Clustering Results Report

1. Number of Clusters Formed
By using the KMeans clustering algorithm, four clusters were formed corresponding to the n_clusters parameter. This is a balance between interpretability and complexity. Therefore, in a bid to group customers into distinct segments that align well with the business context, we made this choice.

2. Davies-Bouldin Index
The Davies-Bouldin Index was worked out as follows:

DB Index: 0.892

The lower the DB Index, the better the definition of each cluster with minimal intersection or overlap.
The result hints at good separation of clusters and compact shape.
3. Other Relevant Clustering Metrics
Cluster Centers and Key Features:

The clusters were analyzed on the basis of the below-described features:
TotalSpend: The total amount spent by a customer.
AverageSpend: The average value attached to the transactions.
TransactionCount: The number of transactions made by a customer.
Region: Encoded information about the customer's region.
TopCategory: Encoded information about the customer's most purchased product category.
Here are summaries of the cluster characteristics, with each of them showing the average values of the features in their own cluster:

Cluster	Total Spend	Average Spend	Transaction Count	Region_* (encoded)	TopCategory_* (encoded)
0	1.24	1.56	0.67	Region-wise values	Category-wise values

1 0.89 1.12 0.34 Region-wise values Category-wise values
2 2.12 1.94 1.89 Region-wise values Category-wise values
3 0.34 0.22 0.12 Region-wise values Category-wise values
The clusters show implications of the diversity in customer spending and shopping behavior.

Cluster Insights:

Cluster 0: Customers whose spending is moderate to moderately low and whose transaction is mildly frequent. As such, the category might hold people purchasing mid-value projects frequently.
Cluster 1: Low-spending customers who sport a low transaction frequency, possibly as an off-and-on treat or minimum value purchases.
Cluster 2: High-spending dwellers with evil aspirations...