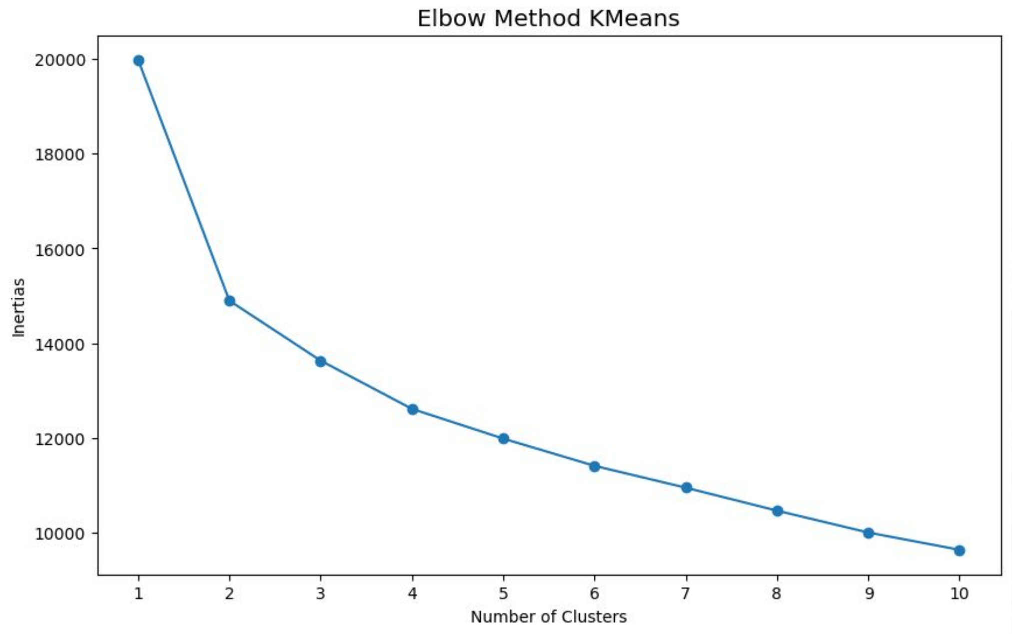
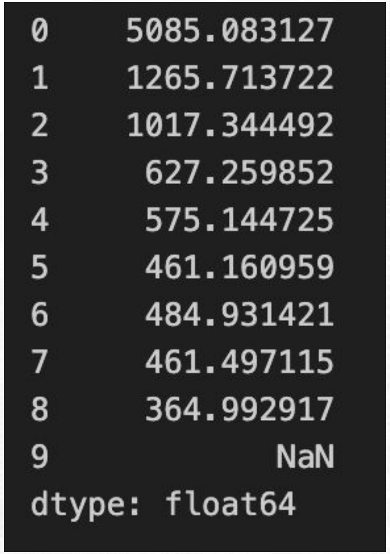
Data Modeling

- The ***Elbow Method*** using ***K-Means Clustering*** is performed to get better visualisation





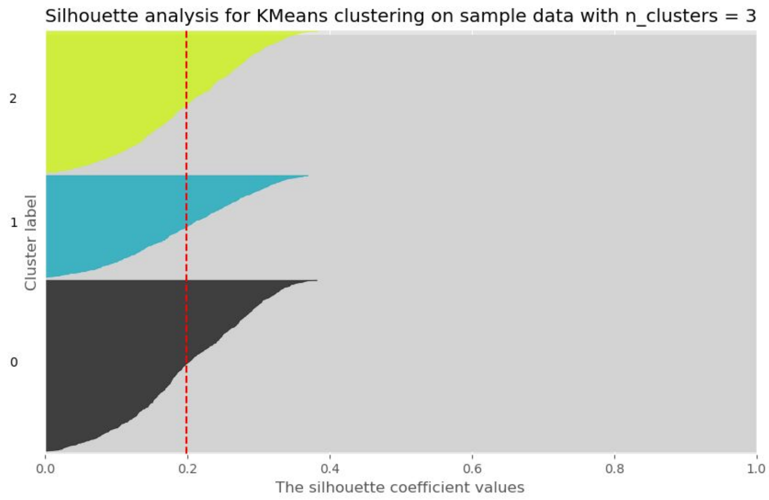
```
0      5085.083127
1      1265.713722
2      1017.344492
3       627.259852
4       575.144725
5       461.160959
6       484.931421
7       461.497115
8       364.992917
9              NaN
dtype: float64
```

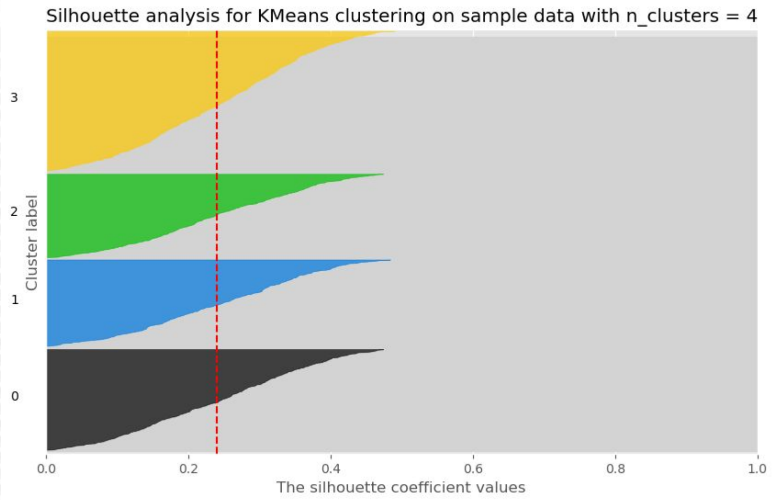
- From the elbow method, the best cluster is 3. Although some confusion with 4 clusters, the difference between 3 to 4 is smaller rather than 4 to 5. However, keeping in mind 4 clusters to be check for modelling is cautious.

For more information, see jupyter notebook here

Data Modeling

- Evaluation using ***Silhouette Score*** can be seen below between 3 and 4 clusters.



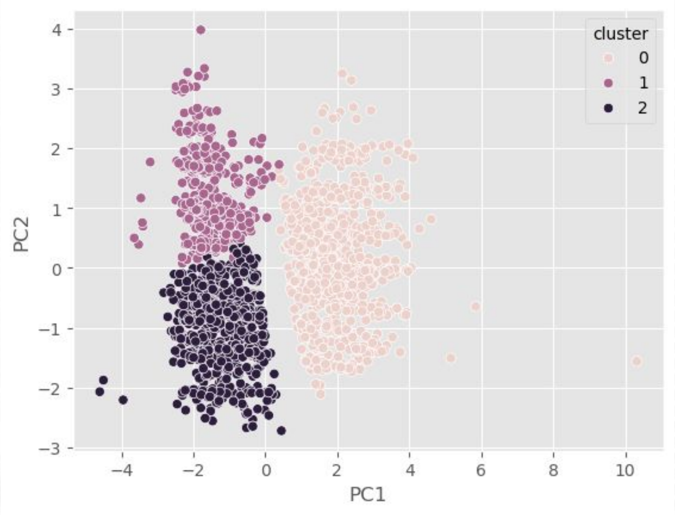


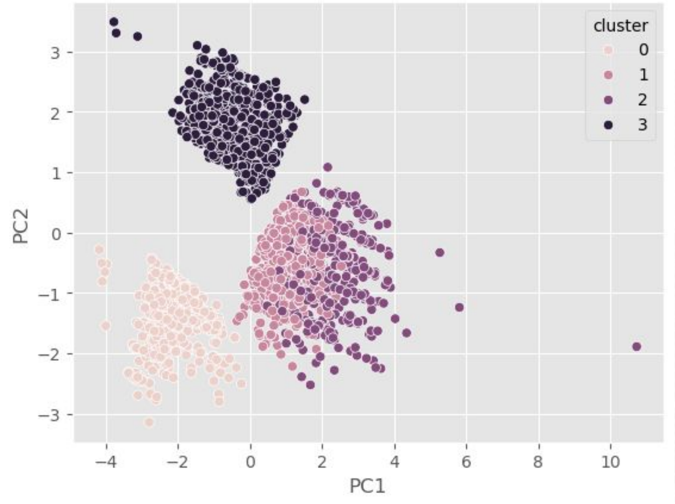
- From the graph, it can be seen that 1 and 0 in n_cluster=3 is being separated into three clusters in n_cluster=4 with more uniform shape.
- Silhouette coefficient is also higher for n_cluster=4 than n_cluster=3.

For more information, see jupyter notebook here

Data Modeling

- Evaluation using ***PCA*** can be seen below between 3 and 4 clusters.





- From the graph, it can be seen that a slight difference in clustering with n_cluster=3 seems to be more spread than n_cluster=4
- In n_cluster=4, although cluster 2 and 3 seems to be overlap, there's a clear distinct as such cluster 2 is high values on PC2 but low values on PC1. While the opposite is for cluster 3.

For more information, see jupyter notebook here

Data Modeling

In conclusion, the 4-cluster solution appears to be the better choice because:

- It has a slightly better silhouette score, indicating better-defined clusters.
- The PCA visualization strongly supports the existence of 4 distinct groups.
- It likely provides a more detailed and accurate representation of the data's underlying structure.

For more information, see jupyter notebook here