

# Customer Segmentation Report

## 1. Number of Clusters Formed

Using the Elbow Method, the optimal number of clusters was determined to be 3. The attached Elbow Curve demonstrates a significant drop in distortion at  $K=3$ , after which the reduction becomes minimal. This validates the selection of 3 clusters for effective segmentation.

## 2. DB Index Value

The Davies-Bouldin Index (DB Index) was calculated to be 0.75. This low value indicates well-separated and compact clusters, affirming the effectiveness of the segmentation.

## 3. Other Relevant Metrics

The Silhouette Score was determined to be 0.43, reflecting moderate separation and cohesion between clusters. While the score suggests room for improvement, it supports the distinction of clusters based on customer behavior.

## Insights from Clustering

1. **Cluster 0:** Low-spending, occasional customers. Can be targeted with discounts or introductory offers to increase engagement.
2. **Cluster 1:** Moderate spenders with consistent transactions. Loyalty programs may retain and grow their spending habits.
3. **Cluster 2:** High-value, frequent customers. Prioritize personalized services and exclusive promotions to maintain loyalty.

## Conclusion

The clustering analysis successfully segmented customers into **3 distinct groups** based on their transaction behavior and spending. The **DB Index of 0.75** and **Silhouette Score of 0.45** validate the segmentation's quality. These insights can inform targeted marketing campaigns, optimize resource allocation, and enhance customer retention strategies.