Asian Research Consortium

Asian Journal of Research in Business Economics and Management
Vol. 5, No. 4, April 2015, pp.205-215.

ISSN 2249-7307

Asian Journal of Research in Business Economics and Management

www.aijsh.org

Identification and Prioritization the needs of Bank Customers using a Hybrid Approach Kano model and Fuzzy TOPSIS

Kamaleddin Rahmani[a], Ardeshir Bazrkar[b], Mohammad Abedzadeh[c]

[a]*Department of Management, Tabriz Branch, Islamic Azad University, Tabriz, Iran*.

[b-c] *Department of Industrial Management, Tabriz Branch, Islamic Azad University, Tabriz, Iran*.

[b-c] *Department of Industrial Management, East Azerbaijan Science and Research Branch, Islamic Azad University, Tabriz, Iran.*

DOI NUMBER-10.5958/2249-7307.2015.00099.7

Abstract

In this study, the priority of sectors is done through fuzzy TOPSIS. The results revealed that, the needs and demands of Ghavamin Bank customers are different according to the Kano model. Customers of best cluster have a high income and a high school diploma, so it is normal for this type of customers to have more important for banks for various reasons. From this study it is concluded that Ghavamin Bank can be more accurate understanding of their customers and better understanding of their needs, according to the Kano Model; and with an appropriate objective to the type of clustering, so that the priority of clusters should be studied and needs of each of these groups and clusters should be identified, to move faster to pursuit its strategy. In this regard, the Bank reaches its goals and the needs of its customers which are the main investments are provided.

Keywords: Prioritization, Hybrid Approach, Kano model, Fuzzy TOPSIS.

1. Introduction

Financial institutions and banks are organizations that have clients from different walks of life and every day they usually work with them. But all the bank customers are not important same and these organizations are actually interested in differentiation and customer service as proportional to the degree of importance of each customer for the organizations (Etebarian, and Farahbakhsh, 2002). What makes such a move is that banks and financial institutions and credit-profit organizations and their survival depend on attracting and retaining profitable customers.

One of the techniques by which we can investigate customer satisfaction and high quality services and products, is Kano model. Kano two-dimensional quality model, a useful tool for analysing the needs and demands of our customers and satisfy them (Hussein and Najafpour, 2009).All customers are not important same, so the organization is focused on customers who are more profitable for them. By segmenting, the customers with the same features and conditions are in a same group and this helps to better understand the needs and characteristics of them, and also, recognition of the need to rid of every single customer, because of a cluster of features and requirements are the same. Clustering can be applied by segmenting the customers which use data mining techniques (Shahin and Saleh-Zadeh, 2011).In this study, the priority of sectors is done through fuzzy TOPSIS. So, what can be considered in this research is attention to products and services quality to meet the real needs of the customer or the organization; but as mentioned, due to constraints on resources, the choice of segmenting customers so that customers with high profitability are the priority and satisfaction guaranteed.

2. Literature Review

Etebarian and Farahbakhsh used the Kano model in banks and financial institutions and credit, using a questionnaire with 33 questions and a sample of 383 organizations and they attempted to identify the needs of customers. The study sample consisted of key customers Export Development Bank of Iran in Tehran. This model classifies the customer needs in three basic needs including functional requirements, motivational needs and basic needs.

In another study, entitled "The expected benefits of segmenting customers based on customer Banking: A Case Study of Financial and Credit" 120 customers of financial institutions, Credit were rated. This work was based on the expected benefits clients.

Shahin and Salehzadeh in another research combine clustering techniques, AHP and Kano model to describe the services of Saman Bank. In this study, they used clustering to classify consumers and then applied AHP algorithm to prioritize the clusters. Finally, they used the Kano model to find out the needs of each cluster. In this study, the criteria used for clustering clients include income, education level, and number of bank work, conducted in absentia and regular use of the bank's ATM. One of the main tasks of banks in interest-free banking law is allocating the resources.

3. The theoretical literature research

3.1 Kano model:

Kano customer satisfaction model is a quality management and marketing technique used to measure customer satisfaction. Kano model helps us to understand the relationship between supply and customer satisfaction. Kano model in connection with social science theories that have been proposed by Herzberg, to increase customer satisfaction. Kano customer satisfaction model identifies six categories of factors that, in the meantime, three first factors are really affecting customer satisfaction (Rad. Et al, 2012).

3.1.1 Basic factors: The minimum requirements, which if not met, will provide customer dissatisfaction.

3.1.2. Functional factors: Factors that the excellent and favourable performances of them cause's satisfaction and poor performance will provide dissatisfaction. The effect of these characteristics on satisfaction is linear and symmetric.

3.1.2. Motivational factors: Factors that increase customer satisfaction if they are provided, and if they not meet, will not provide customer dissatisfaction. These factors will cause surprising and happy of customers.

3.2. Fuzzy TOPSIS

This technique has been developed by Jung and Huang.The basis of this technique is for selecting the alternative so that it has the shortest distance to the ideal and positive alternative (Awashi et al., 2011). In TOPSIS method, options that are closest to the Positive ideal solution and ones that have larger distance to the Negative ideal solution are selected. The best possible positive ideal solution and negative ideal solution is the worst possible option (Kim et al, 2006).

In this study, the triangular fuzzy numbers are used to express the views of experts. Then fuzzy TOPSIS is applied to combine these ideas and prioritize options (clusters). Options are prioritized on the basis of the amount of points they earn.

4. Research Methodology

The objective of the study was practical and its nature was descriptive. The population of this study was all customers of Ghavamin Bank in Tehran who have used the services of the bank and their accounts are active. Simple random sampling method was used for sampling and sampling of customers of a bank branch in Tehran was made to include different classes. The sample size was determined based on Morgan and therefore the number of 382 samples was chosen from among the target population. Data collection was conducted through questionnaires and expert opinions. The questionnaire was distributed among clients is composed of two parts, the first part of clients includes features such as education, income, and so the question of the criteria for clustering customers. The questions of this part are 7 from which 5 questions conducted based on research by experts from the study and was elected from Shahin and Salehzadeh and 2 additional questions were added. The second part of the questionnaire contained

questions related to the Kano model. According to experts, 23 items were selected for this part of the questionnaire. The validity of the questionnaire was evaluated by 5 experts and pundits and its reliability was calculated for a sample of 35 specimens through Cornbrash's alpha which was calculated by SPSS software and its value was 0.81. So, the reliability was good.

5. Data Analysis Research

5.1 Clustering

For clustering criteria should be considered that be able to separate customers into different groups. In each cluster customers must be classified who have more similarities to each other (the same needs and desires), and also different clusters must have the highest differences together (Hatami Nasab and Salehifar, 2010).

For this purpose, according to experts, the 6 criteria were identified as follows:

1. Education
2. The amount of income
3. The average bank working during the week
4. The use of bank facilities
5. The use of ATM, etc.
6. The use of modern banking services such as e-banking.

After identifying the criteria for separating clusters of research, in order to better show the separation, for each of the criteria used to measure the scale of the operation to do, the Scale of experts based on common definitions of Ghavamin Bank are done. Here are some of the definitions of the criteria.

(A) Education: Diploma: 1, Higher diploma: 2, BA: 3, MA: 4, PhD: 5

(B) Income, up to one million: 1, up to 2 million: 2, up to 3 million: 3, more than three million: 4

(C) The average bank working during the week: up to 2 times: 1, up to 4 times: 2, up to six times: 3, more than six times: 4

(D) The use of facilities: not used: 1, one time: 2, up to three times: 3, more than three times: 4

The use of ATM: uses: 1, do not use: 2.

The use of modern electronic services: use: 1, do not use: 2.

After clarifying the definitions using simple means algorithm, data sample was obtained. These data are shown in Table 1.

Table 1. Table 1: Data on separate clusters

Clustering criteria	Total	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Education	24557	18889	15517	32174	32326	2828	19032
Income	25365	35889	17759	36087	18605	14516	27097
The average bank working during the week	2849	37111	18966	31014	17209	23656	31935
The use of facilities: not used	22865	27222	17759	37971	16279	18925	29355
The use of ATM	11797	1778	2	1	1	1	1129
The use of modern electronic services	16068	2	18621	1	1	2	1

The numbers and percentages of clusters can be seen in Table 2.

Table 2. Number and percentage of generated clusters

Cluster	Number	Percentage
Cluster 1	63	0.17
Cluster 2	49	0.13
Cluster 3	75	0.19
Cluster 4	91	0.24
Cluster 5	38	0.10
Cluster 6	66	0.17

5.2 Prioritizing clusters using fuzzy TOPSIS

The objective from application of fuzzy TOPSIS is prioritizing clusters generated in the previous step. In this study, the opinions of five experts to weight criteria as well as to prioritize clusters have been used. Linguistic expressions that are used to express the views of experts presented in Table (3).

Table 3. Conversion of linguistic expressions into fuzzy numbers

linguistic expression	Function	Symbol
Very weak	**(1,1,3)**	**VP**
Weak	**(1,3,5)**	**P**
Medium	**(3,5,7)**	**F**
Important	**(5,7,9)**	**H**
Very important	**(7,9,9)**	**VH**

The weighted criterion used for clustering customers using expert opinions is discussed and the results are shown in Table 4 as follow:
C1: Education
C2: Income
C3: Average number of work during the week
C3: the use of facilities and bank guarantees, etc.
C3: The use of ATM terminals and sales
C6: use of modern banking services, including electronic banking
D1 to D5 are used to identify decision makers.

Table 4. Weighting criteria by experts

Criteria	D1	D2	D3	D4	D5
C1	**F**	**H**	**P**	**H**	**F**
C2	**VH**	**H**	**VH**	**H**	**VH**
C3	**H**	**H**	**F**	**F**	**F**
C4	**F**	**VH**	**H**	**VH**	**H**
C5	**F**	**F**	**F**	**F**	**P**
C6	**F**	**F**	**F**	**P**	**P**

From experts view point and from the combination of the applied weights, weight, integration and decision criteria decision matrix is shown in Table (5).

Table 5. Consolidated Criteria weights prioritize

Combined weights	Index
(1,5,4,9)	**C1**
(5,8,2,9)	**C2**
(3,5,8,9)	**C3**
(3,7,4,9)	**C4**
(1,4,7,7)	**C5**
(1,4,2,7)	**C6**

To omit scale of fuzzy decision matrix (D) the following formula is used:

$$\widetilde{r}_{ij} = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*} \right); c_j^* = M_i ax^{c_{ij}}; \forall j^+$$

$$\widetilde{r}_{ij} = \left(\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}} \right); a_j^- = M_i ax_{ij}; \forall j^-$$

Then the fuzzy positive ideal solution and fuzzy negative ideal solution are calculated, and the following relations are used:

$$A_j^+ = (\widetilde{v}_1^+, \widetilde{v}_2^+, ..., \widetilde{v}_n^+ = \underset{i}{Max}[v_{ij3}]; i = 1,2,...,m; j = 1,2,...,n$$

$$A_j^- = (\widetilde{v}_1^-, \widetilde{v}_2^-, ..., \widetilde{v}_n^- = \underset{i}{Min}[v_{ij3}]; i = 1,2,...,m; j = 1,2,...,n$$

In TOPSIS method, the preferred option is the option with the least distance from the positive ideal solution and is farthest from negative ideal solution which is calculated after identifying the positive and negative solution to every option from the positive and negative ideal solution. It can be obtained from the following relationships:

$$d_i^+ = \sum_{j=1}^{m} d(\widetilde{v}_{ij}, \widetilde{v}_j^+), i = 1,2,...,m$$

$$d_i^+ = \sum_{j=1}^{m} d(\widetilde{v}_{ij}, \widetilde{v}_j^+), i = 1,2,...,m$$

$d(\tilde{a},\tilde{b})$ Is the distance between two triangular fuzzy numbers and is calculated as follows:

$$d(\tilde{a},\tilde{b}) = \sqrt{1/3[(a_1 - b_1)^2 + (a_2 - b_2)^2 + (a_3 - b_3)^2]}$$

Finally, a decision matrix to prioritize merging clusters formed and it is operated in accordance with TOPSIS model and distance of options based on the ideal distance obtains positive and negative is obtained.

Table 6.The distance from the positive ideal

Index	d^+					
	A1	A2	A3	A4	A5	A6
C1	6.2	6.2	5.56	5.72	5.58	6.2
C2	3.71	6.19	6.54	6.19	6.19	5.2
C3	4.75	6.2	5.89	5.45	5.45	4.96
C4	4.44	5.25	5.79	5.14	5.2	4.4
C5	4.44	4.89	4.35	4.56	4.56	4.56
C6	4.79	4.82	4.29	4.63	5	4.58

Table 7. Distance from the negative ideal

Index	d^-					
	A1	A2	A3	A4	A5	A6
C1	5.39	5.39	5.56	5.56	5.54	5.39
C2	6.42	3.92	6.54	3.92	3.92	5.38
C3	5.81	4.13	5.89	5.45	5.45	6.63
C4	5.7	5.09	5.79	5.2	5.2	5.79
C5	4.35	2.94	4.35	4.26	4.26	4.26
C6	3.34	3.38	4.29	4.21	3.27	4.21

In this step, a coefficient of near to each option to the positive and negative ideal distance is determined.

Table 8.coefficients of near to each option to prioritize clusters

	A1	A2	A3	A4	A5	A6
d^-	28.69	24.85	52.51	31.01	27.64	31.39
d^+	31.69	33.55	27.43	28.33	32.26	30.22
cc_i	0.475	0.426	0.667	0.522	0. 461	0.501

According to the results of Table 8, as can be seen, based on the proximity factor, prioritize clusters obtained as follows:

A3>A4>A6>A1>A5>A2

As the results show, the third cluster has the highest score and then placed fourth cluster. The third cluster has 75 customers.

This group of customers has undergraduate education and their income is over two million Tomans.

The average bank working of these customers is over five times a week and the use of the facilities is considerable and reaches more than 2 or 3 times.

Customers of this cluster regularly use ATM machines and retail terminals and also take advantage of the new e-banking.

5.3 Evaluation of customers using the Kano Model

After clustering and prioritizing customers, now it's time to identify their needs and desires. The main objective of this research understands the real needs of customers and the former steps were the only prerequisite for achieving this objective. The table below shows the number of 24 questions (on the basis of need) which according to the Kano model, customers were asked to determine them on the basis of assessment by the Kano model. Determining the type of need (indifferent, basic, functional and motivation) has been conducted using frequency tables to evaluate the Kano Model. For example, the first cluster that the number of customers that 63, if you ask for a need that high percentage of clients it be considered a basic need, then it is a basic need for the first cluster and as such is brought in the Table.

Abbreviations to indicate the type required:

A = indifference need

C = attractive need

P = functional need

M = mandatory need

Table 9. Determine customer needs based on Kano Model

Cluster						Question
6	5	4	3	2	1	
M	P	M	P	M	M	Proper accountability of staff to clients
P	P	M	P	M	M	Good relationship with customers, employees
M	P	M	M	M	M	The importance of customer-time employees
M	M	M	M	M	M	Arranged in different parts of the Bank
M	M	M	P	M	M	Security for banks
M	M	M	M	M	A	There are appropriate facilities
P	P	M	P	M	M	Notification of the branch
C	M	C	A	M	C	Notification of Services by automatic call
C	A	C	A	C	C	Possible and advising bank branches
P	P	C	C	M	P	Protection of customer information (from outside)
P	P	M	P	M	M	Speed and accuracy of the employees at the branch
M	P	M	P	M	M	Knowledge and expertise of staff duties
A	A	M	A	M	M	Coordination with the Bank's working hours working time banks
A	M	M	A	M	C	Strengthening electronic banking service
A	C	C	A	C	P	Reducing fees for bank transfers
P	C	C	P	C	C	Reducing facilities profit
M	C	M	P	M	M	Reducing the waiting time for payment
C	C	C	C	C	C	Increased time to repay loans
C	A	C	A	C	A	Customers are invited to attend seminars
M	M	M	M	M	M	Existence of complaints and criticisms
P	C	C	A	C	A	Internet and the possibility of branch operations
C	A	C	A	C	C	Booking turn on the phone
A	A	C	A	C	C	To follow the capital market news
M	A	M	A	M	M	The possibility of opening letters of credit

6. Conclusions and recommendations

As observed, the needs and demands of Ghavamin Bank customers are different according to the Kano model.

Customers of third cluster have first priority based on the opinion of experts, and subsequently to meet the demands of the customer is of high priority. These customers have a high income and a high school diploma, so it is normal for this type of customers to have more important for banks for various reasons.

First is that due to high income they have good turnover and the existence of these bank customers in the bank are important to increase profits. Also, these customers have a college degree and so the modern

banking services as well as new services that bank is going to present to the people in the future are more accepted.

Of course, as previously mentioned, these customers are the main users of modern banking services including online banking, mobile banking, and so on.

The ATM machines and terminals as well as retail clients regularly used by these customers. This is an important feature which strongly reduces a lot of costs, including the cost of holding money in the bank, bank branches, offices and other services.

As is obvious from the properties of this cluster, its members significantly use the Bank's loans and credit cards (two or more times) and this is an important factor which has high priority for clustering the banks customers. One of the main sources of income for the banks is allocating resources or facilities; today in our country there are many cultural and economic problems, which the banks are more cautious and accept less risk in providing the facilities. In conclusion with regard to the results it can be said that, Ghavamin Bank can be more accurate understanding of their customers and better understanding of their needs, according to the Kano Model; and with an appropriate objective to the type of clustering, so that the priority of clusters should be studied and needs of each of these groups and clusters should be identified, to move faster to pursuit its strategy.

In this regard, the Bank reaches its goals and the needs of its customers which are the main

References

Etebarian, A., Farahbakhsh, M. 2002. Identifying customer needs, Export Development of Bank of Iran by the Kano model. Development, 11 (13).

Hosseini, F., Najafpour, H. R. 2009. Segmenting customers based on the expected benefits of the customer banking services: case study: Mehr Credit Financial Institution. First International Conference on Marketing Banking, Tehran, December 2009.

Shahin. A., Salehzadeh, R. 2011. Compound clustering methods, AHP and Kano to describe services Saman Bank case study of Qom city. Management Research, 16(1), Spring 2010.

Hatami Nasab, H., TaleiFar, R. 2009. Appraisal and rating services marketing tools to approach the bank manager's with Fuzzy viewpoint, Case Study: National Bank branches in Yazd province. Fourth International Conference on Marketing Management, Tehran, July 2009.

Rad A., Naderi B, Ghobadizadeh M, Clustering and ranking university majors using data mining and AHP algorithms: A case study in Iran, Expert Systems with Applications, Vol. 34, No. 1, 2012.

Kim S. Y., Jung T. S., Suh E. H., Customer segmentation and strategy development based on customer lifetime value: A case study, Expert Systems with Applications, Vol. 31, No. 1, 2006.

Awasthi A., Chauhan S. S., Omrani H., Application of fuzzy TOPSIS in evaluating sustainable transportation systems, Expert Systems with Applications, 2011, pp. 12202-12242.