

# Clustering Report

Customer segmentation was performed using K-Means and DBSCAN clustering techniques on customer profiles and transaction data. For K-Means, the optimal number of clusters was 8, achieving a Davies-Bouldin Index (DB Index) of **0.9190** and a Silhouette Score of **0.3009**, indicating moderate cluster separation. While K-Means provided consistent groupings, some overlap between clusters was observed. In comparison, DBSCAN, with its best configuration of **eps=1.5** and **min\_samples=5**, achieved a significantly better DB Index of **0.3363**, showcasing more compact and well-separated clusters, particularly handling noise and outliers effectively.

The results highlight that DBSCAN outperformed K-Means in terms of clustering quality due to its ability to dynamically adapt to data density. However, K-Means offers simplicity and predefined groupings, making it effective for general applications. Based on the lower DB Index, DBSCAN is the recommended method for this dataset, providing better segmentation and identifying key customer patterns. Visualizations for both methods showed distinct clusters, with DBSCAN performing better for separating dense regions and outliers.