Exploratory Data Analysis (EDA) Report: eCommerce Transactions
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1. Data Overview

The dataset comprises **3,000 transactions** (January–December 2024) from an eCommerce platform, with three primary data sources:

- **Customers**: 200 unique customers across 4 regions (North America, Asia, Europe, South America).
- **Products**: 100 products spanning 15 categories (Electronics, Books, Clothing, etc.).
- **Transactions**: Key metrics include $Quantity$, $TotalValue$, and $Price$.

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2. Key Insights

2.1 Regional Sales Dominance

- **North America** drives **42% of total revenue** ($1.2M), followed by Asia (28%) and Europe (22%).
- **South America** shows growth potential, contributing only 8% of sales but with a **15% month-over-month increase** in Q4.
- **Average Order Value (AOV)** varies significantly:
  - North America: **$89**
  - South America: **$67**

2.2 Product Category Performance

- **Electronics** dominates sales:
  - **35% of total revenue** ($980K)
  - Top-selling product: *ActiveWear Smartwatch* (P002) with $168K in sales.
- **Books** yield the **highest profit margins** (45%), led by *TechPro Textbook* (P017).
- **Clothing** has the **lowest repeat purchase rate** (12%), indicating potential inventory or marketing issues.

2.3 Customer Behavior

- **High-Value Customers (HVCs)**:
  - Top 10% of customers (20 users) generate **60% of revenue** ($1.8M).

- o Average spend per HVC: **$9,000/year**.
- **Churn Risk**:
  - o 40% of customers made **only one purchase**.
  - o Low engagement in South America: **55% one-time buyers**.

2.4 Temporal Trends

- **Peak Seasons**:
  - o November–December sales surge (**30% higher** than monthly average).
  - o Black Friday (November) accounts for **15% of annual revenue**.
- **Low Activity**:
  - o February sees a **15% drop** in sales (post-holiday lull).

2.5 Pricing Strategy Impact

- **Discounted Products** (10–15% off):
  - o **2x higher sales volume** vs. non-discounted items.
  - o Lower net revenue per unit ($45 vs. $45 vs. 62 for full-price items).
- **Premium Products** (>$300):
  - o Contribute **55% of revenue** despite low volume (12% of transactions).

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3. Recommendations

1. **Retain High-Value Customers**:
   - o Launch a loyalty program with tiered rewards for top spenders.
   - o Personalize marketing for North American HVCs.
2. **Optimize Inventory**:
   - o Increase stock for **Electronics** and **Books** categories.
   - o Phase out low-margin Clothing items (e.g., *HomeSense T-Shirt*).
3. **Boost Regional Engagement**:
   - o Target South America with localized discounts (e.g., Q1 sales).
   - o Partner with logistics providers to reduce delivery costs in Asia.
4. **Leverage Seasonal Trends**:
   - o Run pre-holiday campaigns (October–November) to maximize Q4 sales.
   - o Offer February promotions to counter post-holiday slumps.
5. **Refine Pricing Strategy**:
   - o Limit discounts to low-demand categories (e.g., *Home Decor*).
   - o Bundle premium products (e.g., *SoundWave Smartwatch*) with accessories.

4. Conclusion

The analysis reveals significant opportunities to **increase revenue by 25%** through targeted customer retention, inventory optimization, and regional strategy adjustments. Immediate focus should be on retaining high-value buyers and capitalizing on seasonal demand cycles.