Task 3: Customer Segmentation / Clustering

Optimal Number of Clusters: 7

Davies-Bouldin Index: 0.9198360716444208

KMeans was selected for clustering due to its efficiency and compatibility with Davies-Bouldin Index evaluation. The algorithm iteratively assigns customers to clusters to minimize intra-cluster variance.

- **Optimal Number of Clusters**: Through evaluation of Davies-Bouldin Index across clusters (2–10), the optimal number of clusters was determined to be **7**, which yielded the lowest DB Index.
- **Davies-Bouldin Index**: The DB Index for the optimal clustering solution is **0.9198**, indicating good cluster separation and compactness.
- **Feature Selection**: Clustering was performed using:
    - TotalSpent: Total monetary value of purchases.
    - TransactionCount: Number of transactions.
    - TotalQuantity: Total items purchased.
    - RegionCode: Encoded region information.
- **Data Normalization**: All features were scaled to ensure equal contribution to the clustering process.