Asian Journal of Managerial Science
ISSN: 2249-6300 (P) Vol.6 No.1, 2017, pp.28-37

DOI: https://doi.org/10.51983/ajms-2017.6.1.1221

# CRM Practices Dimension Identification and Classification through EFA to Cluster Approach: A Customer Perspective

**S. Sheik abdullah[1] and R. Mohammed Abubakkar Siddique[2]**
[1]Assistant Professor, Department of Business Administration,
M.S.S. Wakf Board College, Madurai, Tamil Nadu
[2]Research Scholar, Post Graduate and Research Department of Commerce,
Ayya Nadar Janaki Ammal College, Sivakasi, Tamil Nadu
Email: abdullah.sheik0499@gmail.com
(Received 23 February 2017; Revised 19 March 2017; Accepted 4 April 2017; Available online 11 April 2017)

***Abstract*** **- This study has been conducted to extract the pattern relationship among the dimensions of CRM practices. The researcher applies the Explorative Factor Analysis (EFA) and additionally the factor scores are used to segment the respondents through cluster analysis. In the present study further the researcher has to conduct pattern factor analysis technique to confirm the validated scale for CRM practices followed by banks in Virudhunagar district. While conducting the EFA the researcher uses the 192 selected sampled respondents. The set of 42 scale items used to measure the opinion of the respondents towards CRM practices. Based on the results of K-means clustering the researcher classifies the respondents into three segments namely informative and value based customer, receptive customer and gaining customer.**
***Keywords:*** **Customer Relationship Management, Crm Practices in Banks, Scale Development, EFA, Cluster Analysis, K-Means Clustering.**

## I. INTRODUCTION

Banking industry is one of the major important sectors for national economic development in India. The role and contribution of banking sector in GDP is essential. Due to dynamic changes in competition as well as the needs of customer expectation have resulted, force the banks to tune their business strategies into superfluous focus on customer and satisfy them well (Day,2000).Keeping and maintaining customer is not an easy task. But more empirical researches conducted in banking side with customer perspective (Parasuraman 2002; Payne 2006; Rootman et.al. 2008) results shows many banks developed and manage strong interaction with their customer to maximize the share of customer equity through CRM. The goal of CRM is managing the relationship; definition of CRM is varying from author to author (Brown 2000; Lu and Shang, 2007; Rootman, 2008).

Customer Relationship Management (CRM) in the banking sector involves reading the consumers' changing minds and needs, creating services to satisfy these needs because building and maintaining a relationship with customers in the banking industry is important for the survival. Therefore, it becomes imperative for service providers to meet or exceed the target customers' satisfaction with quality of services expected by them (Ashok and Kumar 2006). Many researchers, who study the CRM with customer perspective and expectation, frame the dynamic frame work on CRM (Park and Kim, 2003, Dutta, 2009). The financial sector is still lacking in research on CRM (Lu and Shang, 2007). But in recent years more empirical research has been conducted CRM in financial sector (Arun Kumar Agariya and Deepali Singh, 2012; Sanjay Kanti Das, 2012; Gisela Demo and Kesia Rozzett, 2013 Sheik Abdullah Manohar, 2014). On the other hand there is countable number of research studies with objective to construct and frame the measurement scale for CRM practices (Sin et.al, 2005; Lu and Shang, 2007; Wang and Feng, 2008; Izah Mohd Tahir, 2012; Sanjay kanti Das, 2012). But on the other hand there is no study conducted earlier to segment the customer on the basis of CRM Practices perspective. Therefore this study is undertaken to analyse the CRM Practices dimension identification and classification of customers through in respect of CRM in banks.

## II. REVIEW OF LITERATURE

### A. *Importance of CRM*

Paravatiyar and Sheth (2001) observed that the CRM is a comprehensive strategy and process of acquiring, retaining and partnering with selective customers to create superior value for the company with the customers.

Ryals and A.Payne (2001) imparted that customer relationship management has become important topic in marketing. They further disclosed the uses of information technology which helps to starting relationship marketing strategy.

Pisharodi *et al.* (2003) found that a process oriented strategic approach to connect the operational, informational and the organizational components of the CRM are critical for the success of the CRM application.

Reinartz & Kumar, (2003) CRM refers to all business activities directed towards initiating, establishing, maintaining, and developing successful long-term relational exchanges.

Peeru Mohamed and Sagadevan (2005) Managing relationship with customer and making customer delightful has become a necessity in this present globalization. Customer delightment is not only the key to success but also very excellent method of approach for the organisation.

Blery and Michalis (2006) identified that the expected areas to generate future value for the banks are customer segmentation, distance sales/outbound, delays and human capital management.

Brink & et.al. (2006) defined CRM as a definite marketing activity by which the institution prepare its customers to use its resources to produce and market a valuable product for them. CRM aims at two goals: supporting the social cause and improving the marketing performance.

Kumar & Reinartz (2006), stated that CRM is merely a strategic process by which the institution's more profitable customers are chosen, and interactions between this institution and these customers is determined, in order to achieve the goal of maximizing the present and future values for customers.

Leverin and Liljander (2006), found that the implementation of relationship marketing strategy in a retail bank did not result in the increase of loyalty with respect to the most profitable customer segment.

**B.*Model Development Oriented***

The following review section offers strong discussion and argument for the selection of variables for the empirical investigation on CRM. The concept of CRM emerge due to dramatic changes in the global business environment, the paradigm of B2C has been replaced by CRM Hui –I-Yao and Kok Weikong (2011).Although CRM has now become as a powerful concept to align the interest of a firm and its customer. The focus of CRM is now shifted to how firms implement CRM to enhance profits Boulding et.al (2005). The implementation of CRM creates an urge for development and identification of key construct on CRM practices. Thus insist in need of further theoretical development Gummesson (2002) and also Baser *et.al.(*2011) to measure the perception of CRM practices should need different defining construct required. Theory building piece of work the dimension extraction is based on the definition of CRM in the initial year.

Sin *et.al*(2005) articulated four dimension namely Customer focus, CRM organization, Technology-based CRM and knowledge management. These four dimensions extracted based on the definition of CRM. Further Lu and Shang (2007) identify six factor dimension of CRM in Freight Forwarder service. The dimension consists of Customer Acquisition, Customer Response, Customer Knowledge, Customer Information System, Customer value Evaluation and Customer Information Process. Among the six factors "Customer Knowledge" dimension has high loading factor than others. The reliable scale development to measure CRM practices not only to end itself with customer.

Rootman *et.al* (2007) identifies two dimension attitude and Knowledgeability of employees' about CRM. The selected two dimensions have positive relationship with CRM. The author highly recommends attitude and knowledgeability of bank employees leads to good impact on CRM in banking sector. Banks have realized the importance of becoming customer oriented and therefore Customer Relationship Management practices (CRM) is seen as to be very important. Hui-I Yao and Kok Weikong (2011) conducted research with three purposes to conceptualize and operationalize the CRM implementation in commercial banks, to determine whether the CRM implementation is positively associated with Customer satisfaction and to determine key moderators between CRM implementation and customer satisfaction. Based on their findings of a regression model to evaluate the criteria to measure the level of CRM implementation on customer satisfaction is predicted by three dimensions namely Acquisition, Enhancement and Recovery.

Izah Mohd Tahir and Zuliana Zulkifli (2011) conducted the pilot study under five dimensions namely Customer acquisition, Customer Response, Customer Knowledge, Customer Information System and Customer value evaluation. CRM has attracted a lot attention among academicians and practitioners but as far as, in Indian contest still lacking. Sanjay Kanti Das (2012) conducted the study with ten dimension, six dimensions were explored by the research cited by Lu and Shang (2007) namely Customer acquisition, Customer Information System, Customer Value Evaluation and Customer Information Process. The results indicated there is no positive relationship in perception of CRM practices and Demographic factors.

Zuliana Zulkifli and Izah Mohd Tahir (2012) developed and validating construct of Customer Relationship Management Practices. The scale instruments was adopted from the work of (Sin et.al 2005,Lu and Shang, 2007 and Rootman,2008). After the panel recommend 48 scale statements are retained out of 51 scale statements. The result after applying the EFA for CRM construct, it has reduced to 29 statements under five dimensions. The sixth dimension Customer Information was dropped due to low loading factor.

Conceptually developed and validated CRM scale catering to Indian banking sector, that help the bank managers to implement the CRM and create the attention of the unfocused area. Arun Kumar Agariya and Deepali Singh (2012) initially developed 50 scale items from the work of Agariya and Singh (2011). The critical factor identified with the help of multivariate data analysis, that identified CRM

construct consists Organizational structure and Customer support, service quality, Trust, Technology, and Personalization and Market orientation.

Manol Simo and Magadalena Bregasi (2013) in their empirical study identifies the four dimension that are highly caught the attention of bank employees in improvement of tools and strategies development in the banks. The exposed four factors are Customer satisfaction, Customer retention, Implementation of Hardware and Software and transparency regarding products. These four dimensions has extracted through Factor analysis with Principle Component Analysis.

Gisela Demo and Kesia Rozzett (2013) develop the scale for CRM in Business to Consumer market (B2C). The main objective of this study is to develop and validate a reliable and valid CRM scale instrument for B2C market. The authors bridge the gap version of CRM scale especially for B2C market to assess the customer perception on relationship. There are 21 scale instruments are developed based on the Rozzet and Demo (2011) works. Data collected and analysed in three different stages in the first stage 210 sample data is taken for analysis to conduct EFA (Explorative Factor Analysis) then CFA was done in the second stage, sample size of 425. At the end the scale generalization test is applied with 415 samples. Narges Dela Froos et.al (2013) aimed to analyse the outcomes of Electronic Customer Relationship Management system implementation in the banks. The author proposed model and scale consists the dimension of E-CRM initiatives, System Intrinsic success and E-CRM system goal. The instrument scales were adopted from the works of Sivaraks et.al (2011). The results of Path analysis CRM-carrying out has a positive relationship with all intergradient's of relationship. Thus claim to us good customer relationship leads to customer satisfaction.

There are so many studies have focused either in the form of customer perception on CRM and its implementation at banks. There is limited studies has conducted on the linkage of theory and scale construct. So support of the existing selected review of literatures the author develop and construct five factor dimension of CRM practices in banks based on original work of Lu and Shang (2007) followed by Sanjay Kanti Das (2012), Sheik Abdullah et.al (2016). Here the researcher only uses the five factor dimension to construct and validate the model. Therefore 42 statements is used for validate the model under five dimension.

## III.STATEMENT OF THE PROBLEM

Customer is the focal point in the development of successful marketing strategy. Marketing strategies both influence and are influenced by consumers' affect and cognition, behaviour and environment. Traditional marketing strategy is not enough to the service industry to keep their customer. Inevitably relationship marketing strategy is replacing the traditional marketing strategy in the form of Customer Relationship Management. The concept believed us, CRM is an Information technology to build long term relationship with customer (Ryals and Payne, 2001). In the banking field "a Unique Relationship" exists between the customers and the bank. But because of various reasons and apprehensions like financial burdens, risk of failure, marketing inertia etc., many banks are still following the traditional ways of marketing and only few banks are making attempts to adapt CRM. CRM seeks to establish a long term, committed, trusting and cooperative relationship with customers (Bennett,1996).While close looking of CRM and its implementation in banks create success and failure, as to develop better understanding of CRM practices (Hussain et.al,2009). The efficiency of a banking sector depends upon how best it can deliver services to its targeted customers. To survive in this competitive environment and provide continual customer satisfaction, the providers of banking services are now required to continually improve the quality of services. In order to provide quality of service and continual relationship with customer, CRM is essential and vital (Bose, 2002). Nowadays, Banks have realized that customer relationships are a very important factor for their success. Customer relationship management (CRM) is a strategy that can help them to build long-lasting relationships with their customers and increase their revenues and profits. Therefore the study is undertaken to explore and analyze the extract the pattern relationship among the factors of CRM Practices and to classify the respondents through pattern relationship results.

## IV.CONCEPTUAL FRAMEWORK MODEL

The conceptual framework of the present model consist five dimensions, which is latent construct of CRM practices. The five dimension factor namely Customer Acquisition, Customer Response, Customer Knowledge, Customer Information System and Customer Value Evaluation System. The present conceptual framework model of this study is validated from our previous work.


Fig.1 Model Framework (Sheik Abdullah et al. 2016)

### *A.Customer Acquisition*

Customer acquisition is one of the processes of Relationship marketing, it bring new customers to the marketer. In bank-marketing more number of acquisitions oriented practices and initiatives followed to acquire the new customers. The primary purpose of acquisition based practices should handle with less consumption of time and cost. The customer acquisition initiatives should provide adequate requirements to the customers.

### *B.Customer Response*

Customer response is the term used to describe and discuss, how the customer query and issues handled by the banks. If the bank deals the customer query in poor way it will result in dissatisfaction. So the bank should deal these receptive practices in an effective way. The impoverished customer response oriented practices working out through technologically and also the bank offers new type of services, schemes and it should intimated to the customer.

### C.*Customer Knowledge*

Customer knowledge is essential one, who aims to adapt their processes, products and services to their customers' needs in order to build a healthy and profitable customer relationship. In this respect, the banking companies gather information and the insight they need to build stronger customer relationships. Their customer knowledge may not be sufficient and should set up the necessary processes and systems in order to collect more information and data on who are the customers are, what they do and how they think from the financial point of view.

### *D.Customer Information System*

A good CRM-Information system will help a business to attract, and win new customers, retain those the company already has, as well as reduce the costs of marketing and customer service. Thus in other sense a good customer information system provide adequate and complete information to the needy people. Complete information will leads to customer satisfaction. Customer information system in banks adopts recent innovative technologies to attract and systematic transparent information should be read out by the customers.

### *E.Customer Value Evaluation*

Customer value Evaluation is essential part of Customer Relationship Management dimension. The examination of customer value is not an easy task, it's based on the method followed. Generally traditional method of evaluation process is very complex and difficult to execute it instead of modern evaluation process. The Modern evaluation process consist online survey, post and pre customer perceived value through product and services and so on. Moreover the bank should periodically conduct the customer audit meets to evaluate their customer service performance through the customer data. (Sheik Abdullah et al. 2016)

## V. OBJECTIVES OF THE STUDY

The core objectives of the present study is

1. To extract the pattern relationship among the factors of CRM Practices.
2. To segment the customers on the basis of CRM Practices.

## VI.RESEARCH METHODOLOGY

This study is descriptive in nature and to examine the customer's opinion about customer relationship management practices in banks. The district consists six blocks with total population as per 2011 census 19,42,288. The researcher identified sample size of 384. The model validity and reliability the researcher has select 50 per cent of the sample to apply the EFA and the balance 50 per cent of the respondents are used to develop the model in further research. The first 50 per cent of the sampled respondents are chosen through random number generator wizard in SPSS. The respondents are selected on the basis of Judgment sampling method. The scale statement was adapted from the work of lu and shang (2007) followed by (Izah mohd tahir and zuliana zulkifli, 2011; Sanjay Kanti Das, 2012; and Zuliana Zulkifli and Izah Mohd Tahir, 2012; Sheik Abdullah et al, 2016 ) modified and suited to redefine the practices of banking sector. The researchers uses five point likert type scale option (5 - Strongly agree to 1 - Strongly disagree) to measure the perception of CRM practices.

## VII. RESULTS AND DISCUSSION

### *Application of Factor Analysis*

Factor analysis is the mathematical form of identifying interrelated measure to find the pattern in a data set (Child, 2006). In other sense the factor analysis is the simplest form to interpret the observed data (Harman, 1976). The key concept of factor analysis is that multiple observed variables have similar patterns of responses because they are all associated with a latent (i.e. not directly measured) variable Factor analysis is a data reduction technique that uses correlation between data variable. Factor analysis is widely used in psychology, social sciences and marketing studies. It assumes that some underlying factors exist that explains the correlation or interrelationship between the observed variable/factors. There are two methods to conduct the factor analysis such as Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). CFA attempts to confirm hypotheses and uses path analysis diagrams to represent variables and factors, whereas EFA tries to uncover complex patterns by exploring the dataset and testing predictions.

Moreover Exploratory Factor Analysis (EFA) technique used in two ways, first one the researcher may reduce large number of variable from the data set within each factor and uses it for deducting the factor dimension. The researcher conduct EFA or CFA, it based on their research assumption. EFA is used when a researcher wants to discover the number of factors and which factor influencing more (DeCoster, 1998).

A basic hypothesis of EFA is that there are common 'latent' factors to be discovered in the dataset, and the goal is to find the smallest number of common factors that will account for the correlations (McDonald, 1985). In the present study the researcher has to conduct Exploratory Factor Analysis (EFA) technique to confirm the validated scale for CRM practices followed by banks in Virudhunagar district. The set of 42 scale items used to measure the opinion of the respondents towards CRM practices. Before going to conduct the factor analysis, the researcher should fulfill the reliability and validity issues of the data set.

***Reliability and Validity Criterion***

In order to establish the strength of the factor analysis solution, it is essential to establish the reliability and validity of the obtained reduction. For simplicity and convenient purpose each factor (statements) re-coded with identifiable code viz. (Customer acquisition CA, Customer Knowledge CK like that). Cronbach's alpha test was applied to know the reliability and validity of the statement. Cronbach's alpha values of 0.7 and greater is considered reliable, (straub et al. 2004). The Cronbach's alpha values for each component are greater than 0.7 and composite alpha values for each component are greater than 0.7 and composite alpha value for five dimensioin is .879, thus indicating good reliability. The reliability statists presented in Table 1.

TABLE 1
CRONBACH'S ALPHA TEST –RELIABILITY AND VALIDITY

| **Cronbach's Alpha** | **No. of items** |
|---|---|
| .862 | 42 |

Source: SPSS Output

The Cronbach's alpha values for each component are greater than 0.7, corrected item correlation is also more than 0.3, which is more insist that the statements are reliable. The composite alpha value for five dimension is .862, thus indicating good reliability.

***KMO and Bartlett's Test***

The KMO measures the sampling adequacy; this test is based on the correlations and partial correlations of the variables. The value of KMO should be close than 0.5 for a satisfactory factor analysis to proceed. Kaiser (1974) recommend 0.5 (value for KMO) as minimum (barely accepted), values between 0.7- 0.8 acceptable, and values above 0.9 are superb. The value of test statistic is given in Table 6.4, as 0.742 which means the factor analysis for the selected variables is found to be appropriate to the data. Bartlett's test is another indication of the strength of the relationship among variables. This test is to test the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is matrix in which all of the diagonal elements are close to 0.

TABLE 2 KMO AND BARTLETT'S TEST

| | |
|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .742 |
| ***Bartlett's Test of Sphericity*** | |
| Approx. Chi-Square | 3.230E3 |
| Df | 861 |
| Sig. | .000 |

Source: Computed Data

From the Table 2, the Bartlett's Test of Sphericity test value is 32.30 at Degrees of freedom 861. That significant level is less than 0.05. In fact, it is actually 0.00, i.e. the significance level is small enough to reject the null hypothesis **($p<0.05$).** This means that correlation matrix is not an identity matrix (there exist correlations between the variables).

***Factor Extraction and Rotation***

The Eigen value Table has been divided into three sub-sections, i.e. Initial Eigen Values, Extracted Sums of Squared Loadings and Rotation of Sums of Squared Loadings. In order to determine the number of significant factors, it is important to note that only extracted and rotated values are meaningful for interpretation. The factors are arranged in the descending order based on the most explained variance. The Extraction Sums of Squared Loadings is identical to the Initial Eigen values except factors that have Eigen values less than 1 are not shown. These columns show the Eigen values and variance prior to rotation. The Rotation Sums of Squared Loadings shows the Eigen values and variance after rotation. For analysis and interpretation purpose the researcher only considered the Rotation Sums of Squared Loadings. The following Table 3 summated details of Rotation sum of squared loadings of factors.

TABLE 3 ROTATION SUM OF SQUARED LOADINGS

| Rotation sum of squared loadings | | | |
|---|---|---|---|
| **Factors** | **Rotated Eigen values** | **% of variance** | **Cumulative %** |
| First factor | 9.672 | 23.08 | 23.08 |
| Second factor | 7.504 | 17.86 | 40.94 |
| Third factor | 5.400 | 12.86 | 53.08 |
| Fourth factor | 3.963 | 09.44 | 63.24 |
| Fifth factor | 3.501 | 08.33 | 71.57 |

Extraction Method: Principal Component Analysis.
Source: SPSS output

From Table 3 the second column contains the rotated Eigen values. The Eigen value is a measure of how much of the variance of the observed variables a factor explains. Any factor with an Eigen value ≥1 explains more variance than a single observed variable. The first factor will always account for the most variance and the next factor will account for as much of the left over variance as it can, and so on. Hence, each successive factor will account for less and less variance. The percentage of variance explained by each of the factor can be computed manually through Eigen values. As there are 42 variables, the total variance equals hundred. Therefore the variable explained by each factor can be computed as:

Percentage of variance explained by Factor 1:

Factor 1= Eigen value of first factor / Sum total of the Eigen value*100

= 9.672/42*100

= 23.028

The other factor variance could be computed as from above formula. The total variance explained by both factors = 23.08+17.86+12.86+9.44+8.33= **71.57%.**

The results of EFA, extracted factor components are highly loaded with its own dimension. Some of the factors CR2, CR7, CR9, CK5, CK6, CK7, CK8, CIS7, CIS8, CIS10 and CVE7 not used in the analysis due to poor or low loading factor (refer annexure table). The factor scores can be useful in several ways Field (2000). In SPSS the separate option is available to save the scores of each respondent in three different methods. The best method is regression method, which produces unbiased scores that are correlated only with their own factor. Another method is called the Anderson-Rubin method which produces scores that are uncorrelated and standardized. The method chosen will depend on the research question, but the Bartlett method is the most easily understood (Tabachnick & Fidell, 2007). Factor scores can be treated as variables for further statistical analyses of variables (e.g., Regression, Cluster Analysis) or can be used to overcome the issue of multicollinearity as uncorrelated variables can be produced. Sometimes the researcher uses this factor co-efficient to compute and obtain the score of hold out sampled respondents (adding the values ratings given by the respondents of the respective variables) for particular factor.

Due to the objective of the present study the researcher classifies the respondents in respect of CRM practices with three different Segments on the account of respondents' opinion. For that purpose the cluster analysis was performed by the researcher. Cluster analysis is a conceptually simple and technically slippery methodology applied in many areas of CRM marketing. In general clustering is the task of grouping a set of objects in such a way that objects in the same group (called cluster) are more similar (in some sense or another) to each other than those of other groups (clusters). There are two approaches to conduct the cluster analysis namely hierarchical clustering and non-hierarchical clustering. A hierarchical clustering method works by grouping data into a tree of clusters. Non-hierarchical method often known as k-means clustering. It desired number of clusters is specified in advance and the 'best' solution is chosen. Non-hierarchical cluster analysis tends to be used when large data sets are involved. It is sometimes preferred because it allows subjects to move from one cluster to another (this is not possible in hierarchical cluster analysis where a subject, once assigned, cannot move to a different cluster). K-means is a well-accepted method in social science research, often used in data mining and analysis of social networks, particularly because it is exploratory cited by (Huang 1998; Tan, Steinbach, and Kumar 2006, Amanda Krantz et.al 2009).

TABLE 4 FIVE FACTOR EXTRACTED DIMENSION OF CRM PRACTICES

| **CRM Dimension** | **Recode** | **Average Factor loading** | **% of variance explained** | **Alpha co-efficient** |
|---|---|---|---|---|
| Customer Acquisition | CA | .688 | 23.08 | .878 |
| Customer knowledge | CK | .744 | 12.86 | .863 |
| Customer Response | CR | .777 | 17.86 | .854 |
| Customer value evaluation | CVE | .626 | 8.33 | .767 |
| Customer information system | CIS | .648 | 9.44 | .773 |

Source: Computed Data

Hence due to more advantage and considering the significance, the researcher chosen k-means model to cluster the sampled respondents in accordance on CRM practices. The first step in k-means clustering is finding the k centers. This is done iteratively. To start with an initial set of centers and then modify them until the change iterations is small enough. The following table shows the initial cluster centers of CRM dimension.

TABLE 5 INITIAL CLUSTER CENTRES

| Factor Dimension | Cluster | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Customer Acquisition | -.15157 | 1.68430 | -.93403 |
| Customer Response | 2.04046 | -2.15516 | -.08281 |
| Customer knowledge | -.07728 | 2.00948 | -1.87697 |
| Customer information system | -3.40117 | .58058 | -1.09901 |
| Customer value evaluation | 1.41031 | .15776 | -2.88245 |

Source: SPSS output

The initial cluster centers have been selected, each case is assigned to the closest cluster, based on its distance from the cluster centers. After all of the cases have been assigned to clusters, the cluster centers are recomputed, based on all of the cases in the cluster. Case assignment is done again, using these updated cluster centers. To keep up the assigning cases and re computing the cluster centers until no cluster center changes appreciably or the maximum of 10 iterations is reached. In the present analysis the iteration was reached and stopped at the $4^{th}$ iteration because the iteration history shows the practical evident to us.

The iteration process is over the researcher able to find the cluster dimension of CRM practices. Table 6 shows the cluster final centres.

TABLE 6 FINAL CLUSTER CENTRES

| Dimension | Cluster | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Customer Acquisition | .31572 | .67686 | 1.59090 |
| Customer Response | .46905 | .45107 | 2.01844 |
| Customer knowledge | -.22811 | .56220 | -.35089 |
| Customer information system | 1.26075 | .80761 | .06704 |
| Customer Value Evaluation | 1.09463 | .54789 | -.66803 |

Source: SPSS output

Table 6 shows the final cluster centers are computed as the mean for each variable within each final cluster. The final cluster centers reflect the characteristics of the typical case for each cluster. In the first cluster Customer Information System (1.260) and Customer Value Evaluation (1.094) dimension is considered more by the respondents. In the second cluster all the factors are considered by the respondents. Respondents in third cluster only concentrating the Customer Response (1.590) and Customer Knowledge dimension (2.018).

It is very essential to identify the group membership through cluster analysis. The predicted group membership presented in Table 7 details are presented as follows.

TABLE 7 NUMBER OF CASES IN EACH CLUSTER

| | | |
|---|---|---|
| **Cluster** | 1 | 26.000 |
| | 2 | 90.000 |
| | 3 | 76.000 |
| Valid | | 192.000 |
| Missing | | .000 |

Source: SPSS output

Table 7 exhibit the predicted group membership of the sampled respondents. Out of 192 respondents 26 respondents come under the first cluster, 90 respondents are under the second cluster and 76 respondents fall into the third cluster.

***Naming the Cluster***

In the first cluster Customer Information System (1.260) and Customer Value Evaluation (1.094) dimension is highly considered by the respondents so the first cluster is called "Informative and value based Dimension". In the second cluster all the factors are considered by the respondents so the second cluster is called "Receptive Dimension". Respondents in third cluster only concentrating the Customer Response (1.590) and Customer Knowledge dimension (2.018) so named as "Gaining Dimension".

## VIII. FINDINGS OF THE STUDY

In Exploratory Factor Analysis (EFA), the high loaded factor is customer acquisition (23.08), followed by customer response (17.86), customer knowledge (12.86), customer information system (9.44) and customer value evaluation (8.33). Therefore, the bank should concentrate more on customer information system and customer value evaluation.

The researcher applies non-hierarchical methods of clustering to segment the respondents based on their opinions. The results as:

The first cluster customer information system (1.260) and customer value evaluation (1.094) dimension is highly considered by the respondents so the first cluster is called "Informative and value based dimension".

The second cluster all the factors are considered by the respondents so the second cluster is called "Receptive dimension".

Respondents in third cluster only concentrating the customer response (1.590) and customer knowledge dimension (2.018) so named a"Gaining dimension".

## IX. RECOMMENDATIONS

In the dimension of CRM practices, Customer Acquisition is the process of acquiring new customer or converting existing prospect into new customer. Most of the respondents in this dimension felt disagreed with customer acquisition dimension statements. So the bank should concentrate more on this dimension and also this dimension is one of the best predictor of CRM practices construct model. If the bank concentrate more on this dimension it is possible to understand customer business problem.

While extracting the pattern relationship among the five dimensions of CRM practices. Customer Value evaluation dimension is least loading dimension in the CRM practices construct. The value evaluation is very essential part of customer life cycle. If the bank concentrated well in the customer value evaluation dimension, it results in enduring long lasting relationship with customer thereby ensuring profitability at right time with huge customer base.Based on the outcomes of the cluster model the segment named as "Receptive Dimension" is more considered by the respondents in the study area. So it is advised to bank might concentrate more on entire dimension of CRM practices is to maintain long lasting relationship with their customer. As to managerial implication the bank manager may use this validated scale instrument to evaluate and better understating of CRM practices. Thus offer and create loyalty among customer and create long term committed relationship.

## X. CONCLUSION

CRM is an effective tool in supporting and boosting services in the era of hypercompetitive world. For this there is higher need for the CRM in Banks. Hence, sincere efforts have been taken to analyse the CRM practices in banks. The selected dimensions are employed and devised from the existing empirical study conducted in financial sector. One of the objectives of the present study is to examine the influence of five factor model on CRM practices is fulfilled. The results revealed that Customer Acquisition dimension is highly influencing dimension from other dimension in the same latent construct. Nevertheless all the implied latent factors are highly influencing and statistically significant. The CRM measurement five factors construct with 31 scale items are valid model with critical fit.

## REFERENCES


[1] Ajitah Dash and Soumendra Kumar Patra (2013), "Service Quality as A key to Customer Satisfaction: An Assessment with Private Banks in Odisha", *European Journal of Commerce and Management Research*, Vol. 2, No. 11, pp. 247-251.

[2] Akroush, M.N., Dahiyat, S.E., Gharaibeh, H.S., & Abu-Lail, B.N. (2011). "Customer relationship management implementation: an investigation of a scale's generalizability and its relationship with business performance in a developing country context". *International Journal of Commerce and Management*, 21(2), 158-190.

[3] Amanda Krantz, Randi Kom and Margaret Manniger (2012), "Rethinking Muesem Vistors: using K-means cluster Analysis to explore a museum's audience" pp.363-374.

[4] Arun Kumar Agariya and Deepali Singh (2012),"CRM Scale development in Indian Banking Sector", *Journal of Internet banking and Commerce*, Vol. 17, No.1.

[5] Ashok kumar and Selvakumar (2006), "Customer satisfaction in banks" *PSG journal of management research"* vol.1, No.4, pp. 101-110.

[6] Ata, U.Z., & Toker, A. (2012). "The effect of customer relationship management adoption in business-to-business markets". *Journal of Business & Industrial Marketing*, 27(6), 497-507.

[7] Bennett, R. (1996). "Relationship formation and governance I n Consumer Markets: Transactional analysis versus the behaviorist approach". *Journal of Marketing Management*, 12, 417- 436.

[8] Blery and Michalis, (2006). "Customer Relationship Management: A Case Study of a Greek Bank", Journal of Financial Services Marketing, 11(2), 116-124.

[9] Bose, R (2002). "Customer relationship management: key components for IT success", *Industrial Management & Data Systems*, Vol. 102 Issue: 2, 89 – 97.

[10] Brink, (2006), D.& et.al., " The effect of strategic and tactical cause – related marketing on consumers' brand loyalty", Forthcoming Journal of Consumer Marketing.

[11] Brown, S. A, (2000) "Customer Relationship Management: A Strategic Imperative in the World of e-Business", John Wiley & Sons Canada, Toronto.

[12] Calin Gurau, Ashok Ranchhod, and Ray Hackney, (2003). "Customer-Centric Strategic Planning: Integrating CRM in Online Business Systems", *Information Technology and Management*, Vol. 4, No. 2, 199-214.

[13] Child, D. (2006). "The essentials of factor analysis". (3rd edition.). New York, NY: Continuum International Publishing Group.

[14] Chin Shan Lu and Kuo Chung Shang, (2007). "An Evaluation of Customer Relationship Management in Freight Forwarder Services", *Proceedings of the 13th Asia Pacific Management Conference*, 1096-1105.

[15] David Gefen, (2002). "Customer Loyalty in E-Commerce", *Journal of the Association for Information Systems*, Vol. 3, No. 1, 27-51.

[16] Day, G. S. (2000) "Managing market relationships," *Journal of the Academy of Marketing Science*, Vol. 28, No. 1, 24-30.

[17] DeCoster, J. "Overview of factor analysis". Retrieved March 22, 2012 from http://www.stat-help .com/notes.html.

[18] Diana Suhr, "The Basis of Structural Equation Modeling", Available at: lexjansen.com/tutorials/tut-suhr/pdf.

[19] Dilip B. Patil and Dinesh D. Bhakkad, (2014). "*Redefining Management Practices and Marketing in Modern Age*", Athrar Publications.

[20] Dutta, K., and Dutta, A. (2009). "Customer expectations and perceptions across the Indian banking Industry and the resultant financial implications" *Journal of services research*, vol.9, 31-49.

[21] Field, A. (2000) "*Discovering Statistics using SPSS for Windows*." London – Thousand Oaks –New Delhi: Sage publications.

[22] Gefen, David (2002). "Customer Loyalty in E-Commerce," *Journal of the Association for Information Systems*, Vol. 3: Issue. 1, Article 2.

[23] Gisela Demo and kesia Rozzett, (2013). "Cusomter relationship management scale For the Business –to-Business Consumer market: Validation in the United States and Comparison to Brazilian Models", *En Anpid Publication*, Vol.7.Issue.11.

[24] Gummesson, E. (2004). "Return on relationships (ROR): The value of relationship marketingand CRM in business-to-business contexts". *The Journal of Business and Industrial Marketing*, 19 (2), 136-148.

[25] Gurau, Calin, Ashok Ranchhod, and Ray Hackney, (2003). "Customer-Centric Strategic Planning: Integrating CRM in Online Business Systems." *Information Technology and Management* 4, No. 2- 3, 199–214.

[26] Harman, H.H. (1976). "Modern factor analysis" (3rd ed. revised). Chicago, IL: University of Chicago Press.

[27] Huang, (1998). "Extension to the K-means algorithm for clustering large data search with categorical values", data mining and knowledge discovery, 2, 283-304.

[28] Hui-I Yao and Kok Wei Khong, (2011). "Effectiveness of Customer Relationship Management on Customer Satsifaction in the Commercial banks of Taiwan", *Contemporary Management Reserch*, Vol.7,No.2.

[29] Hussain, I., Hussain, M., Hussain, S., & Sajid, M. A. (2009). "Customer relationship management: Strategies and practices in selected banks of Pakistan", *International Review of Business Research Papers*, 5(6), 117-132.

[30] Izah Mohd Tahir and ZulianaZulkifli, (2011). "A Preliminary Analysis of CRM Practices among Banks from the Customers' Perspective", *Journal of Public Administration and Governance*, Vol. 1, No. 1, 274-285.

[31] Kaiser, H.F. (1974). "An index of functional simplicity, pshycometrica, 39, 31-36.

[32] Kumar, V & Reinartz, W. "Customer Relationship Management: A data based approach" (N. Y.: Joh Wiley, 2006).

[33] Leverin, A., Liljander, V. (2006). Does Relationship Marketing Improve Customers Satisfaction and Loyalty?", *International Journal of Bank Marketing*, 24 (4), pp. 232-251.

[34] Lu, C.S. & Shang, K.C. (2007). "An Evaluation of Customer Relationship Management in Freight Forwarder Services". Proceedings of the 13th Asia Pacific Management Conference, Melbourne, Australia.

[35] Mamoun N. Akroush, Samer E. Dahiyat, Hesham S. Gharaibeh and Bayan N. Abu-Lail, (2011). "Customer Relationship Management Implementation: An Investigation of a Scale's Generalizability and its Relationship with Business Performance in a Developing Country Context", *International Journal of Commerce and Management*, Vol. 21, No. 2, 158-190.

[36] Manol Simo and Magdalena Bregasi. (2013) "Customer Relationship Management and Challenging Aspects in the Banking Sector:Case of Albania", Europian Academic Research, Vol,1, issue.4.

[37] Mazhar Hussain, Iftikhar Hussain and Mushtaq A. Sajid, (2009). "Customer Relationship Management: Strategies and Practices in Selected Banks of Pakistan", *International Review of Business Research Papers*, Vol. 5, No. 6, 117-132.

[38] McDonald, R.P. (1985). "Factor analysis and related methods", Hillside, NJ: Lawrence Erlbaum Associates, Inc.

[39] Narges Delafrooz, Mohammed Taleghani and Davud yaghubiKhorram dare, (2013). "Effects of E-CRM on Customer-Bank Relationship Quality and Outcomes", *International Journal of Science Innovations and Discoveries*, Vol.3.Issue.3.

[40] Nimako S, Azumah F K, Donkor F and Adu-Brobbey V (2012) "Confirmatory factor analysis of service quality dimensions within mobile telephony industry in Ghana" *The Electronic Journal Information Systems Evaluation*, Volume 15 Issue 2,197-215.

[41] Nishikant Jha and Shraddha Mayursh Bhome, (2013). "A Study of CRM-As a Strategic Tool Adopted by Banks with Reference to Axis Bank in Thane City", *Indian Journal of Applied Research*, Vol. 3, No. 5, 454-457.

[42] Park, C. H. and Kim, Y. G. (2003). "Identifying key factors affecting consumer purchase behavior in an online shopping context". *International Journal of Retail & Distribution Management*, 31 (1), 16-29.

[43] Parvatiyar, A. (Eds.), Handbook of Relationship Marketing, Sage Publications, Thousand Oaks, California, 39-67.

[44] Parvatiyar, A. and Sheth, J. N. (2001). "Conceptual framework of customer relationship management", in Sheth, Parvatiyar and Shainesh (Eds.), Customer RelationshipManagement: Emerging Concepts, Tools and Applications, Tata McGraw Hill, Delhi,3-25.

[45] Payne, A. (2006) "Handbook of CRM: Achieving excellence in Customer management". *oxford: Elsevier.*

[46] Peeru Mohamed and Sagadevan, (2005). Customer RelationshipManagement, Vikas Publishing House Pvt. Ltd., Delhi.

[47] Pisharodi, R.M., Angur, M., Shainesh, G.C. (2003), "Relationship Strategy, Effectiveness and Responsiveness in Service Marketing", Journal of Relationship Marketing, 2(1), 3-22.

[48] Ranjit Bose, (2002). "Customer Relationship Management: Key Components for IT success", *Industrial Management and Data Systems*, Vol. 102, No. 2, 89-97.

[49] Reinartz, W. J.. & Kumar, V. (2003). "The impact of customer relationship characteristics on profitable lifetime duration", Journal of Marketing, 67(1), 77-99.

[50] Roger Bennett, (1996). "Relationship Formation and Governance in Consumer Markets: Transactional Analysis versus the Behaviorist Approach", *Journal of Marketing Management*, Vol. 12, No. 5, 417-436.

[51] Rootman C, Tait.M and Bosch.J, (2007). "The influence of Bank Employees on Bank Customer Relationship Management", *ACTA Commerce*, 181-192.

[52] Rootman, M. Tait and J. Bosch, (2008). "Variables Influencing the Customer Relationship Management of Banks", *Journal of Financial Services Marketing*, Vol. 13, No. 1, 52-62.

[53] Ryals, L. and Payne, A.F.T., (2011). "Customer relationship management in financial services: towards information-enabled relationship marketing". *Journal of Strategic Marketing*, 1-25.

[54] Sachdev and H.V. Verma, (2004). "Relative Importance of Service Quality Dimensions: A Multi-Sectoral Study", *Journal of Services Research*, Vol. 4, No. 1, 93-116.

[55] Sachdev S. B and Verma H.V. (2004). "Relative importance of service quality dimensions: A multi-sectoral study". *Journal of Services Research*, 4(1), 59-81.

[56] Sanjay Kanti Das, (2012). "Bank Customer Perception Towards CRM practices: Influence of Demographic Factors", *Journal of Business Management, Commerce & Research*, Vol. I, No.2.1-17.

[57] Sanjay Kanti Das, (2012). "Bank Customer's Perception Towards CRM Practices: Influence of Demographic Factors", *Journal of Business Management, Commerce & Research*, Vol. 1, No. 1. 1-15.

[58] Sheik Abdullah. S., Manohar. R and Manikandan. M (2016). "Framing Hypothesized model for CRM practices in banks: Application of confirmatory factor analysis. *ICTACT journal management studies*, vol.02, issue 01, 252-258.

[59] Shibu. N.S. (2011) "Customer Relationship Management and Banking Industry", *Journal of Social Sciences*, 36(17), 72-79.

[60] Simon Gyasi Nimako, Foresight Kofi Azumah, Francis Donkor and Veronica Adu-Brobbey, (2012). "Confirmatory Factor Analysis of Service Quality Dimensions within Mobile Telephony Industry in Ghana", *Electronic Journal Information Systems Evaluation*, Vol. 15, No. 2, pp. 197-215.

[61] Sin, L.Y.M., Tse, A.C.B. and Yim, F.H.K. (2005). "CRM Conceptualization and Scale Development", *European Journal Market*, 39 (11&12), 1264-1290.

[62] Sivaraks, P., Krairit, D., & Tang, J. C. (2011). "Effects of e-CRM on customer– bank relationship quality and outcomes: The case of Thailand". *The Journal of High Technology Management Research*, 22(2), 141-157.

[63] Straub, Detmar; Boudreau, Marie-Claude; and Gefen, David. (2004). "Validation Guidelines for IS Positivist Research," *Communications of the Association for Information Systems*, Vol. 13, Article 24.

[64] Straub, M.-C. Boudreau and D. Gefen, (2004). "Validation Guidelines for IS Positivist Research", *Communications of the Association for Information Systems*, Vol. 13, No. 1, 380-427.

[65] Tabachnica, P.G. and Fidell, L.S, (2007). "Using multivariate statistics, 5th edition, Bosten, MA: Allyn and Bacon.

[66] Tan, Steinbach, and Kumar, (2006). "Introduction to data mining, instructor solution manual", Addison- Wesely companion book site.

[67] Validation in the United States and Comparison to Brazilian Models", (2013). *EnANPAD*, Vol. 37, 1-15.

[68] Wang, H.P. Lo, R. Chi and Y. Yang, (2004)."An Integrated Framework for Customer Value and Customer Relationship Management Performance: A Customer based Perspectives from China", *Managing Service Quality*, Vol. 14, No. 2/3, 169-182.

[69] Wang, Y. & Feng, H. (2012). "Customer relationship management capabilities: Measurement, antecedents and consequences". *Management Decision*, 50(1), 115 – 129.

[70] Yim F., Anderson R., & Swaminathan S. (2004). "Customer relationship management: its dimensions and effect on customer outcomes". *Journal of Personal & Sales Management*,24(4),265–280.

[71] Zeynep Ata and Aysegul Toker, (2012). "The Effect of Customer Relationship Management Adoption in Business-to-Business Markets", *Journal of Business and Industrial Marketing*, Vol. 27, No. 6, 497-507.

[72] Zhao, X. Cheng and W. Jiang, (2011). "Design and Implementation of Power Customer Value Evaluation System", *Proceedings of International Conference on Information Technology, Computer Engineering and Management Sciences*, Vol. 4, 16-20.

[73] Zuliana Zulkifli and Izah Mohd Tahit, (2012). "Influence of Demographic Factors on Customers Perception towards CRM Practices Among banks", *Universal Journal of Management and Social Sciences*, Vol.2, No.3, 30-36.

***Appendix - Rotation Component Factor Matrix***

| Statements | Component | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| CA1 | .528 | .030 | -.050 | .248 | -.151 |
| CA2 | .696 | .029 | -.038 | .116 | .027 |
| CA3 | .695 | .094 | .116 | .183 | -.059 |
| CA4 | .742 | -.054 | .011 | .059 | .098 |
| CA5 | .784 | -.047 | -.004 | .102 | -.001 |
| CA6 | .688 | -.078 | .160 | .027 | .058 |
| CR1 | .159 | -.012 | .757 | -.141 | .038 |
| CR2 | .302 | -.043 | .052 | .008 | -.030 |
| CR3 | .027 | .121 | .781 | -.108 | .043 |
| CR4 | .206 | .158 | .771 | -.129 | .065 |
| CR5 | .056 | .093 | .773 | -.145 | .108 |
| CR6 | .369 | .002 | .841 | .324 | .532 |
| CR7 | .142 | .484 | -.068 | .074 | .229 |
| CR8 | -.069 | .405 | .739 | -.044 | .463 |
| CR9 | .119 | .290 | .271 | .359 | .143 |
| CK1 | -.068 | .971 | .214 | .109 | .108 |
| CK2 | .034 | .686 | -.109 | .210 | .115 |
| CK3 | .050 | .756 | .103 | .109 | .424 |
| CK4 | .069 | .691 | .395 | -.074 | .498 |
| CK5 | .041 | .138 | .521 | .068 | .341 |
| CK6 | -.048 | .277 | .410 | .133 | .180 |
| CK7 | -.066 | .330 | .164 | .095 | -.126 |
| CK8 | -.052 | .306 | .047 | .308 | .137 |
| CK9 | .021 | .616 | .086 | .255 | .017 |
| CIS1 | .123 | .369 | .125 | .075 | .628 |
| CIS2 | .092 | .244 | .365 | .002 | .501 |
| CIS3 | .098 | .320 | .120 | -.162 | .602 |
| CIS4 | -.016 | .083 | .268 | .391 | .614 |
| CIS5 | .058 | .101 | .235 | -.006 | .674 |
| CIS6 | -.038 | .155 | .045 | .133 | .576 |
| CIS7 | -.090 | .314 | .148 | .023 | -.239 |
| CIS9 | .030 | .028 | .654 | .096 | .947 |
| CIS10 | .013 | .230 | -.009 | .080 | .430 |
| CVE1 | .049 | .062 | .147 | .688 | .047 |
| CVE2 | .006 | .190 | .153 | .505 | .048 |
| CVE3 | .089 | .198 | .313 | .626 | -.091 |
| CVE4 | .048 | .141 | -.002 | .653 | -.041 |
| CVE5 | .144 | .377 | .415 | .572 | -.223 |
| CVE6 | -.140 | .196 | .326 | .782 | -.049 |
| CVE7 | .005 | -.023 | .002 | .045 | .380 |
| CVE8 | -.050 | -.026 | -.047 | .554 | .354 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
CA – Customer Acquisition, CR – Customer Response, CK – Customer Knowledge, CIS – Customer Information System, CVE – Customer Value Evaluation.