ALL LIFE BANK

Customer Segmentation

Contents

Business Problem Overview and Solution Approach

- All Life Bank aims to direct its focus for credit card customers in the upcoming financial year and on improving its breakthrough in the market. Their Marketing team proposed ideas to run personalized campaigns, to aid in targeting new customers and upselling existing ones, and also to greatly enhance the support services based on customer preferences

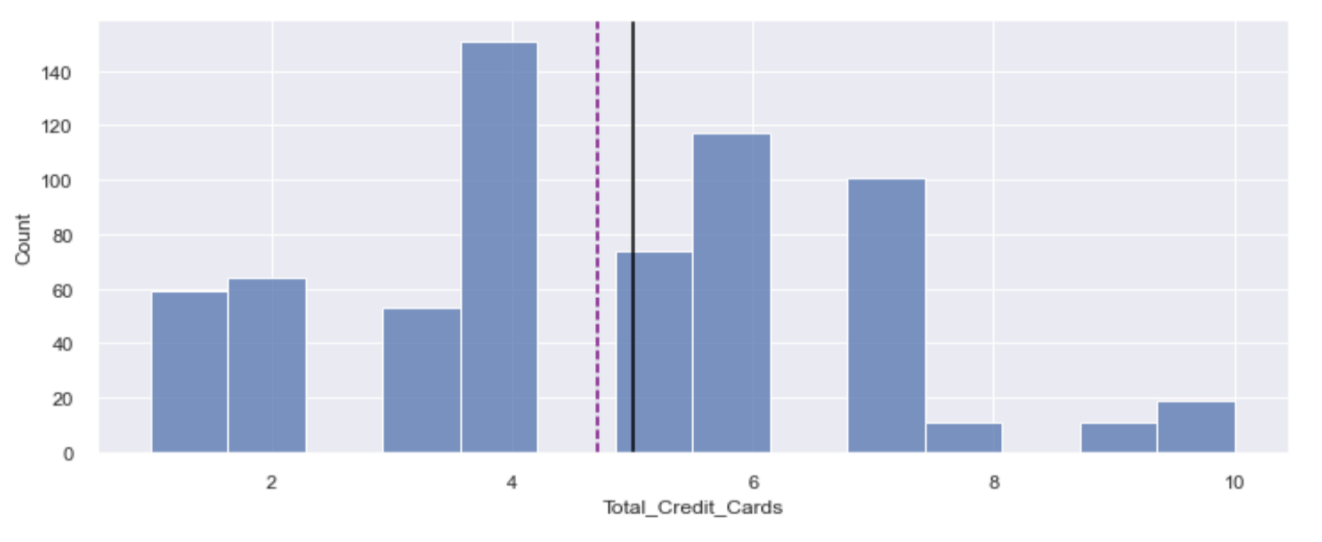
- We will use clustering algorithms to identify different segments of the existing customer, based on their spending patterns and past interaction with the bank

- Provide recommendations to better market and serve the customers

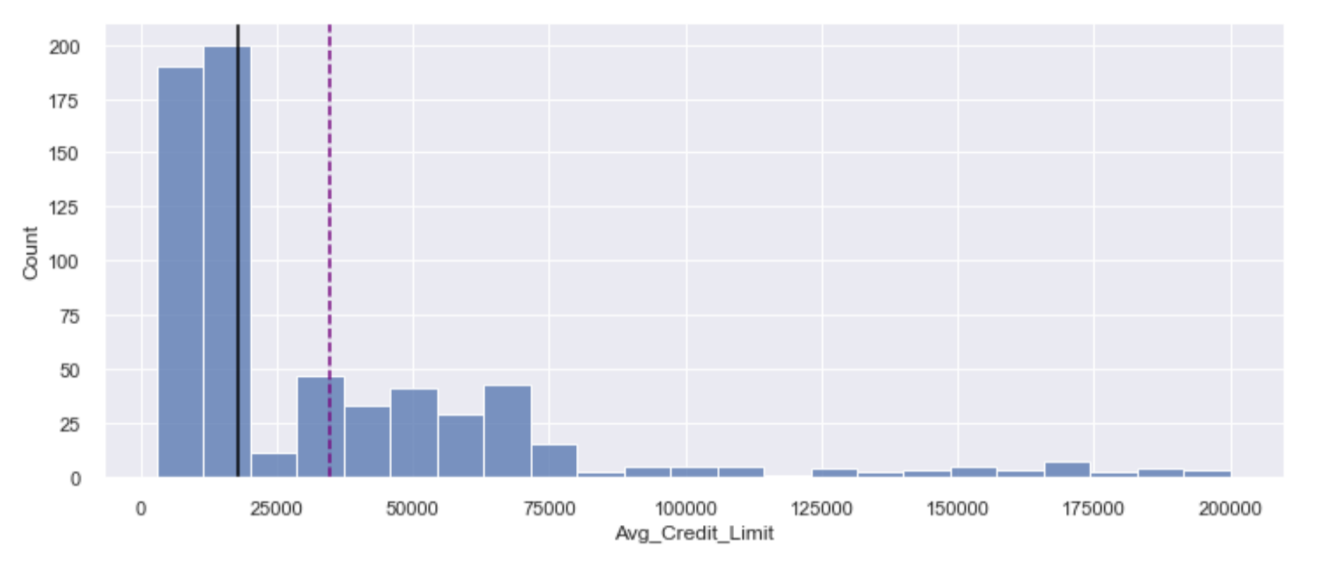
Data Overview

- The data contains information about 660 customers
- The information includes unique Customer Key, Average Credit Limit, Total Credit Cards, Total visits to the bank, Total visits online, and Total calls made
- No missing values in the data
- 5 records with duplicate Customer Key, which were not deleted owing to the fact that the customer could have upgraded their account
- Customer Key feature was dropped for the analysis
- Data was standardized to perform clustering

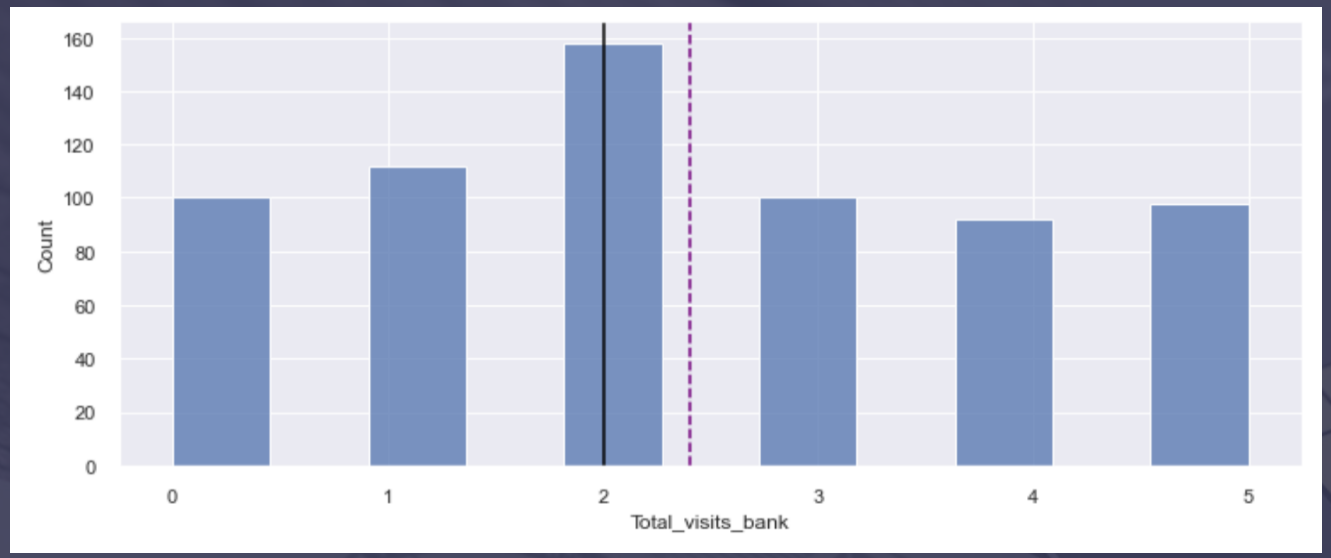
Exploratory Data Analysis



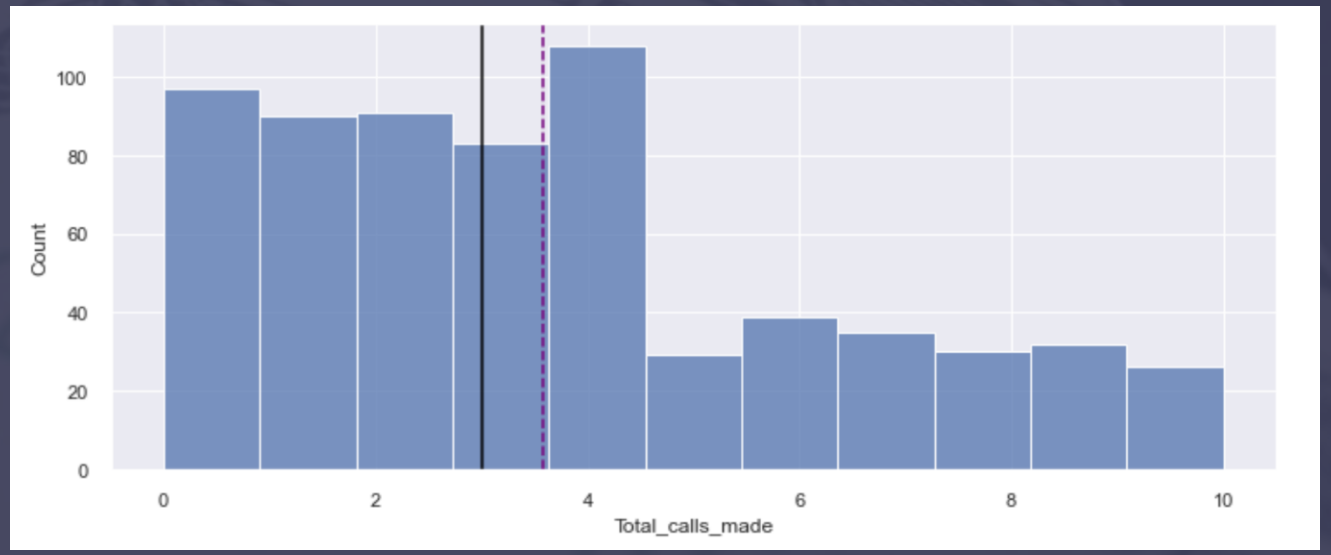
- The minimum number of credit cards owned by a customer is 1 whereas, the maximum number of credit cards owned is 10
- Large number of customers hold 4 credit cards followed by 6 and 7
- Customers own around 4 or 5 credit cards on an average



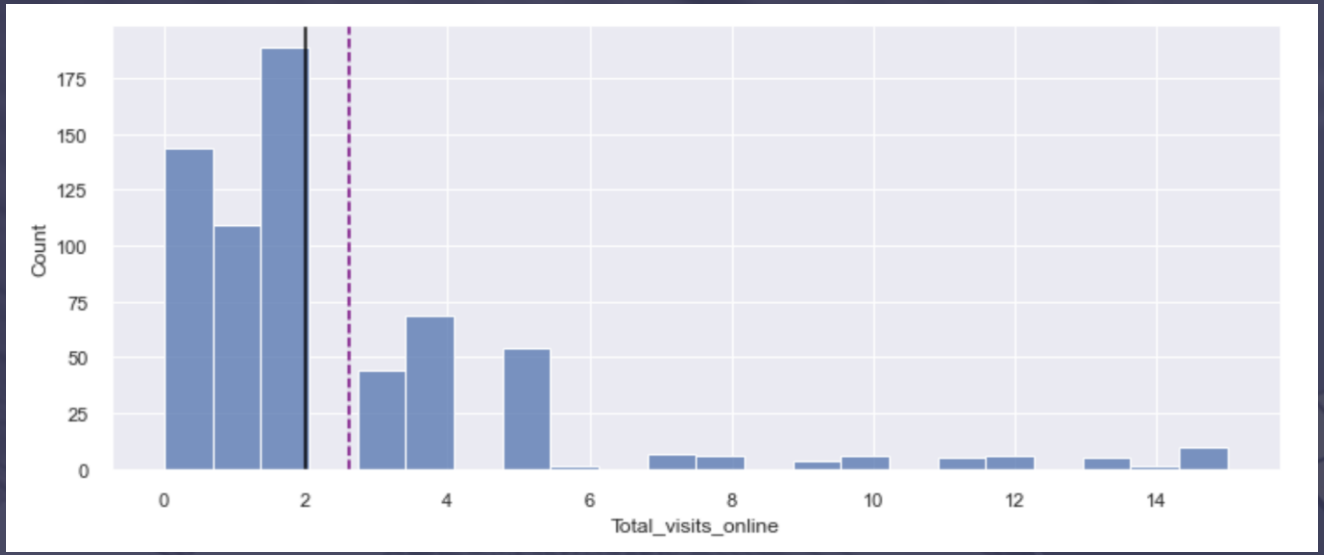
- Majority of the customers have credit limit under 25K i.e., most customers own the basic credit cards with lower credit limit
- Outliers above the upper whisker indicate there are customers holding Premium credit cards with higher credit limits ranging between 100K and 200K



- Large number of customers visit the bank twice, yearly
- Maximum number of bank visits made by a customer is 5
- There are almost equal number of customers who hardly visit the bank and those visiting the bank 5 times, yearly

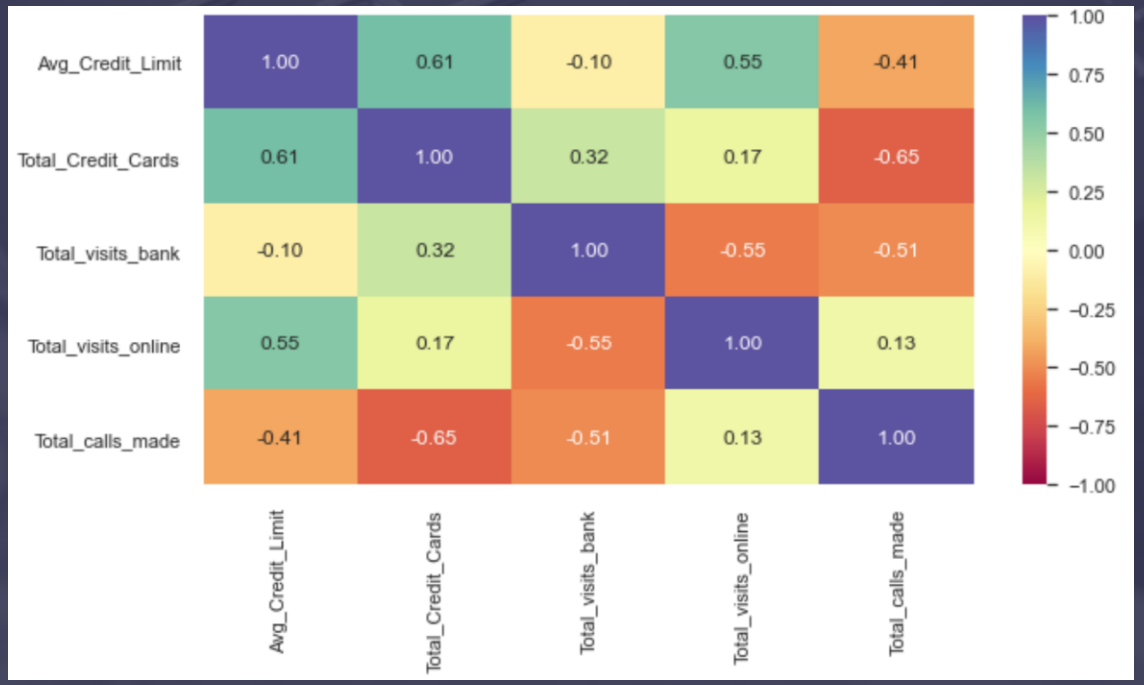


- The yearly average number of calls made to the bank is about 4
- Maximum number of calls made by a customer in a year is 10
- Very few customers make 5 or more calls yearly



- Large number of customers seek online services less than 2 times
- Very few customers make use of the online services maximum number of times they can ask for help

- Avg_Credit_Limit is positively correlated to Total_Credit_Cards and Total_visits_online and negatively correlated to Total_calls_made and Total_visits_bank
- Total_visits_bank has a negative correlation with Total_visits_online, Total_calls_made and Avg_Credit_Limit and is in a moderately positive correlation to Total_Credit_Cards



Key Insights from EDA

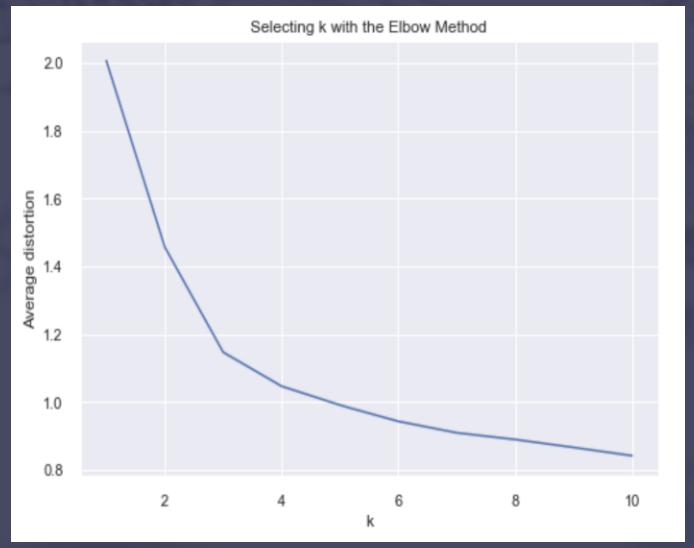
- Large number of customer have an average credit limit below $25K i.e., they are Standard customers
- Average credit limit above $100K indicates they are Premium customers
- Premium credit card customers mostly prefer online visits
- The minimum number of credit cards owned by a customer is 1, while the maximum is 10
- On average, a customer owns about 5 credit cards
- The average yearly visit to the bank made by a customer is about 3 times whereas the maximum 5
- There are almost equal number of customers who hardly visit the bank and those who make 5 visits each year
- The average yearly online visits by a customer is about 3 times whereas the maximum is 15
- The average yearly calls made by a customer is about 4, whereas the maximum is 10
- Customers who own around 4-7 credit cards make maximum visits to the bank
- Customers who own around 1-4 credit cards make maximum calls to the bank

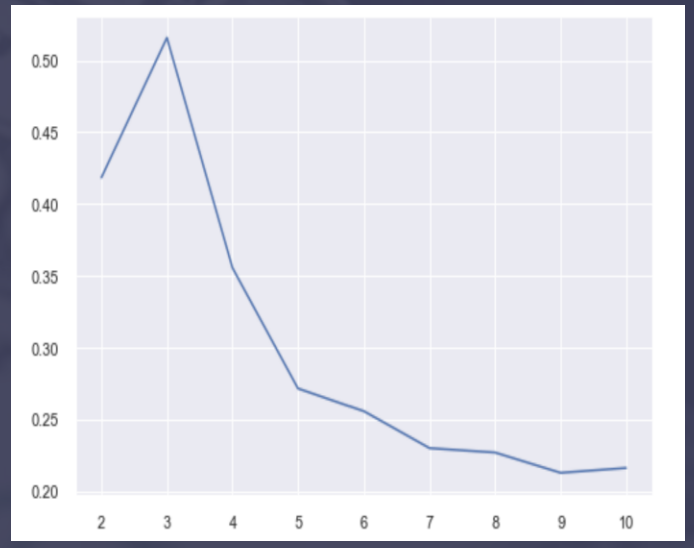
K-Means Clustering

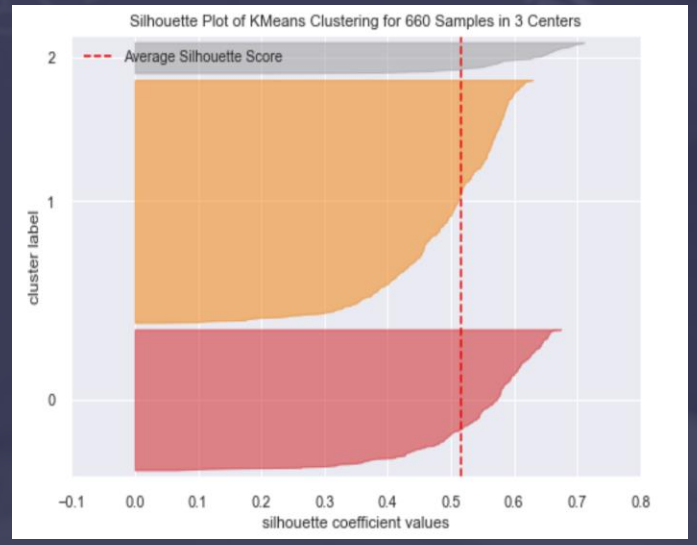
For both Manhattan and Euclidean distance measures,

- There was a knick at 3 in the Elbow Method
- Silhouette score was equal and the highest was at 3

Chose Euclidean distance measure with k=3 for clustering, as the average distortion was comparatively low







Cluster 0

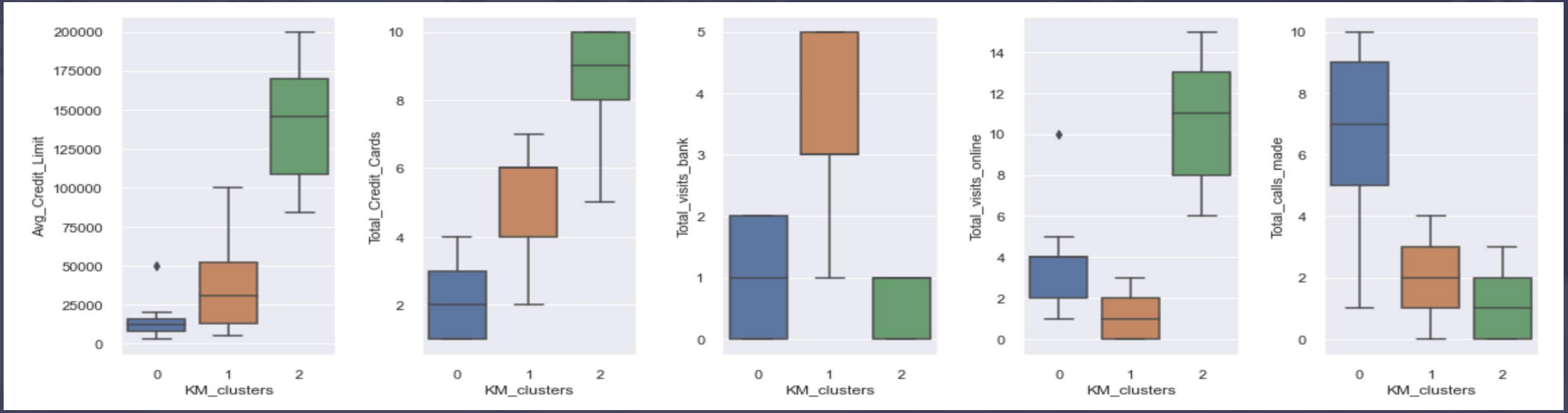
- 224 observations
- Prefer calls
- 6-7 calls yearly
- Avg credit limit below $25K
- Own 3 credit cards on average

Cluster 1

- 386 observations
- Prefer bank visits
- 3-4 visits yearly
- Avg credit limit between $5K - $100K
- Own 5-6 credit cards on average

Cluster 2

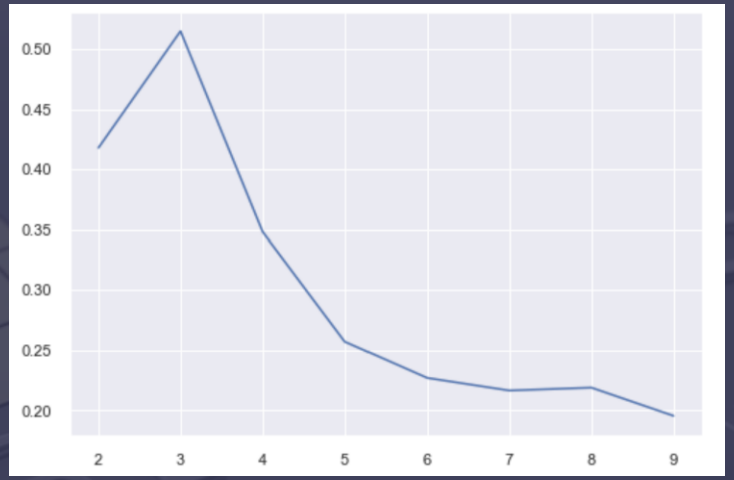
- 50 observations
- Prefer online visits
- 10-11 visits yearly
- Avg credit limit above $84K
- Own 8-9 credit cards on average

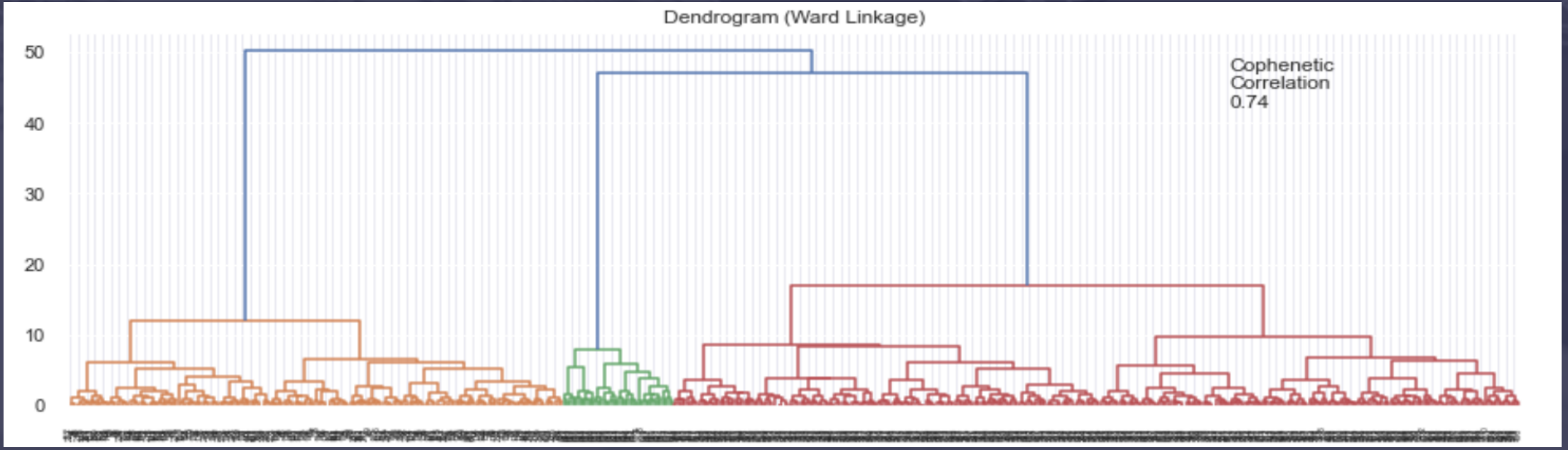


Hierarchical Clustering

Chose Euclidean distance with ward linkage with 3 clusters for clustering since,

- Cophenetic correlation was 0.74
- Clusters were distinct, well separated and pretty balanced comparatively
- Silhouette score for k=3 was the highest





Cluster 0

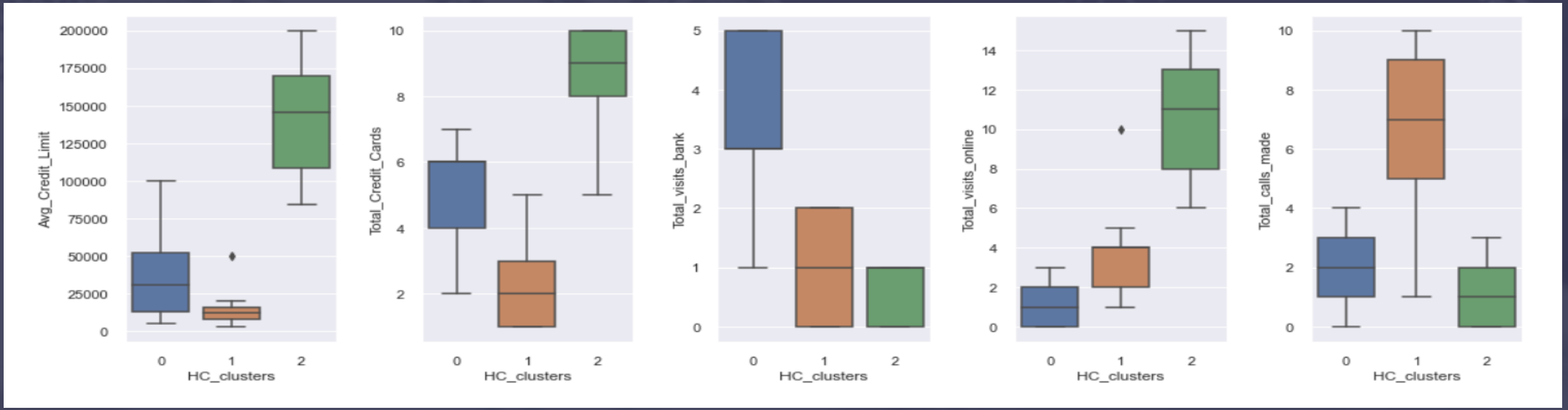
- 385 observations
- Prefer bank visits
- 3-4 visits yearly
- Avg credit limit between $5K-$100K
- Own 5-6 credit cards on average

Cluster 1

- 225 observations
- Prefer bank visits
- 6-7 visits yearly
- Avg credit limit below $25K
- Own 2-3 credit cards on average

Cluster 2

- 50 observations
- Prefer online visits
- 10-11 visits yearly
- Avg credit limit above $84K
- Own 8-9 credit cards on average



Comparison of K-Means and Hierarchical Clusters

Similarities

- Appropriate number of clusters is 3
- Cluster 2 has 50 observations in each
- Cluster 2 consists of Premium customers
- Silhouette scores are approximately the same
- Clustering was done based on the customers' preferred mode of contact

Differences

Hierarchical clustering,

- Took more time to execute
- Resulted in overlapping clusters
- Complex to interpret
- Difficult to identify the appropriate number of clusters

Business Insights and Recommendations

- Bank should provide:
  - Digital support like live chat/chat bot to customers who prefer online visits
  - Automated Phone Teller services to address the customer needs and eventually reduce the call wait time
  - Personalised services such as Success Managers (CSM) to customers who visit the bank in person

- Marketing team should send offers via online, text and mail depending upon cutomer preferences
- Operations Team should conduct online and phone surveys to customers based on their preference, to get feedback on the customer services provided and focus on ways to improve

- The bank should keep track of the changes in the cluster pattern of a customer and target them based on their current preferences

- The bank must target customers with average credit limit below $12K to upsell their credit card services as they are the customers who own a minimum number of credit cards
- The bank should offer to increase the credit limit of customers with their average credit limit below $12K because they are large in number

Thank You