

Exploratory Data Analysis Report on eCommerce Dataset

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Introduction

This report analyzes an eCommerce transaction dataset to understand customer behavior and product sales. By studying the data, we aim to find useful patterns such as which products are popular, where most customers are located, and how much they usually spend. These insights can help businesses make better decisions and improve sales strategies.

Dataset Overview

The data comes from three files:

- **Customers.csv:** Contains details about customers such as their unique ID, name, region, and signup date.
- **Products.csv:** Includes product-related information like product ID, name, category, and price.
- **Transactions.csv:** Stores information about purchases, such as transaction ID, customer ID, product ID, quantity purchased, total value, and price.

By combining these datasets, we can better understand which customers buy which products and how much they spend.

Methodology

To analyze the data, we followed these simple steps:

1. **Data Cleaning:** We checked the data for any missing values or mistakes and fixed them.
2. **Data Exploration:** We looked at the data to find interesting patterns, such as which products are selling the most.
3. **Data Visualization:** We used charts and graphs to make the insights easier to understand.
4. **Business Insights:** Based on the analysis, we found important business trends and opportunities.

We used Python and tools like Pandas (for handling data) and Matplotlib and Seaborn (for creating charts) to complete this analysis.

Key Insights

1. Number of Customers by Region

Different regions have different numbers of customers, and this is a key insight for businesses aiming to understand their customer base. The data reveals that the highest number of customers come from **South America** and **Europe**, which are the primary markets. On the other hand, **Asia** and **North America** have relatively fewer customers, presenting an interesting **opportunity for growth**. Companies can explore ways to increase their reach in these regions through targeted marketing or localization strategies. For instance, promoting products that are popular in North America in similar markets in Asia could increase engagement.

2. Popular Product Categories

Understanding which product categories are popular can help businesses make informed decisions about their inventory and marketing strategies. The data shows that the most popular categories are **Books**, **Electronics**, and **Clothing** products. These categories seem to attract a large number of customers. By focusing on these popular categories, businesses can align their marketing efforts and product availability with customer demand. Offering **discounts or promotions** on popular products is a good way to increase sales. Additionally, knowing which categories are in demand helps businesses stock the right products.

3. Products with the Highest Number of Sales

When it comes to understanding customer preferences, looking at the products with the **highest number of sales** gives valuable insights. The **ActiveWear Smartwatch** is the top-seller, with 100 units sold. Other best-sellers include **SoundWave Headphones** (97 units) and **HomeSense Desk Lamp** (81 units). These products are in high demand, and businesses should ensure they are always available in stock to meet customer needs. Additionally, promoting these best-selling products through advertising or special deals can help bring in more customers. Since these products are popular, they are likely to attract more attention. Monitoring sales regularly helps businesses identify **which products are performing well** and which ones need more attention.

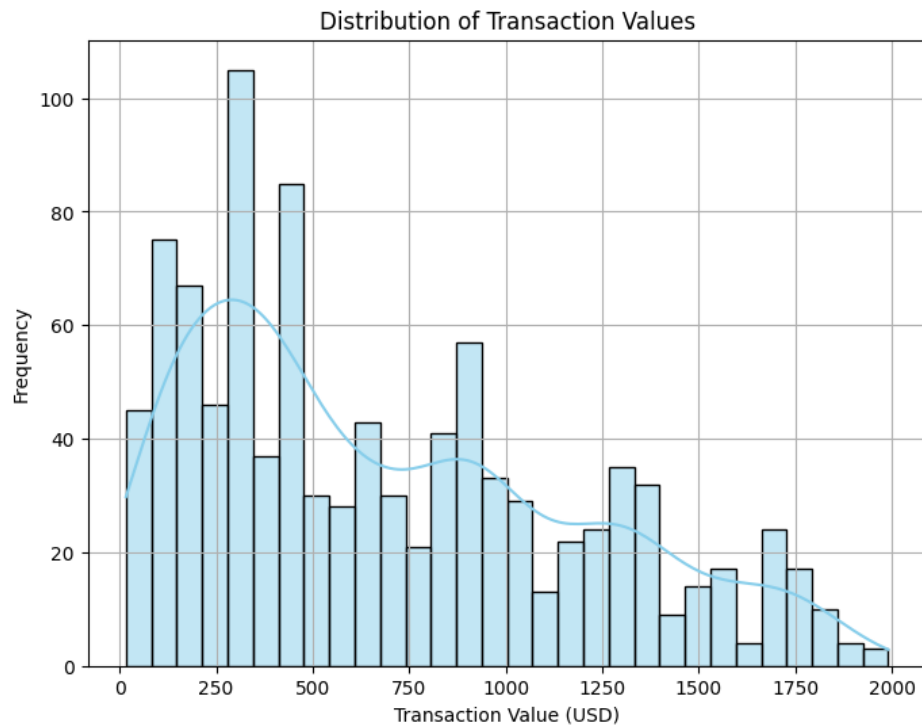
4. Top Revenue-Generating Products

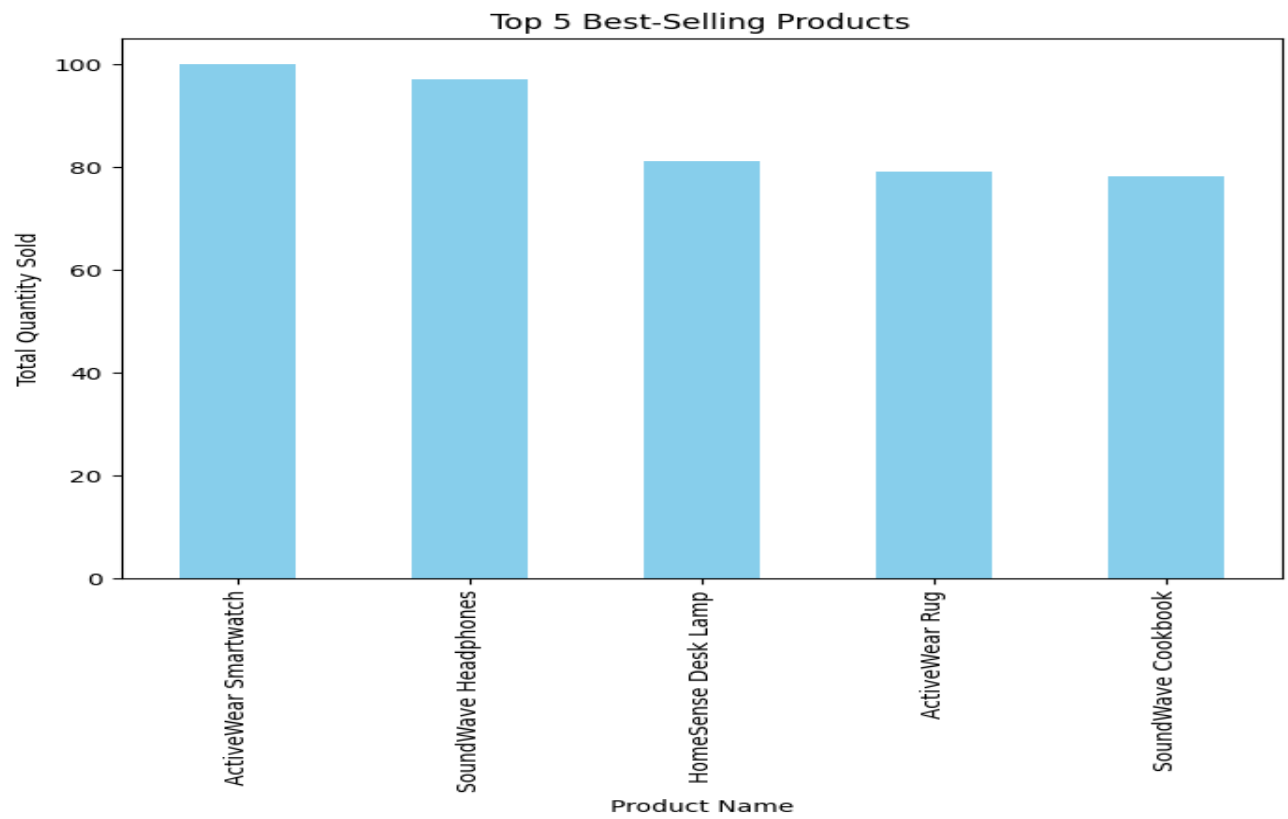
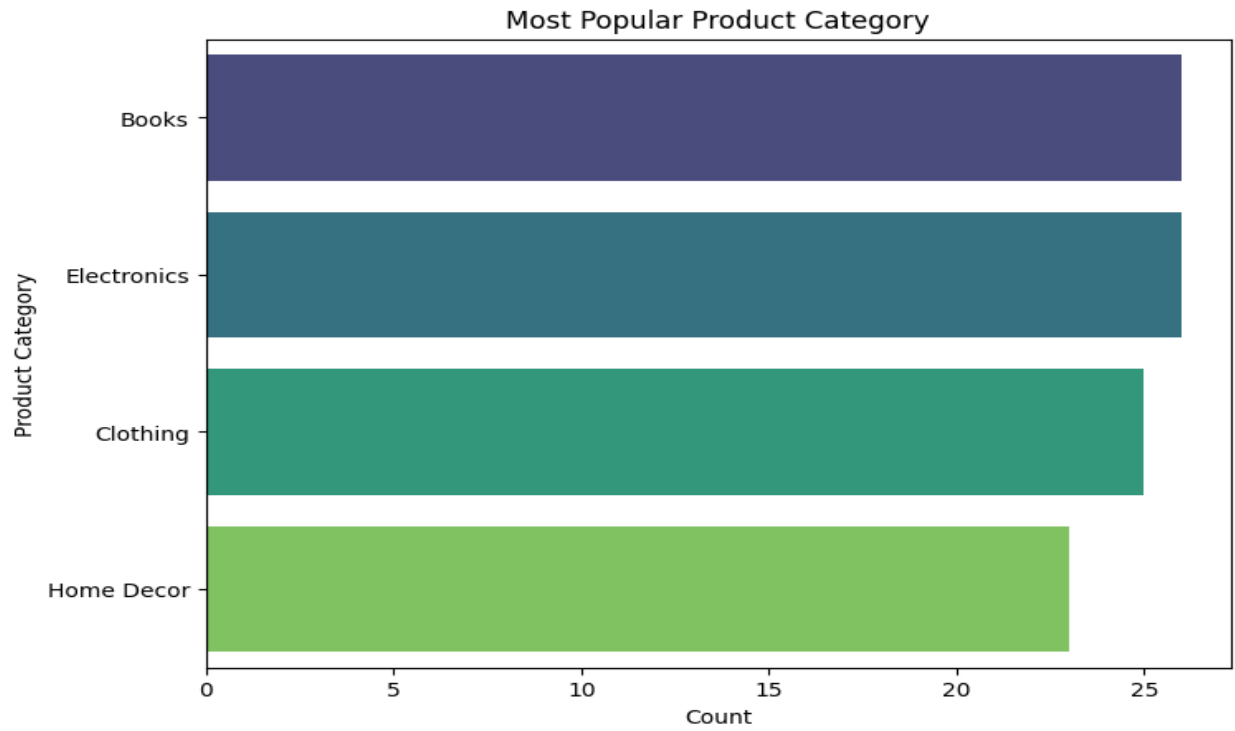
Revenue generation is crucial for any business, and understanding which products bring in the most money is key. The **ActiveWear Smartwatch** leads the revenue chart, contributing a total of **\$39,096.97**. Other top revenue-generating products include **SoundWave Headphones** (\$25,211.64) and **SoundWave Novel** (\$24,507.90). These products, although perhaps more expensive than others, make a significant contribution to total earnings. By promoting these high-earning products more actively, businesses can help increase overall revenue. Offering product bundles (e.g., pairing the ActiveWear Smartwatch with accessories) or special discounts can attract more buyers. These strategies can help generate more income by targeting customers who are willing to spend more.

5. How Much Customers Usually Spend per Transaction

The spending habits of customers provide useful insights for businesses. The data reveals that most customers tend to spend between \$100 and \$500 per transaction. However, some customers are willing to spend more, and their larger purchases significantly contribute to total revenue. Encouraging customers to buy more items in one order can lead to an increase in spending. For instance, businesses can introduce discounts or special offers for customers who spend above a certain amount, such as free shipping or a discount on their next purchase. By understanding how much customers are willing to spend, businesses can tailor their pricing strategies to ensure they are meeting customer expectations. Additionally, targeting high-spending customers with exclusive offers can increase customer loyalty and drive higher sales in the long term.

Visualization





Conclusion

From the analysis, we found that:

- Most customers are from North America and Europe.
- The ActiveWear Smartwatch is the most popular product.
- Customers usually spend between \$100 and \$500 per purchase.
- Some products bring in higher revenue than others, which can help businesses focus on the right items.
- These findings can help businesses make better decisions about inventory and marketing strategies.

Recommendations

Based on our findings, we recommend the following actions:

- **Focus on Best-Selling Products:** Promote top products like the ActiveWear Smartwatch to attract more customers.
- **Expand to New Regions:** Consider increasing marketing efforts in regions with fewer customers, such as Asia.
- **Offer Discounts:** Providing discounts on high-revenue products can encourage more purchases.
- **Improve Inventory Management:** Keep high-demand products well-stocked to avoid missing sales opportunities.
- **Understand Spending Patterns:** Analyze customer spending habits to offer personalized recommendations and deals.