## EXAMINING FREQUENCY OF OPERATING INTERACTIVE VOICE RESPONSE SYSTEM FOR SPECIFIED PURPOSES (IN MOBILE TELECOMMUNICATION INDUSTRY)

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### ABSTRACT

**Purpose-**To determines the exact nature and number of clusters in frequency of operating the IVR system for mobile telecommunication related purposes.

**Design/Methodology/Approach-**Structured questionnaire was used to collect the data from the respondents. Questionnaire method was adopted to collect the responses from the samples. 800 responses were obtained and 627 responses were eligible to use for the further analysis. Cluster analysis was used to cluster the frequency of operating IVR system for mobile telecommunication related purposes.

**Findings-**The frequency of operating IVR system for mobile telecommunication related purposes was grouped into three clusters, namely, conservative, aggressive and planned IVR system users. Further, the three clusters of frequency of operating IVR system for mobile telecommunication related purposes cluster profile was segregated with IVR system users age groups, whereas, three clusters were also focused by three different IVR system users age groups.

Keywords: SST, Customer Service, IVR System, Mobile Telecommunication, Cluster Analysis.

### **INTRODUCTION & CONCEPTUAL DEVELOPMENT**

Acquiring, satisfying and retaining customers are the biggest challenge for any company in the present scenario. Customer relationship activities are the backbone for profit of an enterprise. As stated by Farooqi and Dhusia (2011) CRM initiatives are significant strategies to identify and satisfy the customer needs and behaviour's. Every industry focuses and strives hard to provide customer service through many means and ways. Among various industries, mobile telecommunication service providers actually pay more attention towards customer service via many technologies et al. (2007) has stated that mobile telecommunication companies are much more working together with other companies in diversified industrial sectors, such as, media and IT to accelerate innovation. Many companies use Self Service Technologies (SSTs) for their effective suffice to the customers. Robertson, McDonald et al. (2016) also determined that use of SSTs in telecommunication industry is drastically increased. In such the case, predominantly, mobile telecommunication service providers utilize Interactive Voice Response system (IVR system) to provide continuous and stable customer service and support. Mobile telecommunication service providers design IVR system menu options in such a way that it covers all their services in it. Service providers try their best to keep their menu options in a very simple manner. Though there are many menu options included in the IVR system, the current research focuses only on the five basic and specified purposes of operating IVR system, such as (for making product related enquiries, for making promotional offer related enquiries, for registering and enquiring about complaints, for getting service requests done and for making any other general enquiries) and it is further discussed in detailed. Customer service is a needed responsibility for both developing and maintaining buyer-seller relationships among service providers (Wagner, 1989).

Emergences of many privatized mobile service companies have forced telecom suppliers to develop more competitive products through electronics Ploetner (2004). Mobile telecommunication service providers compete largely on the basis of widened range of products and additional services. As the mobile telecommunication service providers' product list increases, the qualms or any other queries regarding to the products may drive the customers to operate IVR system for their customer service. The product enquiries also hold an extensive list of enquiries which are made through IVR system. The broad category of enquiries related to products included in the current research are, prepaid related enquiries, post-paid related enquiries, news and alerts related enquiries, plans and offers related enquiries and new and existing plan related enquiries.

Mobile telecommunication service providers launch a number of promotional offers for their customers. In fact the service providers attract and motivate the customers to use most of their services through promotional offers. Customers would certainly have enquiries related to the promotional offers and they often prefer using IVR system for such enquiries. All the promotional enquiries in the mobile telecommunication are classified and named as, festival offers, special tariffs and full talk-time offers.

Mobile telecommunication service providers' Value Added Services (VAS) and other related services have drastically increased over the period. From the last decade, customers have emphasized more on using the VAS and other related services. As the customer focus has increased more on utilizing these additional/relative services in mobile, which is expected to accelerate customers to operate IVR system and that urged the service providers to concentrate more on these issues while designing the IVR system menu options. In the current research, this aspect is focused deeply and gave special attention to service requests, such as activation or deactivation of alerts, SMS and caller tunes services.

Customer complaints are a specific attribute, which plays a vital part in customer relationship activity of the service providers. Florkowsk and Olivas-Lujan (2006) strongly mentioned that IVR system is also used for delivering human resource services (HR Services) in certain organizations. Many customers too tend to use the IVR system exclusively for their complaints. In relation to the variety of services provided by the mobile telecommunication service providers, the customer grievances or complaints (including other discomforts) are also very high. Though there are many ways and means for customers to put their complaints forward and get them solved, the mobile telecommunication customers majorly prefer IVR system for resolving of their complaints. Thus customer complaints specifically include registering of complaints, making enquiries about the registered complaints and knowing about the status of the registered complaints.

Other than the specified purposes discussed, there are a few more types of enquiries which are made through the IVR system, such as current balance enquiries (prepaid), bill payment information requests (post-paid), bill statement related enquiries (post-paid), recharge related enquiries and service centre related enquiries (availability/location), etc.

The five major divisions discussed under the purpose of operating IVR system covers almost all the major aspects of products and services rendered in mobile telecommunication. It is to be significantly noted that there can even be more purposes other than the one discussed above. Those purposes, however, are not inclined in this current research attempt.

The objective of the study is to determine the exact nature and number of clusters in 'IVR system users' frequency of operating the IVR system for mobile telecommunication related purposes.

### METHODOLOGY

Phone users who use IVR system personally was chosen as the population of the study, as they are very much aware about IVR system operation and possess better information interpretation ability. Chennai (an Indian city) tops the 22 mobile circles amongst the users (Telecom Annual Report, 2013) and thus Chennai was chosen as the research location for the current research. Convenience and judgment sampling method was adopted to collect the data from the target respondents. Structured questionnaire was used to collect the data from the respondents. Content validity of the questionnaire was tested with marketing (academic) and industrial experts who are more specifically experienced in CRM area.

Data was collected from the population in mobile recharge shops and mobile relationship centres which is randomly chosen from Chennai. The respondents were initially enquired about their wish to respond to the questionnaire and interested respondents completed the survey. Although more than 800 responses were obtained, only 627 responses were eligible to use for the further analysis.

### RESULTS

Cluster analysis is also known as classification/grouping technique. It is best used when multiple factors are involved in the research (Chawla and Sondhi, 2011). Cluster analysis attempts to assess similarity in the variables and thereby groups the variables according to their similarities. The purpose of using this analysis is to classify cases into relative clusters. Hierarchical clustering and non-hierarchical clustering are the two common types of clustering methods used in research. The present research uses non-hierarchical clustering method and for which the initial number of clusters will be identified by using K-means approach. This study also uses cluster analysis to find the similarities and cluster the consumer profiles according to the frequency of operating the IVR system for mobile telecommunication related purposes.

The current study uses hierarchical cluster analysis in stage one, to find the exact number of clusters that exists in the data. Coefficients are used to identify the number of clusters in the data. Since the study would need to have the lowest possible number of clusters for better interpretation, the coefficient figure is noted form the bottom of the table to the top of the table. There exists a difference of 10.444 in the coefficients (134.506-124.062) between the  $1^{st}$  cluster and  $2^{nd}$  cluster (stage 626 and stage 625). In the next difference between  $2^{nd}$  cluster and  $3^{rd}$ 

cluster, there exists a minimum coefficient difference of 1.929. The third and the fourth cluster pertains to a larger difference of 22.024 (122.133-100.109) in the coefficients. Thereafter, the differences of coefficients are comparatively small with 4.541, 2.148, etc. Thus, the highest difference between the third and the fourth cluster indicates to choose the 3-cluster solution.

In the stage two, K-means cluster method is used in the current study to find the stable clusters that exists in the data. K-means cluster requires pre-specified number of starting points for segregating the clusters. From the above stage of hierarchical cluster analysis, it is found that 3-cluster solution clusters the data better.

Table 1 K MEANS FINAL CLUSTER CENTROIDS					
Frequency of operating IVR system for mobile telecommunication related purposes	Clusters				
	Cluster1	Cluster2	Cluster3		
Prepaid/Post-paid enquiries	2	4	4		
SMS enquiries	2	4	4		
Roaming enquiries	2	3	3		
Internet enquiries	3	4	4		
Alert enquiries	1	3	3		
Caller tune enquiries	1	3	3		
New plan enquiries	2	4	4		
Existing plan enquiries	2	4	4		
Festival offers	2	4	3		
Special offers	2	4	4		
Full talk times	2	4	4		
Alerts activation/deactivation	2	4	3		
SMS activation/deactivation	2	4	3		
Caller tune activation/deactivation	2	4	3		
Registration of complaints	3	4	4		
Status of complaints	2	4	3		
Enquiries about complaints	2	4	3		
Balance enquiries	3	4	4		
Bill payment enquiries	2	4	1		
Bill statement enquiries	2	4	1		
Recharge enquiries	3	4	3		
Service centre enquiries	2	3	3		

Mean scores of each purpose is depicted in the table 1. From the Table 1, cluster 1 shows the mean scores of (Prepaid/Post-paid enquiries: 2, SMS enquiries: 2, Roaming enquiries: 2, Internet enquiries: 3, Alert enquiries: 1, Caller tune enquiries: 1 and so on), cluster 2 depicts the mean scores of (Prepaid/Post-paid enquiries: 4, SMS enquiries: 4, Roaming enquiries: 3, Internet enquiries: 4, Alert enquiries: 3, Caller tune enquiries: 3 and so on) and cluster 3 shows the mean scores of (Prepaid/Post-paid enquiries: 4, SMS enquiries: 4, Roaming enquiries: 3, Internet enquiries: 4, Alert enquiries: 4, SMS enquiries: 4, Roaming enquiries: 3, Internet enquiries: 4, Alert enquiries: 3, Caller tune enquiries: 4, Roaming enquiries: 3, Internet enquiries: 4, Alert enquiries: 3, Caller tune enquiries: 4, Roaming enquiries: 3, Internet enquiries: 4, Alert enquiries: 3, Caller tune enquiries: 3 and so on). The clusters' purposes mean scores of 4, 3, 2, 1 is actually equivalent to almost always, many times, sometimes and

occasional, respectively in frequency of operating IVR system. By comparing all the 22 purposes together in one single cluster, a complete picture of the particular cluster emerges efficiently.

IVR system users belonging to the first cluster were who use IVR system only sometimes for prepaid or post-paid, SMS and roaming or Standard Trunk Dialling (STD) related enquiries. IVR system users many times use it for internet or 2G or 3G or GPRS related enquiries in the current cluster. IVR system users in this cluster use it very occasionally for enquiring about alerts and caller tunes. In this cluster, IVR system users sometimes use IVR system for enquiring about both new plans and existing plans. IVR system users rarely (sometimes) use IVR system for making promotional offers related enquiries (such as, festival offers, special offers and full talk times) and for requesting services (such as, for activating or deactivating of alerts, SMS, caller tunes). The users many times use IVR system for registering complaints but they use it rarely for knowing about their complaints and for making further enquiries about their complaints. IVR system users in this cluster many times use IVR system for making enquiries about the balance and they even sometimes use the IVR system for making bill payment and statement related enquiries. Many times IVR system users use IVR system for making recharge related enquiries and them sometimes also use it for making service centre related enquiries.

IVR system users belonging to the second cluster use IVR system almost always for prepaid or post-paid, SMS and for internet or 2G or 3G or GPRS related enquiries. In this cluster, IVR system users many times use it for enquiring about roaming or STD related information and for enquiring about alerts and caller tunes related information. In this cluster, IVR system users almost always use IVR system for most of the purposes. In the second cluster, specifically, the IVR system users almost always use IVR system for enquiring about new and existing plans, enquiring about promotional enquiries, such as festival offers, special offers and full talk times and for requesting services, such as activation/deactivation of alerts, SMS and caller tune services. IVR system users in the second cluster use IVR system almost always for registering complaints, for enquiring about the status and other information about the complaints. IVR system users in this cluster use IVR system almost always for making enquiries related to the current balance, bill payment, bill statement and recharge related information. IVR system users many times use the IVR system for making service centre related enquiries.

IVR system users in the third cluster, almost always use IVR system for prepaid or postpaid, SMS and for internet or 2G or 3G or GPRS related enquiries. In this cluster, IVR system users many times use IVR system for enquiring about roaming or STD related information and for enquiring about alerts and caller tunes related information. IVR system users also use IVR system almost always for enquiring about new and existing plans and about special offers and full talk time's related information. The users in this cluster use IVR system many times for enquiring about festival offers and for making activation/deactivation of alerts, SMS and caller tune services. IVR system users in the third cluster use IVR system almost always for registering complaints and for enquiring about current balances. They use IVR system many times for enquiring about the status and other complaint related information, recharge &service centre related information. IVR system users in the third cluster use IVR system rarely (occasionally) for bill payment and bill statement related enquiries.

The significance values in ANOVA table 2 indicate that all the 22 frequency of operating IVR system for mobile telecommunication related purposes are statistically significant at 0.01 levels. Since all the p values are lesser than 0.01, they are significant at 1%. Hence, concluded

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that all the frequency of operating IVR system for mobile telecommunication related purposes studied with the help of cluster analysis is significant.

Table 2   CLUSTER ANALYSIS ANOVA				
Frequency of operating IVR system for mobile telecommunication related purposes	f-value	p-value		
Prepaid/Post-paid enquiries	114.578	0.000		
SMS enquiries	121.003	0.000		
Roaming enquiries	134.681	0.000		
Internet enquiries	41.918	0.000		
Alert enquiries	133.535	0.000		
Caller tune enquiries	149.139	0.000		
New plan enquiries	222.556	0.000		
Existing plan enquiries	181.559	0.000		
Festival offers	252.819	0.000		
Special offers	224.056	0.000		
Full talk times	168.737	0.000		
Alerts activation/deactivation	82.264	0.000		
SMS activation/deactivation	107.190	0.000		
Caller tune activation/deactivation	108.676	0.000		
Registration of complaints	53.806	0.000		
Status of complaints	123.621	0.000		
Enquiries about complaints	112.503	0.000		
Balance enquiries	35.865	0.000		
Bill payment enquiries	474.316	0.000		
Bill statement enquiries	425.249	0.000		
Recharge enquiries	57.036	0.000		
Service centre enquiries	93.691	0.000		

# Table 3CLUSTER SUMMARY FOR FREQUENCY OF OPERATING IVR SYSTEM FOR MOBILETELECOMMUNICATION RELATED PURPOSES

Cluster names	No. of respondents in each cluster
Conservative IVR system users	259
Aggressive IVR system users	168
Planned IVR system users	200

The above table 3 depicts the cluster summary of the number of cases (respondents/IVR system users) in each cluster. Majority of IVR system users are in the conservative IVR system users cluster (259), followed by planned and aggressive clusters (200 and 168) respectively.

The above table 4 shows that majority of conservative IVR system users (86 users) are in the age group of 36-45 years. Aggressive users who use IVR system are comparatively more in the age group of 26-35 years with 54 users. The table 4 also depicts that planned IVR system users are more in the young customers cluster (16-25 years) with 57 users.

Table 4 CLUSTER PROFILE-AGE GROUP WISE DISTRIBUTION OF IVR SYSTEM USER RESPONDENTS					
Age groups	Conservative IVR system	Aggressive IVR system	Planned IVR system users		
	users	users			
16-25years	51	44	57		
26-35years	38	54s	48		
36-45years	82	35	42		
46-55years	72	30	44		
56years & more	16	5	9		
Total	259	168	200		

### DISCUSSION

Though hierarchical and k-means clustering was efficiently used to obtain better results and interpretation, it is essential to validate the cluster results for further precision. The current study validated the cluster centre results through two-step clustering solution. However, clustering results from k-means and two-step clustering revealed almost the same results.

Majority of respondents were in the first cluster (with 259 IVR system users). Second cluster compressed of 168 IVR system users and third cluster pertained to 200 IVR system users.

It is a group of IVR system users who likes to use the IVR system only sometimes for enquiring about promotional offers and for making service requests. This cluster also pertains to the IVR system users who tend to use it many times for registering complaints, for making internet related enquiries and for making balance &recharge related enquiries. In this group, IVR system users very occasionally use it for enquiring about alerts and caller tunes.

It is also very clear from the analysis result that the, IVR system users in cluster 1 concentrate to use the IVR system for very specific & necessary purposes like, for obtaining their own product information and for complaining purposes. IVR system users in this cluster do not show much interest on promotional offers or any other service requests provided through IVR system. Thus this cluster of IVR system users in termed as *"conservative IVR system users"*. Majority of the respondents (IVR system users) were in the age group of 36 - 45 years.

It is a cluster that depicts the largest usage of IVR system among the IVR system users for almost all the purposes. This cluster holds the users who almost always use IVR system for many purposes (such as, prepaid or post-paid related enquiries, SMS, internet or 2G or 3G or GPRS related enquiries, enquiries related to new and existing plans). This cluster pertains to IVR system users who almost always use it for promotional enquiries(such as, related to festival offers, special offers, full talk times), for requesting services (such as, activation/deactivation of alerts, SMS and caller tune services), for making customer complaints (such as, registering complaints, for enquiring about the status and other related information about the complaints) for making general enquiries related to the current balance, bill payment, bill statement and recharge related information. In this cluster, IVR system users many times use IVR system for enquiring about roaming or STD related information, alerts &caller tunes related information and for enquiring about service centre related information.

The inference from the cluster analysis is that the, IVR system users in the cluster 2 pay attention to use the IVR system for almost all the purposes listed in this study. Broadly, IVR system users in this cluster use the IVR system almost always (aggressive IVR system users) for all the purposes. Thus the second cluster of IVR system users is named as *"aggressive IVR system users"*. This cluster compressed of middle age IVR system users in the age group of 26-35 years.

In summary, it is a group which moderately uses the IVR system for many purposes. This cluster holds the IVR system users who almost always use IVR system for making prepaid or post-paid, SMS, internet or 2G or 3G or GPRS related enquiries, new and existing plans related enquiries. IVR system users use it almost always for enquiring about special offers and full talk times, current balance and for registering complaints. They use IVR system very occasionally for bill payment and bill statement related enquiries. This cluster pertains to IVR system users who many times use the IVR system for roaming or STD, alerts, caller tunes, festival offers related enquiries, making activation/deactivation of alerts, SMS and caller tune services, for enquiring about the status & other related information about the complaints and recharge & service centre related information.

Palpable result indicated by the analysis is that, IVR system users in cluster 3 use the IVR system very moderately. For some purposes the IVR system users in this cluster use the IVR system for almost always and for some purposes the IVR system users many times use the IVR system. Specifically, IVR system users very rarely (occasionally) use it for bill payment and bill statement enquiries. Thus this group of IVR system users is termed as *"planned IVR system users"*. This cluster composed of young IVR system users in the age group of 16-25 years.

### SUGGESTIONS

IVR system operation is uniquely based on different purposes. As highlighted by Kumar, et al. (2010), IVR system is a software application that allows a telephone caller (customer) to select the needed options from voice menu. Examining the different clusters in frequency of operating IVR system for mobile telecommunication related purposes helps the marketers/service providers to deeply concentrate and redesign the IVR system menus, options, etc. Customer service is the top priority for organizations and they constantly try for opportunities to grab and develop their service strategies better et al. (2013) have also found that the only way to increase financial benefits in business is through better customer service.

In broad, IVR system users belonging to the first cluster (i.e. conservative IVR system users) use the IVR system very rarely. Their frequency of operating IVR system for many purposes are rare and notably for making internet enquiries, registering complaints, enquiring about balance and recharge related information are comparatively more than other purposes.

It can also be inferred from the results that IVR system users in this cluster use IVR system for very specific purposes and they are not more prone to use IVR system for alerts (or) caller tune enquiries. Service providers can use different strategies to push more information about VAS details and urge the customers to use other ancillary services also. IVR system users

in this cluster can also be educated through promotional calls/SMS about other details of festival; special and full talk time offers and services details about SMS, prepaid& post-paid, roaming, etc. It basically accelerates the frequency of using mobile for many purposes and simultaneously pushes the frequency of operating IVR system for different purposes.

It is inferred from the results that middle age IVR system users forms a greater share (36-45years) in this cluster. Service provider may concentrate more and make strategies specifically according to this (age group) significant demographic factor. IVR system users in this particular age group may be approached/contacted separately and the benefits can be customized according to each customer's requirements. Better communication channels for this particular age group could even fetch good results for mobile telecommunication service providers.

IVR system users belonging to the second cluster (aggressive IVR system users) use IVR system almost always for many purposes. But, they use IVR system moderately less for making roaming, alert, caller tunes and service centre related enquiries. Apart from this, IVR system users in this cluster use IVR system very frequently for all the other purposes. It is provident from the current research result that IVR system users in this cluster use IVR system less for many ancillary services and they enquire less about those services. It may even be because of the class of cluster. Service providers may provide special offers, inbound calls to inform about the alerts, caller tunes, roaming details and offer some customized discounts to attract the customers to use those services and IVR system as well.

It is found from the current results that IVR system users in this age group of 26-35 years form a major part. However this cluster's customers use IVR system very frequently, still their usage can also be aggravated to greater heights. This cluster of IVR system users is the integral part of mobile telecommunication service providers who use the maximum of the mobile services.

IVR system users belonging to the third cluster (planned IVR system users) use it many times for different purposes, as well as, they use it very rarely for a few purposes. It is evident from the results that the third cluster of IVR system users are heterogeneous who use IVR system very frequently for many purposes and very rarely for some purposes such as, for enquiring about bill payments & statements. Service providers should take special initiatives for the current cluster of IVR system users, as their behaviour is highly diversified. Comparatively it is also proven that IVR system users in this cluster use IVR system less frequently for services like activation/deactivation of alerts, SMS, caller tunes and for enquiring & knowing about complaints. Thus service providers may provide customized information and educate the customers in the current cluster about the availability of various automatic VAS & other added services. Service providers may intimate IVR system users about the time &cost reduction benefits regarding the IVR system usage for different purposes and by that frequency of operating IVR system among the customers would increase & sequentially the customer benefits may also rise to greater levels.

It is also inferred from the findings that young customers in the age group of (16-25years) play a vital role in this cluster. This cluster of IVR system users are too young and their money affordability to use many of the features & services may be restricted and that may form the vibrant reason for little less frequency in operating the IVR system. Though they are little less frequent in operating the IVR system, this particular cluster of IVR system users are the prospective customers who are long term & potential customers who can use mobile telecommunication and IVR system for longer period in future. Thus, they even are attracted

with some customized cost reduced services, promotional offers, etc. They are the valuable and prospective customers in terms of life time usage.

### CONCLUSION

It can be concluded from the current research findings that, obtaining the above found three clusters and profiling them helps the mobile telecommunication service providers to get an idea and a picture about their customer profiles on the frequency of operating IVR system. It facilitates marketers/service providers to redesign or alter the existing IVR system menus, options, etc., and help the customers to use the IVR system better and get satisfied.

### LIMITATIONS & RECOMMENDATIONS FOR THE FUTURE RESEARCH

The study is limited with respect to mobile telecommunication industry in India. In the same direction, future researches can further explore in any other industry and with different geographical location. However, almost all the purposes of operating IVR system in mobile telecommunication service is gathered, the purpose often tend to increase as and when there are technology advancements. Those additional purposes of operating IVR system may even be researched in the future researches. Age group was solely used to profile the customers in the current study and future researches can also use other additional demographic factors to profile the customers even better.

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