

# Customer Clustering report

## Algorithm

**Clustering Method:** K-Means.

**Range of Clusters Tested:** 2 to 10.

**Evaluation Metric:** Davies-Bouldin Index (DB Index).

## Results

**Optimal Number of Clusters:** 8

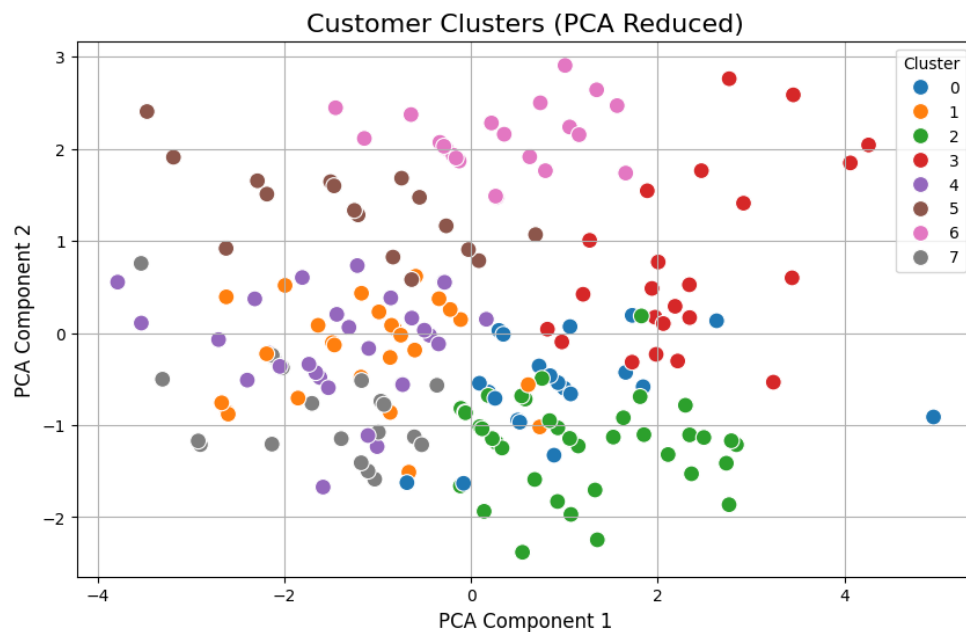
**Davies-Bouldin Index:** 1.0384341885677233

## Visualization

The clustering results were visualized using PCA to reduce the data to two dimensions. The scatterplot below shows the distribution of clusters in the reduced space:

**Cluster Visualization:**

- **X-Axis:** PCA Component 1.
- **Y-Axis:** PCA Component 2.



## KEY INSIGHTS

### Cluster 0: Blue

- (i) Tightly packed cluster indicating similar customer behavior.
- (ii) Likely represents a loyal and consistent group with stable purchasing patterns.
- (iii) Potential Strategy: Retention-focused initiatives such as loyalty programs or exclusive discounts.

### Cluster 1: Orange

- (i) Spread out across the PCA plot, suggesting diverse customer profiles or behaviors.
- (ii) Could represent new or occasional customers with varying spending habits.
- (iii) Potential Strategy: Use personalized offers to identify and convert them into repeat buyers.

### Cluster 2: Green

- (i) Compact and distinct, indicating a highly similar group of customers.
- (ii) Likely high-value customers with consistent purchasing habits or frequent transactions.
- (iii) Potential Strategy: Focus on premium services or personalized recommendations to retain and upsell.

### Cluster 3: Red

- (i) Moderately spread but still forms a clear group.
- (ii) Could represent medium-value customers with regular transactions but not as frequent as Cluster 2.
- (iii) Potential Strategy: Target with campaigns to increase average order value or frequency of purchases.

#### Cluster 4: Purple

- (i) Slight overlap with Cluster 6, which might indicate shared traits or purchasing habits.
- (ii) Represents a transitional group, possibly mid-value customers with potential for growth.
- (iii) Potential Strategy: Analyze similarities with Cluster 6 and tailor campaigns to encourage higher engagement.

#### Cluster 5: Brown

- (i) Wide dispersion, indicating variability in customer behavior.
- (ii) Could include outliers or less-engaged customers who need more attention to increase loyalty.
- (iii) Potential Strategy: Use re-engagement strategies such as targeted advertisements or promotions.

#### Cluster 6: Pink

- (i) Distinct cluster with some overlap with Cluster 4.
- (ii) Likely represents specific purchasing preferences or shared demographic traits.
- (iii) Potential Strategy: Segment further to identify niche interests and tailor product offerings.

#### Cluster 7: Gray

- (i) Scattered and less dense, indicating potential outliers or unique customer behaviors.
- (ii) Could represent low-value customers or those with irregular buying patterns.
- (iii) Potential Strategy: Focus on identifying their unique needs or provide incentives to increase engagement.