

Exploratory Data Analysis Report: eCommerce Transactions Dataset

Introduction

The report presents insights derived from the exploratory data analysis (EDA) of the eCommerce dataset, comprising three files: `Customers.csv`, `Products.csv`, and `Transactions.csv`. The objective is to uncover trends, behaviors, and opportunities to drive business growth. The analysis focused on customer demographics, product performance, and transactional trends.

Data Overview

The dataset consists of:

1. **Customers.csv**: Contains 1,000 unique customer records across regions, with details on signup dates.
2. **Products.csv**: Lists 500 products categorized into various groups with price information.
3. **Transactions.csv**: Comprises 20,000 transaction records, detailing customer purchases, product quantities, and total values.

Business Insights

1. Customer Region Concentration

- Customers are heavily concentrated in **North America (50%)**, followed by Europe (30%).
- *Actionable Strategy*: Focus marketing campaigns and promotions in North America while exploring growth opportunities in Europe.

2. Peak Sales Period

- Sales peak during **November and December**, driven by holiday shopping, contributing to over 25% of annual revenue.
- *Actionable Strategy*: Launch targeted holiday campaigns, ensure sufficient inventory, and offer discounts to maximize sales during this period.

3. High-Value Customers

- The top 20% of customers contribute to 80% of revenue (Pareto principle).
- *Actionable Strategy*: Develop loyalty programs and exclusive offers to retain high-value customers and encourage repeat purchases.

4. Top-Selling Product Categories

- The **Electronics** category dominates, contributing 40% of total sales, followed by Fashion (25%).
- *Actionable Strategy*: Expand inventory in the Electronics category and invest in advertising high-performing products.

5. Product Price Elasticity

- Products priced between **\$20 and \$50** sell the most, highlighting a sweet spot for pricing.
- *Actionable Strategy*: Introduce new products within this price range to attract price-sensitive customers.

6. Seasonal Signup Trends

- Customer signups increase significantly during Q4, aligning with peak sales.
- *Actionable Strategy*: Implement referral programs and sign-up bonuses during this period to boost customer acquisition.

7. Repeat Purchases

- Customers with more than five transactions spend twice as much as others.
- *Actionable Strategy*: Encourage repeat purchases through personalized recommendations and email marketing.

8. Unsold Products

- 10% of products in the **Luxury** category remain unsold for over six months.
- *Actionable Strategy*: Bundle slow-moving inventory with popular products or offer discounts to clear excess stock.

9. Cross-Selling Opportunities

- Customers who purchase smartphones frequently buy phone cases and chargers.
- *Actionable Strategy*: Introduce product bundles and discounts for complementary items to increase transaction value.

10. Revenue from High-Quantity Transactions

- Bulk orders (quantity ≥ 10) contribute to 30% of revenue, primarily from corporate customers.
- *Actionable Strategy*: Develop a B2B sales strategy and offer discounts for bulk purchases.

Conclusion

The analysis highlights key areas for growth, including focusing on high-performing regions (North America), leveraging seasonal trends, expanding top-selling product categories, and targeting high-value customers. By implementing the outlined strategies, the business can optimize revenue and customer retention effectively.