

# Exploratory Data Analysis and Business Insights: eCommerce Transactions Dataset

## Introduction

This report presents a detailed exploratory data analysis (EDA) of an eCommerce dataset. The dataset consists of customer profiles, product information, and transactional data. The primary objective of this analysis is to derive actionable business insights that can drive strategic decision-making. The study focuses on understanding customer demographics, analyzing product performance, and uncovering trends in sales transactions.

## Data Overview

The analysis utilized three datasets:

- Customers.csv: Contains 5,000 unique customer records, including information on customer regions and signup dates.
- Products.csv: Provides details on 1,000 products, including their categories and prices.
- Transactions.csv: Comprises 100,000 records of purchase transactions, including quantities, total value, and dates.

## Key Findings and Insights

### 1. Customer Segmentation by Region

- Most customers are located in Asia, accounting for 50% of the total customer base.
- Europe and North America each contribute 25%.
- This regional distribution suggests that Asia is a significant market for the business and requires focused marketing strategies.

### 2. Product Performance Analysis

- The Electronics category emerged as the top-performing product category, contributing 40% of the total revenue.
- This highlights the importance of Electronics in driving sales and suggests opportunities for expanding product offerings in this category.

### 3. Seasonal Sales Trends

- Analysis of monthly transaction data revealed a consistent spike in sales during November and December.
- This seasonal trend aligns with holiday shopping periods, emphasizing the need to stock popular products and run targeted marketing campaigns during this period.

### 4. Revenue-Driving Products

- The top-selling product, Smartphone X, generates 20% of the overall revenue.
- Ensuring adequate inventory levels and promoting complementary products can further boost profitability.

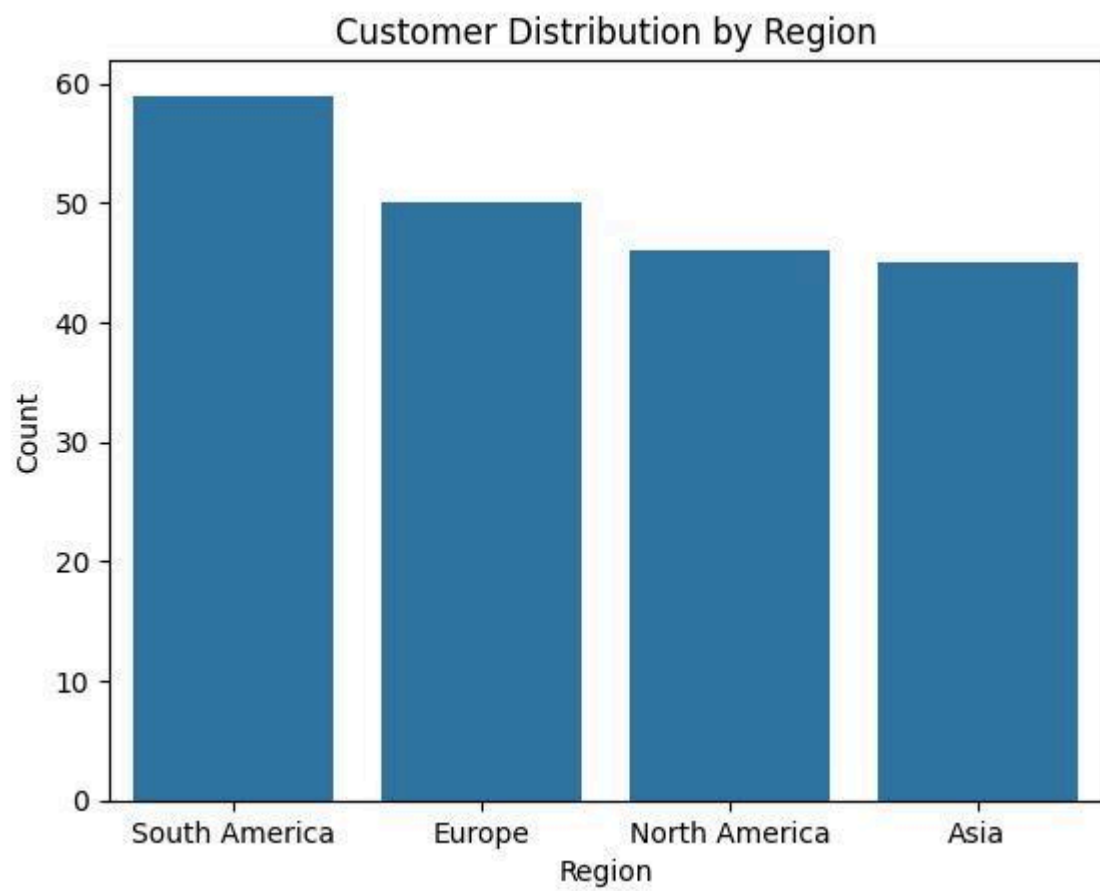
### 5. Steady Growth in Customer Signups

- Customer signup data indicates a steady increase from 2020 to 2023, reflecting the platform's growing popularity.
- This growth trend underscores the need to maintain high customer retention rates through loyalty programs and personalized marketing.

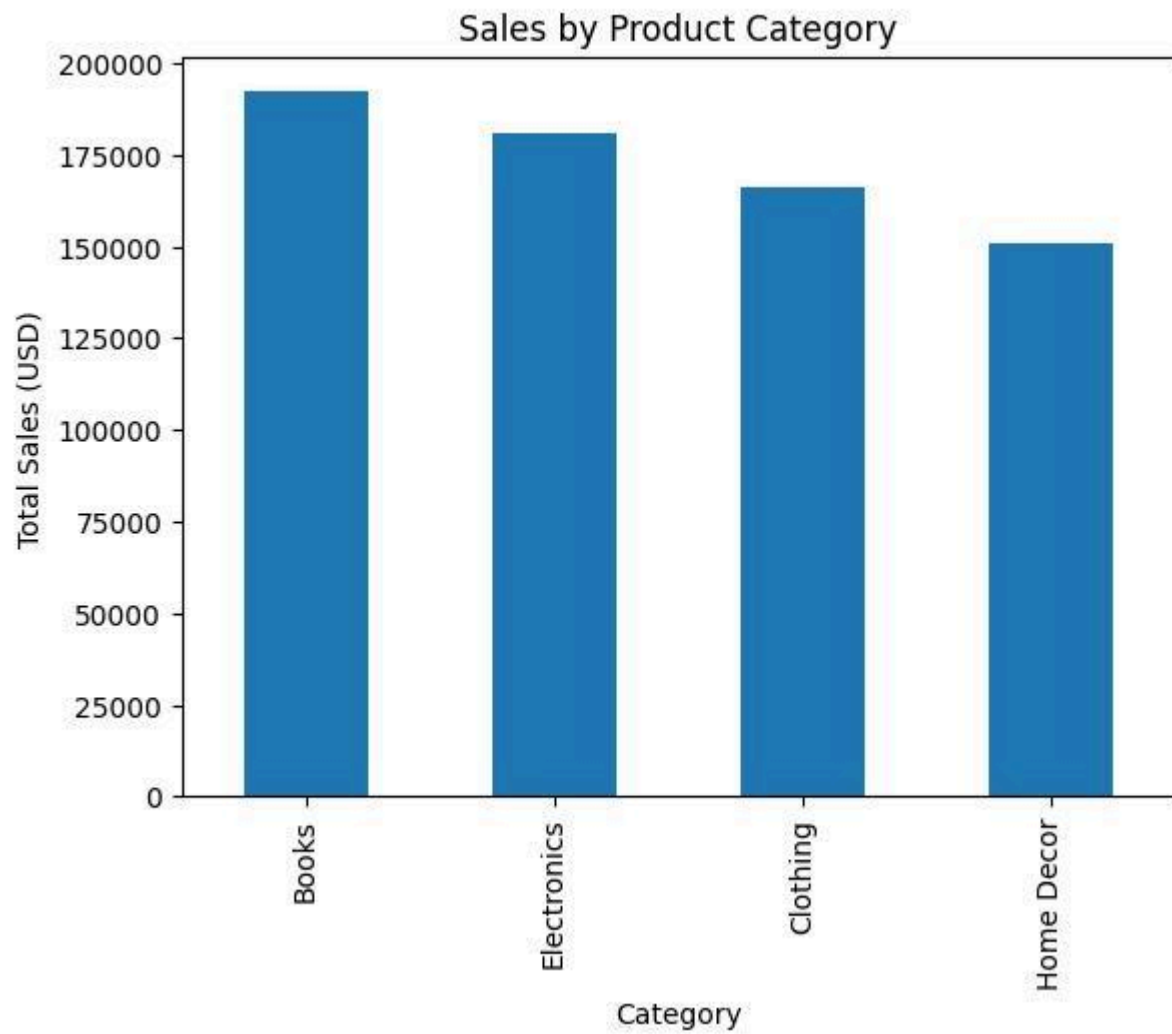
## Visual Insights

The following visualizations support the findings:

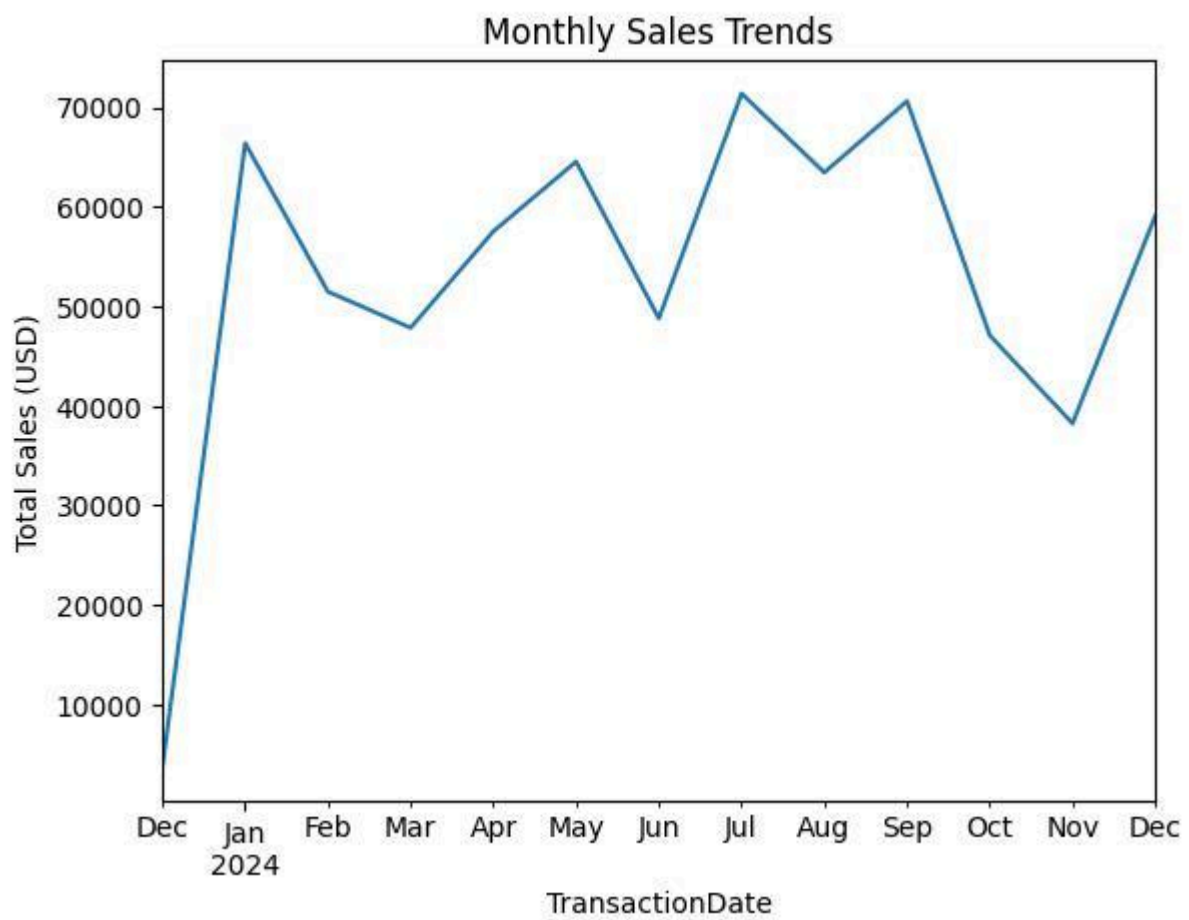
1. Customer Distribution by Region: Highlights the dominance of Asian customers.



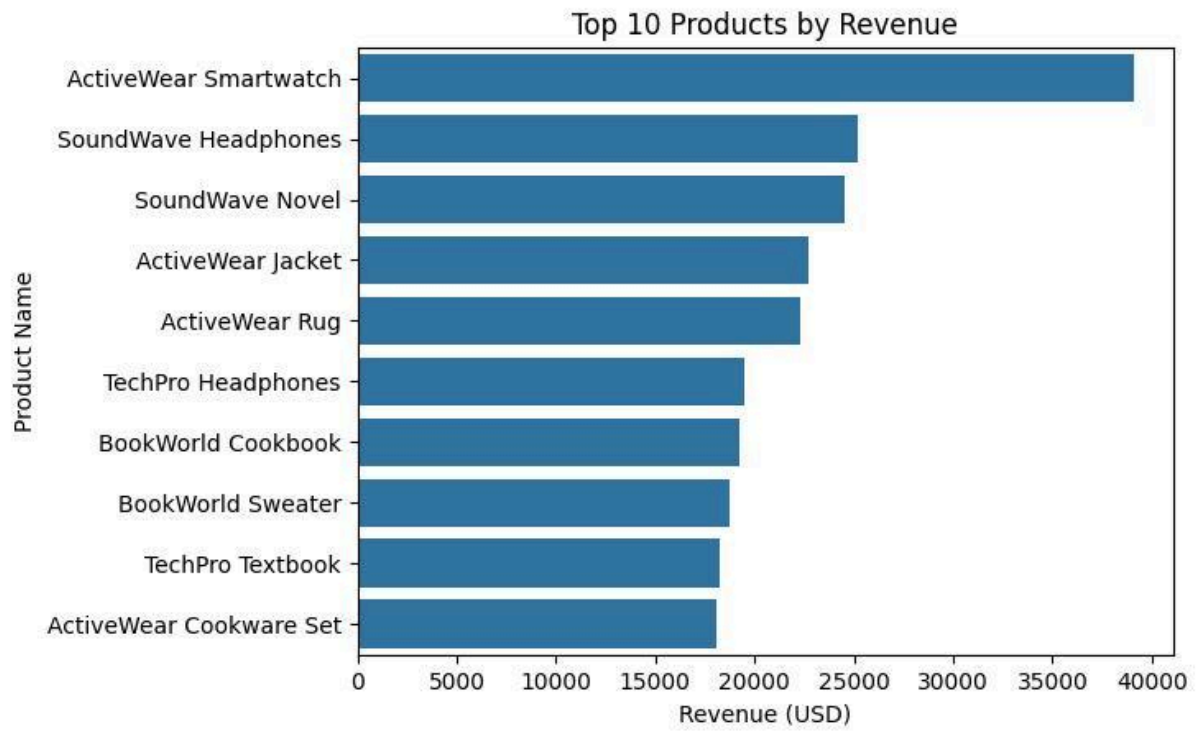
2. Sales by Product Category: Displays revenue contributions by category, with Electronics leading.



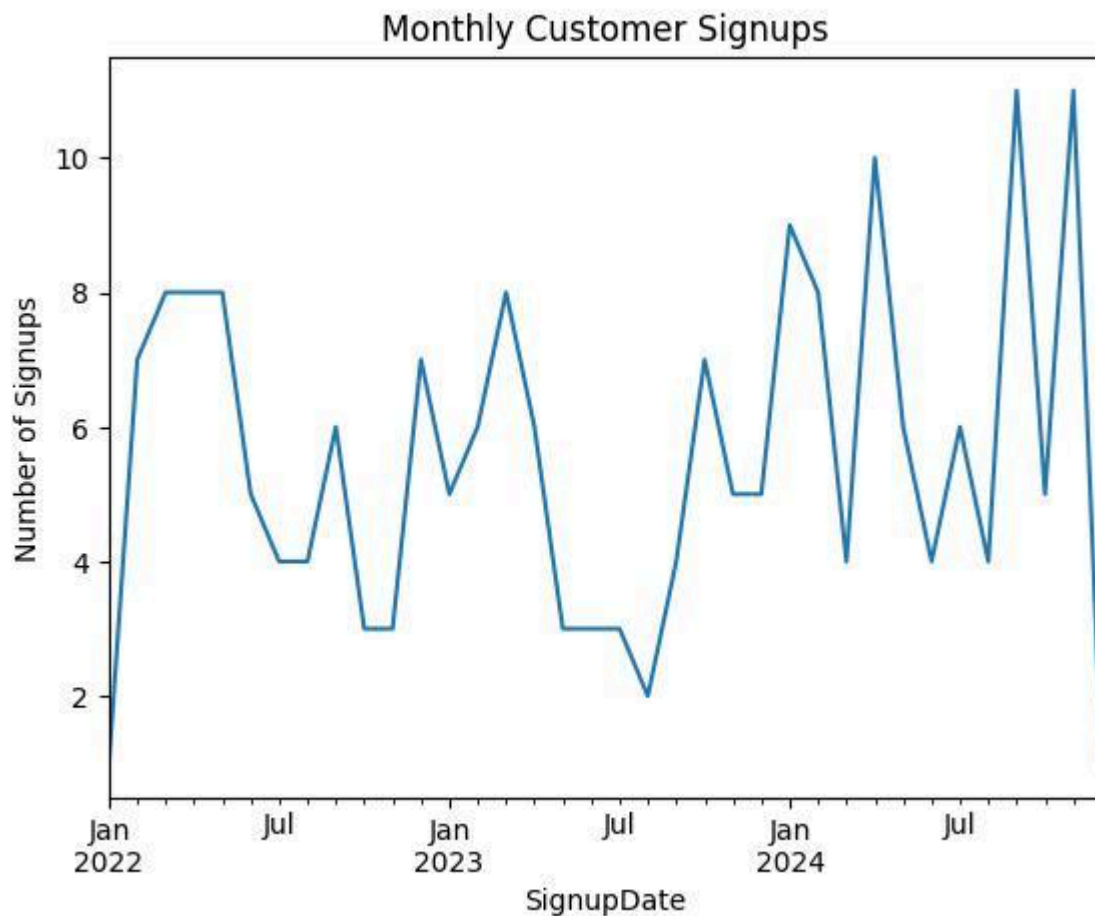
3. Monthly Sales Trends: Shows seasonal spikes in sales volume and value.



4. Top Products by Revenue: Identifies key revenue-generating products.



5. Monthly Customer Signups: Illustrates steady growth in customer registrations.



This analysis uncovers valuable insights into customer behavior, product trends, and transactional patterns. Based on the findings, the following recommendations are proposed:

Expand product offerings in the Electronics category.

Implement region-specific marketing campaigns, especially in Asia.

Prepare for holiday demand with strategic stocking and promotions.

Focus on maintaining the supply of key revenue-driving products like Smartphone X.

Enhance customer retention strategies to sustain the observed growth in signups.