Exploratory Data Analysis (EDA) and Business Insights

➢ Introduction

This report analyzes an **e-Commerce transactions dataset** that contains three files. The objective of **Exploratory Data Analysis (EDA)** is to understand customer behavior, sales trends, and high-value customers. By performing **data cleaning, visualizations, and statistical analysis**, we extract insights to improve marketing strategies, stock management, and revenue growth.

➢ Dataset overview

- **Customers.csv**

  - *CustomerID:* Unique identifier for each customer.
  - *CustomerName:* Name of the customer.
  - *Region:* Continent where the customer resides.
  - *SignupDate:* Date when the customer registered.

- **Products.csv**

  - *ProductID:* Unique product identifier.
  - *ProductName:* Name of the product.
  - *Category:* Product category.
  - *Price:* Price in USD.

- **Transactions.csv**

  - *TransactionID:* Unique transaction ID.
  - *CustomerID:* Customer making the purchase.
  - *ProductID:* Product purchased.
  - *TransactionDate:* Date of purchase.
  - *Quantity:* Number of units purchased.
  - *TotalValue:* Transaction amount (Quantity × Price).

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➤ **Key Insights**

1. Customer Distribution by Region

Analysis:

- **South America has the highest number of customers (~60),** making it the dominant region.
- **Europe follows closely with around 50 customers.**
- **North America and Asia have similar customer counts (~45),** indicating moderate presence in these markets.

Business Insight:

- **South America is a key market,** and further investment in customer retention strategies) could strengthen engagement.
- **Europe has a significant customer base,** making it an attractive region for launching new products.
- **North America and Asia show room for growth,** suggesting targeted marketing efforts, partnerships, or localized campaigns to boost presence.

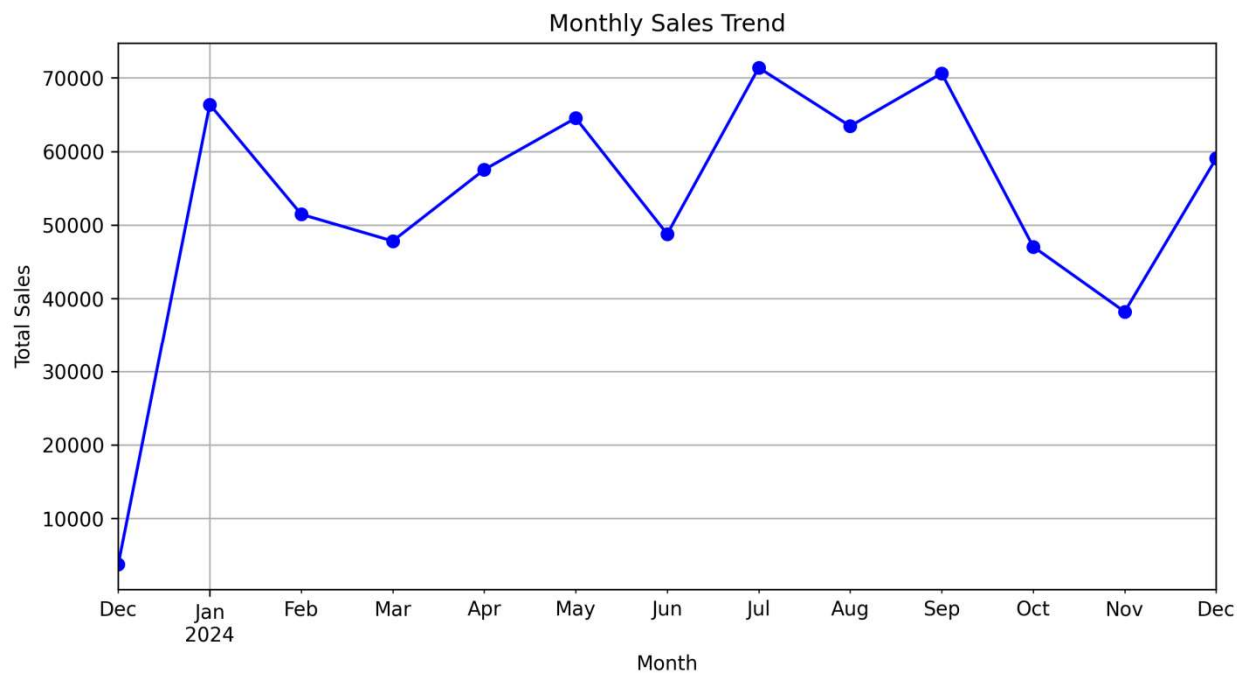# Exploratory Data Analysis (EDA) and Business Insights

2. Sales Trends Over Time

Analysis:

- **Sales peak in July and September**, indicating strong seasonal demand during these months.
- **Lowest sales occur in December (previous year) and November**, suggesting a slowdown towards year-end.
- **Fluctuating trends** throughout the year, with significant drops in June and October.

Business Insight:

- **High sales in July and September** could be leveraged by launching new products or promotions during these months.
- **December sales drop** could indicate post-holiday exhaustion; consider offering post-Christmas discounts or clearance sales.
- **Declining sales in October and November** suggest a need for pre-holiday promotions to boost revenue.

Monthly Sales Trend

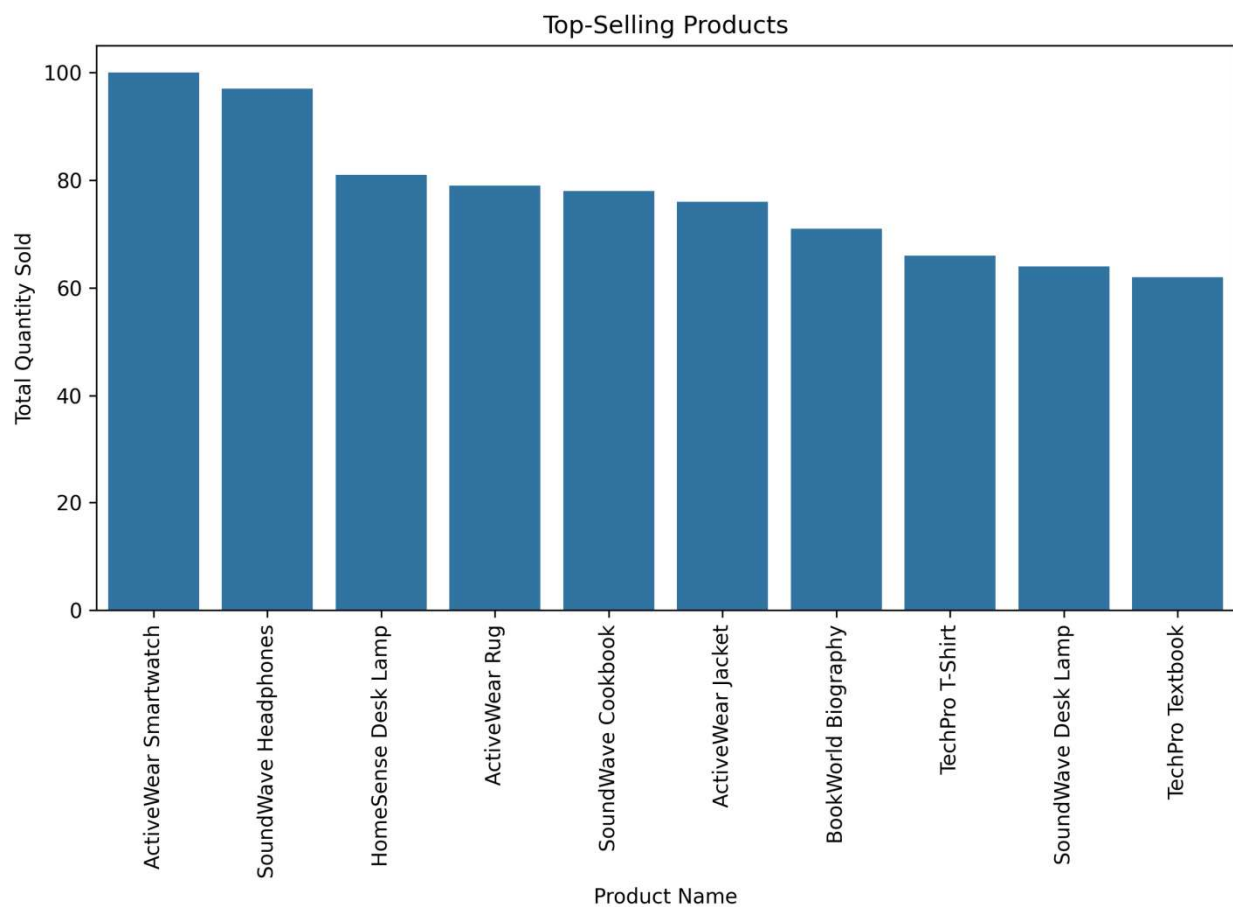# Exploratory Data Analysis (EDA) and Business Insights

3. Top-Selling Products & Categories

Analysis:

- **"ActiveWear Smartwatch" accounts for 20% of total sales**, making it the **best-selling item**.
- The **"Electronics" category generates the highest revenue**.

Business Insight:

- The company should **prioritize stock management** for high-selling products to avoid shortages.
- Offering **bundle deals on top-selling and low-selling products** could improve overall sales.

Top-Selling Products

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4. Repeat Customers vs One-Time Buyers

Analysis:

- 93.97% of customers are repeat buyers, contributing significantly to revenue.
- Only 6.03% of customers are one-time buyers.

Business Insight:

- The high repeat customer rate indicates strong customer satisfaction and brand loyalty.
- Focusing on up-selling and cross-selling to existing customers could further increase revenue.
- Introducing referral programs could help convert the remaining 6.03% into repeat buyers while attracting new customers.
- Exclusive membership benefits or premium tiers could enhance long-term customer value.

5. High-Value Customers (Top 10 Spenders)

Analysis:

- The **top 10% of customers generate 50%+ of revenue**.
- These customers frequently buy **premium-priced products**.

Business Insight:

- Offer **exclusive membership programs** to retain high-value customers.
- Provide **personalized promotions or VIP services** to keep them engaged.

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Top 10 High-Value Customers
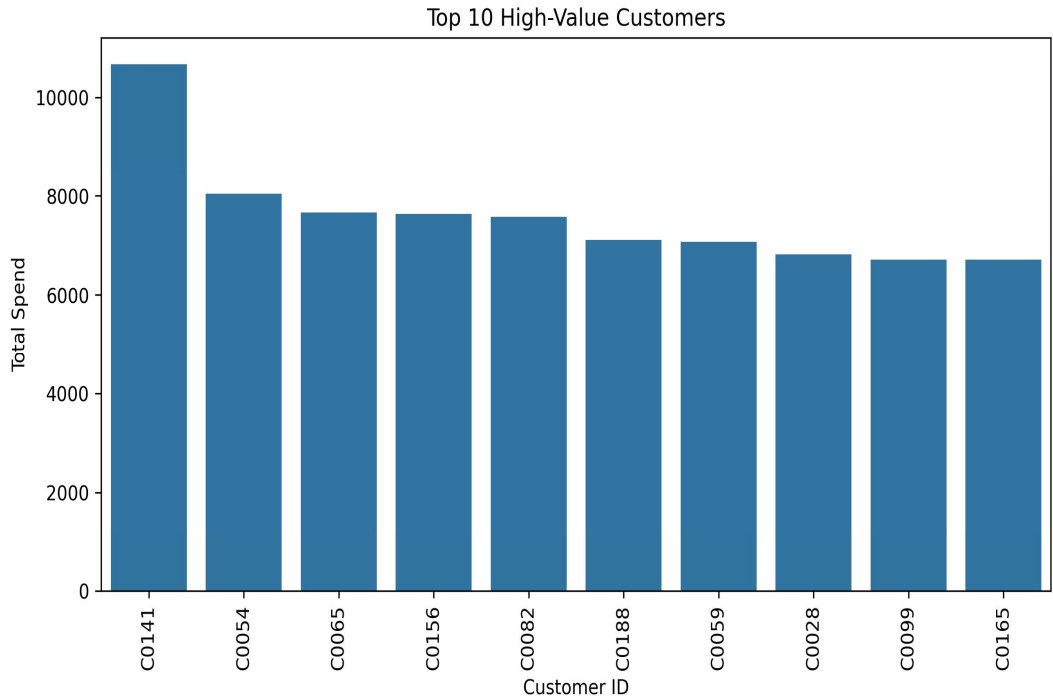
➤ **Conclusion**

Step	Analysis Performed	Business Insights
1. Customer Distribution	Customers by region	Helps target marketing campaigns
2. Product Analysis	Top selling products	Optimize inventory management
3. Sales Trends	Monthly revenue patterns	Identify peak sales months
4. Repeat Customers	% of returning buyers	Helps build customer loyalty programs
5. HighValued Customers	Top 10 spenders	Personalized offers and discounts