inconsistent stock availability ruin the overall shopping experience for customers.

2. Customer engagement is also a major problem. Due to lack of personalized recommendations and promotions many customers can tend to but same products again and again which limits them from exploring new items. for the company this habit of customer can misses the opportunity to increase the sales by cross-selling methods. less popular products also prevents the company to diversify their sales patterns due to the absence of targeted promotions. Due to the lack focus towards customer purchase patterns opportunities to increase sales through engaging the customers were missed.

The root causes of these problems include limited use of historical data for predicting demand and a lack of advanced tools to analyze customer behavior. Externally, factors like competition, evolving consumer preferences, and market trends make it even harder to tackle these challenges.

5 Problem Solving Approach

To solve the issues identified, i will perform exploratory data analysis to analyse the customer purchase behaviour patterns and product sales patterns using the data visualization techniques. this analysis will help in improving the product performances and sock availability optimization and will increase the decision making in business

METHODOLOGY:

1.Data Cleaning: The first step will be clean the data and preprocess the data to handle to missing values and make data consistent. I will organize the data into structured format for easy and better analysis.

2. Understanding the patterns in data: I will use the visualization tools like bar charts, line graphs and histograms to analyse the sales patterns, seasonal demands and customer preferences. From the data i will identify the top-selling products, demand fluctuations over time and slow moving items. I will analyse the product patterns to avoid under-stocking and overstocking situations. checking order frequency will help to determine which product need attention in order to ensure products are always available.

I will analyse the customer purchase behaviour to know how frequently customers buy certain products and check whether customers buy same products together.

3. Recommendations: by identifying the product preferences and past purchase patterns, i will group customers based on their shopping habits to suggest relevant products and by creating lists of frequently bought items together items to encourage cross-selling and up-selling. i will use association rule mining(i.e. customer who bought X may also bought Y) to create product grouping strategies.

DATA COLLECTION:

I collected the data from Kaggle. the available datasets includes customer purchase records and product details which i will be using to extract the meaningful insights. the main attributes in the dataset includes:

customer purchase data: customerId, order_number, SKU, item_name

products data: product_name, category, sub_category, brand, sale_price, market_price, type, rating

ANALYTICAL TOOLS & TECHNIQUES:

The analysis will be performed using Microsoft excel, python libraries like matplotlib, pandas, numPy for data analysis and visualization for plotting graphs like bar charts, line charts to showcase purchase patterns.

I will use correlation analysis to find relationship between products that are frequently purchased together.

6 Expected Timeline

6.1 Work Breakdown Structure:

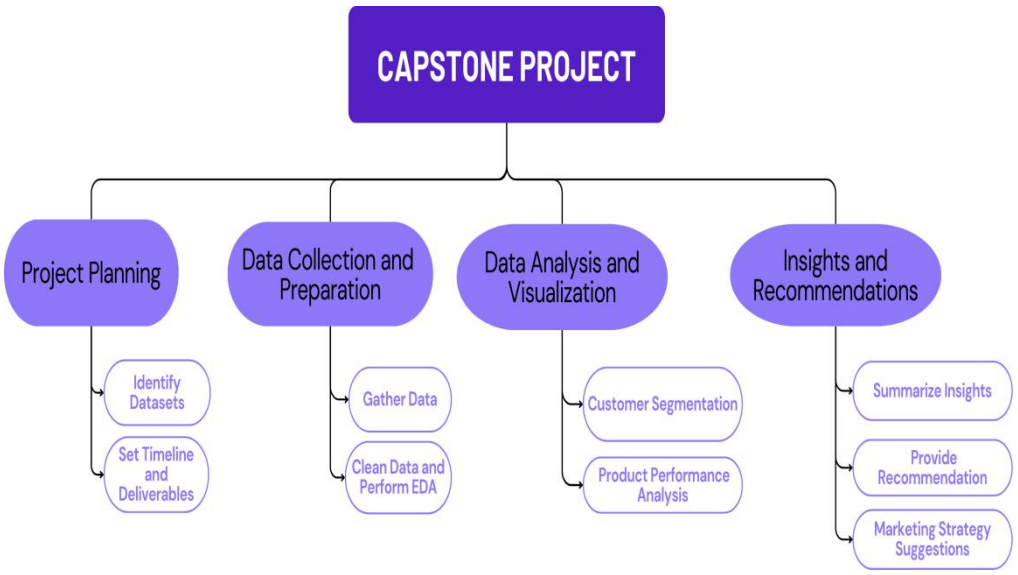

Figure: Work Breakdown stuccture for project

6.2 Gantt chart

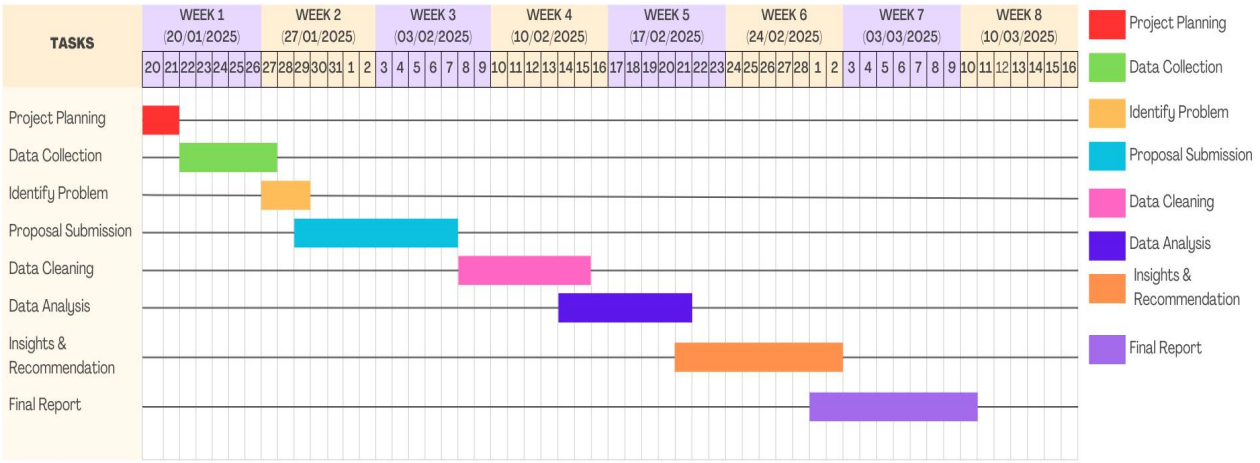

Figure: Expected timeline for completion of project

7 Expected Outcome

7.1 Better inventory planning and better understanding of which products are more sold.

7.2 Improved customer engagement by providing personalized product recommendations and special offers to encourage customers to try new products.

7.3 Data driven insights used to plan discounts and stock the products wisely in order to boast the business