

Task 1: Exploratory Data Analysis (EDA) and Business Insights

1. Objective

The objective of this task is to perform Exploratory Data Analysis (EDA) on the provided eCommerce datasets (Customers.csv, Products.csv, and Transactions.csv) and derive actionable business insights. This report includes the key findings and their implications for business strategy.

2. Datasets Overview

Customers.csv

- **Attributes:** CustomerID, CustomerName, Region, SignupDate
- **Key Highlights:**
 - 200 unique customers across 4 regions (Asia, Europe, North America, South America).
 - Signup trends indicate periods of peak customer acquisition.

Products.csv

- **Attributes:** ProductID, ProductName, Category, Price
- **Key Highlights:**
 - Products are grouped into multiple categories.
 - Price ranges vary significantly across categories.

Transactions.csv

- **Attributes:** TransactionID, CustomerID, ProductID, TransactionDate, Quantity, TotalValue, Price
- **Key Highlights:**
 - Tracks customer purchases and their transactional behavior.
 - Includes product quantity and total transaction value.

3. Methodology

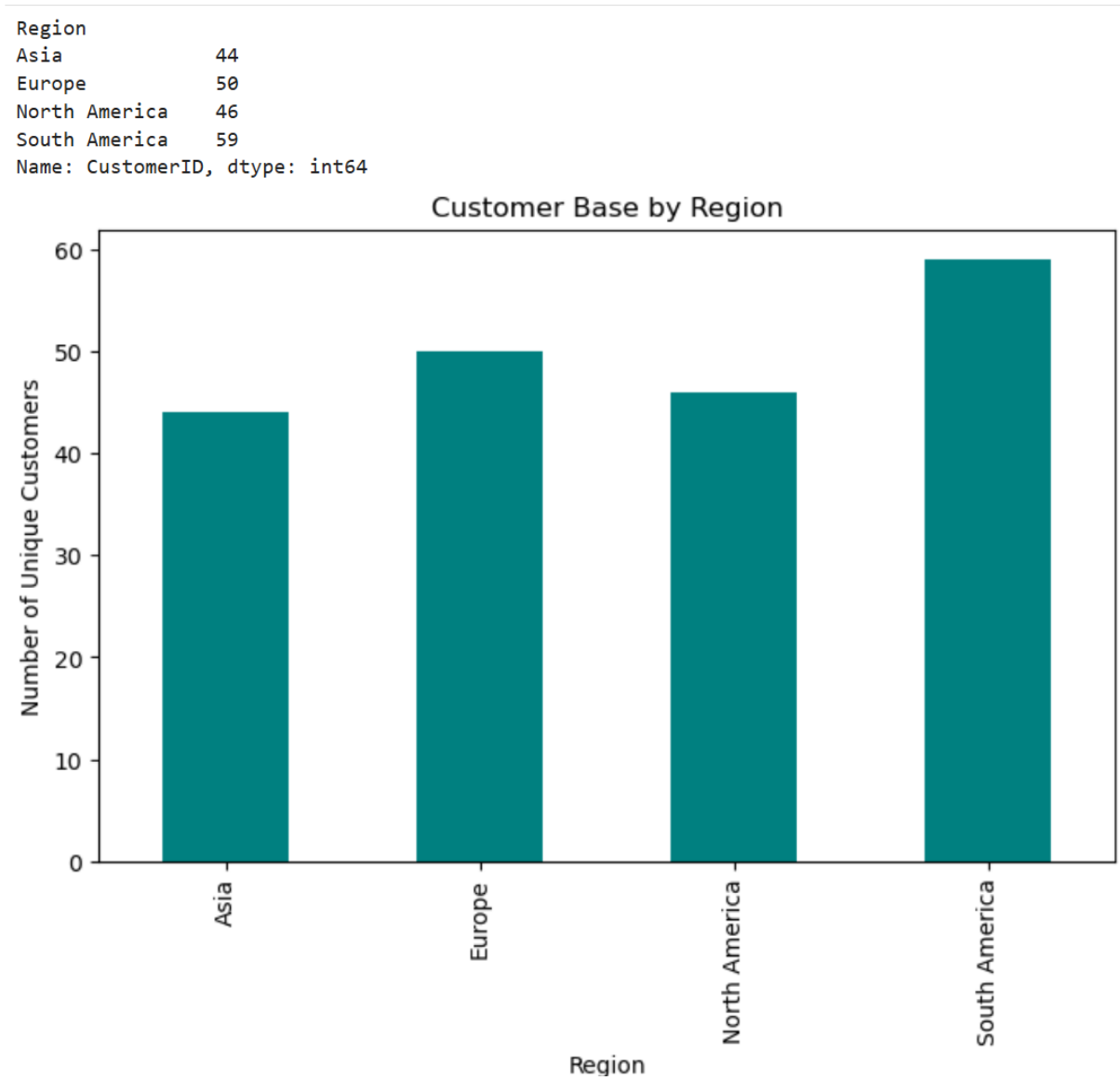
1. Loaded and cleaned the datasets.
2. Performed EDA using Python libraries (e.g., Pandas, Matplotlib, Seaborn).
3. Merged the datasets to create a unified view for cross-dataset analysis.

4. Identified trends, patterns, and anomalies using statistical analysis and visualizations.

4. Business Insights

Insight 1: South America is the largest customer base.

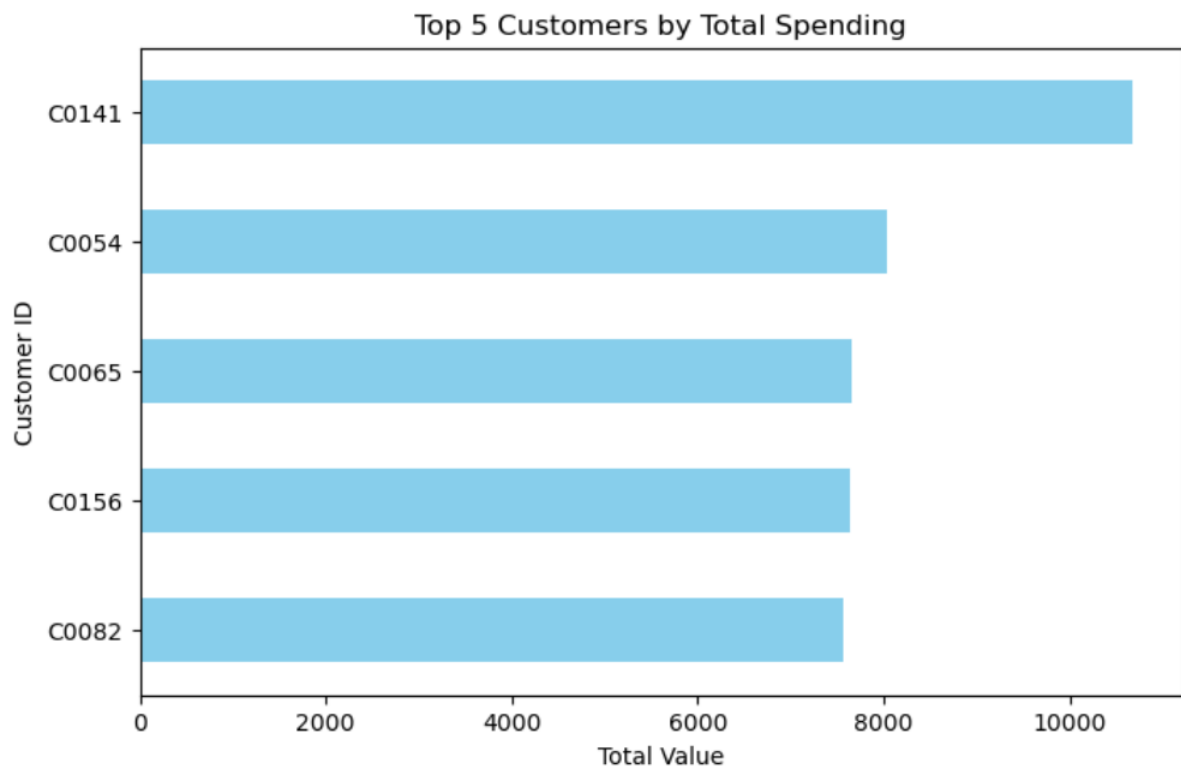
- **Observation:** South America has the highest number of customers (59 out of 200).
- **Implication:** This region should be prioritized for customer retention and marketing campaigns, as it represents a significant share of the platform's user base. By leveraging localized promotions and understanding cultural preferences, the business can strengthen customer loyalty and drive higher engagement within this region.



Insight 2: High-value customers drive revenue.

- **Observation:** A small subset of customers contributed to the majority of the revenue, with high-value transactions linked to premium product categories. For example, CustomerID C0141 generated \$10,673.87 alone.
- **Implication:** Implement loyalty programs and personalized offers for top spenders to maximize lifetime value. By identifying characteristics of these high-value customers, the business can also focus on acquiring similar customer profiles to grow revenue sustainably.

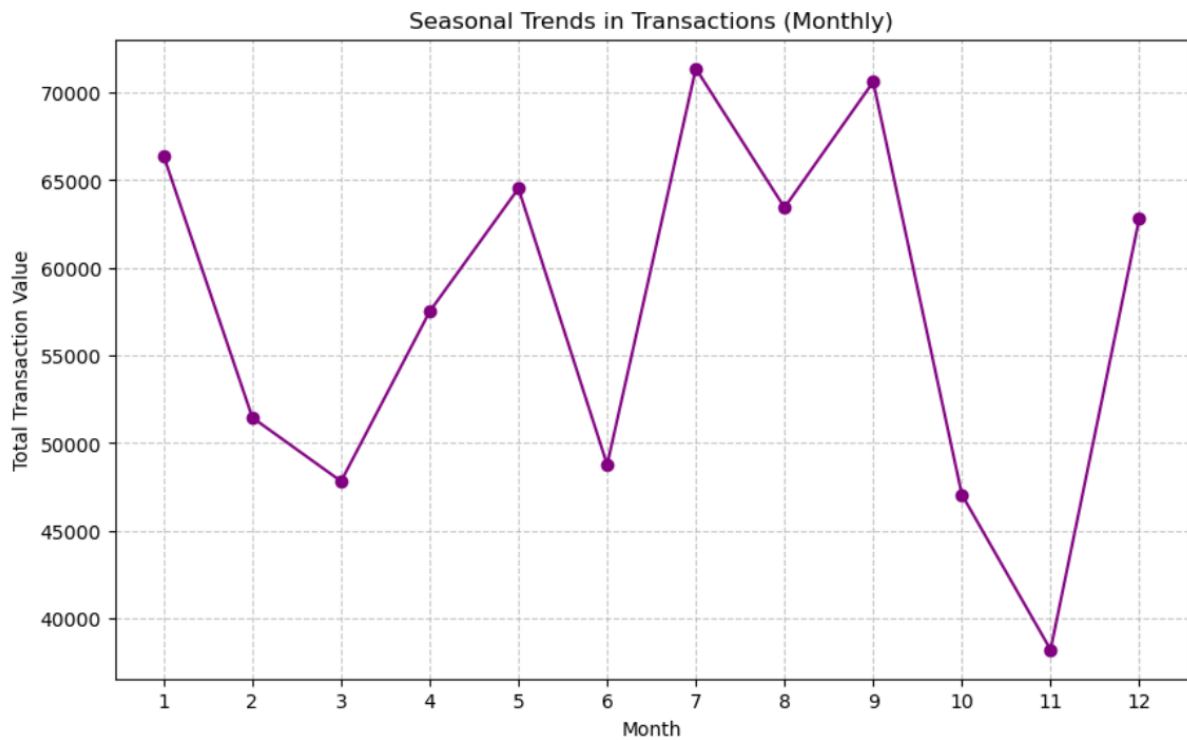
```
CustomerID
C0141    10673.87
C0054     8040.39
C0065     7663.70
C0156     7634.45
C0082     7572.91
Name: TotalValue, dtype: float64
```



Insight 3: Seasonal trends affect transaction volume.

- **Observation:** Transaction data shows spikes during certain months, likely tied to seasonal sales or holiday periods. Notably, July (\$71,366.39), September (\$70,603.75), and January (\$66,376.39) were the highest-earning months, while November (\$38,224.37) was the lowest.
- **Implication:** Align marketing campaigns and inventory planning with these seasonal trends. Offering discounts or launching special promotions during slower months like November can help smooth revenue fluctuations.

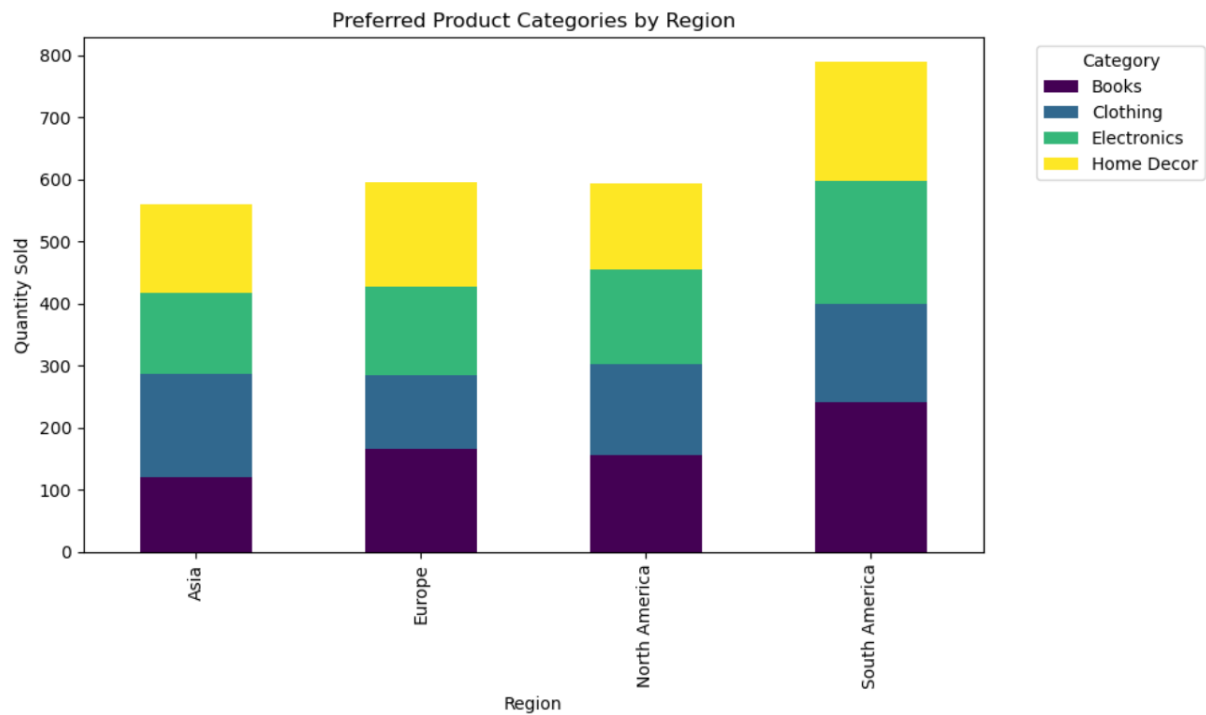
```
Month
1    66376.39
2    51459.27
3    47828.73
4    57519.06
5    64527.74
6    48771.18
7    71366.39
8    63436.74
9    70603.75
10   47063.22
11   38224.37
12   62818.72
Name: TotalValue, dtype: float64
```



Insight 4: Product categories vary in popularity by region.

- **Observation:** Different regions exhibit distinct product preferences. For instance, South America shows the highest demand for Books (241) and Electronics (198), while Europe prefers Home Decor (167). Asia shows balanced interest across all categories, with a slightly higher preference for Home Decor (142).
- **Implication:** Regional-specific marketing strategies can increase product relevance and sales. By tailoring advertising and stocking decisions to regional preferences, the business can better meet customer needs and enhance satisfaction.

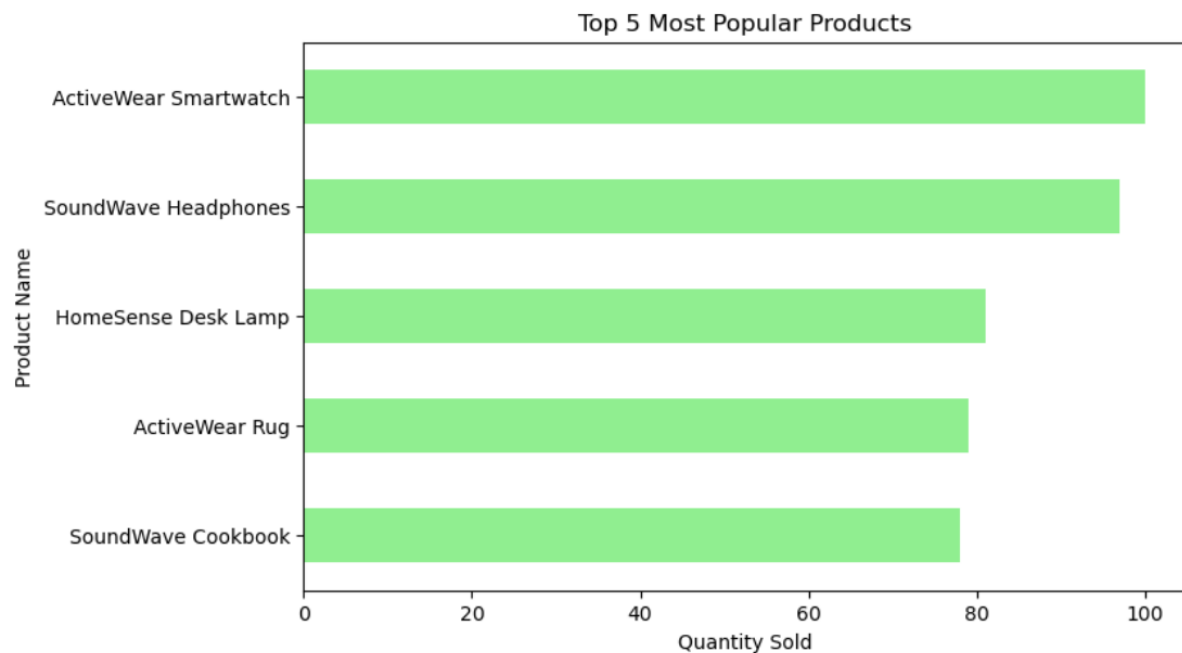
Category	Books	Clothing	Electronics	Home Decor
Region				
Asia	120	166	132	142
Europe	165	119	144	167
North America	155	147	153	138
South America	241	158	198	192



Insight 5: Popular products drive bulk purchases.

- Observation:** The top five most purchased products include ActiveWear Smartwatch (100 units) and SoundWave Headphones (97 units). These items are consistently in high demand.
- Implication:** Investing in stock replenishment and targeted promotions for these products can sustain their sales momentum and attract repeat buyers. Highlighting these products in campaigns can also boost overall revenue.

```
ProductName
ActiveWear Smartwatch    100
SoundWave Headphones      97
HomeSense Desk Lamp       81
ActiveWear Rug            79
SoundWave Cookbook        78
Name: Quantity, dtype: int64
```



Insight 6: Books generate the highest revenue across categories.

- **Observation:** Books contribute the most revenue (\$192,147.47), followed by Electronics (\$180,783.50). Clothing and Home Decor rank lower in total revenue despite moderate unit sales.
- **Implication:** Promotions like bundling Books with related items (e.g., Home Decor or Accessories) could leverage their popularity and drive cross-category sales. This can also help increase the average transaction value per customer.

```
Category
Books      192147.47
Electronics 180783.50
Clothing    166170.66
Home Decor  150893.93
Name: TotalValue, dtype: float64
```

Revenue Generated by Each Product Category

