Dataset Overview

The analysis was conducted using three datasets: **Customers**, **Products**, and **Transactions**.

1. **Customers Dataset:** Contains 200 customers' details, including their region and signup date.
   - Example: Customer `C0001` (Lawrence Carroll) resides in **South America**, signed up on **2022-07-10**.
2. **Products Dataset:** Includes 100 products across various categories such as *Books*, *Electronics*, and *Home Decor*.
   - Example: Product `P001` (*ActiveWear Biography*) from the **Books** category is priced at **$169.30**.
3. **Transactions Dataset:** Comprises 1,000 transactions, detailing transaction value, quantity, and product information.
   - Example: Transaction `T00001` shows **Customer C0199** purchased **Product P067** on **2024-08-25** for **$300.68**.

Key Business Insights

1. Sales Trend

Observation: Monthly sales demonstrate a steady growth with an **average monthly growth rate of 140.69%**. **Actionable Insight:** Implement demand forecasting and inventory planning to meet increasing sales trends effectively.

2. Top Selling Category

Observation: The **Books** category dominates, generating **$192,147.47** in total revenue. **Actionable Insight:** Expand the product range within the Books category and explore cross-selling opportunities.

3. Most Valuable Region

Observation: **South America** is the leading region, contributing **$219,352.56** to overall sales. **Actionable Insight:** Focus on targeted marketing campaigns and region-specific offers to sustain growth in South America.

4. Customer Spending

Observation: The **average transaction value** across all customers is **$690.00**. **Actionable Insight:** Introduce premium and bundled product offerings to capitalize on the high-value customer base.

5. Customer Recency

Observation: The **average time since the last transaction** is **73.89 days**. **Actionable Insight:** Launch loyalty programs and retention strategies to encourage frequent purchases and reduce recency.

6. Regional Insights

Observation: Customers in **South America** have the **highest average value per customer** at **$3,717.84**. **Actionable Insight:** Enhance customer relationship management strategies in this region to maximize lifetime value.

Top 10 Customers Analysis

- **Total Revenue:** $689,995.56
- **Top 10 Customers Revenue:** $76,013.31
- **Top 10 Customers Percentage Contribution:** 11.02%

Actionable Insight: Prioritize high-value customers with exclusive deals and personalized services.

Top Products by Region

1. **South America:** *ActiveWear Smartwatch* - $14,226.61
2. **North America:** *ActiveWear Smartwatch* - $10,080.99
3. **Europe:** *BookWorld Cookbook* - $8,360.56
4. **Asia:** *BookWorld Sweater* - $7,266.20

Actionable Insight: Tailor marketing strategies and inventory stocking based on region-specific product preferences.

Predictive Model Performance

1. **Mean Squared Error (MSE):** The model achieves an **MSE of 24,104.08**, indicating low prediction error.
2. **R-squared (R^2):** The model explains **89% of the variance** in transaction values, making it highly reliable.