Exploratory Data Analysis (EDA) Report

1. Introduction

- **Objective**: The aim of this EDA is to analyze customer, product, and transaction data to derive actionable business insights that can help improve decision-making and business strategy.
- **Datasets Used**:
  - **Customers.csv**: Contains customer details and signup information.
  - **Products.csv**: Details on product IDs, names, categories, and pricing.
  - **Transactions.csv**: Records of transactions including purchase details and financial metrics.

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2. Dataset Overview

- **Customers**:
  - Total number of customers: `200`
  - Unique regions: `4`
- **Products**:
  - Total number of products: `100`
  - Product categories: `Books,Electronics,Clothing,Homedecor`
- **Transactions**:
  - Total transactions: `1000`
  - Date range: `Start Date: 2023-12-30 15:29:12 to End Date: 2024-12-28 11:00:00`

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3. Data Cleaning and Preprocessing

- Checked for missing values and handled inconsistencies.
- Verified data types
- Ensured relationships between datasets are consistent .

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4. Key Findings

1. **Regional Performance**:
   - The top 5 regions contribute `100%` of total revenue.
   - Region `South America` leads in revenue generation.
   - Focus on underperforming regions like `Asia` for targeted growth.
2. **Product Performance**:
   - The top 5 products contribute `12.32%` of total revenue.
   - Product `PO29` generates the highest revenue.
   - Recommendations: Can Prioritize these products in inventory and marketing.
3. **Category Contributions**:
   - The category `Books` contributes `27.85%` of total revenue.

o Opportunities exist to expand offerings in `HomeDecor`.
4. **Monthly Sales Trends**:
   o Peak sales occur during `july and september`, contributing 10.34`%` and 10.23`%` of total revenue.
   o Sales decline during `December`.
   o Recommendations: Adjust marketing and inventory based on seasonality.
5. **Customer Loyalty**:
   o The top 5 customers account for `6.03%` of total revenue.
   o Customer `Paul Parsons` generates the highest revenue.
   o Recommendations: Develop loyalty programs for top customers.

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5. Visualizations

- **Revenue by Region**: A bar chart showing the contribution of each region.
- **Top Products**: A bar chart highlighting the revenue generated by the top 5 products.
- **Category Revenue Distribution**: A bar chart showing the total revenue for each product category.
- **Monthly Sales Trends**: A line chart displaying sales trends over time.

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6. Conclusion and Recommendations

- The analysis highlights key areas for improvement and strategic focus, such as prioritizing high-performing regions, products, and categories, while also addressing customer retention and sales seasonality.
- Next Steps:
  1. Implement loyalty programs for top customers.
  2. Enhance inventory planning for peak sales periods.
  3. Focus marketing efforts on regions and categories driving the most revenue.
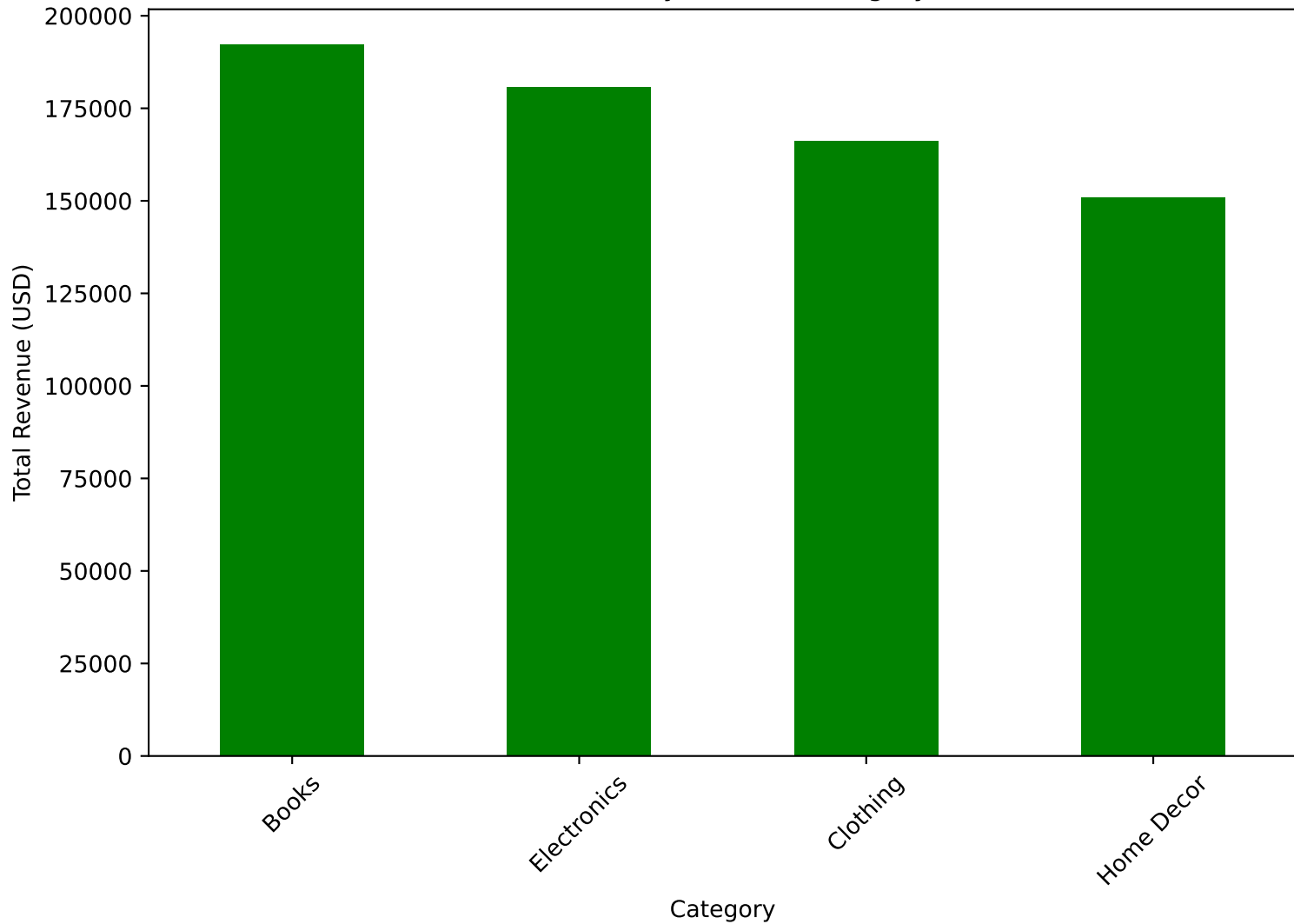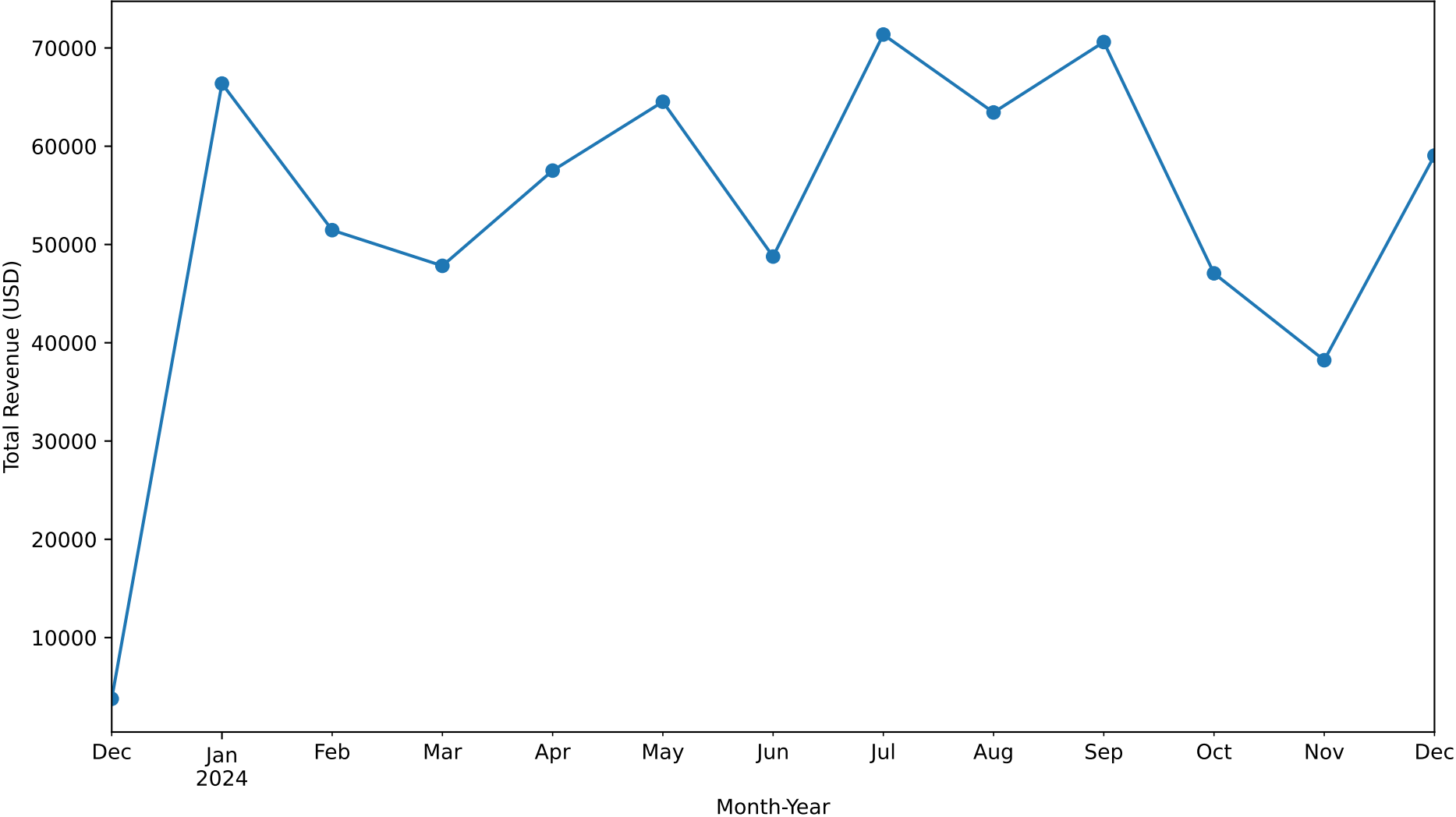
Top 5 Regions by Revenue
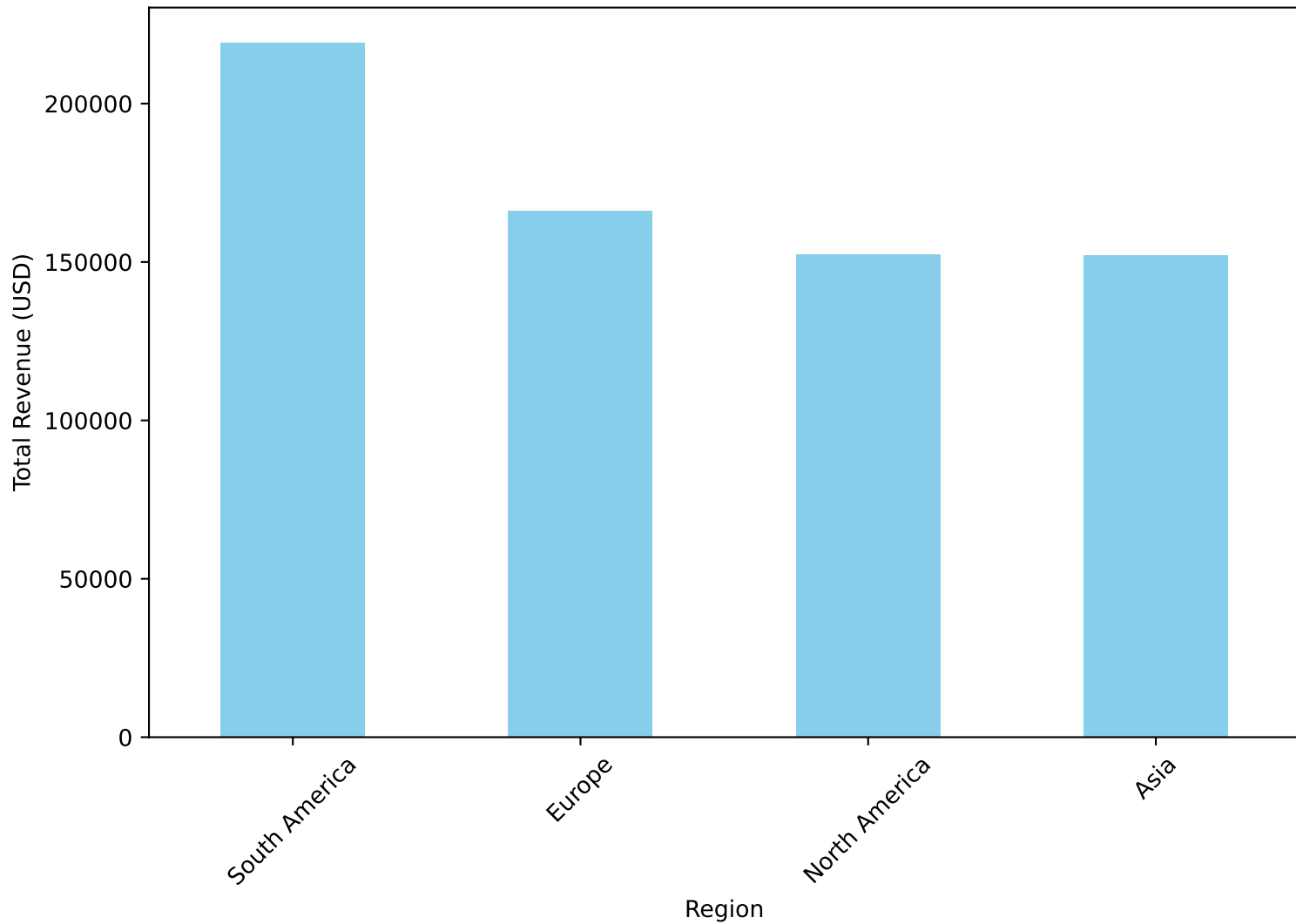
Top 5 Products by Revenue
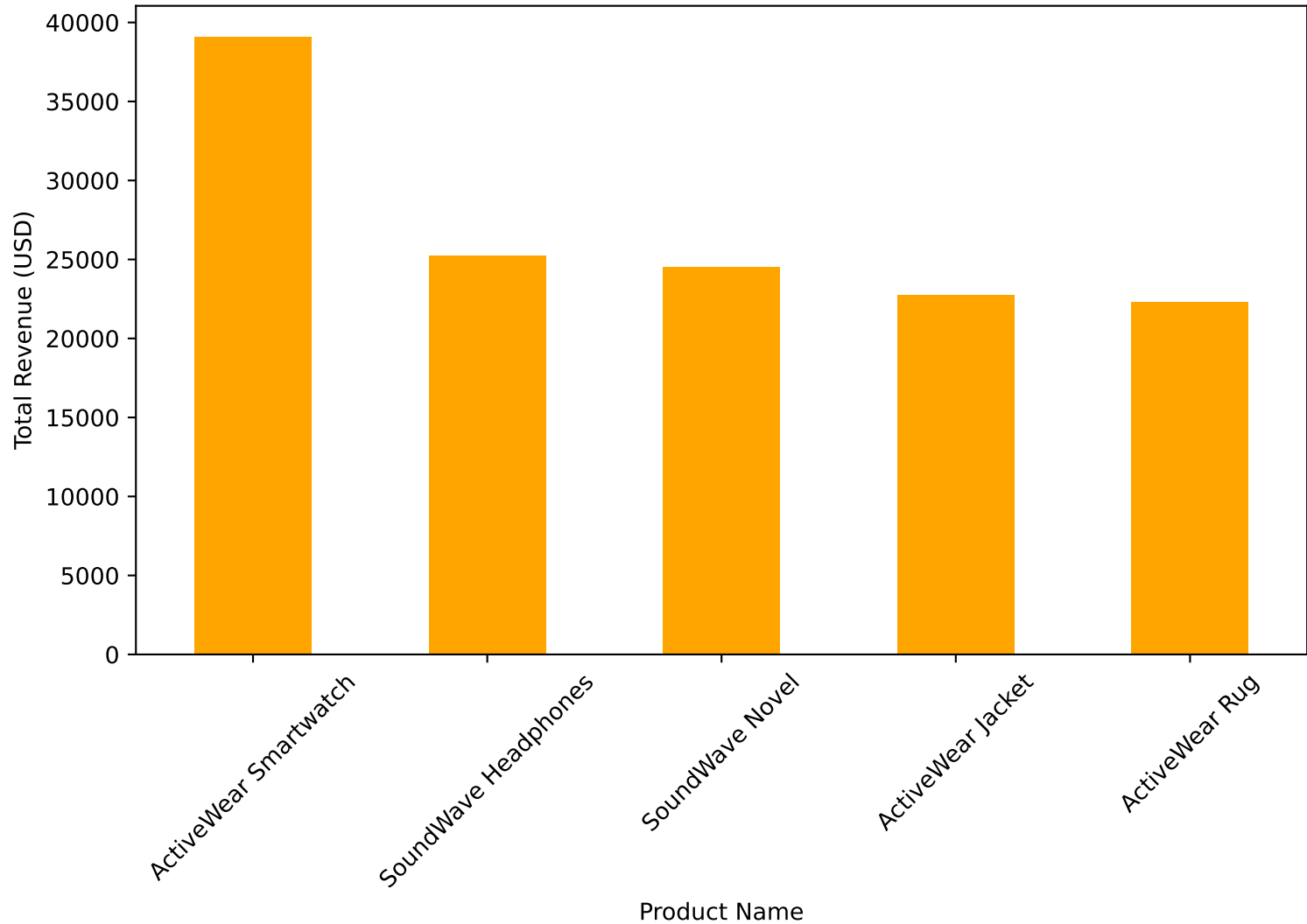
Revenue by Product Category

Monthly Sales Trend

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Business Insights:

- Regional Performance: Top 5 regions contribute significantly to the overall revenue. Focusing marketing in these areas can maximize sales.

- Top Products: Few products dominate revenue generation. Optimizing inventory and promotions for these products can increase profitability.

- Category Contributions: Certain categories outperform others. Expanding product range in top categories could improve revenue balance.

- Sales Trends: Sales show clear monthly peaks. Align marketing and inventory planning with these trends for better performance.

- Customer Loyalty: A few customers generate high revenue. Loyalty programs for these customers can increase retention and lifetime value.