

## Segmenting the Customers using Cluster Analysis - R as a Tool

**Srilakshminarayana G.**

### **Preamble**

The case study is written by the author to explain the importance of cluster analysis and application of the same in segmentation. It introduces “R” as a tool, for conduct of cluster analysis using “R”. A management student learns in marketing course, how to segment the customers. But he/she do not learn an analytical method that segments the customers based on their likes and dislikes. Hence, it becomes important for faculty to teach the students cluster analysis, which is used for segmentation. Another challenge the faculty faces is, to introduce a tool like “R” for conduct of cluster analysis with ease. Taking these two needs, the current case is written. The target readers for the case are the management students, who are looking for a method for segmentation and also looking for an explanation on implementing the same using “R”. These two form the main objectives of the case. The situation and the corresponding data are created by the author to achieve the objectives of the study. A set of questions have been given towards the end of case, and can be taken up by the instructor for discussion in the class.

### **The main issue in the case**

Mr S, the statistician, who provides consultancy to SLN ANALYTICS\* is waiting to meet Mr LN. Today, during the meeting, they are going to have an interesting discussion on a process called “Cluster analysis”, used for segmentation. MrS had successfully completed several projects and associated with SLN ANALYTICS, since 2016. The first assignment of Mr S was,



Copyright © 2018 Shri Dharmasthala Manjunatheshwara Research Centre for Management Studies (SDMRCMS), SDMIMD, Mysore. This case is published as a part of ‘Cases in Management Volume 7 (2018)’ with ISBN 978-93-83302-36-9.

The case writer(s) Srilakshminarayana.G, Assistant Professor - Quantitative Methods, SDMIMD, Mysore may be reached at lakshminarayana@sdmimd.ac.in Author(s) have prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of the situation. The case is fictionalized and any resemblance to actual person or entities is coincidental. This publication may not be digitized, photocopied, or otherwise reproduced, posted, or transmitted, without the permission of SDMRCMS, SDMIMD, Mysore. For Teaching Notes please contact sdmrcms@sdmimd.ac.in.

estimating the employee satisfaction, which was successfully completed by Mr S. Mr LN was impressed with the entire process Mr S had adopted and SLN ANALYTICS had received appreciation from their client. Based on the feedback given by the client, Mr LN had decided to involve Mr S in the next assignment. This time, the task is to help the client in segmentation. Client of Mr LN has made it clear that they wish to have proper segmentation of the customers based on a scientific process. Mr LN had read about cluster analysis, used for segmentation and preferred to adopt the same. But, he wished that it should be carried out by someone who has a complete understanding of the process. Also, there is another demand by the client. That is, to programme the entire process of segmentation and handover the codes to them, along with copyright. Mr LN knew that “SAS” is one of the best options, but commercial. He is totally confused on how to proceed, so that he will be able to fulfil the need of the client. At that time, he remembered Mr S mentioned about an alternative tool “R”, which is non-commercial and can be used for all types of data analysis. He also remembered that Mr S had conducted several training programmes on “R”. Taking this into consideration and also the expertise of Mr S, Mr LN had arranged this meeting. Mr LN wishes that Mr S takes up the assignment and does the same as per the requirement of the client. But, he wants Mr S to work on “R” and explain him the details, before Mr LN presents the same to the client. Hence, he feels that this meeting is very important. He is expecting that Mr S gives complete details on Cluster analysis using R and this forms the main objective of this case.

**\*SLN ANALYTICS is a fictitious company created by the author for discussion.**

### **Introduction to SLN ANALYTICS (fictitious)**

SLN ANALYTICS is founded by Mr LN in the year 2010. He is a graduate from one of the top B-schools in India and felt for a need to start an analytics company, after foreseeing the demand for analytics in future. He had attended few courses offered at the Institute and also had completed few certifications in analytics. After working for ten years in the industry, he along with his batch mates have started SLN ANALYTICS.

Soon, SLN ANALYTICS could gain the confidence of the clients and have won awards, as the fastest growing start-up. Mr LN, who looks after the marketing and sales division, is always closer to the market and the clients. He is an expert in identifying the needs of the clients and generates business for the company. In recent times, he is focusing more on projects related to data analysis, and soon had taken personal interest in learning the statistical methods and helping the clients in data analysis. He found that the changing times have made clients to

rely more on statistical methods for data analysis and want solutions that are powerful and lasts long.

SLN ANALYTICS takes special interest in answering the clients' queries, related to statistical methods in detail and have a process which is very easy to adopt, but powerful. During the first stage, the client gets into an agreement with the company after discussing their problem with the technical team. The technical team then passes the message to the marketing team for finalizing the process. It is a two stage process and most of the clients are comfortable with the process. This is the main difference between SLN ANALYTICS and other companies. The clients can freely interact with the technical team directly and express their problems. Once they are comfortable with the technical team, then the marketing team negotiates the commercials. They do not charge anything for the initial discussion and feels that the clients do not leave them if they find that the team can give them the complete solution. The success rate for this is 95%.

Mr LN had given complete freedom for the teams to attain success and always participates in the team meetings with complete energy and enthusiasm. The attrition rate at SLN ANALYTICS is very low and soon employees have realized that they have a definite growth at SLN ANALYTICS. One frequent question that Mr LN used to ask is "So What and What next?". This made everyone at SLN ANALYTICS to think and find new ways of giving solutions to the clients. Another important aspect is creating a cordial relation with the employees and between the employees. No employee goes empty hand during a requirement or during a festival or any other special occasion. Mr LN had ensured that everyone within and around the company work with high spirits and happiness. He also ensured that there will be a healthy competition amongst the members of the teams and has got good relations with his competitors in the market.

Mr S had come in to contact with Mr LN, as the part of his meetings with the experts in statistics. Mr S had helped SLN ANALYTICS in solving the problem of their previous client, in estimating the customer satisfaction using factor analysis regression (FAR). Since then, Mr S is continuously helping SLN ANALYTICS, by providing consultancy on statistical methods. This time, SLN ANALYTICS's client, ABC Ltd., wants the team to help them in segmenting their

customers, based on their preferences given by the customers on different aspects related to the services received.

### **The situation**

ABC Ltd. has a chain of retail stores, established in the year 2015 and doing well in the sector. Over the years, they have gained the confidence of the customers, with respect to quality of the products and delivery. After two years of existence in the market, they felt that it is time for them to conduct a survey on the customer satisfaction and know the customer requirements better. Mr J of ABC Ltd. has raised a new aspect. During the team discussions, he raised a point on, possibility of segmenting the customers based on their satisfaction levels on several service related aspects. This is a different question, as they are very well aware of segmenting the customers based on demographics. The team also felt that segmenting the customers based on their satisfaction levels can give them a better understanding of the customers. Also, it will help them to study their preferences separately. In order to address the question raised by Mr J, ABC Ltd. had approached SLNANALYTICS for an answer. Another question was on, adopting the process of segmentation using a tool that is non-commercial. Most of the analytical tools are commercial and the client wants to know about a non-commercial tool that can be all the time functioning. ABC Ltd. had approached SLNANALYTICS to achieve the two objectives 1. Segmenting the customers based on their satisfaction levels, 2. Doing the analysis using an open source tool.

Mr LN felt that Mr S can help them in this issue and had fixed an appointment with him to discuss on the current issue. Mr LN had learnt that cluster analysis can be used for segmentation and “R” can be used as a tool for the entire process. Remembering the way Mr S had handled the entire process for the previous client, Mr LN had trusted Mr S in the current assignment. Before meeting Mr S, Mr LN had decided to meet Mr J and his team to understand the requirement better. He is very well aware that his technical team had met Mr J and taken all the requirements. Now, Mr LN wants to meet the team to get more details. Mr J had met Mr LN and gave the following details.

ABC Ltd. had conducted a survey on 50 customers and collected data on several aspects (refer to the questionnaire given in the appendix). They include basic demographics like gender, educational qualification, profession etc., and, on the association of the customers with the store. Other details include the satisfaction levels on service, ambience of the store, variety,

delivery etc. ABC Ltd. also gathered data on customer rating on new offers, discounts, quality etc. Using this information, Mr J wants SLNANALYTICS to help them in segmenting the customers.

### **Dialogue between Mr LN and Mr S**

**Mr LN:** Good evening Mr S. Good to see you after the last assignment. We again wish that you help us in the current assignment.

**Mr S:** Good evening Mr LN. I am happy to take-up the second assignment and thank you for the opportunity. Let me know the issue and your expectations.

**Mr LN:**The current assignment is all about segmenting the customers using cluster analysis. Is cluster analysis a method? Also, the client wants to perform the analysis using “R” as a tool. Can you please make us understand the application of cluster analysis and also “R”?

**Mr S:** Sure. Let me know on what basis your client wants to segment the customers. If you can explain me, I will be able to help you in the assignment.

**Mr LN:**The Client had done a survey on customer satisfaction and it includes data on demographics, association of customers with the store etc. Satisfaction on different aspects like service, ambience of the store, staff behaviour etc., are measured on a 5-point Likert scale. Aspects related to advertisements, offers, quality etc., are measured on a 10-point rating scale. Note that, the satisfaction levels and the opinions of the customers are quantified using these two scales. I hope you have received the data and the questionnaire.

**Mr S:** Excellent. I have seen the data and the corresponding questionnaire. Now, let us discuss about the analysis.

The first step in data analysis is, to understand the variables under study. It includes understanding the definitions, scaling etc. Each variable’s definition has to be recorded to avoid the confusion and also the corresponding scaling. Note that, in few cases, variables can be measured on different scaling and during the analysis, they may have to be taken together. In such cases, one has to normalize all the variables and use the resulting set of normalized

variables. This is an important step in cluster analysis. Let me first introduce cluster analysis in brief and then “R”.

### **What is Cluster analysis?**

Clustering is a process of grouping the objects or individuals, based on similarities. Grouping is done in such-a-way that objects in a group are identical and objects in other groups are not. Cluster analysis is not a method but goal of a given situation. It can be achieved by various algorithms and it is a multi-objective optimization problem. Clustering is done, taking into consideration the distance between the objects. In order to achieve this, one has to decide upon a distance function, number of clusters and a clustering algorithm.

Most commonly used clustering algorithms are 1. Hierarchical clustering and 2. K-Means clustering. It helps in modifying the data and help the analyst in understanding the objects better. Cluster analysis is an iterative process of knowledge discovery or interactive multi-objective optimization that involves trial and failure. Cluster analysis was originated in anthropology by Driver and Kroeber in 1932 and introduced to psychology by Zubin in 1938 and Robert Tryon in 1939 and famously used by Cattell beginning in 1943 for trait theory classification in personality psychology. **(Instructor can discuss on other clustering algorithms)**

**Mr S:** Let me now present before you the steps to be adopted to achieve clustering.

### **Steps in cluster analysis**

- a. Consider the attributes or variables, based on which one can identify and understand the differences among groups of observations within the data.
- b. Scale the data considered.
- c. Find the distance matrix or dissimilarity matrix.
- d. Decide upon the number of clusters.
- e. Select an appropriate algorithm for clustering.
- f. Apply the algorithm and get the clusters.
- g. Interpret the clusters appropriately.
- h. Take a decision based on the interpretation.

**Mr S:** The above steps are to be used to conduct cluster analysis. Let me explain the steps in the following paragraphs, in brief.

**a. Consider the attributes or variables based on which one can identify and understand the differences among groups of observations within the data.**

Note that the first step in cluster analysis is, to list all the variables in the data set based on which the segmentation has to be done. Also, that the variables have to be either quantitative or quantified (for example Likert scale). Here, the definition of variables plays an important role. While taking group of variables in the process of clustering, it should give a proper meaning to the group, theoretically. **(Instructor can discuss on this in detail)**

**b. Scale the data considered.**

The second step in cluster analysis is, to scale the variables. That is, normalizing the variables. This is achieved by subtracting the data from its mean and dividing by standard deviation. This step ensures that the variables are unit free. **(Instructor can introduce normal distribution and calculation of z-scores)**

**c. Find the distance matrix or dissimilarity matrix.**

The most important step in cluster analysis is, to construct the distance matrix. Distance matrix gives the points that are closer and this forms as the basis for cluster analysis. Note that, before calculating the distance, it is essential to bring all the variables on to one level and this is achieved in step b. Unless it is achieved, finding distance doesn't give a meaningful result. In most of the cases, analyst use Euclidean distance formula to construct the distance matrix. **(Instructor can discuss on other distance formulae)**

**d. Decide upon the number of clusters.**

The next step is to decide upon the number of clusters. Number of clusters indicate the number of groups and one has to decide upon the same before clustering. One can use an appropriate package in R to find the number of clusters. **(Instructor can discuss on how this is decided while using SAS or SPSS or any other tool)**

**e. Select an appropriate algorithm for clustering.**

Under this step, one has to select an appropriate algorithm to cluster. Clustering algorithm is a process of combining the data points into groups. One can use any of the following algorithms for clustering. These algorithms are discussed in detail in later parts of this case study.

- a. Hierarchical clustering
- b. K-means clustering

Note that, though there are other ways of clustering, I will be focusing more on these two algorithms.

**f. Apply the algorithm and get the clusters.**

The next simple step is to apply the algorithm to get the clusters.

**g. Interpret the clusters appropriately.**

**h. Take a decision based on the interpretation.**

**Mr S:** Let me now explain the steps using the situation under consideration. The variables are measured on a 5-point Likert scale and a 10-point rating scale. In order to apply cluster analysis, we need to consider all the variables and scale them or form two separate sets of clusters, one based on 5-point Likert scale (all related to in store aspects), two based on 10-point rating scale (all related to other aspects related to the stores). Let me know whether you wish to have two or one. The questionnaire is attached as appendix. **(Instructor can discuss in detail the difference between the two)**

**Mr LN:** You have mentioned that there are two types of clustering algorithms. I wish that you apply both the algorithms on the data sent to you. One on the variables measured on 5-point Likert scale and the second on the variables measured on 10-point rating scale. By doing this, we will be able to know the differences in the clusters and understand the customers better. **(Instructor can discuss on how customer can be understood better using the two methods separately)**

**Mr S:** Alright. Let me do the same. Before I get into the process, let me first introduce “R” and few details about the same.

**Mr LN:** Yes. I am eagerly waiting to learn about “R”.

**Mr S:** R is a language and environment for statistical computing and graphics and provides an opportunity for the analyst to customize. It was developed by Ross Ihaka and Robert Gentleman and is currently developed by R Development Core Team. R is named after the first names of



the two R authors. The project was conceived 1992 and with an initial version in the year 1995. It can be used for implementing variety of statistical techniques like statistical testing, clustering, time series analysis, and others. It is also used for graphical presentation of the data and very useful for advanced data analysis.

There are several packages available for each of the methods and can be installed when required. Note that, it helps the analyst to analyse the data using advanced methods with ease. The current version is 3.5.1 and has undergone several upgradations. Now, there is a team of contributors that contributes to the development of the tool. Also, they have a journal that looks at publishing the latest finding by the researchers all over the world and also brings out new packages to existence.

R environment is very powerful and an integrated suite of software facilities for data analysis. It includes

- Data storage and provisions for effective data handling
- a suite of operators for calculations on arrays and matrices
- a large, coherent, integrated collection of intermediate tools for data analysis
- graphical facilities for data analysis and display either on-screen or on hardcopy, and
- a well-developed, simple and effective programming language which includes conditionals, loops, user-defined recursive functions and input and output facilities.

The term “environment” is intended to characterize it as a fully planned and coherent system, rather than an incremental accretion of very specific and inflexible tools, as is frequently the case with other data analysis software. The following is the logo of “R”.



**Mr LN:** Excellent information. I am happy to know about “R” and I will instruct my team to gather more information about “R” and other developments. Now, let us move on to cluster analysis and implementing the same on “R”.

**Mr S:** Now, let us proceed to cluster analysis. I will explain the entire procedure to be followed in “R”.

To implement any method in R, one has to set a working directory using the built-in function “setwd ()”, and this will allow the analyst to save all the working files in this directory. Also, it will be easy to retrieve the saved files when required and this process is similar to saving any other document (ex, word, excel etc.). In most of the cases it is convenient to save all the files in the same working directory. Also, most the times, the data is stored in an excel format and it is easy to import the data to R using either the built-in functions or import option. The required built-in functions are available in the package “readxl” and one has to install this before using the function “read\_excel()”.

**Mr LN:** This is interesting and I think this is similar to any other statistical tool for analysis. But, I feel it is relatively easy to understand.

**Mr S:** You are right. Researchers have constructed the platform in such-a-way that the built-in functions can be recalled using normal English words. For example, read\_excel(). Let us continue with our discussion on cluster analysis. I will first discuss the hierarchical clustering and then K-means clustering. I will apply the steps given above for the same and explain simultaneously to run in “R”.

### **Running cluster analysis in R**

**Step-1:** In order to apply the clustering, I had considered all the variables corresponding to service related to internal aspects of the store, measured on a 5-point Likert scale. This can be found under question 12 of the questionnaire.

**Step-2:** Read the data on stores to R using the function read\_excel and scale the same using the function scale ().

**Step-3:** In order to find the distance matrix, we use Euclidean distance. **(Here, the discussion can be on the formula for the Euclidean distance in higher dimensions and also other formulae).** To compute the distance matrix in R, we use the function `dist()`.

**Step-4:** In order to find the number of clusters, we use the function `NbClust()` and for this, we use the package `NbClust`. Note that, for hierarchical clustering it is not necessary to consider the number of clusters. Let us now apply the hierarchical clustering algorithm for the data selected.

### Hierarchical Clustering

- Define each observation (row, case) as a cluster.
- Calculate the distances between every cluster and every other cluster.
- Combine the two clusters that have the smallest distance. This reduces the number of clusters by one.
- Repeat steps 2 and 3 until all clusters have been merged into a single cluster containing all observations.

In order to find the distance between the point, one can use one of the following methods

- **Single Linkage**-Shortest distance between a point in one cluster and a point in the other cluster.
- **Complete Linkage**-Longest distance between a point in one cluster and a point in the other cluster.
- **Average Linkage**-Average distance between each point in one cluster and each point in the other cluster (also called UPGMA [unweighted pair group mean averaging]).
- **Centroid**- Distance between centroids (vector of variable means) of the two clusters. For a single observation, the centroid is the variable's value.
- **Ward**-The ANOVA sum of squares between the two clusters added up over all the variables.

For the given situation we use Ward distance method and the following are the R-codes to run the same, followed by the output.

**Step-5:**To implement the hierarchical clustering, we use the function `hclust ()`.

**Step-6:**To plot the Dendrogram, we use the function `plot ()`.

The following codes are used to implement the hierarchical cluster analysis using “R”.

### R-Codes for implementing the Hierarchical clustering

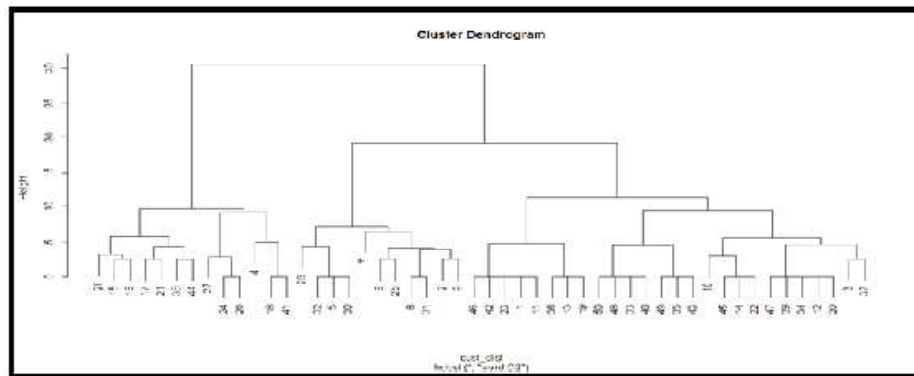
```

setwd("E:/SLN/ABC Ltd.")           # Setting the working directory
getwd()
install.packages("readxl")         # To import the excel data to R
library(readxl)
install.packages("NbClust")        # To find the number of clusters
library(NbClust)
cust=read_excel(file.choose())     # Importing the data to R
attach(cust)
cust1=cust[,13:30]                 # sub-setting the variables for clustering
cust_scale=scale(cust1)            # Scaling the variables
cust_dist=dist(cust1, method = "euclidean") # Finding the distance matrix
nc=NbClust(cust1, diss=cust_dist, distance=NULL,method="ward.D2", min.nc = 2, max.nc = 25,
index="ch")                        # Finding the number of clusters
nc$Best.nc
cust_clust=hclust(cust_dist, method="ward.D2") # Hierarchical clustering
plot(cust_clust)                   # Dendrogram
clus_cut=cutree(cust_clust,3)
fr=data.frame(cust1,clus_cut)
table(clus_cut)
View(fr)
write.csv(fr, "segement.csv")# Writing the output to CSV

```

Figure-1

Dendrogram-Cluster analysis



Source: From Mr S's analysis

Here, one can discuss on the interpretation for the above dendrogram. This has to be done in connection with the organization's requirement.

**Mr S:** The above dendrogram can be understood in two ways. Agglomerative and divisive.

**Agglomerative:** This is a "bottom up" approach: each observation starts in its own cluster, and pairs of clusters are merged as one moves up the hierarchy. For the given situation, one can observe that customers 15 and 16 are grouped as one cluster and in later stage, they are grouped with customer 28. In the third stage, all the three are grouped with 17, 21, 38, and 44 customers. **(Instructor can elaborate the discussion)**

**Divisive:** This is a "top down" approach: all observations start in one cluster, and splits are performed recursively as one moves down the hierarchy.

For the given situation, one can observe that there are two major clusters (from top) and under each of the clusters, we have other customers clustered.

**Mr LN:** Can we get the cluster number along with the customer? Can we achieve this in R?

**Mr S:** Yes. You can check this in the output table below. Against each customer there appears the corresponding cluster number. Also, note that the same can be saved as a CSV file in the

working directory. The corresponding codes are given below. As an example I have given few rows.

Table-1  
Clustering table

Customer id	Cluster number
1	1
2	2
3	1
4	3
5	2
6	2
7	2
8	2
9	2
10	1

Source: From Mr S's analysis

**Mr LN:** Excellent. This is what the client wants and I am very happy to see the output.

**Mr S:** Once this is achieved, we can consider the customers separately and analyse their characteristics separately. For example, we can find their average satisfaction levels towards each of them cluster-wise and make comparisons.

**Mr LN:** I think we can use ANOVA to compare the customers belonging to different clusters. I am excited to learn the entire process. **(Instructor can discuss on this)**

**Mr S:** Let us now look at K-Means clustering. In order to explain the same, I will consider the data on other aspects measured on 10-point rating scale. Note that, it is necessary to apply all the steps mentioned above. I want you and your team to think on these steps and adopt the same.

### K-Means Clustering

1. Select K centroids (K rows chosen at random).
2. Assign each data point to its closest centroid.
3. Recalculate the centroids as the average of all data points in a cluster (that is, the centroids are p-length mean vectors, where p is the number of variables).
4. Assign data points to their closest centroids.
5. Continue steps 3 and 4 until the observations aren't reassigned or the maximum number of iterations is reached.

### R-codes for K-means clustering

```

setwd("E:/SLN/ABC Ltd.")           # Setting the working directory
getwd()
install.packages("readxl")         # To import the excel data to R
library(readxl)
install.packages("NbClust")        # To find the number of clusters
library(NbClust)
library(cluster)
cust=read_excel(file.choose())     # Importing the data to R
attach(cust)
names(cust)
cust2=cust[31:41]                  # sub-setting the variables for clustering
cust_scale=scale(cust2)            # Scaling the variables
cust_dist=dist(cust2, method = "euclidean") # Finding the distance matrix
nc=NbClust(cust2, diss=cust_dist, distance=-
NULL,method="ward.D2", min.nc = 2, max.nc =
= 10, index="ch")                 # Finding the number of clusters
nc$Best.nc
cust_clust=kmeans(cust_dist, 7)    # K-Means Clustering
cust_clust
clusplot(cust1, cust_clust$cluster)
cust_c=data.frame(cust2, cust_clust$cluster)
write.csv(cust_c, "segment2.csv")  # Writing the output to CSV

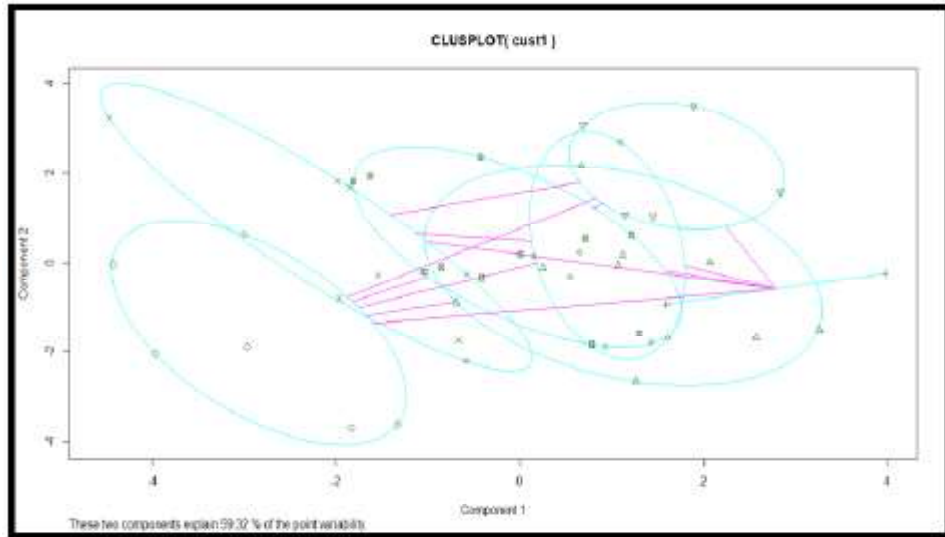
```

Table-2  
Clustering 2

Customer id	Cluster number
1	1
2	5
3	6
4	5
5	2
6	7
7	1
8	5
9	7
10	2

Source: From Mr S's analysis

Figure-2  
K-means clustering



Source: From Mr S's analysis



**Mr LN:** Please leave the interpretation of the above to us and let us learn. We thank you for your time and hope we can continue our association.

**Mr S:** Definitely. All the best.

### **Possible questions for discussion**

1. What is the importance of cluster analysis in segmentation?
2. Explain the importance of scaling of variables in cluster analysis.
3. Difference between the distance formulae used in cluster analysis.
4. Difference between segmenting using demographics and segmenting using the customer preferences.
5. Importance of dendrogram in Hierarchical clustering.
6. What are other clustering algorithms apart from the two discussed in the case?
7. How “R” is different from other statistical tools?
8. Can you explain how clustering can be implemented in R?
9. What are the packages used in R for implementing cluster analysis?
10. Is clustering a way of classification?
11. What possible analysis can be done after clustering?
12. Discuss on the application of clustering in different fields.

## **Appendix Questionnaire**

### **ABC Ltd.**

Dear Customer,

We thank you for being with us for these years and wish to express our happiness with you. To serve you better, we are conducting a survey and we request you to give your valuable feedback. Your responses will be kept secret and will help us serve you better. Please spend five minutes of your valuable time and give your viewpoints to the following.

Thanks and regards

### **Data Analytics team**

1. May we know your good name.....
2. Gender
  - a. Male
  - b. Female
  - c. Others
3. Educational Qualification
  - a. Tenth
  - b. Plus-two or intermediate
  - c. Under-graduation
  - d. Post-graduation
  - e. Others (please specify).....
4. Your profession
  - a. Self-Employed
  - b. Salaried
5. Marital status
  - a. Married
  - b. Un-married
  - c. Others (specify).....

6. Can you specify the place of stay
  - a. From Mysore
  - b. Outside Mysore
7. Since how many years you are staying in this place
  - a. < 1 year
  - b. 2-3 years
  - c. 4-5 years
  - d. >=5 years
8. Since how many years you have been purchasing the products from our store
  - a. < 1 year
  - b. 2-3 years
  - c. 4-5 years
  - d. >=5 years
9. Number of times you visit our store per month
  - a. 1 time
  - b. 2-4 times
  - c. 4-6 times
  - d. >=6 times
10. Average amount you spend
  - a. <5,000
  - b. 5,000-10,000
  - c. 10,000-15,000
  - d. >=15000
11. Have you received any gift for your purchase during seasonal offers?
  - a. Yes
  - b. No
12. Kindly give your opinion on the following

	<b>Factors</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
A	Service					
B	Ambience					
C	Variety					
D	Billing process					
E	Communication with the customers					
F	Staff behaviour					
G	Parking facilities					
H	Security					
I	Home delivery					
J	Arrangement of the items					
K	Reasonable pricing					
L	Quality of the items					
M	Children play space					
N	Easy moving options for elders					
O	Discounts and gift coupons					
P	Branded products					
Q	Encouragement for hand made products					
R	Motivation to visit again					

13. Help us serve you better. Please give your rating on a scale of 1-10

	<b>Factor</b>	
A	Advertisements about new offers	
B	Having all the items at one place (including vegetables)	
C	Having apparels in the same building	
D	The discounts given on the electronic appliances	
E	Children's products	
F	Stationary and related items	
G	Export quality items	
H	Local made products	
I	Gifts given for regular purchase	
J	Tendering change during billing	
K	Having more billing counters	

14. Your overall satisfaction on a scale of 1-10.....

We thank you for your valuable responses.  
Kindly collect a gift coupon after you submit this form.

