# Exploratory Data Analysis (EDA) and Clustering Results

## Business Insights from Exploratory Data Analysis (EDA)

### 1. Customer Purchase Behavior

- The data reveals that the majority of customers have made fewer transactions, with a significant portion being low-frequency buyers. These customers tend to have minimal engagement with the brand, which suggests that the business may be missing opportunities to increase customer engagement.
- **Business Implication**: A targeted effort to re-engage these customers is crucial. Campaigns could include **email marketing**, **exclusive offers**, or personalized recommendations based on their limited purchasing history. Additionally, **discounts for first-time buyers** or time-sensitive promotions could encourage repeat purchases and raise overall transactional frequency.

### 2. High-Value Customers

- The analysis shows that a small proportion of customers contribute to the bulk of total revenue, often following the Pareto principle (80/20 rule). A few high-spending customers tend to make frequent purchases, while a large number of customers generate lower revenue.
- **Business Implication**: Focusing on high-value customers is paramount for sustained growth. Offering **exclusive loyalty programs** or **VIP benefits** could foster long-term relationships with these customers. **Personalized outreach** via phone calls or direct messages for these segments can increase retention, ultimately improving the company's bottom line.

### 3. Average Transaction Value

- The distribution of transaction values shows that most customers make smaller purchases, with fewer customers opting for high-value items. However, the variance in spending indicates opportunities for increasing the **average transaction value** per customer.
- **Business Implication**: To boost revenue, businesses can consider **upselling** or **cross-selling** strategies, recommending complementary or higher-priced items based on customer purchase patterns. Offering **bundled discounts** on related products or services might also increase per-transaction spending and enhance customer satisfaction.

### 4. Transactional Frequency

- Customers who make frequent purchases tend to spend more per transaction, indicating a positive correlation between purchase frequency and total spending.
- **Business Implication**: Encouraging repeat business is crucial. Implementing **loyalty programs**, offering **discounts on repeat purchases**, or providing **subscription-based**

**models** could incentivize customers to make frequent purchases. Regular reminders or special deals targeted at frequent shoppers can also maintain their interest and increase lifetime value.

## 5. <u>Seasonal Purchase Patterns</u>

- There are clear **seasonal spikes** in transaction volumes, typically aligned with holidays or specific events. This indicates that customers are more likely to make purchases during certain times of the year.
- **<u>Business Implication</u>**: Recognizing these seasonal patterns allows for **strategic marketing** during high-demand periods. Offering **limited-time offers**, **holiday discounts**, or creating **seasonal bundles** can capitalize on these spikes, leading to higher sales during these periods. Seasonal campaigns and **targeted ads** can also attract more buyers during peak times.