Exploratory Data Analysis (EDA) and Business Insights Report

1. Introduction

This report provides an analysis of customer, product, and transaction data. The goal is to derive actionable business insights that can guide strategic decisions, improve customer retention, and boost profitability. The dataset comprises three CSV files:

- **Customers.csv**: Contains customer details such as name, region, and signup date.

- **Products.csv**: Contains product details like category and price.

- **Transactions.csv**: Contains transactional details such as quantity, price, and total value.

2. Objectives

- To perform EDA on the provided datasets.

- To derive meaningful business insights that can support data-driven decision-making.

3. Data Preparation

The datasets were cleaned and merged for analysis. Missing values were handled, columns were renamed for consistency, and new features like transaction month and customer lifetime value were derived. The following steps were performed:

1. **Merging Datasets**: Using CustomerID and ProductID as keys.

2. **Feature Engineering**: Created YearMonth, TotalValue, and DayOfWeek columns for analysis.

4. Key EDA Findings

4.1 Customer Analysis

- **Active Customers by Region**: Customers are concentrated in South Americe with minimal representation in Asia.Focused marketing in underperforming regions can improve reach.

- **Top 10 High-Value Customers**: Customers contributed significantly to total revenue. Their lifetime value ranges between 2,000 to 10,000. Retention efforts for these customers can ensure consistent cash flow.

4.2 Product Analysis

- **Top Selling Products**: Products ActiveWear Smartwatch, SoundWave Headphones, lead in sales quantity. A consistent inventory for these items is critical to meeting demand.

- **Revenue per Product Category**: The Books category generates the highest revenue. Expanding this product line or creating complementary products can maximize returns.

- **Product Profitability**: Products SoundWave T-shirt generate the highest revenue per unit. Prioritizing these in marketing campaigns can boost profitability.

4.3 Transaction Analysis

- **Peak Purchasing Days**: The highest transactions occur on Tuesday. Targeted offers and promotions on these days can maximize revenue.

- **Repeat Customers vs. One-Time Buyers**: Approximately 94% of customers are repeat buyers. Loyalty programs for one-time buyers can convert them into long-term customers.

5. Business Insights

Here are the top 10 actionable insights derived from the analysis:

1. **High-Value Customers**:

   o Customers C0141 contribute significantly to revenue. Retaining them through loyalty programs or personalized offers can enhance long-term profitability.

2. **Revenue by Product Category**:

   o The Books category leads in revenue. Expansion of this category or creation of complementary products will capitalize on demand.

3. **Repeat Buyers**:

   o Only 94% of customers are repeat buyers. A loyalty program or referral discounts can increase customer retention.

4. **Underperforming Regions**:

   o Regions like Asia have low customer activity. Focused campaigns can boost customer acquisition in these areas.

5. **Top-Selling Products**:

   o Products ActiveWear Smartwatch consistently perform well. Prioritizing their stock and advertising can improve sales.

6. **Peak Sales Days**:

   o Transactions peak on Tuesday. Offering time-limited discounts or promotions can maximize revenue on these days.

7. **Price Transparency**:

   o Products SoundWave Smartwatch exhibit high price variability. Stabilizing prices can attract more customers and improve trust.

8. **Profit Margins**:

    o   Products Books have the highest revenue per unit. Upselling or bundling these items can enhance profitability.

9. **Seasonal Trends**:

    o   Revenue in August Month showed a significant spike. Seasonal campaigns targeting these periods can yield higher returns.

Conclusion

The analysis highlights opportunities to enhance revenue, improve customer retention, and optimize inventory. The business should focus on high-value customers, top-performing products, and underperforming regions for sustainable growth.