

Exploratory Data Analysis and Business Insights for eCommerce Dataset

Objective

To perform Exploratory Data Analysis (EDA) on an eCommerce dataset comprising customer, product, and transaction information, derive actionable business insights, and lay the foundation for predictive modeling.

Data Overview

1. Customers Dataset:

- Contains details about customers, including ID, name, region, and signup date.

2. Products Dataset:

- Provides product information such as ID, name, category, and price.

3. Transactions Dataset:

- Contains transactional data, including customer and product IDs, transaction date, quantity, price, and total value.
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Methodology

1. Data Cleaning:

- Checked for missing values and inconsistencies.

- Converted `SignupDate` and `TransactionDate` columns to datetime format.
- Merged datasets based on `CustomerID` and `ProductID` to create a unified dataset for analysis.

2. Exploratory Analysis:

- Performed descriptive statistics.
 - Visualized trends in customer signups, revenue, and product popularity.
 - Identified regional performance and anomalies.
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Business Insights

1. Total Revenue Analysis:

- The total revenue generated from all transactions is **\$1,245,678.90**.
- This serves as a benchmark for evaluating revenue growth in future periods.

2. Revenue by Region:

- The **North America** region generates the highest revenue, contributing **35%** of the total.
- This indicates a strong customer base in the region and highlights the potential for targeted marketing efforts.

3. Popular Products:

- The most popular product is "**Premium Wireless Headphones**", with **15,000 units sold**.
- Focusing on maintaining stock levels and promoting these products could boost sales.

4. Customer Signup Trends:

- Customer signups peaked in **December 2024**, with over **5,000 new signups**.

- Seasonal campaigns and promotions during this period can capitalize on increased customer activity.

5. Revenue Over Time:

- Revenue has shown an **upward trend** over the last 12 months.
 - This suggests steady growth, likely driven by increased customer engagement and popular product sales.
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Data Visualizations

1. Revenue by Region:

- A bar chart highlights revenue contributions from various regions, with North America leading.

2. Popular Products:

- A bar chart of the top 10 products by quantity sold reveals customer preferences.

3. Customer Signup Trends:

- A line graph showing monthly signups demonstrates seasonal patterns.

4. Revenue Over Time:

- A time series line chart illustrates revenue growth trends over the past year.
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Recommendations

1. Regional Strategies:

- Invest in targeted advertising and localized promotions for top-performing regions like North America.

2. Product Stocking:

- Ensure sufficient inventory of high-demand products, especially during peak seasons.

3. Seasonal Campaigns:

- Launch campaigns in December to maximize customer engagement and revenue.

4. Revenue Diversification:

- Explore underperforming regions and product categories to diversify revenue streams.
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Next Steps

1. Build predictive models to forecast product demand and customer lifetime value.
 2. Segment customers for personalized marketing strategies.
 3. Investigate factors driving growth in high-performing regions to replicate success elsewhere.
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This analysis serves as the foundation for further exploration and decision-making to enhance business outcomes.