E-commerce Data Analysis Report

Executive Summary

This report presents a comprehensive analysis of e-commerce transaction data spanning multiple regions and product categories. The analysis covers customer behavior, product performance, and regional trends, leading to actionable business insights for strategic decision-making.

Dataset Overview

The analysis is based on three interconnected datasets: - Customer data covering 200 unique customers across four regions - Product catalog containing 100 unique products in four categories - Transaction records comprising 1,000 transactions

Key Metrics

- Total Revenue: $689,995.56
- Average Transaction Value: $690.00
- Average Purchases per Customer: 5.03
- Average Customer Lifetime Value: $3,467.31

Regional Analysis

The customer base is distributed across four major regions: - South America: 59 customers (29.5%) - Europe: 50 customers (25%) - North America: 46 customers (23%) - Asia: 45 customers (22.5%)

Key regional performance indicators: | Region | Transaction Count | Total Revenue | Avg. Transaction Value | |—————-|——————|————|——————————| | South America | 304 | $219,352.56 | $721.55 | | Europe | 234 | $166,254.63 | $710.49 | | North America | 244 | $152,313.40 | $624.24 | | Asia | 218 | $152,074.97 | $697.59 |

Product Category Performance

Category	Transaction Count	Total Revenue	Avg. Order Value
Books	270	$192,147.47	$711.66
Electronics	254	$180,783.50	$711.75
Clothing	228	$166,170.66	$728.82
Home Decor	248	$150,893.93	$608.44

Business Insights

1. Regional Market Opportunity

South America demonstrates exceptional market potential with the highest transaction count (304) and average transaction value ($721.55). Despite having a similar customer base size to other regions, South American customers show significantly higher engagement and spending patterns. This indicates an underserved market with strong purchasing power, suggesting immediate opportunities for market expansion and increased marketing investment in this region.

2. Product Category Performance Gap

Analysis reveals a notable performance disparity in the Home Decor category. While maintaining a competitive transaction count (248), Home Decor's average order value ($608.44) significantly lags behind other categories (>$710). This represents a potential revenue opportunity of approximately $25,000 if brought to par with other categories' performance. The gap suggests a need for premium product introductions or pricing strategy optimization in this category.

3. Customer Acquisition Patterns

Customer signup trends show increasing volatility from 2022 to 2024, with more pronounced peaks and troughs. The data reveals consistent July peaks in signup rates, indicating optimal timing for marketing campaigns. However, the growing volatility in acquisition rates suggests a need for more stable, year-round customer acquisition strategies to maintain consistent growth and reduce dependency on seasonal patterns.

4. Day-of-Week Transaction Optimization

Transaction analysis reveals significant day-of-week variations in customer spending: - Highest: Wednesday ($754.45 average) - Lowest: Saturday ($646.03 average) This 16.7% difference represents a substantial opportunity to optimize weekend performance through targeted promotions or special weekend offerings. Bringing weekend performance up to weekday levels could potentially increase annual revenue by approximately $28,000.

5. Product Mix Strategy

Analysis of top-performing products reveals distinct patterns: 1. Technology products (e.g., ActiveWear Smartwatch: $39,096.97) generate highest revenue despite lower unit sales 2. Clothing items show high volume but lower total revenue 3. Cross-category products (e.g., ActiveWear series) perform consistently well

This suggests opportunities for: - Premium pricing in technology categories - Bundle deals in clothing to increase average order value - Expansion of cross-category product lines

Recommendations

1. **Regional Focus**: Prioritize South American market expansion through increased marketing investment and localized product offerings.

2. **Category Optimization**: Revamp Home Decor category by:

   - Introducing premium product lines
   - Reviewing pricing strategies
   - Implementing cross-category bundling

3. **Customer Acquisition**: Develop year-round acquisition strategies to stabilize growth patterns and reduce seasonal dependencies.

4. **Temporal Strategy**: Implement weekend-specific promotions to boost Saturday and Sunday sales to weekday levels.

5. **Product Strategy**:

   - Expand technology product offerings
   - Develop more cross-category product lines
   - Create premium bundles for high-volume categories

Methodology

This analysis was conducted using Python, leveraging pandas for data manipulation and matplotlib/seaborn for visualization. Statistical significance was considered where applicable, and all monetary values are reported in USD.