

## Clustering Results Overview

In this analysis, I performed customer segmentation using K-Means clustering, utilizing customer profile information and transaction data. The primary goal was to identify distinct customer groups that could inform targeted marketing strategies and enhance customer engagement.

### Number of Clusters Formed

After evaluating various cluster configurations, I determined that 3 clusters were optimal for this dataset. This decision was based on a combination of visual inspection of the clustering results and the evaluation of clustering metrics, ensuring that the selected number of clusters was meaningful.

### DB Index

The Davies-Bouldin Index (DB Index) is an important metric for evaluating clustering quality. A lower DB Index indicates better-defined clusters. For 3 clusters, the calculated DB Index value was 0.8802, which suggests that the clusters are well-separated and distinctly defined, providing clear segmentation between different customer groups.

### Other Relevant Clustering Metrics

Along with the DB Index, the following metrics were also computed:

**Silhouette Score:** The Silhouette Score for 3 clusters was 0.3836. This score indicates moderate quality in clustering, with some separation between the clusters, but still room for refinement to improve the distinctness of the groups.

### Conclusion

The customer segmentation analysis successfully identified three distinct clusters with varying levels of spending and engagement. The DB Index value of 0.8802 indicates satisfactory separation between the clusters, while the Silhouette Score of 0.3836 shows that there is potential for further improvement in the cluster definitions. These insights can be leveraged by businesses to tailor marketing strategies that are more effective in engaging each customer segment, ultimately improving customer satisfaction and driving sales growth.