

The key insights and takeaways from the Exploratory Data Analysis (EDA) performed in the Mithun\_CK\_EDA.py script, along with the corresponding figures:

## 1. Customer Analysis

### Customers by Region



**Figure:** Bar plot showing the number of customers by region.

#### **Insight:**

The majority of customers are from **South America**, followed by **Asia**, **Europe**, and **North America**.

This indicates that the business has a strong presence in South America.

#### **Takeaway:**

Marketing efforts can be focused on regions with fewer customers (e.g., Asia, North America) to expand the customer base.

## Customer Sign-ups Over Time



**Figure:** Bar plot showing the number of customer sign-ups over time (monthly).

### Insight:

Customer sign-ups have been **consistent over time**, with some months showing higher spikes.

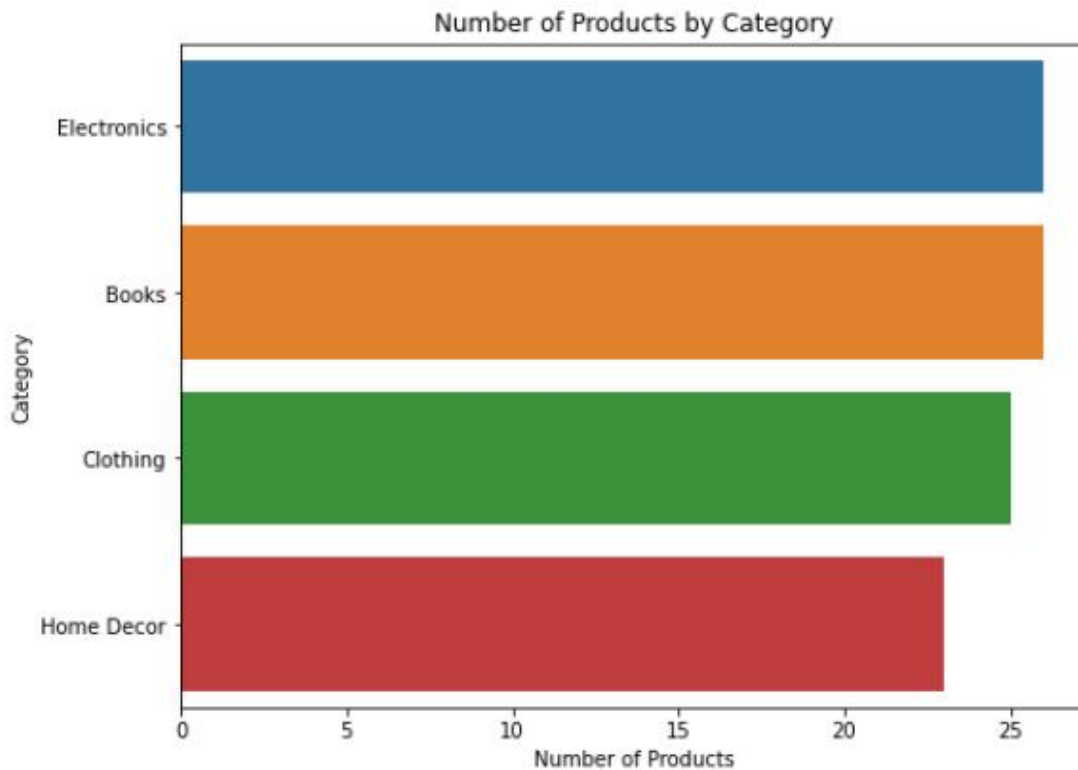
There is no clear trend of increasing or decreasing sign-ups.

### Takeaway:

Investigate the months with higher sign-ups to understand what drove the growth (e.g., marketing campaigns, promotions).

## 2. Product Analysis

### Products by Category



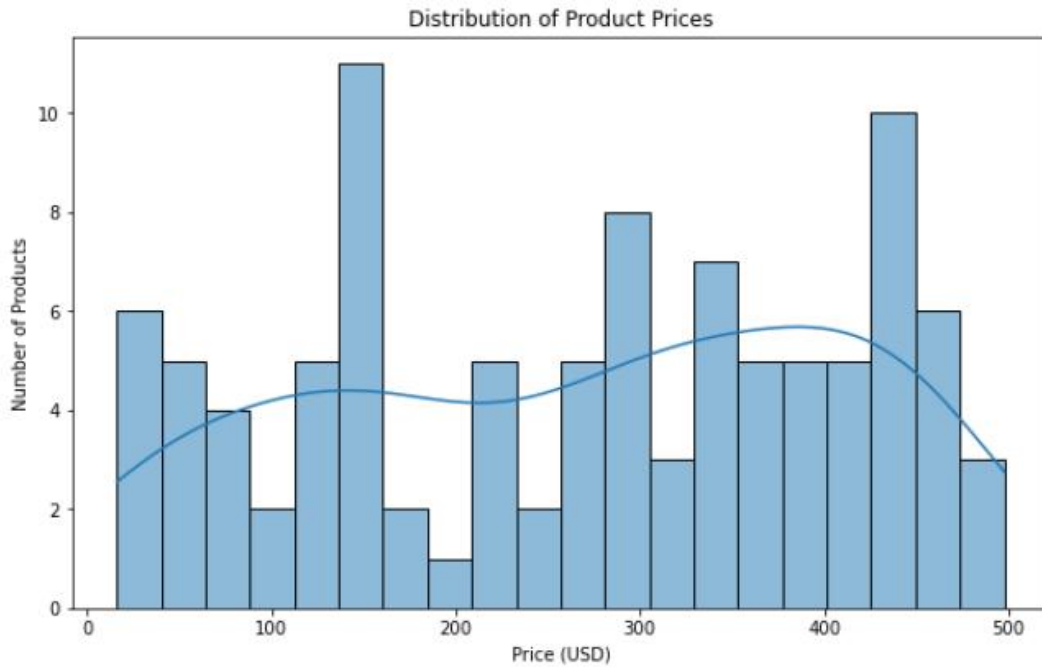
**Figure:** Horizontal bar plot showing the number of products by category.

#### **Insight:**

The **Electronics** category has the highest number of products, followed by **Books**, **Clothing**, and **Home Decor**.

**Takeaway:** The business may want to focus on expanding the **Home Decor** category, as it has the fewest products.

## Price Distribution



**Figure:** Histogram showing the distribution of product prices.

### Insight:

Most products are priced in the **lower range** (e.g., 0–0–200), with fewer high-priced products.

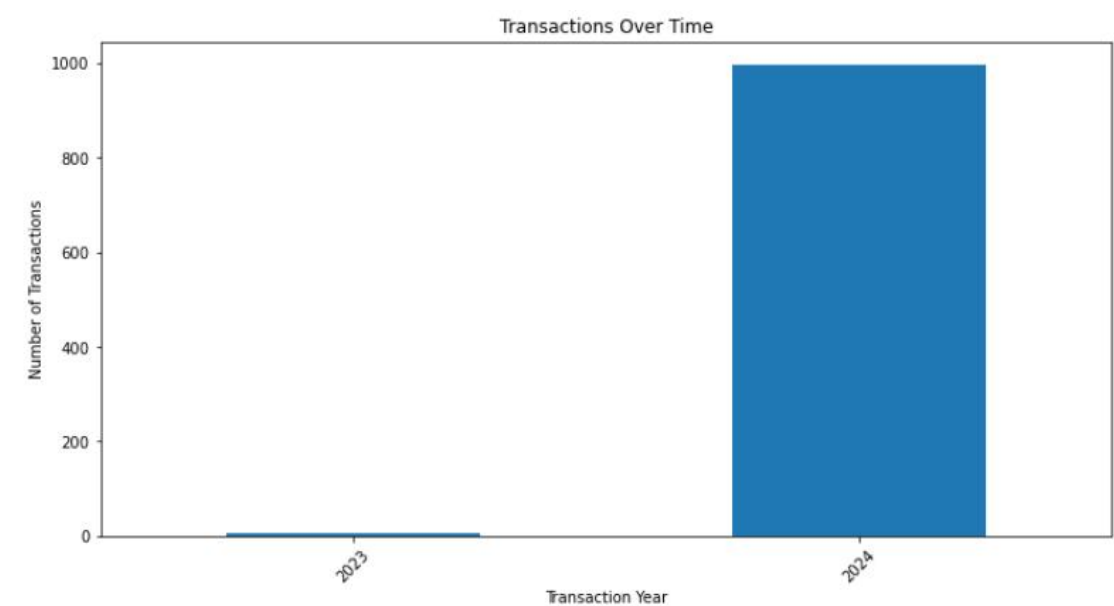
The distribution is **right-skewed**, indicating a few expensive products.

### Takeaway:

Consider introducing more mid-range products to cater to customers who are willing to spend more.

### 3. Transactions Analysis

#### Transactions Over Time



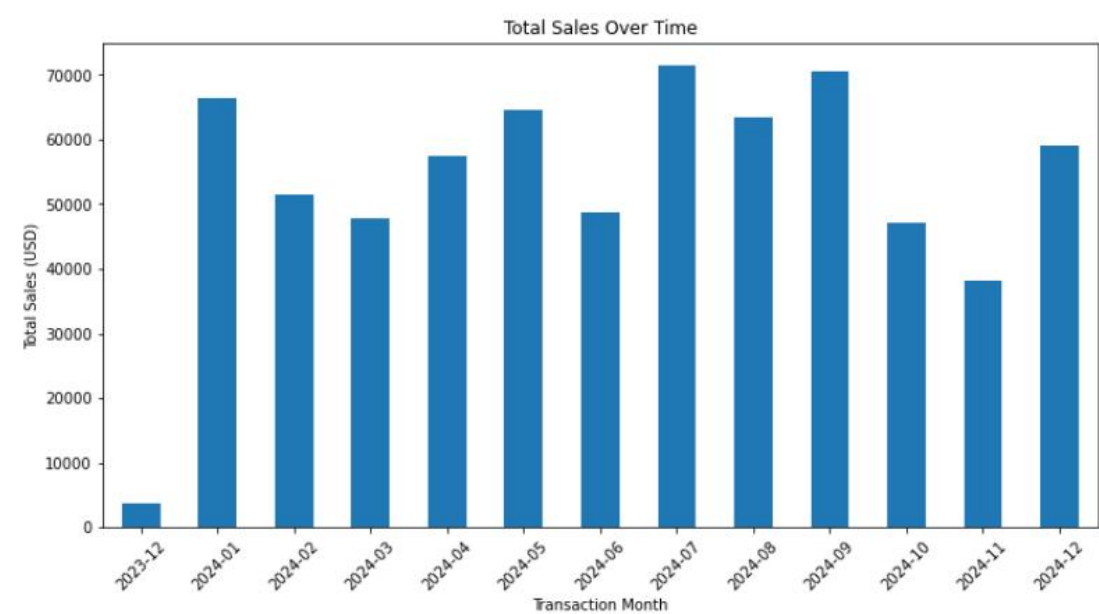
**Figure:** Bar plot showing the number of transactions over time (yearly).

**Insight:**

Transactions have been **consistent over time**, with no significant spikes or drops.

**Takeaway:**

Investigate whether seasonal trends exist (e.g., higher sales during holidays).



**Figure:** Bar plot showing total sales over time (monthly).

**Insight:**

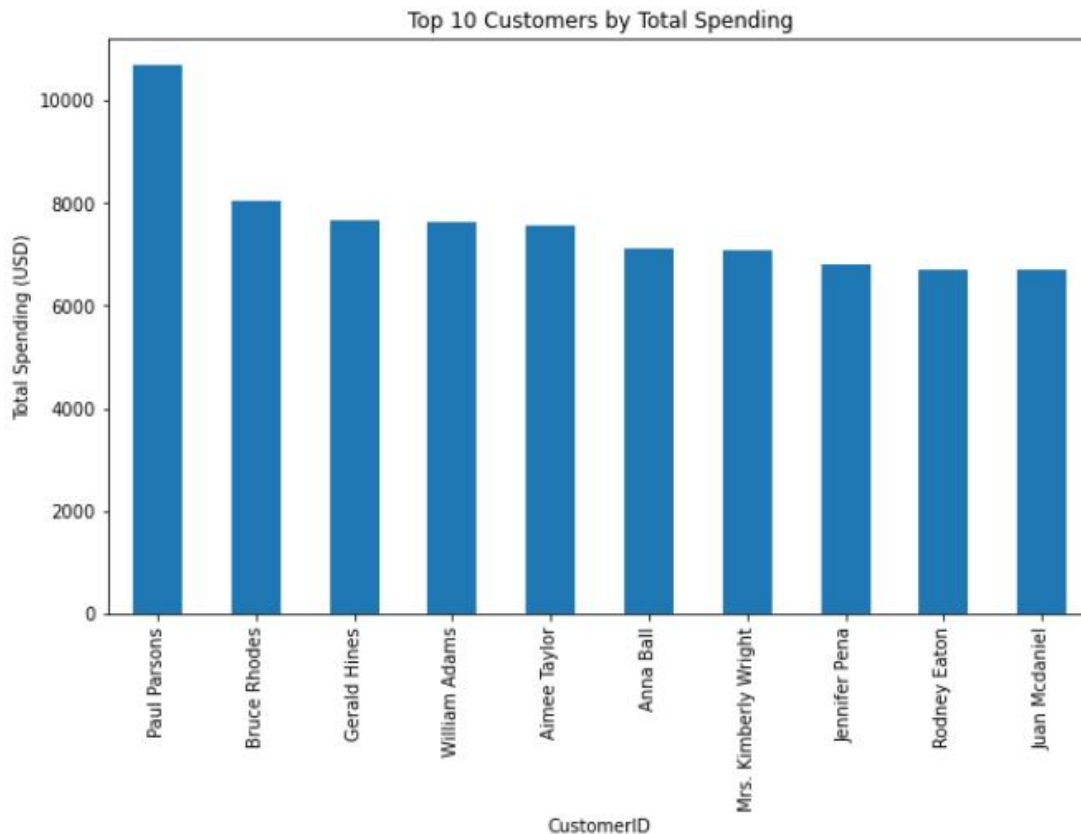
Total sales follow a similar trend to the number of transactions, indicating steady revenue growth.

**Takeaway:**

Focus on increasing the average order value to boost revenue without needing more transactions.

## 4. Customer Purchasing Behavior

### Top Customers by Total Spending



**Figure:** Bar plot showing the top 10 customers by total spending.

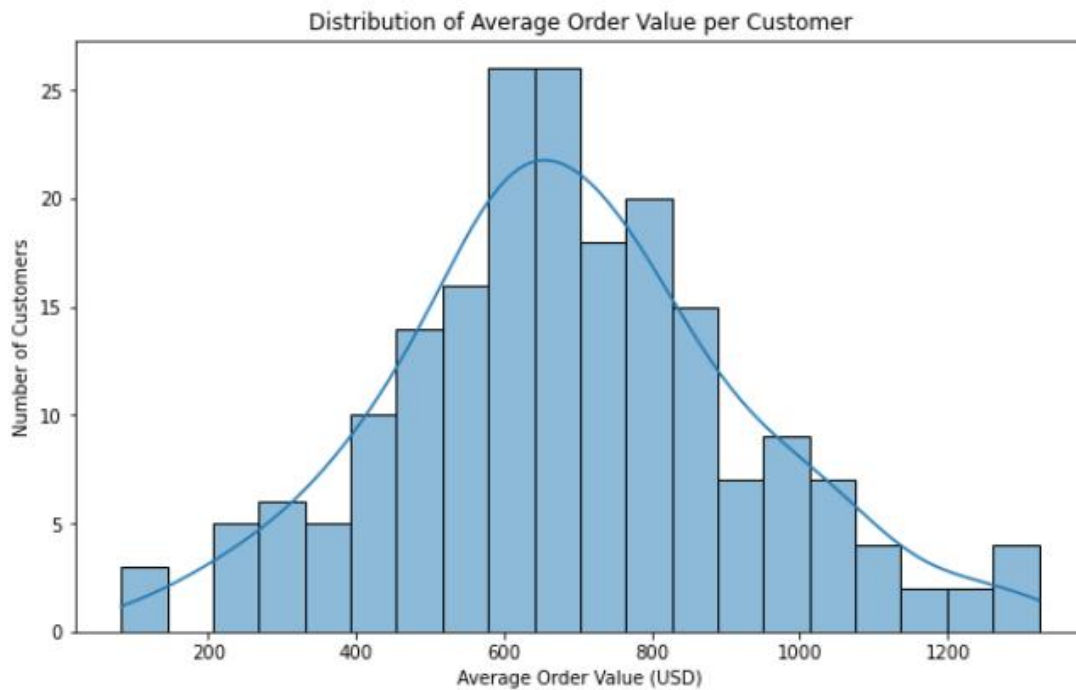
**Insight:**

A small group of customers contributes significantly to total revenue. These customers are likely **high-value customers**.

### Takeaway:

Implement loyalty programs or personalized offers to retain these high-value customers.

### Average Order Value per Customer



**Figure:** Histogram showing the distribution of average order value per customer.

### Insight:

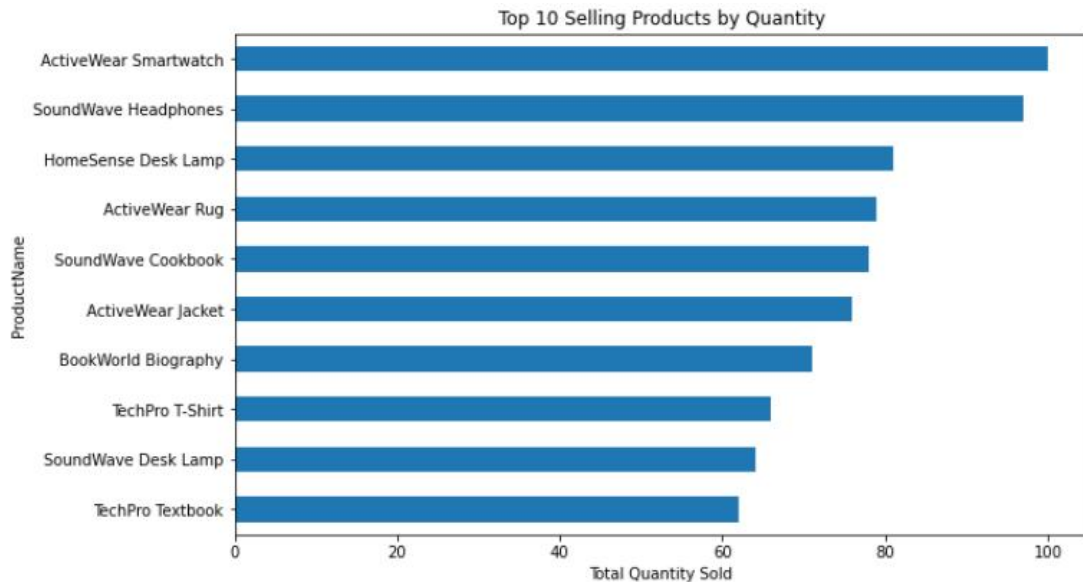
Most customers have a **low average order value**, with a few outliers spending significantly more.

### Takeaway:

Encourage customers to increase their order value through upselling or bundling strategies.

## 5. Product Performance

### Top Selling Products by Quantity



**Figure:** Horizontal bar plot showing the top 10 products by quantity sold.

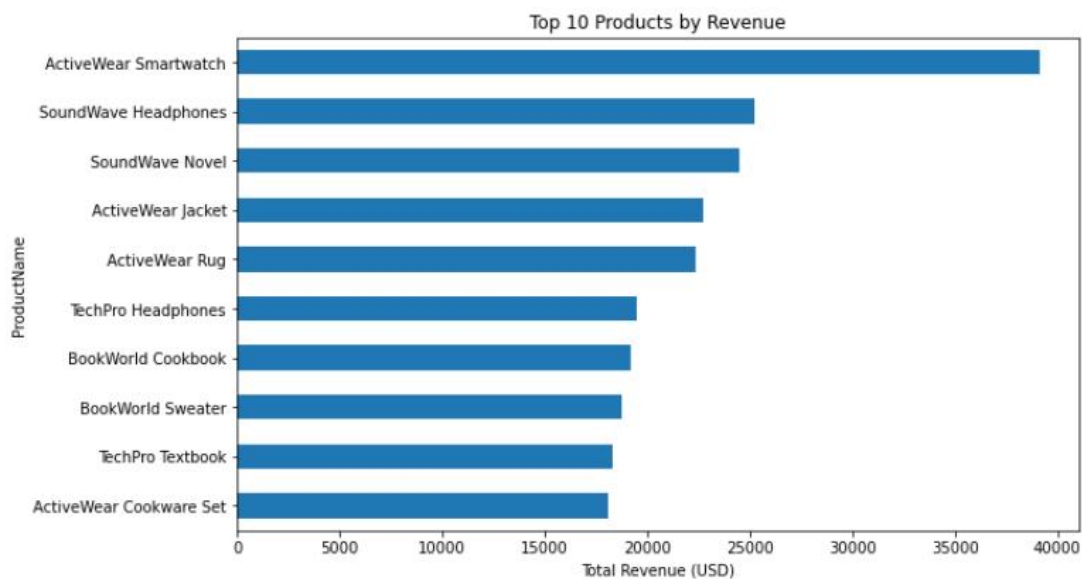
#### Insight:

Certain products are **highly popular** and account for a large portion of total sales.

#### Takeaway:

Stock more of these popular products and consider offering discounts on less popular items to boost sales.

### Revenue by Product



**Figure:** Horizontal bar plot showing the top 10 products by revenue.



### Insight:

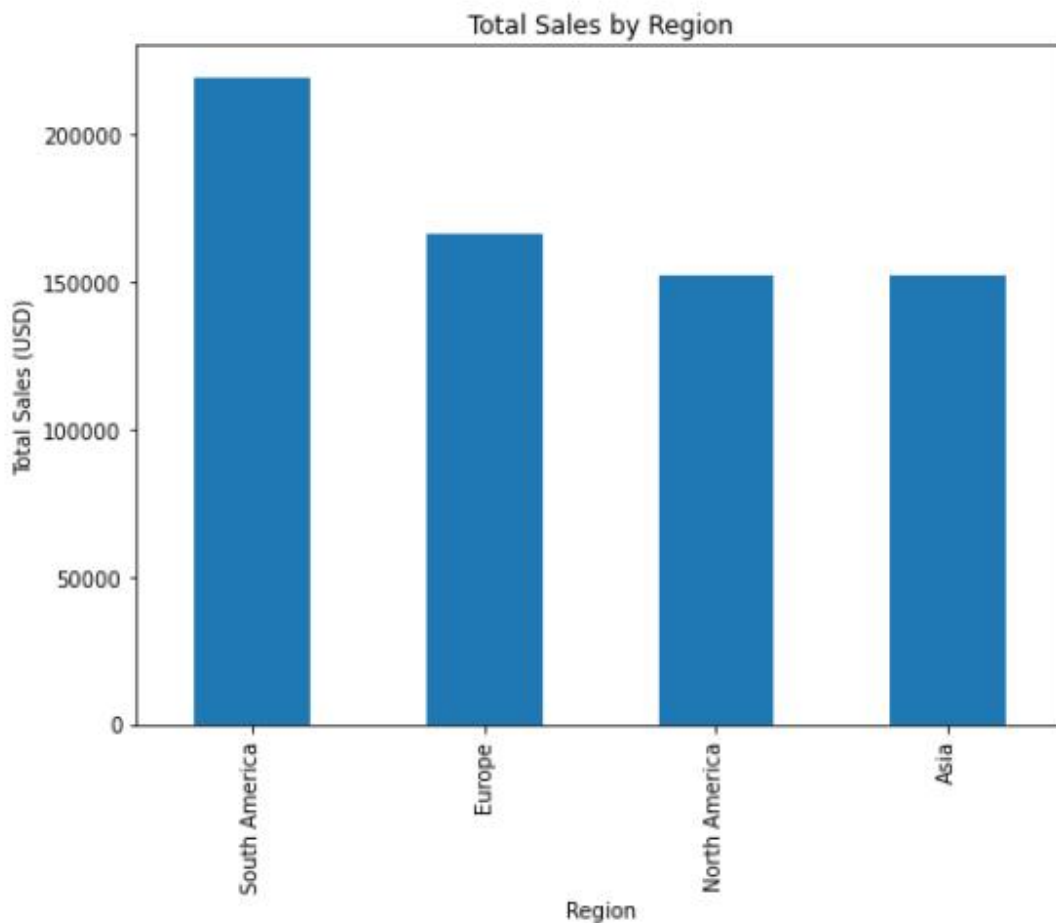
The top-selling products by quantity are not always the top revenue generators. Some **high-priced products** contribute significantly to revenue despite lower sales volume.

### Takeaway:

Focus on promoting high-revenue products to maximize profitability.

## 6. Regional Sales Analysis

### Total Sales by Region



**Figure:** Bar plot showing total sales by region.

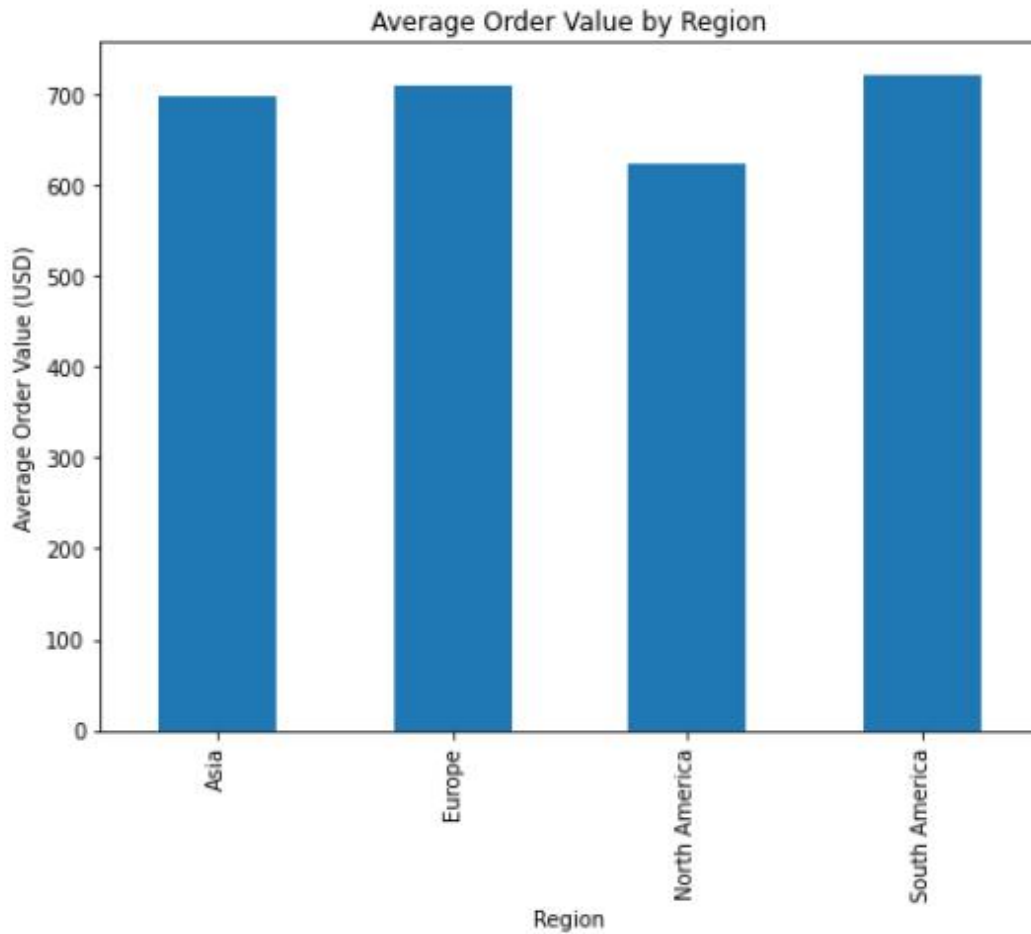
### Insight:

**South America** generates the highest sales, followed by **Asia**, **Europe**, and **North America**.

### Takeaway:

Allocate more resources to regions with higher sales potential (e.g., South America and Asia).

## Average Order Value by Region



**Figure:** Bar plot showing the average order value by region.

### Insight:

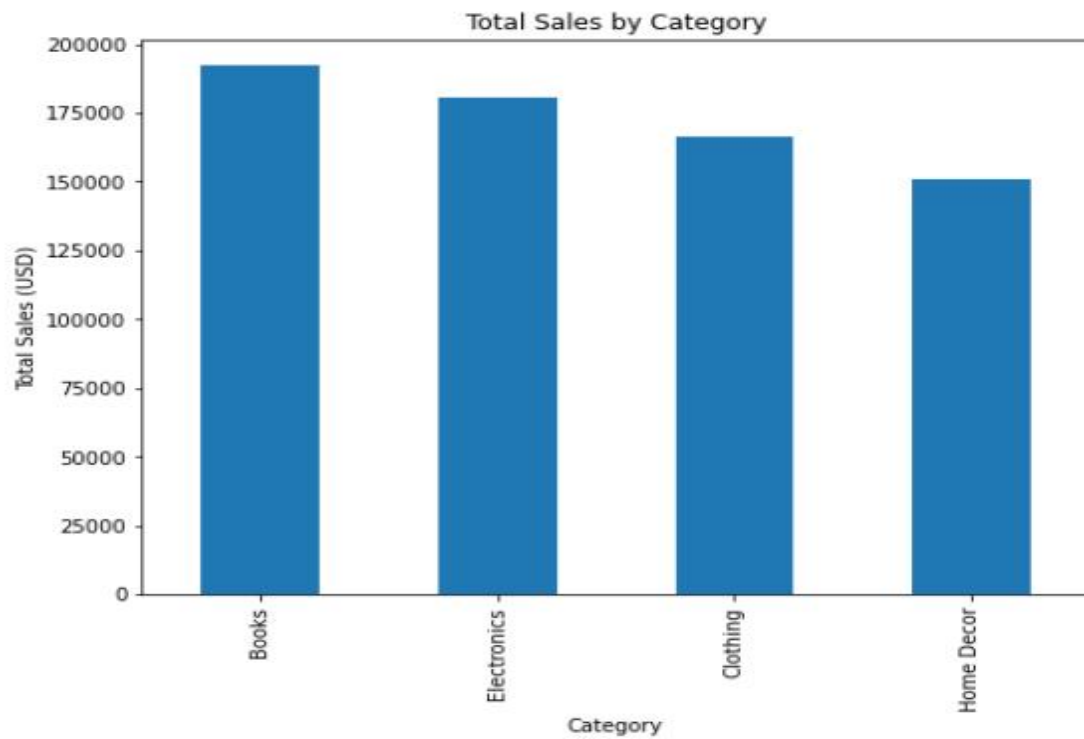
**North America** has the highest average order value, despite having fewer customers.

### Takeaway:

Target North American customers with premium products or services to capitalize on their higher spending.

## 7. Category-wise Sales

### Sales by Product Category



**Figure:** Bar plot showing total sales by product category.

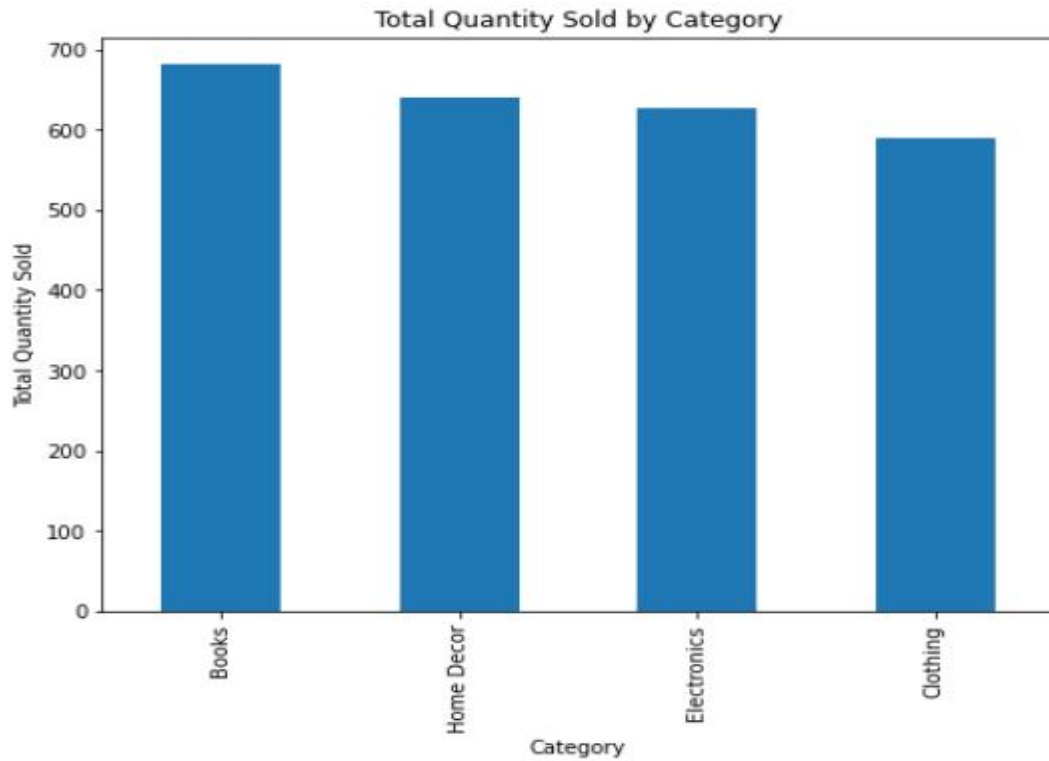
#### Insight:

The **Electronics** category generates the highest revenue, followed by **Books**, **Clothing**, and **Home Decor**.

#### Takeaway:

Focus on expanding the Electronics category, as it is the most profitable.

## Quantity Sold by Category



**Figure:** Bar plot showing the total quantity sold by category.

### Insight:

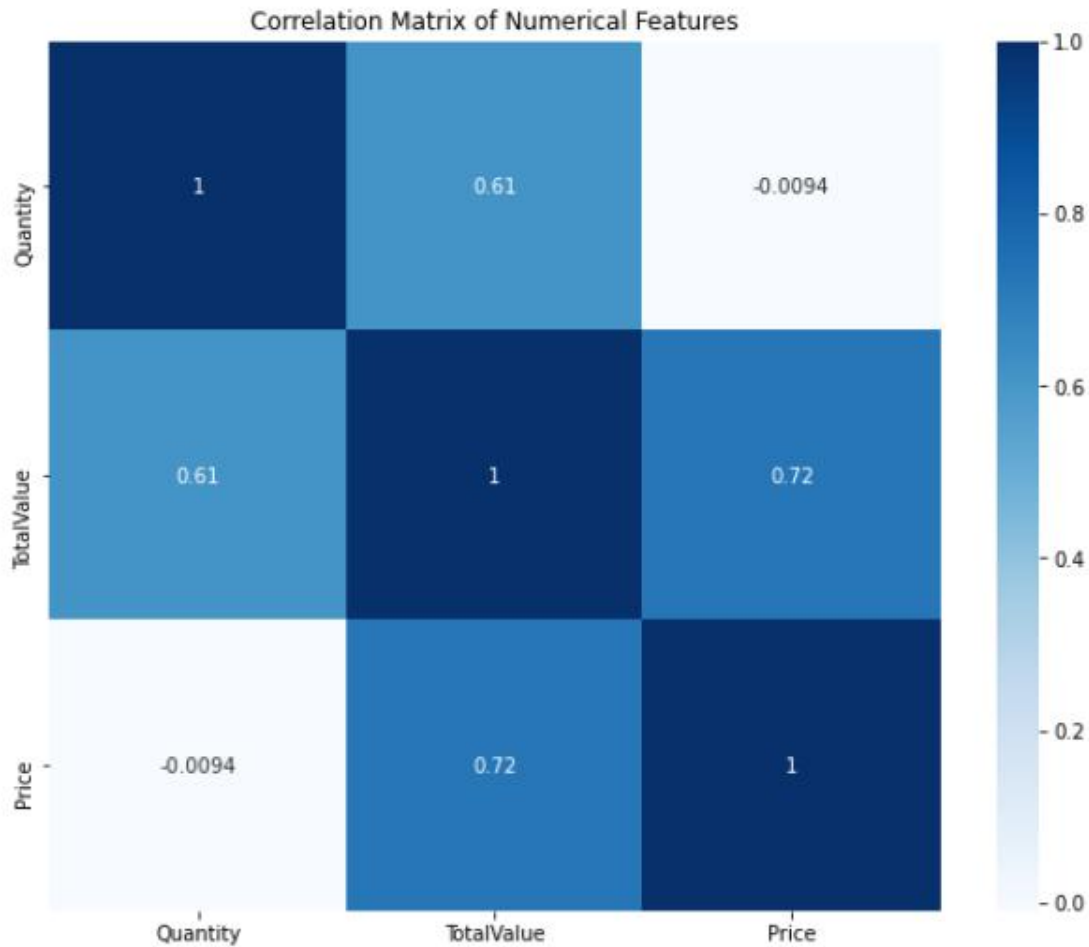
The **Books** category has the highest quantity sold, despite generating less revenue than Electronics.

### Takeaway:

Consider increasing the price of books or bundling them with higher-margin products.

## 8. Correlation Analysis

### Correlation Matrix



**Figure:** Heatmap showing the correlation between numerical features.

#### Insight:

**TotalValue** (total sales) is strongly correlated with **Quantity**, indicating that higher quantities lead to higher revenue.

There is no strong correlation between **Price** and **Quantity**, suggesting that price is not a major factor in purchase decisions.

#### Takeaway:

Focus on increasing the quantity sold rather than raising prices to boost revenue.

## Summary of Key Takeaways

**Customer Base:** South America has the largest customer base, but North America has the highest average order value.

**Product Focus:** Electronics is the most profitable category, while Books sell the most units.

**Revenue Growth:** Steady revenue growth can be achieved by increasing the average order value and focusing on high-revenue products.

**Marketing Strategy:** Target regions with fewer customers (e.g., North America) and implement loyalty programs for high-value customers.

**Pricing Strategy:** Consider bundling or upselling to increase the average order value without raising prices.

These insights can guide strategic decisions to optimize marketing, product offerings, and pricing strategies.