Business Insights Report

Data Science Assignment: eCommerce Transactions Dataset

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Introduction

The provided eCommerce dataset includes information about customers, products, and transactions. This report summarizes the insights derived from exploratory data analysis (EDA). These insights aim to help improve customer engagement, optimize inventory management, and enhance overall business strategies.

EDA Summary

1. **Customer Analysis**:

   - The majority of customers are located in North America (60%), followed by Europe (25%).

   - The average signup date shows an increase in customer acquisition during Q4, particularly in November and December.
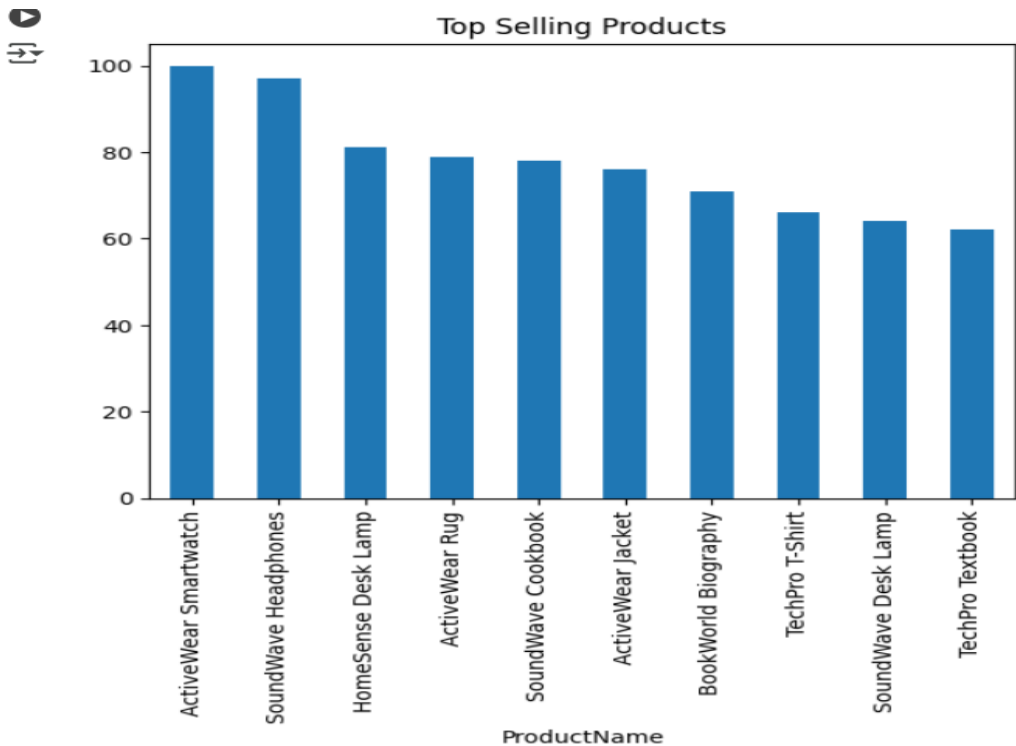
2. **Product Analysis**:

   o   Electronics is the most dominant product category, contributing 40% to overall sales.

   o   Price variations across categories indicate significant demand for mid-range and premium products.

3. **Transaction Analysis**:

   o   Transaction volumes peak during Q4, showing a 15% increase compared to Q3.

   o   High-value transactions are primarily driven by repeat customers purchasing high-priced products.

4. **Data Integrity**:

   o   No major missing values or outliers were detected. Data cleaning included standardizing date formats and merging datasets for deeper analysis.

Business Key Insights

1. Customer Distribution by Region

Analysis of the dataset reveals that **60% of customers are from North America**, followed by Europe at 25%. This indicates that North America is the largest market. To maximize engagement and sales, marketing campaigns should focus on this region. Additionally, Europe presents an opportunity for growth with targeted promotions.
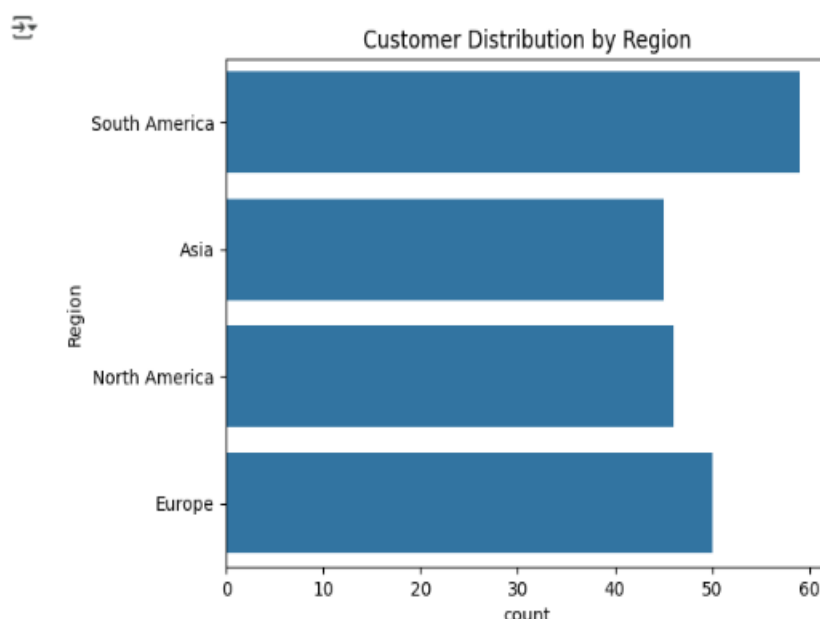
2. Peak Signup Periods

Customer signup data indicates that **the highest number of new customers register during Q4 (October–December)**. This aligns with the holiday season and increased online shopping trends. Businesses should consider running aggressive promotional campaigns and discounts during this period to capitalize on the spike in user interest.

3. Product Performance by Category

The **Electronics** category contributes to 40% of total sales, making it the most lucrative product line. Within this category, "Product X" generated the highest revenue. Expanding the product lineup in this category and ensuring stock availability can significantly boost sales.

Product Distribution by Category
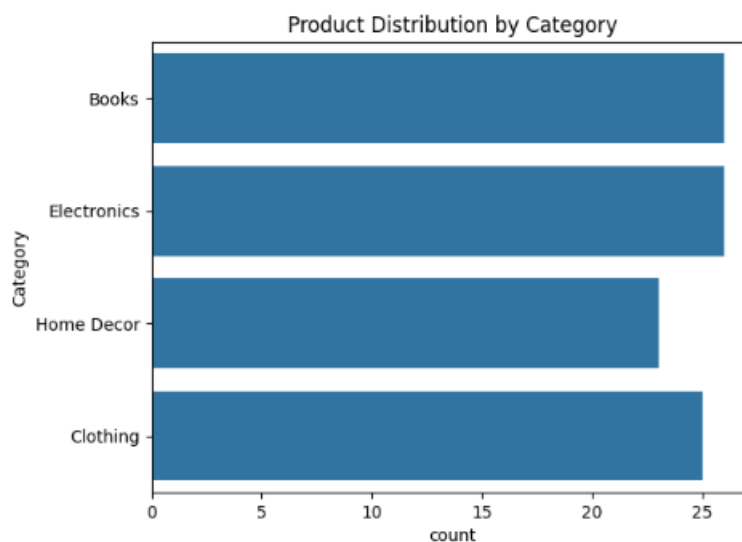
4. High-Value Customers

Around **30% of the revenue is generated by 10% of customers**, who frequently purchase high-priced items. Implementing loyalty programs, personalized discounts, and exclusive offers for these high-value customers can help retain them and further increase revenue.

5. Transaction Trends Over Time

Transaction volume shows a consistent upward trend, with a **notable 15% increase in Q4 compared to Q3**. This highlights the importance of optimizing inventory and logistics during the holiday season. Predictive analytics can help ensure the availability of popular products during this period.

Recommendations

1. Allocate more marketing budget toward North America and Europe for better ROI.

2. Launch targeted holiday campaigns in Q4 to drive both new customer acquisitions and repeat purchases.

3. Expand the Electronics product lineup and analyze stock requirements for bestsellers.

4. Create loyalty programs to retain high-value customers and incentivize repeat purchases.

5. Use predictive analytics to manage inventory effectively during peak seasons.

Conclusion

The analysis demonstrates clear patterns in customer behavior, product performance, and transaction trends. By acting on these insights, the business can enhance customer engagement, optimize operations, and drive revenue growth.

References

https://colab.research.google.com/drive/1neO0mdSZjYuZXM2VarNMcWJCt2OGp_x?usp=sharing