# Data Analysis Report for Customer Transactions and Sales

---

## 1. Regional Breakdown of Customer Signups and Transactions

Insights:

- **Customer Signups by Region**: The data analysis revealed the distribution of customer signups across different regions. Each region's contribution to the total customer base was quantified, and trends were identified.
- **Transactions by Region**: After merging transactions with customer data, the number of transactions for each region was calculated. This highlighted regions with high customer activity.
- **Comparison**: A stacked bar chart was used to compare customer signups and transactions for each region. Regions with disproportionate signups and transactions indicate variations in engagement levels or purchasing behavior.

Customer Signups and Transactions by Region
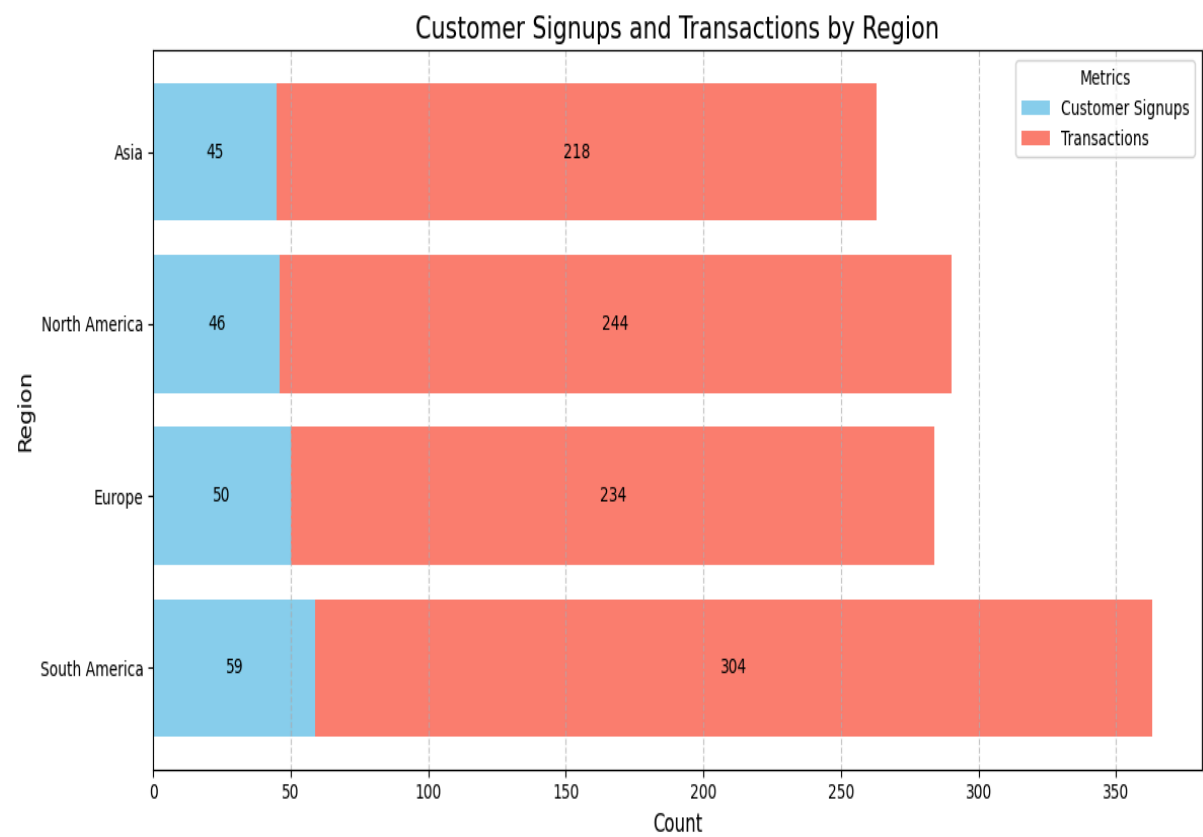
2. Sales of Products Across Different Regions

Insights:

- By merging customer, transaction, and product datasets, the total sales for each product category and region were calculated.
- A pivot table was created to provide an easy-to-read summary of sales by product and region.
- A stacked bar chart illustrated the distribution of sales across regions for various products.
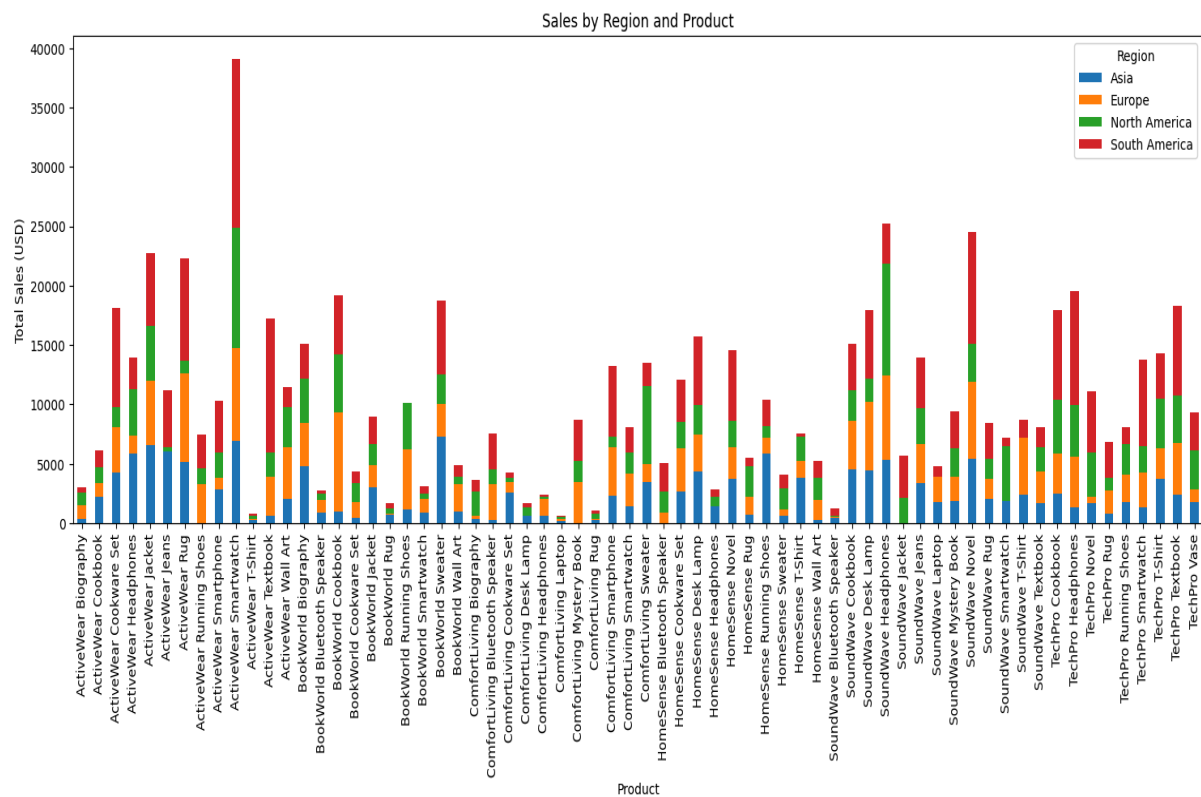

3. Customer Lifetime Value (CLV)

3.1. Top 10 High-Value Customers

- The top 10 customers, based on their total transaction value, were identified.
- These high-value customers provide insights into the most profitable segments and can help guide targeted retention strategies.
- This will help to identify high-value customers and target them with personalized offers or loyalty programs.

CustomerID	TotalValue	CustomerName	Region	SignupDate
C0141	10673.87	Paul Parsons	Europe	2023-02-23
C0054	8040.39	Bruce Rhodes	Asia	2024-09-29
C0065	7663.7	Gerald Hines	North America	2024-07-10
C0156	7634.45	William Adams	North America	2023-08-19
C0082	7572.91	Aimee Taylor	South America	2022-05-13
C0188	7111.32	Anna Ball	South America	2022-05-17
C0059	7073.28	Mrs. Kimberly Wright	North America	2024-04-07
C0028	6819.57	Jennifer Pena	Asia	2024-06-29
C0099	6715.72	Rodney Eaton	South America	2023-01-29
C0165	6708.1	Juan Mcdaniel	South America	2022-04-09

## 3.2. Customer Value Breakdown Over Their Lifetime

- The distribution of CLV across all customers was plotted using a histogram.
- This visualization highlighted patterns, such as the majority of customers having a relatively low CLV, while a small number contributed significantly.

Distribution of Customer Lifetime Value (CLV)
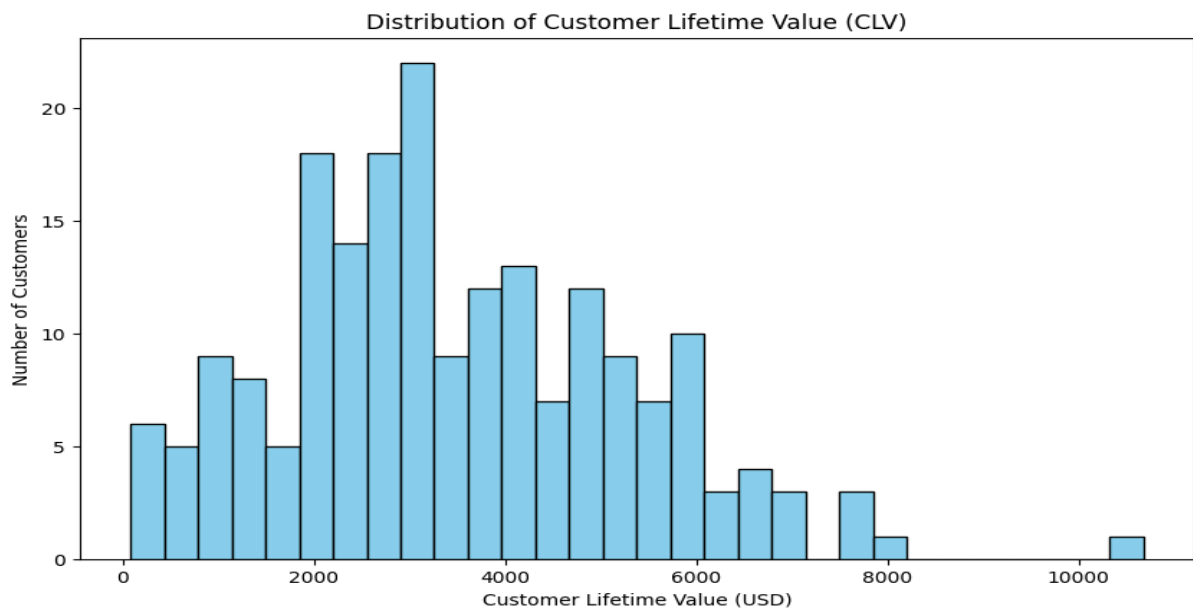
4. Revenue Distribution

4.1. Revenue Distribution by Product Category

- Determine the sales volume and revenue generated by each product category.
- Total revenue by product category was calculated and visualized using a pie chart.
- This analysis revealed the percentage contribution of each category to overall revenue.

Total Value by Category
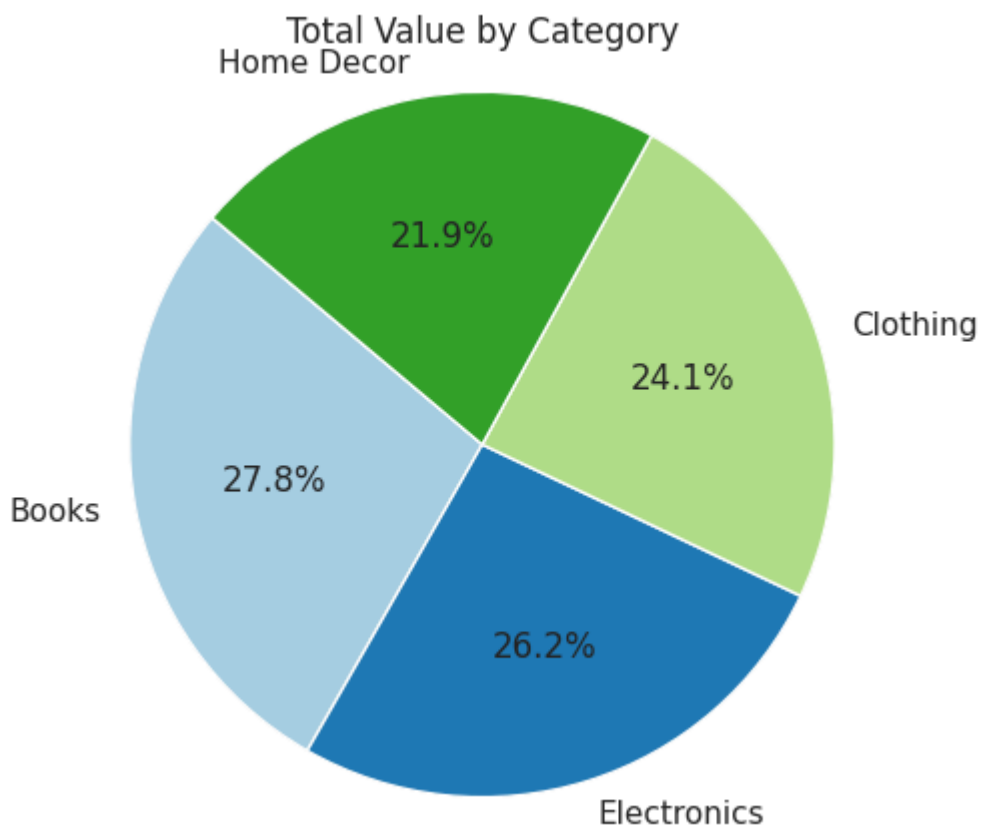
4.2. Revenue Contribution by Each Product

- The analysis of revenue contribution by individual products identified the top-performing products.
- These products were visualized using a bar chart, showcasing their percentage contribution to total revenue.

ProductID	ProductName	TotalValue	RevenueContribution (%)
P029	TechPro Headphones	19513.8	2.828105
P079	ActiveWear Rug	17946.91	2.601018
P048	TechPro Cookbook	17905.2	2.594973
P020	ActiveWear Jacket	15060.92	2.182756
P062	HomeSense Novel	14592.24	2.114831
P059	SoundWave Jeans	13947.2	2.021346
P039	TechPro Smartwatch	13778.88	1.996952
P083	ActiveWear Smartwatch	13671.6	1.981404
P019	ComfortLiving Sweater	13487.95	1.954788
P041	ComfortLiving Smartphone	13232.12	1.917711

Revenue Contribution by Product
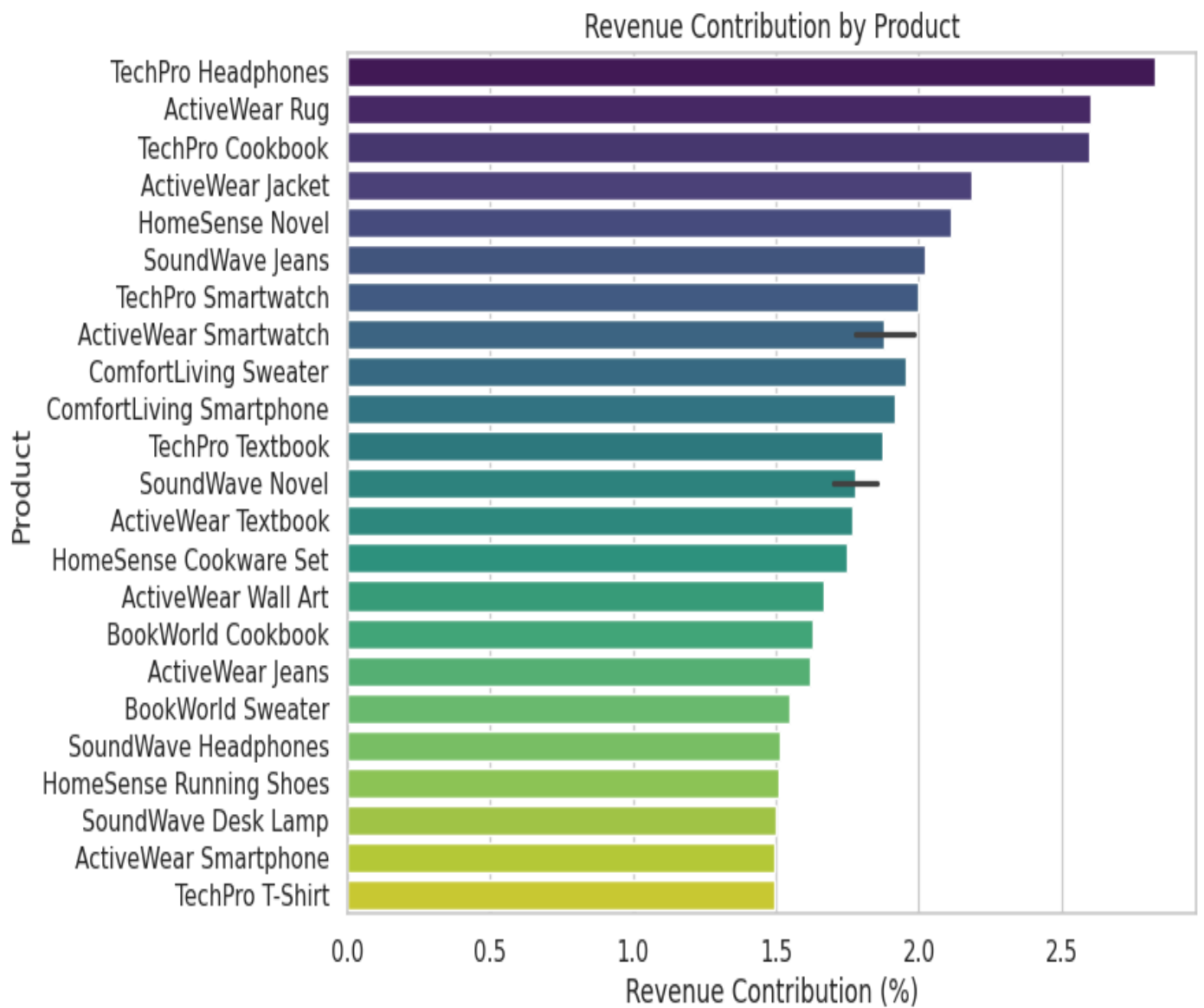
5. Transaction Value

5.1. Average Transaction Value

- The average transaction value across all transactions was calculated as: **Average Transaction Value:** `$690.00`

5.2. Average Order Value (AOV)

- By grouping transactions by customers, the AOV for each customer was calculated as the total revenue divided by the number of orders.
- The overall AOV, averaged across all customers, was determined as: **Overall AOV:** `$687.58`

Note: Average Transaction Value (ATV) measures the average amount spent per transaction, while Average Order Value (AOV) measures the average amount spent per order.

6. Transaction Timing Analysis

Insights:

- **Transactions by Day of the Week**: A bar chart showed transaction counts for each day of the week, identifying peak activity days.
- **Transactions by Hour of the Day**: A time-of-day analysis revealed trends in transaction timing, helping to identify hours of peak purchasing activity.
- **Transactions by Month**: Monthly trends highlighted seasonal variations in customer activity.
- **Product-Specific Timing**: By analyzing product purchase behavior over time, specific buying patterns for individual products were uncovered.

Transactions by Day of the Week

Transactions by Hour of the Day

Transactions by Month
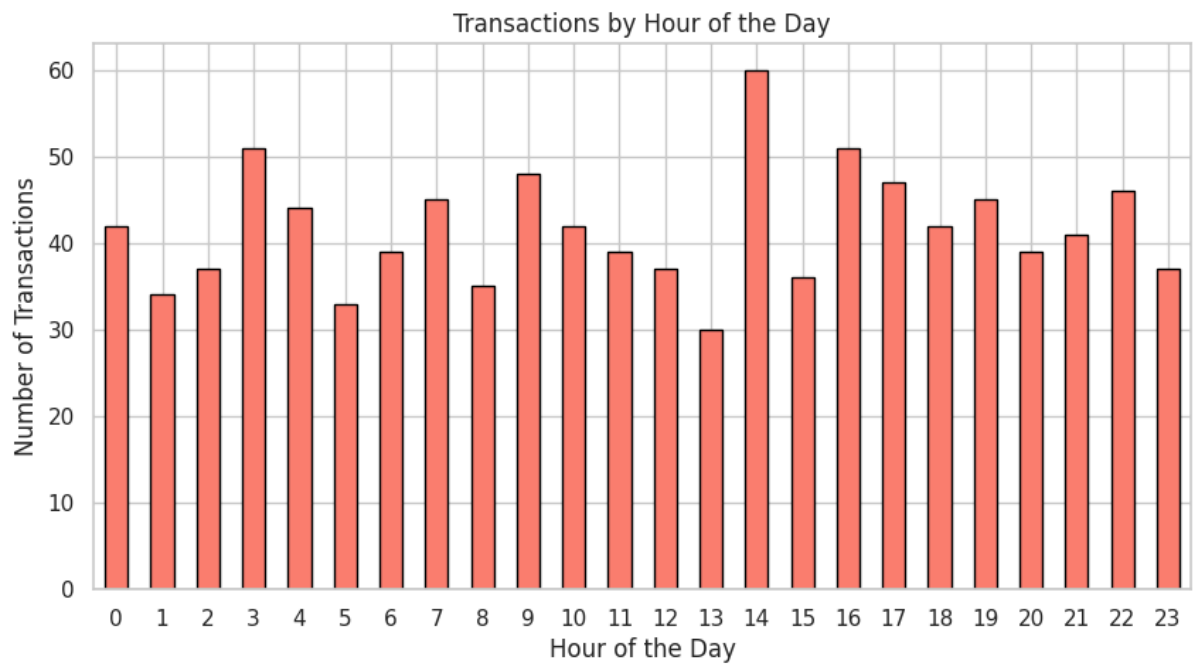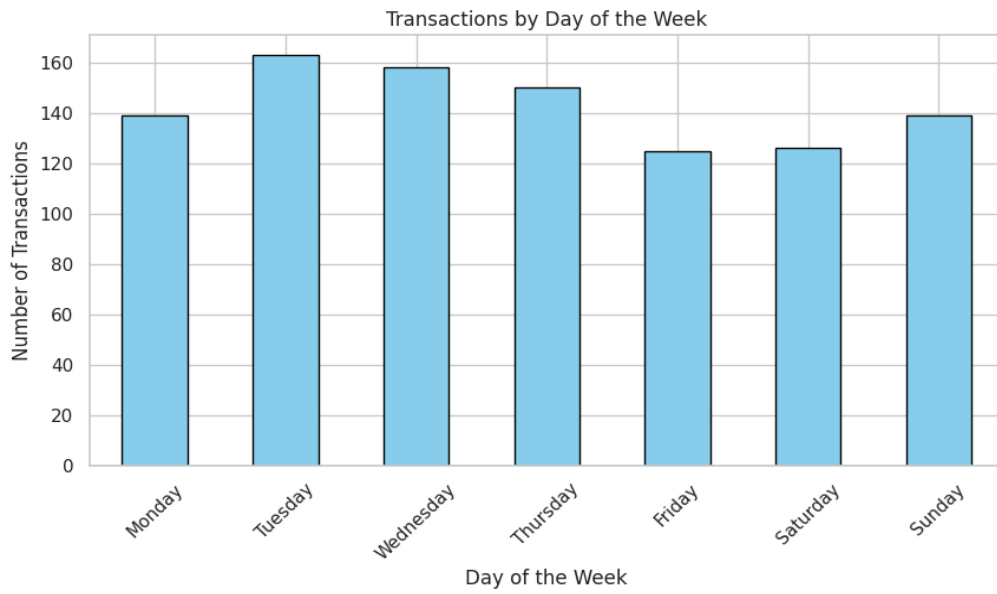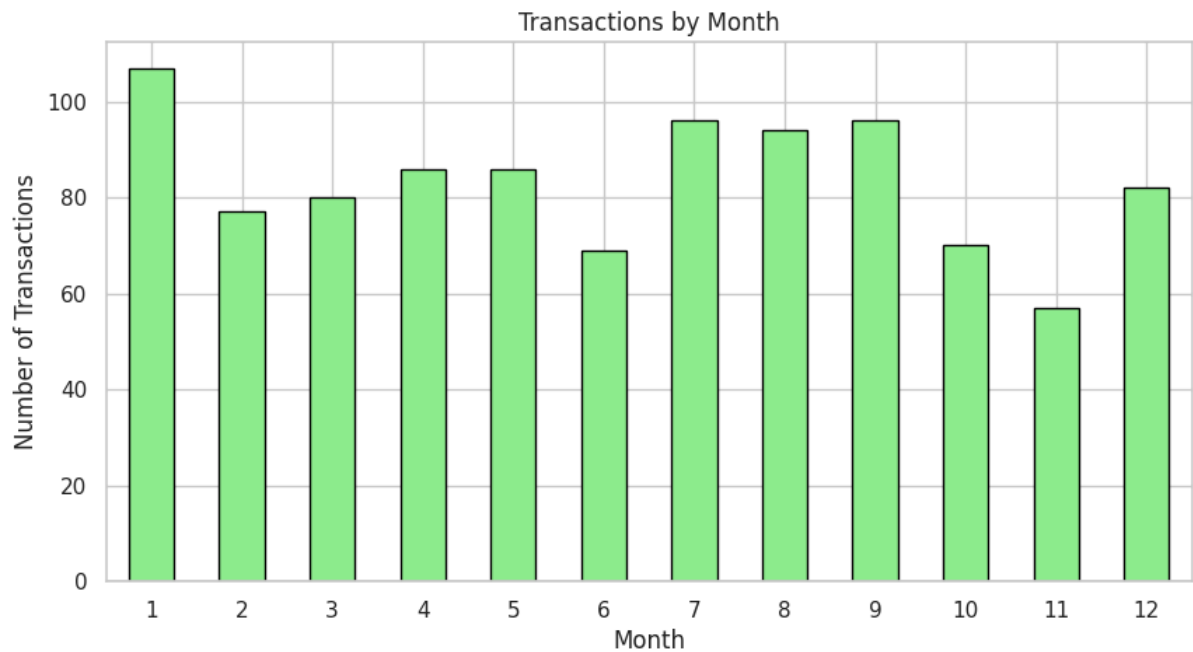
Conclusion and Recommendations

This analysis provides actionable insights into customer behavior, product performance, and sales trends. Businesses can use this information to:

- Optimize marketing and promotional strategies by focusing on high-value regions and customers.
- Tailor inventory and product placement based on regional preferences and seasonal demand.
- Enhance engagement during peak transaction hours and days.
- Develop strategies to improve CLV, focusing on retaining high-value customers.