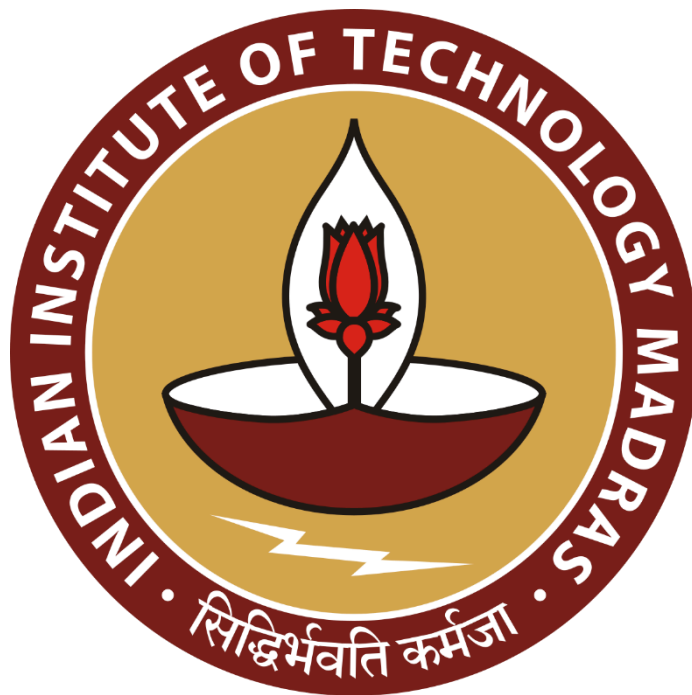# Amazon Sales & Fulfillment: Data-Driven Insights for Optimization & Growth

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled "**Amazon Sales & Fulfillment: Data-Driven Insights for Optimization & Growth**". I extend my appreciation to **Amazon**, for providing the necessary resources that enabled me to conduct my project.
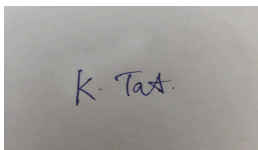
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

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

Name: Tarun Kandarpa

Date: 07/02/2024

1 Executive Summary

The project focuses on analyzing Amazon's e-commerce operations data and addressing the key challenges in order fulfillment, cancellations, logistics, and promotional strategies. One of the major business challenges arises from the high order cancellation rate, along with inefficiencies in fulfillment, shipping delays, and ineffective promotional strategies. These factors not only lead to revenue loss but also reduce customer satisfaction and cause logistical inefficiencies.

To address these challenges, the project will use various analytical approaches such as data cleaning and preprocessing to ensure accuracy, data visualization through graphs and charts for clear insights, and exploratory data analysis (EDA) to identify key trends in cancellations, order fulfillment, logistics, and pricing. Moreover, statistical and predictive analytics will also be employed to forecast demand, optimize inventory levels, and improve seller performance.

The expected outcome is to reduce order cancellations, enhance logistical efficiency, and improve promotional effectiveness. By optimizing fulfillment strategies, the project will enhance customer satisfaction, thereby improving Amazon's competitive position and driving higher sales performance. Ensuring efficient stock management and reducing delivery delays as well as transportation problems will help Amazon maintain excellent operations, ensuring smooth business performance and sustainable growth.

2 Organization Background

Amazon is one of the world's largest e-commerce giants whose business operates in both B2B and B2C markets. It has revolutionized online shopping by offering a vast selection of products across various categories, including electronics, fashion, home essentials, books, groceries and many more. Since its inception, Amazon has continually expanded its operations, leveraging advanced technology, robust logistics, and an extensive seller network to cater to millions of customers globally. The company's fulfillment infrastructure, including Fulfilled by Amazon (FBA) and third-party seller services ensures fast, reliable and efficient deliveries, allowing customers to receive products quickly and enjoy a seamless shopping experience, further solidifying Amazon's position as a leader in online retail.

3 Problem Statement

Despite its success, Amazon faces operational challenges such as order cancellations, logistics inefficiencies, and competitive pressures, necessitating data-driven strategies for continued growth and customer satisfaction. Amazon must address critical operational challenges to enhance efficiency, optimize customer satisfaction, and drive overall business growth while maintaining its competitive edge in the market:

3.1. **High Order Cancellations**: A significant portion of orders is being canceled, leading to lost revenue and potential dissatisfaction among customers. High cancellation rates can indicate issues such as misleading product descriptions, pricing concerns, or logistical inefficiencies.

3.2. **Fulfillment and Delivery Challenges**: Variability in fulfillment methods, with seller-managed fulfillment sometimes causing delays, impacts delivery reliability. This inconsistency affects customer trust and overall satisfaction.

3.3. **Ineffective Promotional Strategies**: Many orders do not have any associated promotions, potentially indicating a lack of engagement with discount strategies or ineffective targeting of deals to customers.

4 Background of the Problem

Amazon experiences a significant number of order cancellations, leading to revenue loss and increased operational costs. Customers may cancel orders due to unclear product descriptions, pricing concerns, or fulfillment issues. High cancellation rates can also indicate problems with seller reliability, delivery timelines, or product quality, which ultimately impact customer trust and long-term retention.

In addition, inconsistencies in fulfillment methods, especially with third-party sellers, can result in delays and an unreliable delivery experience. Seller-fulfilled orders may not meet the same standards as Amazon's Fulfilled by Amazon (FBA) program, leading to late shipments

and dissatisfied customers. These logistical inefficiencies put additional strain on Amazon's marketplace reputation and can drive customers toward competitors with more reliable shipping services.

Furthermore, a significant percentage of orders do not leverage promotions, suggesting that discount campaigns and pricing strategies may not be optimized. This can result in lower conversion rates, making Amazon less competitive compared to other ecommerce platforms that offer more attractive deals. Additionally, ineffective promotional strategies may indicate gaps in understanding customer buying behavior, leading to missed opportunities for boosting sales and retaining customers.

5   Problem Solving Approach

5.1. Data Acquisition, Cleaning, and Organization

A1	fx	index											
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	index	Order ID	Date	Status	Fulfilment	Sales Channel	ship-service-leve	Style	SKU	Category	Size	ASIN	Courier Status
2	0	405-8078784-57	04-30-22	Cancelled	Merchant	Amazon.in	Standard	SET389	SET389-KR-NP-	Set	S	B09KXVBD7Z	
3	1	171-9198151-11	04-30-22	Shipped - Delive	Merchant	Amazon.in	Standard	JNE3781	JNE3781-KR-XX	kurta	3XL	B09K3WFS32	Shipped
4	2	404-0687676-72	04-30-22	Shipped	Amazon	Amazon.in	Expedited	JNE3371	JNE3371-KR-XL	kurta	XL	B07WV4JV4D	Shipped
5	3	403-9615377-81	04-30-22	Cancelled	Merchant	Amazon.in	Standard	J0341	J0341-DR-L	Western Dress	L	B099NRCT7B	
6	4	407-1069790-72	04-30-22	Shipped	Amazon	Amazon.in	Expedited	JNE3671	JNE3671-TU-XX	Top	3XL	B098714BZP	Shipped
7	5	404-1490984-45	04-30-22	Shipped	Amazon	Amazon.in	Expedited	SET264	SET264-KR-NP-	Set	XL	B08YN7XDSG	Shipped
8	6	408-5748499-68	04-30-22	Shipped	Amazon	Amazon.in	Expedited	J0095	J0095-SET-L	Set	L	B08CMHNWBN	Shipped
9	7	406-7807733-37	04-30-22	Shipped - Delive	Merchant	Amazon.in	Standard	JNE3405	JNE3405-KR-S	kurta	S	B081WX4G4Q	Shipped
10	8	407-5443024-52	04-30-22	Cancelled	Amazon	Amazon.in	Expedited	SET200	SET200-KR-NP-	Set	3XL	B08L91ZZXN	Cancelled
11	9	402-4393761-03	04-30-22	Shipped	Amazon	Amazon.in	Expedited	JNE3461	JNE3461-KR-XX	kurta	XXL	B08B3XF5MH	Shipped
12	10	407-5633625-69	04-30-22	Shipped	Amazon	Amazon.in	Expedited	JNE3160	JNE3160-KR-G-	kurta	S	B07K3YQLF1	Shipped
13	11	171-4638481-63	04-30-22	Shipped	Amazon	Amazon.in	Expedited	JNE3500	JNE3500-KR-XS	kurta	XS	B098117DJ3	Shipped

Gather data on SKUs with the highest sales volume to identify revenue trends, pricing patterns, and order fluctuations. Clean and structure this data to eliminate inconsistencies, remove duplicates, and ensure accuracy using tools like Excel, Google Sheets, and Python. Organizing this information helps recognize demand cycles, track consumer preferences, and make informed inventory decisions.

5.2. Sales Insights and Order Analysis

Analyze overall sales performance and order status to gain insights into purchasing behavior, demand fluctuations, frequent cancellations, and refund patterns. Categorize products based

on revenue contribution to identify strong and weak-performing segments, optimize stock levels, and refine sales strategies to minimize cancellations and improve conversion rates.

5.3. Factors Influencing Sales Trends

Investigate product returns and cancellations to uncover patterns related to product quality, pricing, or customer expectations. Analyze revenue trends alongside order quantities to detect inconsistencies affecting sales performance. Recognize peak sales periods to maintain adequate inventory levels and optimize restocking strategies.

5.4. Data Correlation for Smarter Decision-Making

Assess SKU performance in relation to cancellation rates to pinpoint inefficiencies in inventory management. Understand how pricing strategies influence customer behavior to make data-driven adjustments. Identify seasonal demand variations to guide stock replenishment and promotional planning.

5.5. Forecasting and Inventory Optimization

Utilize Python libraries such as pandas, numpy, and scikit-learn to develop regression models that forecast future sales trends. Apply statistical analysis to pricing patterns and order fluctuations to quantify the impact of key market variables on demand. Gain precise stock planning insights to reduce losses from overstocking or stockouts.

### 5.6. Data-Driven Strategies for Business Growth

Address high cancellation rates through refined customer engagement and policy adjustments to enhance sales stability. Implement effective inventory management to balance stock levels, preventing shortages and excess supply. Optimize pricing and supply chain processes through data-driven insights to improve operational efficiency, profitability, and overall sales performance.

6 Expected Timeline

6.1. Work Breakdown Structure

WBS ID	Task Name	Start Date	End Date	Duration (Days)
1	Data Collection	2025-01-27	2025-02-02	6
2	Proposal Preparation and Submission	2025-02-03	2025-02-08	6
3	Data Cleaning	2025-02-09	2025-02-12	4
4	Exploratory Data Analysis	2025-02-13	2025-02-19	7
5	Visualization and Insights	2025-02-28	2025-03-04	5
6	Final Submission Preparation	2025-03-03	2025-03-10	8
7	Final Submission	2025-03-11	2025-03-13	3

6.2. Gantt Chart
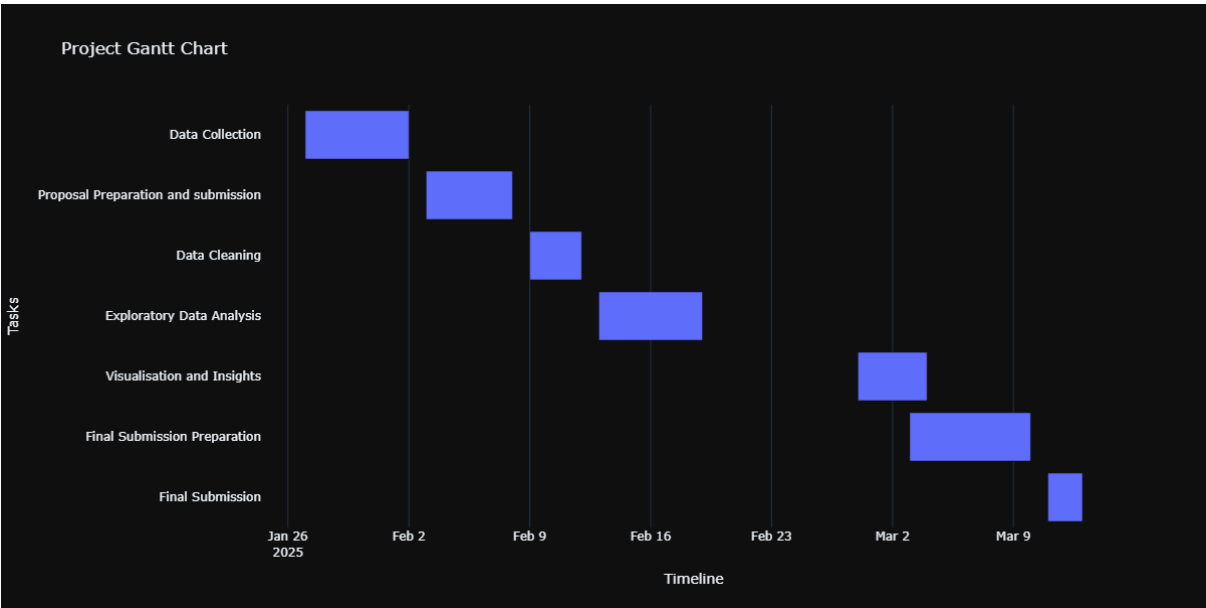
7 Expected Outcome

The anticipated results after executing the proposed solutions are:

- **Minimized Order Cancellations:** By identifying recurring patterns and key factors behind cancellations, strategic changes in fulfillment operations will lead to higher order completion rates and a better customer experience.
- **Stronger Customer Loyalty:** Personalized promotional strategies and improved delivery reliability will encourage repeat purchases, fostering long-term customer engagement.
- **Streamlined Logistics & Supply Chain:** Enhancing inventory management and leveraging predictive analytics will help mitigate supply chain disruptions, ensuring timely order fulfillment.
- **Higher Revenue & Profit Margins:** A shift towards targeted marketing efforts and optimized discount structures will boost sales while maintaining sustainable profitability.
- **Better Financial Stability:** Effective monitoring of supplier payment cycles and optimizing cash flow management will ensure smooth operations and timely restocking of products.
- **Smarter Business Strategies:** Utilizing data-driven insights will enable informed decision-making, helping the business remain competitive and adaptable to market trends.