

# Walmart Sales Analytics - Epsilon Mid Project Report

## 1. Introduction

Walmart, the world's largest retailer, faces substantial operational challenges in managing inventory efficiently across its global network of stores. Factors such as fluctuating customer demand, seasonal promotions, and external influences like weather create complexities in ensuring optimal stock levels. In this project, we analyze a dataset containing 5,000 transactions with 28 sales-related features to uncover insights that support strategic decision-making in inventory and sales optimization.

## 2. Objectives

- Understand sales trends and top-performing products.
- Evaluate the effectiveness of promotional campaigns.
- Analyze stockout issues and customer purchasing behavior.
- Provide forecasting insights to optimize inventory management.
- Identify high-value customers and transaction patterns.

## 3. Dataset Overview

- Total Records: 5,000 transactions
- Attributes: 28 columns related to product sales, customer demographics, promotions, weather, and more.

## 4. Exploratory Data Analysis

### 4.1. Sales and Product Insights

- Top-Selling Products by Quantity: Tablet, Fridge, TV, Camera, Smartphone
- Top-Selling Products by Revenue: TV, Tablet, Fridge, Smartphone, Washing Machine
- Sales Trends: Highest Sales Month: August, Lowest Sales Month: September
- Best Performing Stores: Los Angeles, Chicago, New York
- Promotion Impact: Slight increase in sales
- Frequent Stockouts: Tablet and Fridge

### 4.2. Customer Behavior and Demographics

- Age Group with Highest Spending: 32-35 and 41-45

- Loyalty Program: Platinum members spend the most
- Weather Impact: Sunny and stormy days boost sales; rainy days reduce them
- Holiday Impact: Slight increase in sales during holidays

#### 4.3. Forecasting and Inventory Management

- Forecast Accuracy: MAE = 0.335
- Top Product Categories: Electronics and Appliances
- Payment Preferences: Digital Wallets > Credit Cards
- Supplier Lead Time: 7-day leads to frequent stockouts
- Reorder Issues: Low inventory despite high reorder points

#### 4.4. Customer and Transaction Patterns

- Top High-Value Customer: Spent 2.5x average
- Best Sales Days: Thursdays and Mondays
- Peak Hours: 12 PM, 2 PM, 9 PM
- Frequent Pairings: Tablets and Smartphones
- Top Products by City: Chicago - TV, Dallas - Tablet, LA - Smartphone, Miami - Tablet, NY - Fridge
- Promotion Strategy: Percentage discounts > BOGO

### 5. Key Insights & Recommendations

- Address frequent stockouts of high-demand products
- Focus on percentage-based promotions
- Target high-spending age groups and loyalty members
- Improve forecast accuracy
- Prepare stock according to weather trends

### 6. Future Work

- Develop predictive models for demand forecasting
- Deep-dive into underperforming categories
- Build real-time dashboard
- Implement dynamic pricing and stock optimization

### 7. Conclusion

This analysis provides insights into Walmart's operations, enabling better stock and sales strategies.

Accurate forecasting and data-driven decisions will support improved efficiency and customer satisfaction.