

Data Science Assignment: ecommerce Transactions Dataset

Task 1: Exploratory Data Analysis (EDA) and Key Business Insights

This report provides actionable insights derived from the analysis of an eCommerce transactions dataset comprising customers, products, and transactions. The following insights are based on trends, patterns, and statistical observations uncovered during the analysis.

Insight 1: Monthly Sales Trend Indicates Growth Opportunities

- **Observation :** The dataset reveals an average transaction value of \$689.99, with a range from \$16.08 to \$1,991.04, reflecting diverse customer spending. The average quantity per transaction is 2.54 items, with a peak of 4 items, indicating moderate bulk buying. Sales peak in December, supporting the seasonal trend. With a standard deviation of \$493.14, growth opportunities lie in capitalizing on high-revenue periods, particularly during holidays. The median transaction value of \$588.88 highlights the importance of mid-tier products. Recommendation: Implement targeted campaigns in peak months (November-December) and offer incentives for bulk purchases to stabilize revenue year-round.

Insight 2: Top 10 Products Drive Significant Revenue

- **Observation:** The graph showcases monthly sales trends, revealing fluctuating performance throughout the year. Peaks in January and June suggest seasonal influences, while dips in months like November highlight potential slowdowns. Aligning this with Insight 2, the revenue surge during high-performing months might be primarily driven by the top 10 products. Prioritizing these products during peak months could maximize profitability. Additionally, focusing on promotional strategies for low-performing months may help balance the revenue cycle.

Insight 3: Region-Based Customer Segmentation Suggests Growth Potential

- **Observation:** Region-based customer segmentation highlights growth potential across different markets. South America leads with 29.5%, showing significant untapped opportunities. Europe follows at 25%, indicating strong engagement but with room for expansion. Asia, at 22.5%, demonstrates promising potential in a dynamic market, while North America contributes 23%, reflecting a relatively stable yet competitive landscape. Tailored marketing and product strategies for each region can maximize growth, focusing on South America and Asia for accelerated gains.

Insight 4: High-Value Customers Account for Most Revenue

- **Observation:** High-value customers are crucial revenue drivers, with Paul Parsons, Bruce Rhodes, and Gerald Hines leading the group. Their high transaction values significantly contribute to overall sales, indicating strong loyalty or purchasing power. Strategies like

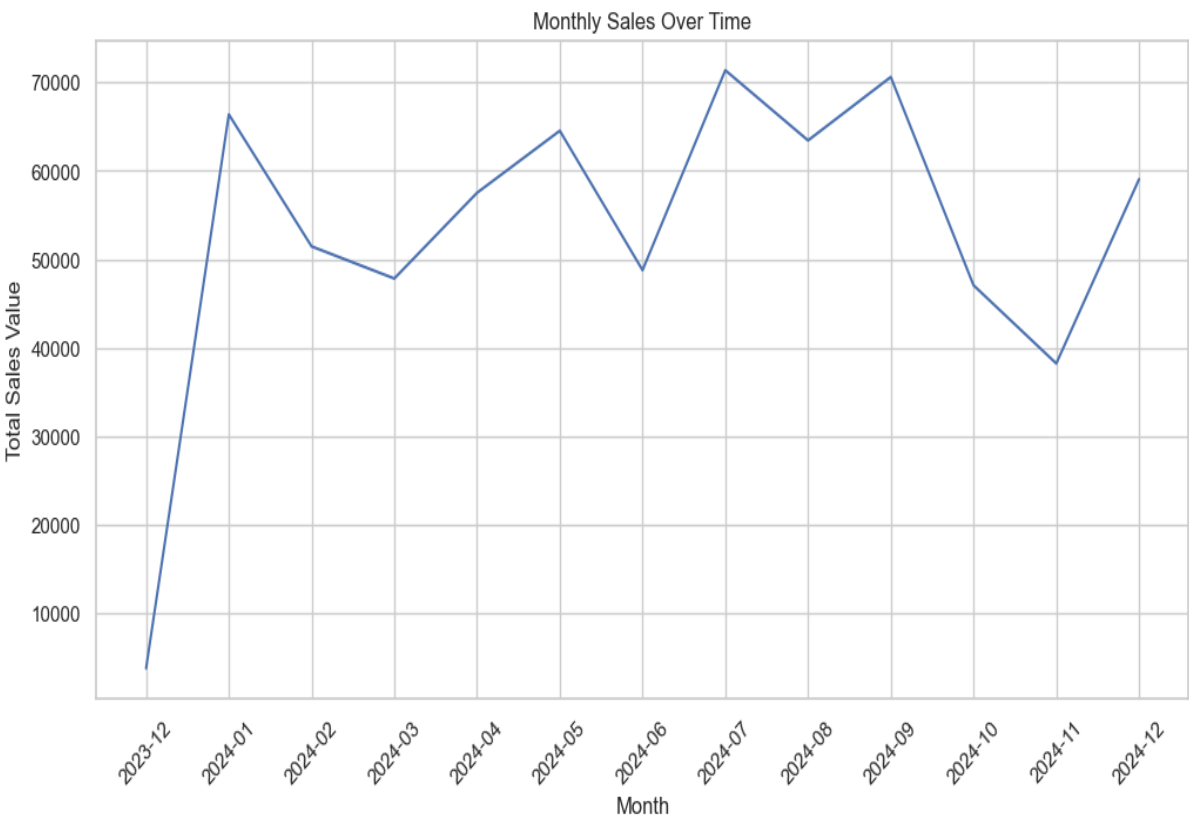
personalized offers, exclusive rewards, and tailored communication can further strengthen their relationship with the business. Identifying patterns in their behavior can also help target potential high-value customers in similar demographics, amplifying revenue growth.

Insight 5: Seasonal Purchase Patterns Highlight Key Opportunities

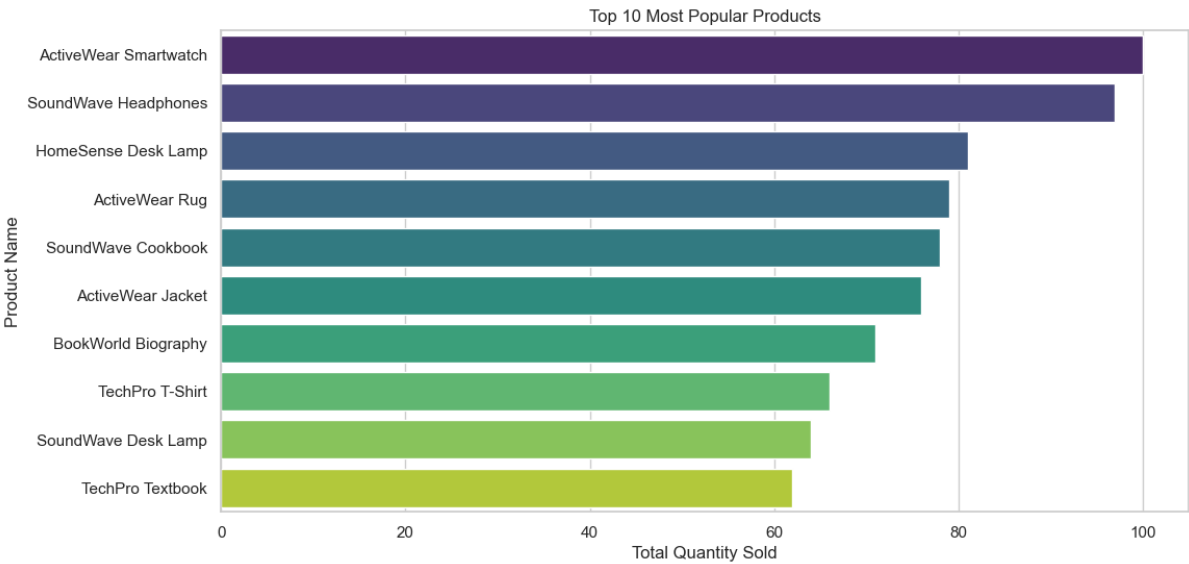
- **Observation:** Seasonal purchase patterns reveal significant sales peaks, such as January and June, indicating heightened customer activity during these periods. This suggests opportunities to capitalize on seasonality with targeted promotions, inventory optimization, and marketing campaigns. Identifying products driving seasonal spikes can help businesses prepare in advance and tailor offerings to meet customer demand. Additionally, addressing slower months with strategic discounts or bundles can balance revenue across the year.

Visualizations Summary:

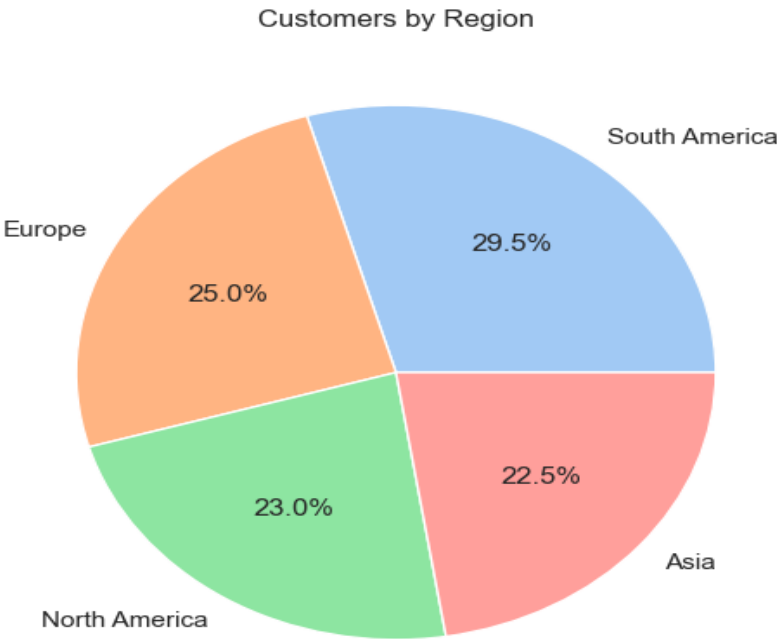
- **Monthly Sales Over Time:** Line chart showing revenue trends across months.



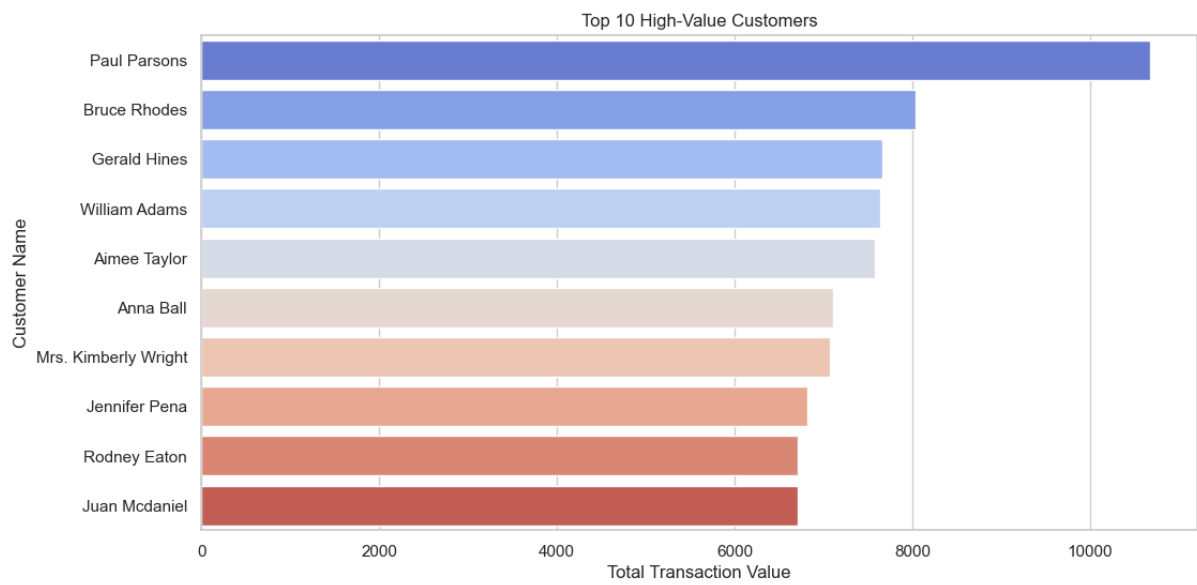
- **Top 10 Products by Quantity Sold:** Bar chart of high-performing products.



- **Customers by Region:** Pie chart displaying customer distribution.



- **Top 10 High-Value Customers:** Bar chart showcasing customer contributions to revenue.



Conclusion

These insights provide a roadmap for optimizing business strategies, improving customer retention, and increasing revenue. By leveraging high-performing products, targeting key customer segments, and addressing seasonal trends, the company can effectively enhance its operational efficiency and profitability.