

# Customer Segmentation Report

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## 1. Key Findings

- Number of Clusters: 4
  - Davies-Bouldin Index: 1.56 (Lower is better; indicates moderate separation)
  - Silhouette Score: 0.23 (Higher is better; suggests some overlap between clusters)
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## 2. Cluster Profiles

The following table summarizes the average characteristics of each cluster:

Cluster	CLV	Frequency	Recency	AvgTransaction Value	Region_Europe	Region_North America	Region_South America
0	5649.80	8.03	77.00	717.73	0.10	0.32	0.00
1	2358.81	3.72	126.63	652.70	0.00	0.55	0.05
2	3891.91	5.38	88.82	713.10	0.00	0.00	1.00
3	3054.94	4.43	109.23	685.52	1.00	0.00	0.00

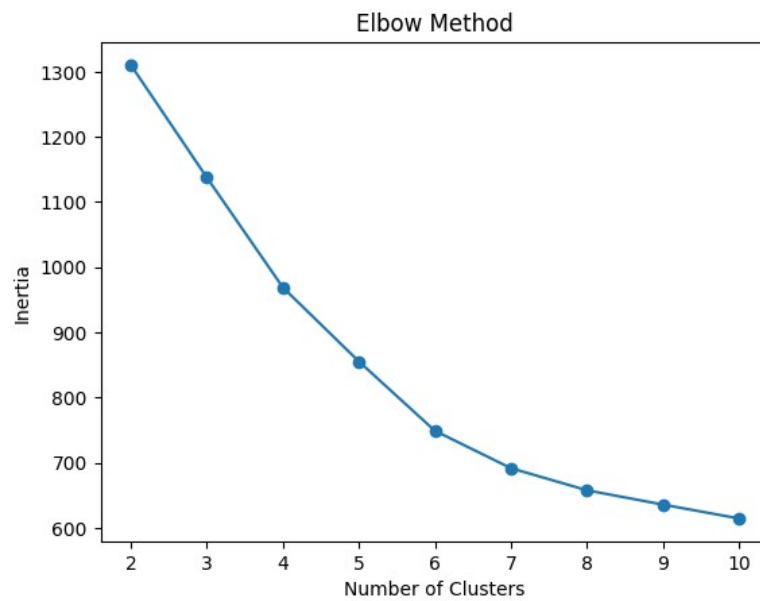
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## 3. Cluster Interpretation

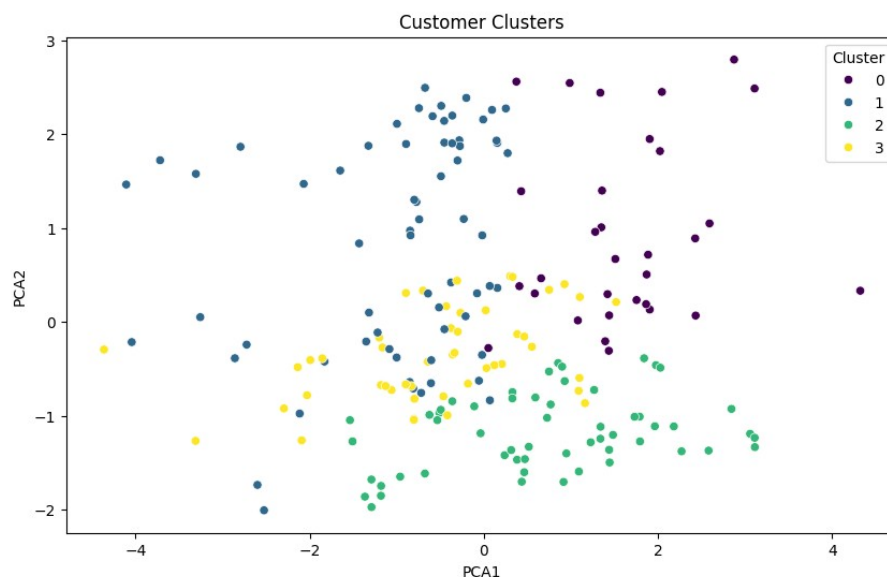
- Cluster 0: High-value customers with the highest CLV and frequency. They are recent buyers and primarily located in North America.
  - Cluster 1: Moderate-value customers with lower frequency and higher recency. Mostly from North America.
  - Cluster 2: Moderate-value customers with consistent behavior, exclusively from South America.
  - Cluster 3: Moderate-value customers with consistent behavior, exclusively from Europe.
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## 4. Visualization

- Elbow Method Plot: Used to determine the optimal number of clusters (k=4).



•PCA Scatter Plot: Visualizes the clusters in 2D space, showing reasonable separation between groups.



## 5.Recommendations

- Cluster 0: High-value, frequent buyers should be targeted with loyalty programs and premium offers.
  - Cluster 1: Moderate-value customers with higher recency may benefit from re-engagement campaigns.
  - Cluster 2 & 3: Region-specific strategies should be implemented for South American and European customers.
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## 6. Conclusion

- The analysis successfully identified 4 customer segments using K-Means clustering.
- While the clustering metrics indicate moderate separation, the results provide actionable insights for targeted marketing strategies.
- Future work could explore additional features or alternative clustering algorithms to improve cluster separation.