Exploratory Data Analysis (EDA) Report

---

1. Retention Rate

Retention rate measures the percentage of customers who return in subsequent months, reflecting customer loyalty and satisfaction. The retention analysis yielded the following insights:

TransactionYearMonth	New Customers	Returning Customers	Retention Rate
2023-12	1	3	75.00%
2024-01	5	102	95.33%
2024-02	3	74	96.10%
2024-03	0	80	100.00%
2024-04	3	83	96.51%
2024-05	3	83	96.51%
2024-06	2	67	97.10%
2024-07	5	91	94.79%
2024-08	0	94	100.00%
2024-09	5	91	94.79%
2024-10	2	68	97.14%
2024-11	1	56	98.25%
2024-12	0	78	100.00%

Key Insight: The retention rate remains consistently high, with some months achieving 100% retention, highlighting strong customer loyalty.

---

2. Revenue by Product Category

The revenue contribution from various product categories is as follows:

Category	Total Revenue (USD)
Books	$192,147.47
Clothing	$166,170.66
Electronics	$180,783.50
Home Decor	$150,893.93

Key Insight: Books and Electronics lead in revenue generation, showcasing their popularity among customers.

---

3. Seasonal Trends by Category

The performance of each product category across months is summarized below:

Month/Category	Books	Clothing	Electronics	Home Decor
2023-12	$0.00	$1,585.36	$1,870.24	$313.92
2024-01	$17,515.05	$17,984.46	$16,786.31	$14,090.57
2024-02	$21,073.17	$8,091.81	$8,556.44	$13,737.85
2024-03	$9,091.55	$7,520.12	$15,383.29	$15,833.77
2024-04	$11,270.08	$14,454.24	$18,390.58	$13,404.16
2024-05	$21,793.32	$17,236.32	$12,244.79	$13,253.31
2024-06	$16,270.05	$13,217.41	$9,430.18	$9,853.54
2024-07	$18,501.32	$16,616.25	$22,096.51	$14,152.31
2024-08	$18,778.53	$14,436.85	$18,214.34	$12,007.02
2024-09	$15,454.39	$18,906.19	$21,703.48	$14,539.69
2024-10	$13,438.32	$12,093.82	$12,781.45	$8,749.63
2024-11	$10,556.56	$11,983.40	$11,275.89	$4,408.52
2024-12	$18,405.13	$12,044.43	$12,050.00	$16,549.64

Key Insight: Electronics show seasonal spikes, particularly in mid-year months, while Home Decor exhibits consistent performance.

4. High-Value Customers (Top 10%)

The top 10% of customers contributing significantly to revenue are:

CustomerID	Revenue (USD)
C0013	$6,000.56
C0028	$6,819.57
C0041	$6,149.78
C0045	$6,021.80
C0054	$8,040.39
C0059	$7,073.28
C0065	$7,663.70
C0068	$5,950.42
C0082	$7,572.91
C0087	$6,604.23
C0096	$6,072.92
C0099	$6,715.72
C0102	$6,132.36
C0104	$6,579.10
C0141	$10,673.87

Key Insight: High-value customers make a substantial contribution to overall revenue and should be prioritized for retention and personalized engagement.

5. Revenue Concentration (Top 10% Transactions)

The top 10% of transactions contribute **24.05%** of the total revenue, indicating the significant impact of high-value transactions on overall performance.

6. Signup Conversion Rate

The signup-to-purchase conversion rate is **99.5%**, reflecting an effective process for turning signups into active customers.

7. Top Regions by Category

Revenue distribution by region and product category is as follows:

Region	Books	Clothing	Electronics	Home Decor
Asia	$33,119.03	$49,353.09	$35,658.15	$33,944.70
Europe	$47,464.42	$36,335.59	$41,562.60	$40,892.02
North America	$41,811.99	$38,038.49	$44,716.43	$27,746.49
South America	$69,752.03	$42,443.49	$58,846.32	$48,310.72

Key Insight: South America dominates revenue across multiple categories, particularly Electronics and Home Decor.

8. Monthly Average Order Value (AOV)

The monthly AOV provides insights into customer spending patterns:

Month	Average Order Value (USD)
2023-12	$942.38
2024-01	$620.34
2024-02	$668.30
2024-03	$597.86
2024-04	$668.83
2024-05	$750.32
2024-06	$706.83
2024-07	$743.40
2024-08	$674.86
2024-09	$735.46

Month	Average Order Value (USD)
2024-10	$672.33
2024-11	$670.60
2024-12	$757.04

Key Insight: The AOV is consistently high during peak sales months, indicating successful promotional strategies.

---

9. Customer Frequency Segments

Customers are categorized by purchase frequency:

Segment	Number of Customers
1	12
2-5	113
6-10	72
10+	2

Key Insight: The majority of customers fall into the 2-5 purchase range, representing an opportunity to encourage higher engagement.

---

10. Signup-Revenue Correlation

A strong positive correlation (**0.91**) exists between signups and total revenue, indicating that an increase in signups directly drives higher revenue.

Conclusion

The EDA highlights critical patterns and trends, providing actionable insights for improving customer retention, targeting high-value customers, and optimizing revenue strategies across regions and product categories.