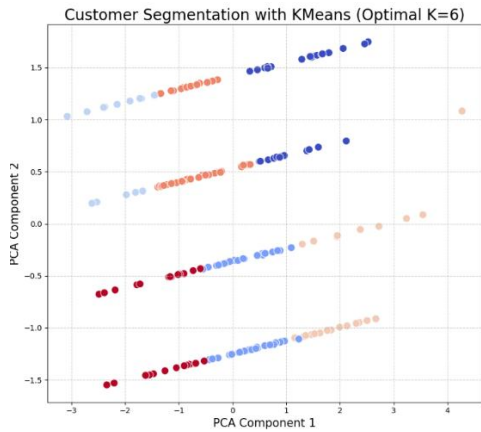


# Clustering Analysis Report



## 1. Optimal Number of Clusters:

We identified that the optimal number of clusters for our customer segmentation is **6**. This was determined using the KMeans clustering algorithm, ensuring we had the right number of groups that best represent the customer base.

## 2. Cluster Quality:

**Davies-Bouldin Index (DB Index): 0.91**

The DB Index helps evaluate how well-separated the clusters are, with a lower score being better. A DB Index of **0.91** indicates that the clusters are fairly well-separated and compact, meaning customers are grouped meaningfully based on their similarities.

## 3. Silhouette Score: 0.34

This score provides an indication of how well each customer fits within their assigned cluster. A score close to **1** would indicate very distinct clusters, while a score of **0.34** suggests that the clustering is moderate. While the clusters are not perfectly separated, they are still reasonable and offer useful insights.

### Visualizing the Clusters

The scatter plot visually represents how customers are distributed across the 6 clusters based on their spending habits and regional data. This helps in understanding how customers are behaving in relation to one another.

### Use of Clustering Insights

This segmentation can be highly valuable for tailored marketing campaigns, improving customer retention strategies, and enhancing the overall customer experience. By analyzing the distinct clusters, we can identify customer needs and preferences more accurately.

## Conclusion:

The clustering analysis has successfully segmented customers into **6 distinct groups**, with a **DB Index of 0.91** and a **Silhouette Score of 0.34**. These results suggest a solid, though moderate, clustering performance. The insights from this segmentation can be used to create more personalized and effective marketing strategies, driving better customer engagement and satisfaction.

For targeted marketing strategies: high spenders can be offered exclusive offers and VIP programs; moderate spenders can benefit from reward frequency programs; new customers can be engaged with a welcoming campaign; infrequent high-value customers can be targeted with personalized communication; regional shoppers can receive region-specific marketing; and low spenders can be re-engaged with attractive offers.

These strategies can help enhance customer engagement, loyalty, and sales by addressing the unique needs and preferences of each customer segment.