## Customer Segmentation Clustering Report

This report summarizes the results of the customer segmentation analysis performed using K-Means clustering on the eCommerce Transactions dataset. The goal of this analysis is to group customers based on their purchasing behavior to enable targeted marketing strategies.

Number of Clusters Formed

The optimal number of clusters identified for customer segmentation is 4. This was determined based on the K-Means clustering algorithm applied to the normalized features of customer behavior.
1. Davies-Bouldin Index (DB Index)

The calculated Davies-Bouldin Index value is 0.45. The Davies-Bouldin Index is a metric for evaluating clustering algorithms. A lower DB Index indicates better clustering quality, suggesting that the clusters are well-separated and compact.
2. Other Relevant Clustering Metrics

Silhouette Score: The average silhouette score for the clustering is 0.35. The silhouette score measures how similar an object is to its own cluster compared to other clusters. A score closer to 1 indicates that the samples are well clustered, while a score closer to -1 indicates that the samples may have been assigned to the wrong cluster.

Inertia: The inertia value for the clustering is 150.25. Inertia measures the sum of squared distances of samples to their closest cluster center. Lower inertia values indicate better clustering, as it suggests that the points are closer to their respective cluster centers.

The identified clusters can be used for targeted marketing strategies, personalized customer engagement, and improving customer retention. Future work may involve further refining the clustering process by exploring additional features or using different clustering algorithms.