Customer Segmentation / Clustering Report

Introduction:

This report summarizes the results of the customer segmentation analysis performed using clustering techniques. The goal of this analysis is to group customers into distinct segments based on their profile and transaction behavior. The clustering results provide insights into customer behavior and can help the company tailor its marketing strategies to different customer segments.

Clustering Results:

The clustering analysis was performed using the **K-Means algorithm**, and the following results were obtained:

1. Number of Clusters:

- The optimal number of clusters was determined to be **4**.

2. Davies-Bouldin Index (DB Index):

- The DB Index value is **1.49**. A lower DB Index indicates better clustering, and this value suggests that the clusters are reasonably well-separated.

3. Cluster Sizes:

The distribution of customers across the clusters is as follows:

Cluster	Size (Number of Customers)
Cluster 1:	55 customers
Cluster 3:	53 customers
Cluster 2:	47 customers
Cluster 0:	44 customers

4. Other Relevant Metrics:

- **Inertia**: The inertia value (sum of squared distances of samples to their closest cluster center) was used to determine the optimal number of clusters. The elbow method was applied to select **k=4**.
- **Silhouette Score**: Although not calculated in this analysis, it is recommended to include this metric in future studies to further validate clustering quality.

Visual Representation:

Cluster Size Distribution:

A bar chart or pie chart could help visualize the distribution of customers across the clusters.

Elbow Method Curve:

An elbow method graph could illustrate the inertia values against different numbers of clusters, showing why **k=4** was selected as the optimal number of clusters.

Cluster Interpretation

Based on the clustering results, the following interpretations can be made:

1. **Cluster 1 (55 customers)**:
    - Likely represents **high-spending customers** who make frequent purchases. These customers are the most valuable to the business.
2. **Cluster 3 (53 customers)**:
    - Likely represents **moderate-spending customers** who purchase occasionally. Targeted promotions could encourage them to increase their spending.

3. **Cluster 2 (47 customers)**:
    - Likely represents **new or infrequent customers** who have made only a few transactions. Engagement strategies (e.g., welcome offers) could help convert them into loyal customers.
4. **Cluster 0 (44 customers)**:
    - Likely represents **low-spending customers** who make small purchases. Offering discounts or bundle deals could encourage them to spend more.

Conclusion:

The clustering analysis successfully segmented customers into **4 distinct groups** based on their profile and transaction behavior. The DB Index value of **1.49** indicates that the clusters are reasonably well-separated. These segments can help the company tailor its marketing strategies to different customer groups, improving customer engagement and driving revenue growth.

1. **High-Spending Customers (Cluster 1)**:
    - Implement loyalty programs to retain these valuable customers.
    - Offer exclusive deals or early access to new products.
2. **Moderate-Spending Customers (Cluster 3)**:
    - Use targeted promotions to encourage more frequent purchases.
    - Highlight popular products or limited-time offers.
3. **New or Infrequent Customers (Cluster 2)**:
    - Send welcome offers or discounts to encourage repeat purchases.
    - Provide personalized recommendations based on their purchase history.
4. **Low-Spending Customers (Cluster 0)**:
    - Offer bundle deals or discounts on bulk purchases.
    - Highlight affordable products to encourage spending.