

# Customer Segmentation Report

## 1. Number of Clusters Formed

- I created **4 clusters** using the K-Means clustering algorithm. Each cluster represents a group of customers with similar behaviors and spending patterns.

## 2. Davies-Bouldin Index (DB Index)

- The **DB Index value** for clustering is **0.91**.
  - A lower DB Index indicates better-defined clusters. Since the value is below 1, it suggests that the clusters are reasonably distinct and well-separated.

## 3. Cluster Characteristics

Each cluster has unique features based on spending, transaction frequency, and signup history. Below is a summary of the clusters:

	Cluster	TotalSpent	TransactionFrequency	DaysSinceSignup
0	0	5905.710000	7.818182	686.840909
1	1	3548.877879	5.227273	257.924242
2	2	2804.902586	4.241379	877.689655
3	3	1072.065484	2.096774	416.741935

## 4. Insights from the Clusters

- **Cluster 0:** These are **high-value customers** who spend the most (\$5,905.71 on average) and make frequent transactions (7.82). They have been customers for a long time (687 days since signup).
- **Cluster 1:** Customers in this group spend moderately (\$3,548.88) and shop occasionally (5.23 transactions). They are newer customers (258 days since signup).
- **Cluster 2:** These are **long-term customers** (878 days) but have a lower spending average (\$2,804.90) and fewer transactions (4.24).
- **Cluster 3:** This cluster includes **low-value customers** who spend the least (\$1,072.06) and shop rarely (2.10 transactions). They have been customers for 417 days.

## 5. Visual Representation

I reduced the data to 2D using **PCA** for visualization. The scatter plot below shows how the clusters are distributed:

- **X-axis:** PCA1 (principal component 1)
- **Y-axis:** PCA2 (principal component 2)

Each point represents a customer, and the colors indicate their cluster.

## Conclusion

- This clustering analysis helped me identify different types of customers, such as high spenders, occasional shoppers, and long-term but low-spending customers.
- These insights can guide strategies like targeted marketing, personalized offers, or loyalty programs.