RECOGNITION AND PRIORITY OF KEY SUCCESS FACTORS (KSF) INCUSTOMERS CLUBS AND CUSTOMERS LOYALTY PROGRAMS

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Abstract

The present study aims to identify and prioritize the Key Success Factors (KSFs) of Customer clubs and Customer Loyalty programs, in Bank Mellat Iran. The different models of Key Success Factors from previous researchers have been studied, and according to 12 experts of bank Mellat Iran, a model of KSFs of Customer clubs and Customer Loyalty programs in banking industry, has been presented. It's a combination of previous researches models, including 20 factors affecting the success of Bank Customer clubs and Customer Loyalty program. A questionnaire of 20 success factors have been designed for determining the effect of each factor on the other 19 factors. It has been filled by 12 experts with over 10 years of experience in banking industry. Then, it has been analyzed by Fuzzy DEMATEL method, and the research results has been extracted. This research concluded 20 main key success factors of Customer clubs and Customer Loyalty programs, in Bank Mellat Iran; the 5 fist most important success factors are in order as: 1. the seller's contact assets, 2. price, discounts and free products, 3. Lack of attention to monitoring system and continuous supervision, 4. Quality of customer services, 5. Creating value for customers.

Keywords: Key Success Factors (KSFs), Fuzzy DEMATEL, Customers Clubs

1. Introduction

In the early 1980s, Peters and Waterman in the book named "In Search of Excellent" have investigated the reasons for success of American successful companies. Their research showed that all successful companies had emphasized on 8 same factors which lead them to success, and this claim was raised that if other companies also have these 8 factors, they will achieve success. This research had significant impact on the management literature, and drawn the attention of other researchers to key success factors of organization.

The concept of Key Success Factors (KSFs) originated by Ronald Daniel in 1961. He argued that factors ensure the success of an organization should be identified and privileged over the increasing volume of information flow. He claimed that decision making is more easy and effective with clear determined KSFs (Ronald Daniel, 1961). This concept has been developed with other researchers in 1970s and 1980s. John Rockart, the manager of Research Center of Information Systems at Massachusetts Institution of Technology (MIT) introduced a new method to identify the scientific needs of an organization related to information systems entitled "Key Success Factors" (Rockart, 1979). In 1980s Peter & Waterman identified 8 factors lead to success in 43 investigated companies in USA. That research had a significant impact on management scholars and encouraged other researchers to start similar studies (Peters and Waterman, 1982).

KSFs defined as the reason of Competitive Advantages. Therefore, attention to these factors can help leaders and managers to empower their companies. They vary from firm to firm, and different time, but they are identifiable and should be well understood by all employees (Thompson and Strickland, 2005; Rockart, 1979). KSFs determine those performance fields that managers must constantly take care. These factors are very important in strategy execution (Piers and Robinson, 1997). Rockart and Bullen believed KSFs play a main role in the success of an individual, group or organization in a competitive environment (Rockart and Bullen, 1981).

In the recent years, competition on customer attraction and retention resulted in relationship-marketing strategies. Developing firms implement different relationship-marketing methods for attraction and retention of profitable customers. One of these methods is foundation of customers' clubs. The focus of relationship-marketing is not on attracting new customers, but was on developing relationships with current customers. Recently, firms pay attention to relationship-marketing and as a start point, they founded customers' club. Nowadays, many organizations spend so much costs for creating ties with customers; Customer Relationship Management (CRM) and one-to-one marketing are some of strategies used by organizations in order to attracting and retaining the customers. Another

approach for attracting customers and creating loyalty is via customers' clubs which providing values for customers beyond the products or services' values through close relationship with them.

German companies are the first founders of customers' clubs in the world. They established customers' club primarily for non-financial reasons. Today, hundreds of clubs in Germany and other countries all over the world are presenting emotional benefits, extra services and plans for creating more values for increasing loyalty among their customers (Eskandarian & Khajehzadeh, 2006).

Customers' club has some characteristics as follows: discussion-based relationship and value-oriented based on creating financial and non-financial benefits that makes an emotional relation between customers and organization and distinguish it from fun clubs, discount clubs, loyalty clubs and so on (Butscher, 2006). Customers' clubs are goal oriented, and have regular and continuous plans for customers. One of their goals is increasing the sales and making profits for both sides. After gathering customers' information, club knows their tastes, favorites and requests, and then can plan their future business direction, and take steps for customers' satisfaction. (Buttle, 2009).

Therefore, in order to achieve the goals, organization should know and pay attention to key factors of success. So, first the key success factors (KSFs) should be identified, and then for knowing the importance of each one, they should be prioritized. In this study, researchers will search for these factors.

2. Methodology

In this study we wanted to recognize the KSFs of customers clubs and customer's loyalty programs in Bank Mellat Iran, and prioritize them. For this purpose in the first step we gathered the declared KSFs in other studies and provided them to 12 experts who were experienced in banking industry. In one by one interview by each of them, we found out the relative factors to the success of customers clubs and customer's loyalty programs in Bank Mellat Iran.

In this research some bank specialists who are qualified in research field help us in a poll. So, it can be stated that validity of this research depends on scientific level of specialists and experts who participate in research rather than their quantity.

In this study, first the customers' club success key factors has been identified by using research literature. Then, we asked specialists in a fuzzy DEMATEL questionnaire about importance of methods, criteria, and finding relation between them. Output was finding cause and effect relations between methods and criteria and also prioritizing key factors.

Statistical population of this research is governmental executive managers and accountants. Since, the validity of this method is directly depends on scientific qualification of specialists and experts, so, just experts work in governmental banks with at least 10 years work experience and bachelor degree in accounting-financial field participated in this research.

In this study, context validity is used for examine the validity of questionnaire. Therefore, after providing the questionnaire, necessary modifications applied based on the feedbacks from experts. The Cronbach's Alpha is used to determine reliability of our questionnaire. It was 0.89 which was enough for proof of this study's reliability. For analyzing data in current research, multiple criteria decision making method (Fuzzy DEMETAL method) is used.

DEMATEL method was presented in 1973 as a kind of structural modeling approach about a problem. It can clearly see the cause & effect relationship of criteria when measuring a problem (Chen et al., 2007). The decision-making involved in selecting appropriate management systems to create sustainable competitive advantages is a very important topic, which can be formulated as a MCDM problem. Applying the DEMATEL illustrates interrelations among criteria, finds central criteria to represent effectiveness of factors or aspects, and avoids "over fitting'' for evaluation. Thus, non-additive methods, fuzzy measure, and fuzzy integral are used to calculate the dependent criteria weights and the satisfaction value of each factor or aspect for fitting with the patterns of human perception (Chen et al., 2007).

DEMATEL method includes following steps:

1. Fuzzy decision matrix formation, 2. Average decision matrix formation, 3. Defuzzification with CFCS method, 4. Normalized matrix formation, 5. Total relation matrix formation, 6. Calculation of rows and columns sum (Cj,Ri), 7. Calculation of Ri+Cj and Ri-Cj, 8. Drawing diagram of cause and effect, 9. Calculation of p-value threshold, and drawing of CRM diagram. Cause and effect relation is obtained, and just factors that their value in total relation matrix was more than p-value threshold were drawn in CRM diagram and the others omitted.

3. Using Fuzzy DEMATEL method

In this research, based on Fuzzy Dematel method for finding interactions between criteria, Paired sample T-test questionnaire is designed and given to experts. The main criteria are compared to each other, and also sub-criteria are compared to each other. Fuzzy numbers has been used to determine the effect of each factor on the other factors, so according to Table 2, the effective intensity of each factor on the other factors has been graded in 5 grades from non-effective to too-high-effective, and has been evaluated by the experts.

For evaluating interactions of factors, fuzzy numbers are used. So factors are graded from non-effective to highly effective and evaluated by specialists via DEMATEL method with following steps:

First Step: after collecting questionnaires, the matrix of paired sample T-test is converted to triangular fuzzy numbers as table 2:

Table 2. criteria interactions

effective intensity	Corresponding fuzzy number
Non-effective	(0,7 , 0,9 , 1)
Low effect	(0,5 , 0,7 , 0,9)
Medium-effect	(0,3 , 0,5 , 0,7)
High effect	(0,1 , 0,3 , 0,5)
Too high effect	(0 , 0,1 , 0,3)

Second step: Defuzzification with CFCS method

This method is based on obtaining maximum and minimum of triangle fuzzy numbers range that includes 4 stages as follows:

Stage1: normalizing decision matrix

According to equations (1) to (4), fuzzy decision matrix is converted to Tables (3) to (6).

$$x_{rj}^{n} = (r_{ij}^{n} - \min l_{ij}^{n}) / D_{\min}^{\max} \quad (1)$$

$$xm_{rj}^{n} = (m_{ij}^{n} - \min l_{ij}^{n}) / D_{\min}^{\max} \quad (2)$$

$$xl_{rj}^{n} = (l_{ij}^{n} - \min l_{ij}^{n}) / D_{\min}^{\max} \quad (3)$$

$$D_{\min}^{\max} = \max r_{ij}^{n} - \min l_{ij}^{n} \quad (4)$$

In Table 3, a sample of normalized value according to opinion of first expert is presented.

	1			2			3			4			5			6			7			8			9			10			11			12			13			14			15			16			17			18			19			20		
	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)	Xl(ij)	Xm(ij)	Xr(ij)
1	0	0	0.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	1	1.333	1.33	0	0.333	0.67	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0	0.333	0.67	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0	0.333	0.67
2	0.67	1	1.33	0	0	0.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0	0.333	0.67	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33
3	0.67	1	1.33	0.33	0.667	1	0	0	0.33	0.67	1	1.33	0.33	0.667	1	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33
4	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	0	0	0.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33
5	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0	0	0.33	0.33	0.667	1	0	0.333	0.67	0	0.333	0.67	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33
6	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0	0	0.33	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1
7	0.33	0.667	1	0.33	0.667	1	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0	0	0.33	0	0.333	0.67	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	0	0.333	0.67	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33
8	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0.33	0.667	1	0	0	0.33	0.33	0.667	1	0.33	0.667	1	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33
9	0	0.333	0.67	0.67	1	1.33	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0	0	0.33	0	0.333	0.67	0.33	0.667	1	0.33	0.667	1	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	0	0.333	0.67	1	1.333	1.33	0.67	1	1.33
10	0.33	0.667	1	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0	0	0.33	0	0.333	0.67	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33
11	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0	0	0.33	0	0.333	0.67	0	0.333	0.67	1	1.333	1.33	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33
12	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	0	0	0.33	0.33	0.667	1	1	1.333	1.33	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33
13	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0	0	0.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0.33	0.667	1
14	0.33	0.667	1	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0	0.333	0.67	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0	0	0.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0.33	0.667	1	0.67	1	1.33	0	0.333	0.67
15	0.67	1	1.33	0	0.333	0.67	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	0	0.333	0.67	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0	0	0.33	1	1.333	1.33	0.67	1	1.33	0	0.333	0.67	1	1.333	1.33	0.33	0.667	1	0	0.333	0.67
16	1	1.333	1.33	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0	0.333	0.67	0	0	0.33	0	0.333	0.67	0.67	1	1.33	0	0.333	0.67	0.33	0.667	1
17	0.67	1	1.33	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	1	1.333	1.33	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0	0.333	0.67	0.67	1	1.33	0	0	0.33	1	1.333	1.33	0	0.333	0.67	0.67	1	1.33
18	1	1.333	1.33	0.33	0.667	1	1	1.333	1.33	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0.33	0.667	1	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	1	1.333	1.33	0.33	0.667	1	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0	0	0.33	0	0.333	0.67	0.67	1	1.33
19	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0.33	0.667	1	0.67	1	1.33	1	1.333	1.33	0	0.333	0.67	0	0.333	0.67	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0.33	0.667	1	0	0.333	0.67	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	0	0	0.33	0.67	1	1.33
20	0.33	0.667	1	0	0.333	0.67	1	1.333	1.33	0	0.333	0.67	0	0.333	0.67	1	1.333	1.33	0.67	1	1.33	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0	0.333	0.67	0.33	0.667	1	0	0.333	0.67	0.67	1	1.33	0.67	1	1.33	0	0.333	0.67	0.33	0.667	1	0.67	1	1.33	0.67	1	1.33	0	0	0.33

Table 3. first expert normalized matrix

Stage 2: Normalized value of left (ls) and right (rs)

In this stage, by using relations (5) and (6), we calculate left and right normalized values:

$$xrs_{ij}^{n} = xr_{ij}^{n} / (1 + xr_{ij}^{n} - xm_{ij}^{n}) \qquad (5)$$

$$xls_{ij}^{n} = xm_{ij}^{n} / (1 + xm_{ij}^{n} - xl_{ij}^{n}) \qquad (6)$$

A sample of calculated result of this stage related to matrix of first expert answers is showed in Table 4:

	1		2		3		4		5		6		7		8		9		10	
	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)
1	0	0.25	0.75	1	1	1.333	0.75	1	0.5	0.75	1	1.333	0.25	0.5	1	1.333	1	1.333	0.75	1
2	0.75	1	0	0.25	0.5	0.75	0.75	1	0.75	1	0.75	1	0.75	1	1	1.333	0.75	1	0.75	1
3	0.75	1	0.5	0.75	0	0.25	0.75	1	0.5	0.75	0.5	0.75	1	1.333	0.75	1	1	1.333	0.75	1
4	0.25	0.5	0.5	0.75	0.75	1	0	0.25	0.5	0.75	0.75	1	0.75	1	0.5	0.75	1	1.333	1	1.333
5	0.75	1	1	1.333	1	1.333	0.75	1	0	0.25	0.5	0.75	0.25	0.5	0.25	0.5	1	1.333	0.75	1
6	0.75	1	1	1.333	1	1.333	0.75	1	0.75	1	0	0.25	0.5	0.75	0.25	0.5	0.75	1	1	1.333
7	0.5	0.75	0.5	0.75	0.75	1	0.5	0.75	0.75	1	1	1.333	0	0.25	0.25	0.5	1	1.333	0.75	1
8	0.25	0.5	0.5	0.75	0.75	1	1	1.333	0.75	1	0.5	0.75	0.5	0.75	0	0.25	0.5	0.75	0.5	0.75
9	0.25	0.5	0.75	1	0.5	0.75	0.25	0.5	0.75	1	1	1.333	0.75	1	0.5	0.75	0	0.25	0.25	0.5
10	0.5	0.75	1	1.333	1	1.333	1	1.333	1	1.333	0.75	1	0.5	0.75	0.75	1	1	1.333	0	0.25
11	0.75	1	1	1.333	0.75	1	0.75	1	0.75	1	0.25	0.5	0.75	1	0.5	0.75	0.75	1	1	1.333
12	1	1.333	0.75	1	1	1.333	1	1.333	0.75	1	0.75	1	1	1.333	1	1.333	0.75	1	0.75	1
13	0.75	1	1	1.333	1	1.333	0.75	1	0.5	0.75	0.75	1	1	1.333	1	1.333	1	1.333	0.75	1
14	0.5	0.75	0.5	0.75	0.75	1	0.75	1	1	1.333	1	1.333	0.75	1	0.25	0.5	1	1.333	1	1.333
15	0.75	1	0.25	0.5	0.5	0.75	1	1.333	0.75	1	1	1.333	0.25	0.5	0.25	0.5	0.75	1	0.75	1
16	1	1.333	0.5	0.75	1	1.333	0.5	0.75	0.75	1	0.75	1	0.75	1	1	1.333	1	1.333	1	1.333
17	0.75	1	0.5	0.75	1	1.333	0.75	1	1	1.333	0.25	0.5	0.5	0.75	0.75	1	0.75	1	0.5	0.75
18	1	1.333	0.5	0.75	1	1.333	0.75	1	0.75	1	0.5	0.75	0.75	1	0.5	0.75	0.5	0.75	0.25	0.5
19	0.75	1	0.75	1	0.75	1	0.5	0.75	0.5	0.75	0.75	1	1	1.333	0.25	0.5	0.25	0.5	0.25	0.5
20	0.5	0.75	0.25	0.5	1	1.333	0.25	0.5	0.25	0.5	1	1.333	0.75	1	0.5	0.75	0.75	1	0.75	1

	11		12		13		14		15		16		17		18		19		20	
	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)	Xls(ij)	Xrs(ij)
1	0.75	1	0.5	0.75	0.25	0.5	1	1.333	0.75	1	1	1.333	1	1.333	0.75	1	0.5	0.75	0.25	0.5
2	0.75	1	0.75	1	1	1.333	1	1.333	1	1.333	0.25	0.5	0.25	0.5	0.25	0.5	0.75	1	0.75	1
3	0.75	1	0.75	1	0.5	0.75	0.25	0.5	0.75	1	0.75	1	0.5	0.75	0.75	1	1	1.333	0.75	1
4	1	1.333	1	1.333	1	1.333	0.75	1	0.75	1	0.5	0.75	1	1.333	1	1.333	1	1.333	1	1.333
5	1	1.333	0.75	1	1	1.333	0.5	0.75	0.5	0.75	1	1.333	0.75	1	0.75	1	0.75	1	1	1.333
6	0.75	1	0.5	0.75	0.75	1	0.75	1	0.5	0.75	0.75	1	1	1.333	1	1.333	0.75	1	0.5	0.75
7	1	1.333	0.25	0.5	0.75	1	0.25	0.5	0.75	1	1	1.333	0.75	1	0.75	1	1	1.333	1	1.333
8	0.75	1	0.25	0.5	0.75	1	0.25	0.5	0.75	1	1	1.333	0.5	0.75	0.75	1	0.75	1	0.75	1
9	0.5	0.75	0.5	0.75	0.5	0.75	0.5	0.75	1	1.333	0.75	1	0.25	0.5	1	1.333	1	1.333	0.75	1
10	0.25	0.5	0.5	0.75	0.25	0.5	0.75	1	1	1.333	0.5	0.75	0.75	1	0.75	1	0.5	0.75	0.75	1
11	0	0.25	0.25	0.5	0.25	0.5	1	1.333	0.5	0.75	0.25	0.5	0.75	1	0.75	1	0.75	1	1	1.333
12	0.75	1	0	0.25	0.5	0.75	1	1.333	0.25	0.5	0.5	0.75	0.75	1	0.5	0.75	0.25	0.5	0.5	0.75
13	1	1.333	1	1.333	0	0.25	0.75	1	0.5	0.75	0.75	1	1	1.333	0.25	0.5	0.75	1	0.5	0.75
14	0.75	1	0.75	1	1	1.333	0	0.25	1	1.333	0.75	1	1	1.333	0.5	0.75	0.75	1	0.25	0.5
15	1	1.333	0.75	1	1	1.333	0.75	1	0	0.25	1	1.333	0.25	0.5	1	1.333	0.5	0.75	0.25	0.5
16	1	1.333	0.75	1	0.5	0.75	0.25	0.5	0.25	0.5	0	0.25	0.25	0.5	0.75	1	0.25	0.5	0.5	0.75
17	1	1.333	0.75	1	0.25	0.5	0.75	1	0.25	0.5	0.25	0.5	0	0.25	1	1.333	0.25	0.5	0.75	1
18	0.75	1	1	1.333	0.5	0.75	0.75	1	0.75	1	0.5	0.75	0.75	1	0	0.25	0.25	0.5	0.75	1
19	0.5	0.75	0.75	1	0.75	1	0.5	0.75	0.25	0.5	0.25	0.5	0.75	1	0.75	1	0	0.25	0.75	1
20	0.25	0.5	0.5	0.75	0.25	0.5	0.25	0.5	0.75	1	0.25	0.5	0.5	0.75	0.75	1	0.75	1	0	0.25

Table 4. left and right normalized values of first expert matrix

Stage 3: Calculation of crisp normalized values via equation (7):

$$x_{ij}^{n} = \left[xls_{ij}^{n}(1 - xls_{ij}^{n}) + xrs_{ij}^{n} \times xrs_{ij}^{n} \right] / \left[1 - xls_{ij}^{n} + xrs_{ij}^{n} \right] \qquad (7)$$

Results of normalized crisp values are presented in Table 5.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.05	0.95	1.33	0.95	0.65	1.33	0.35	1.33	1.33	0.95	0.95	0.65	0.35	1.33	0.95	1.33	1.33	0.95	0.65	0.35
2	0.95	0.05	0.65	0.95	0.95	0.95	0.95	1.33	0.95	0.95	0.95	0.95	1.33	1.33	1.33	0.35	0.35	0.35	0.95	0.95
3	0.95	0.65	0.05	0.95	0.65	0.65	1.33	0.95	1.33	0.95	0.95	0.95	0.65	0.35	0.95	0.95	0.65	0.95	1.33	0.95
4	0.35	0.65	0.95	0.05	0.65	0.95	0.95	0.65	1.33	1.33	1.33	1.33	1.33	0.95	0.95	0.65	1.33	1.33	1.33	1.33
5	0.95	1.33	1.33	0.95	0.05	0.65	0.35	0.35	1.33	0.95	1.33	0.95	1.33	0.65	0.65	1.33	0.95	0.95	0.95	1.33
6	0.95	1.33	1.33	0.95	0.95	0.05	0.65	0.35	0.95	1.33	0.95	0.65	0.95	0.95	0.65	0.95	1.33	1.33	0.95	0.65
7	0.65	0.65	0.95	0.65	0.95	1.33	0.05	0.35	1.33	0.95	1.33	0.35	0.95	0.35	0.95	1.33	0.95	0.95	1.33	1.33
8	0.35	0.65	0.95	1.33	0.95	0.65	0.65	0.05	0.65	0.65	0.95	0.35	0.95	0.35	0.95	1.33	0.65	0.95	0.95	0.95
9	0.35	0.95	0.65	0.35	0.95	1.33	0.95	0.65	0.05	0.35	0.65	0.65	0.65	0.65	1.33	0.95	0.35	1.33	1.33	0.95
10	0.65	1.33	1.33	1.33	1.33	0.95	0.65	0.95	1.33	0.05	0.35	0.65	0.35	0.95	1.33	0.65	0.95	0.95	0.65	0.95
11	0.95	1.33	0.95	0.95	0.95	0.35	0.95	0.65	0.95	1.33	0.05	0.35	0.35	1.33	0.65	0.35	0.95	0.95	0.95	1.33
12	1.33	0.95	1.33	1.33	0.95	0.95	1.33	1.33	0.95	0.95	0.95	0.05	0.65	1.33	0.35	0.65	0.95	0.65	0.35	0.65
13	0.95	1.33	1.33	0.95	0.65	0.95	1.33	1.33	1.33	0.95	1.33	1.33	0.05	0.95	0.65	0.95	1.33	0.35	0.95	0.65
14	0.65	0.65	0.95	0.95	1.33	1.33	0.95	0.35	1.33	1.33	0.95	0.95	1.33	0.05	1.33	0.95	1.33	0.65	0.95	0.35
15	0.95	0.35	0.65	1.33	0.95	1.33	0.35	0.35	0.95	0.95	1.33	0.95	1.33	0.95	0.05	1.33	0.35	1.33	0.65	0.35
16	1.33	0.65	1.33	0.65	0.95	0.95	0.95	1.33	1.33	1.33	1.33	0.95	0.65	0.35	0.35	0.05	0.35	0.95	0.35	0.65
17	0.95	0.65	1.33	0.95	1.33	0.35	0.65	0.95	0.95	0.65	1.33	0.95	0.35	0.95	0.35	0.35	0.05	1.33	0.35	0.95
18	1.33	0.65	1.33	0.95	0.95	0.65	0.95	0.65	0.65	0.35	0.95	1.33	0.65	0.95	0.95	0.65	0.95	0.05	0.35	0.95
19	0.95	0.95	0.95	0.65	0.65	0.95	1.33	0.35	0.35	0.35	0.65	0.95	0.95	0.65	0.35	0.35	0.95	0.95	0.05	0.95
20	0.65	0.35	1.33	0.35	0.35	1.33	0.95	0.65	0.95	0.95	0.35	0.65	0.35	0.35	0.95	0.35	0.65	0.95	0.95	0.05

Table 5. normalized crisp values of first expert matrix

Stage 4: Calculation of final Crisp values

In this stage, using equation (8) final crisp values are obtained and presented as Table 6.

$$z_{ij}^{n} = \min_{ij}^{n} + x_{ij}^{n} \Gamma D_{\min}^{\max} \quad (8)$$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.04	0.71	1.00	0.71	0.49	1.00	0.26	1.00	1.00	0.71	0.71	0.49	0.26	1.00	0.71	1.00	1.00	0.71	0.49	0.26
2	0.71	0.04	0.49	0.71		0.71	0.71	0.71 1.00 0.71 0.71	0.71	0.71	1.00	1.00	1.00	0.26		0.26	0.26	0.71	0.71	
3	0.71	0.49	0.04	0.71		0.49	0.49	1.00 0.71 1.00 0.71	0.71	0.71	0.49	0.26	0.71	0.71		0.49	0.71	1.00	0.71	
4	0.26	0.49	0.71	0.04		0.49	0.71	0.71 0.49 1.00 1.00	1.00	1.00	1.00	0.71	0.71	0.49		1.00	1.00	1.00	1.00	
5	0.71	1.00	1.00	0.71		0.04	0.49	0.26 0.26 1.00 0.71	1.00	0.71	1.00	0.49	0.49	1.00		0.71	0.71	0.71	1.00	
6	0.71	1.00	1.00	0.71		0.71	0.04	0.49 0.26 0.71 1.00	0.71	0.49	0.71	0.71	0.49	0.71		1.00	1.00	0.71	0.49	
7	0.49	0.49	0.71	0.49		0.71	1.00	0.04 0.26 1.00 0.71	1.00	0.26	0.71	0.26	0.71	1.00		0.71	0.71	1.00	1.00	
8	0.26	0.49	0.71	1.00		0.71	0.49	0.49 0.04 0.49 0.49	0.71	0.26	0.71	0.26	0.71	1.00		0.49	0.71	0.71	0.71	
9	0.26	0.71	0.49	0.26		0.71	1.00	0.71 0.49 0.04 0.26	0.49	0.49	0.49	0.49	1.00	0.71		0.26	1.00	1.00	0.71	
10	0.49	1.00	1.00	1.00		1.00	0.71	0.49 0.71 1.00 0.04	0.26	0.49	0.26	0.71	1.00	0.49		0.71	0.71	0.49	0.71	
11	0.71	1.00	0.71	0.71		0.71	0.26	0.71 0.49 0.71 1.00	0.04	0.26	0.26	1.00	0.49	0.26		0.71	0.71	0.71	1.00	
12	1.00	0.71	1.00	1.00		0.71	0.71	1.00 1.00 0.71 0.71	0.71	0.04	0.49	1.00	0.26	0.49		0.71	0.49	0.26	0.49	
13	0.71	1.00	1.00	0.71		0.49	0.71	1.00 1.00 1.00 0.71	1.00	1.00	0.04	0.71	0.49	0.71		1.00	0.26	0.71	0.49	
14	0.49	0.49	0.71	0.71		1.00	1.00	0.71 0.26 1.00 1.00	0.71	0.71	1.00	0.04	1.00	0.71		1.00	0.49	0.71	0.26	
15	0.71	0.26	0.49	1.00		0.71	1.00	0.26 0.26 0.71 0.71	1.00	0.71	1.00	0.71	0.04	1.00		0.26	1.00	0.49	0.26	
16	1.00	0.49	1.00	0.49		0.71	0.71	0.71 1.00 1.00 1.00	1.00	0.71	0.49	0.26	0.26	0.04		0.26	0.71	0.26	0.49	
17	0.71	0.49	1.00	0.71		1.00	0.26	0.49 0.71 0.71 0.49	1.00	0.71	0.26	0.71	0.26	0.26		0.04	1.00	0.26	0.71	
18	1.00	0.49	1.00	0.71		0.71	0.49	0.71 0.49 0.49 0.26	0.71	1.00	0.49	0.71	0.71	0.49		0.71	0.04	0.26	0.71	
19	0.71	0.71	0.71	0.49		0.49	0.71	1.00 0.26 0.26 0.26	0.49	0.71	0.71	0.49	0.26	0.26		0.71	0.71	0.04	0.71	
20	0.49	0.26	1.00	0.26		0.26	1.00	0.71 0.49 0.71 0.71	0.26	0.49	0.26	0.26	0.71	0.26		0.49	0.71	0.71	0.04	

Table 6. final crisp matrix based on first expert answers

Third step: average decision matrix formation

After the questionnaire has been filled out by experts, and the criteria interactions has been determined by them in the decision matrix, average of

total matrix is formed by using relation (9). The result presented in Table7.

$$z_{ij}^{n} = (z_{ij}^{1} + z_{ij}^{2} + \ldots + z_{ij}^{3}) / h \qquad (9)$$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.04	0.64	0.68	0.6	0.47	0.74	0.46	0.7	0.66	0.7	0.62	0.7	0.53	0.61	0.83	0.65	0.79	0.67	0.7	0.56
2	0.44	0.04	0.44	0.71	0.78	0.6	0.69	0.59	0.71	0.6	0.68	0.75	0.73	0.65	0.74	0.65	0.66	0.49	0.59	0.66
3	0.66	0.55	0.04	0.73	0.48	0.52	0.68	0.55	0.6	0.56	0.65	0.52	0.61	0.56	0.42	0.61	0.78	0.56	0.74	0.61
4	0.56	0.54	0.47	0.04	0.56	0.47	0.52	0.61	0.52	0.59	0.58	0.58	0.68	0.61	0.66	0.56	0.71	0.81	0.66	0.82
5	0.58	0.89	0.63	0.89	0.04	0.53	0.61	0.53	0.52	0.72	0.52	0.63	0.85	0.69	0.58	0.62	0.58	0.56	0.69	0.58
6	0.56	0.62	0.71	0.57	0.52	0.04	0.57	0.56	0.44	0.61	0.66	0.64	0.61	0.58	0.54	0.56	0.73	0.65	0.6	0.6
7	0.58	0.58	0.56	0.59	0.73	0.57	0.04	0.36	0.52	0.4	0.56	0.43	0.53	0.56	0.64	0.57	0.66	0.61	0.61	0.76
8	0.5	0.58	0.8	0.7	0.75	0.78	0.54	0.04	0.38	0.7	0.54	0.38	0.47	0.55	0.52	0.66	0.61	0.65	0.61	0.53
9	0.59	0.58	0.66	0.42	0.66	0.71	0.67	0.65	0.04	0.59	0.65	0.65	0.47	0.56	0.49	0.61	0.63	0.67	0.69	0.71
10	0.69	0.57	0.61	0.72	0.72	0.56	0.59	0.49	0.73	0.04	0.53	0.65	0.77	0.67	0.6	0.58	0.61	0.58	0.67	0.77
11	0.52	0.73	0.55	0.58	0.66	0.53	0.61	0.51	0.73	0.66	0.04	0.62	0.6	0.59	0.54	0.45	0.52	0.64	0.67	0.64
12	0.59	0.54	0.68	0.64	0.56	0.66	0.66	0.8	0.73	0.53	0.58	0.04	0.48	0.78	0.77	0.61	0.81	0.7	0.61	0.63
13	0.7	0.82	0.64	0.66	0.61	0.47	0.66	0.69	0.69	0.65	0.57	0.65	0.04	0.49	0.62	0.61	0.61	0.54	0.59	0.42
14	0.65	0.44	0.58	0.54	0.64	0.66	0.65	0.49	0.57	0.72	0.47	0.61	0.64	0.04	0.61	0.58	0.58	0.58	0.56	0.47
15	0.56	0.49	0.58	0.66	0.56	0.71	0.47	0.62	0.6	0.58	0.54	0.73	0.7	0.51	0.04	0.63	0.74	0.61	0.38	0.38
16	0.58	0.63	0.66	0.51	0.56	0.65	0.61	0.57	0.68	0.69	0.68	0.64	0.65	0.47	0.53	0.04	0.49	0.7	0.54	0.56
17	0.66	0.7	0.58	0.49	0.49	0.42	0.61	0.56	0.61	0.59	0.78	0.6	0.49	0.63	0.61	0.59	0.04	0.65	0.44	0.57
18	0.67	0.47	0.61	0.61	0.49	0.61	0.72	0.61	0.44	0.47	0.47	0.7	0.57	0.75	0.75	0.58	0.51	0.04	0.67	0.44
19	0.78	0.69	0.47	0.66	0.52	0.56	0.64	0.51	0.49	0.31	0.47	0.65	0.73	0.69	0.6	0.49	0.86	0.77	0.04	0.84
20	0.4	0.58	0.51	0.64	0.58	0.7	0.71	0.64	0.65	0.63	0.57	0.62	0.74	0.76	0.61	0.75	0.53	0.86	0.65	0.04

Table 7. Average decision matrix

Fourth Step: Forming normalized average decision matrix

By using relations (10) and (11), average matrix has been normalized which presented in Table 8. For normalizing the decision matrix A and formation of matrix D, following relations are sued:

$$S = \max\left(\max_{1\le i\le n} \sum_{j=1}^{n} a_{ij}; \max_{1\le j\le n} \sum_{i=1}^{n} a_{ij} \right) \qquad (10)$$

$$D = A / S \qquad (11)$$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.00	0.05	0.05	0.05	0.04	0.06	0.04	0.06	0.05	0.06	0.05	0.06	0.04	0.05	0.07	0.05	0.06	0.05	0.06	0.05
2	0.04	0.00	0.04	0.06	0.06	0.05	0.06	0.05	0.06	0.05	0.05	0.06	0.06	0.05	0.06	0.05	0.05	0.04	0.05	0.05
3	0.05	0.04	0.00	0.06	0.04	0.04	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.05	0.03	0.05	0.06	0.04	0.06	0.05
4	0.04	0.04	0.04	0.00	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.06	0.06	0.05	0.07
5	0.05	0.07	0.05	0.07	0.00	0.04	0.05	0.04	0.04	0.06	0.04	0.05	0.07	0.06	0.05	0.05	0.05	0.05	0.06	0.05
6	0.04	0.05	0.06	0.05	0.04	0.00	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.06	0.05	0.05	0.05
7	0.05	0.05	0.05	0.05	0.06	0.05	0.00	0.03	0.04	0.03	0.05	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06
8	0.04	0.05	0.06	0.06	0.06	0.06	0.04	0.00	0.03	0.06	0.04	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04
9	0.05	0.05	0.05	0.03	0.05	0.06	0.05	0.05	0.00	0.05	0.05	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.06	0.06
10	0.06	0.05	0.05	0.06	0.06	0.05	0.05	0.04	0.06	0.00	0.04	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.06
11	0.04	0.06	0.04	0.05	0.05	0.04	0.05	0.04	0.06	0.05	0.00	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05
12	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.04	0.05	0.00	0.04	0.06	0.06	0.05	0.06	0.06	0.05	0.05
13	0.06	0.07	0.05	0.05	0.05	0.04	0.05	0.06	0.06	0.05	0.05	0.05	0.00	0.04	0.05	0.05	0.05	0.04	0.05	0.03
14	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.06	0.04	0.05	0.05	0.00	0.05	0.05	0.05	0.05	0.05	0.04
15	0.04	0.04	0.05	0.05	0.05	0.06	0.04	0.05	0.05	0.05	0.04	0.06	0.06	0.04	0.00	0.05	0.06	0.05	0.03	0.03
16	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.04	0.04	0.00	0.04	0.06	0.04	0.04
17	0.05	0.06	0.05	0.04	0.04	0.03	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.05	0.05	0.00	0.05	0.04	0.05
18	0.05	0.04	0.05	0.05	0.04	0.05	0.06	0.05	0.04	0.04	0.04	0.06	0.05	0.06	0.06	0.05	0.04	0.00	0.05	0.04
19	0.06	0.06	0.04	0.05	0.04	0.05	0.05	0.04	0.04	0.02	0.04	0.05	0.06	0.06	0.05	0.04	0.07	0.06	0.00	0.07
20	0.03	0.05	0.04	0.05	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.04	0.07	0.05	0.00

Table 8. Normalized average decision matrix

Fifth step: Formation of total relation matrix

For total relation matrix formation, we used relation (12) and Table (9) is resulted as total relation matrix.

		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.64	0.70	0.70	0.72	0.68	0.70	0.69	0.68	0.69	0.69	0.68	0.72	0.71	0.71	0.72	0.69	0.76	0.75	0.71	0.70
2	0.67	1.65	0.67	0.72	0.69	0.69	0.71	0.66	0.69	0.68	0.68	0.71	0.72	0.71	0.71	0.69	0.74	0.73	0.70	0.70
3	0.64	0.65	1.60	0.68	0.63	0.64	0.66	0.62	0.64	0.63	0.63	0.66	0.67	0.66	0.65	0.64	0.71	0.69	0.67	0.65
4	0.64	0.66	0.64	1.63	0.64	0.64	0.66	0.63	0.64	0.64	0.63	0.67	0.68	0.67	0.67	0.64	0.71	0.71	0.67	0.67
5	0.68	0.72	0.69	0.73	1.64	0.68	0.70	0.66	0.68	0.69	0.67	0.71	0.73	0.71	0.70	0.69	0.74	0.73	0.71	0.69
6	0.63	0.65	0.65	0.66	0.63	1.60	0.65	0.62	0.62	0.64	0.63	0.66	0.66	0.66	0.65	0.64	0.70	0.69	0.65	0.65
7	0.61	0.63	0.61	0.64	0.62	0.61	1.58	0.58	0.61	0.60	0.60	0.62	0.63	0.63	0.63	0.61	0.67	0.66	0.63	0.63
8	0.62	0.65	0.65	0.67	0.64	0.65	0.65	1.57	0.61	0.64	0.62	0.64	0.65	0.65	0.65	0.64	0.69	0.69	0.65	0.64
9	0.65	0.67	0.66	0.67	0.66	0.67	0.68	0.64	1.61	0.65	0.65	0.68	0.67	0.67	0.67	0.66	0.71	0.71	0.68	0.67
10	0.68	0.69	0.68	0.72	0.69	0.68	0.70	0.66	0.69	1.63	0.66	0.71	0.72	0.71	0.70	0.68	0.74	0.73	0.70	0.70
11	0.63	0.66	0.64	0.67	0.64	0.64	0.66	0.62	0.65	0.64	1.58	0.66	0.67	0.66	0.66	0.63	0.69	0.69	0.66	0.65
12	0.68	0.70	0.70	0.72	0.68	0.70	0.71	0.69	0.69	0.68	0.68	1.66	0.71	0.72	0.72	0.69	0.76	0.75	0.71	0.70
13	0.66	0.69	0.66	0.69	0.66	0.65	0.68	0.65	0.66	0.66	0.64	0.68	1.64	0.67	0.68	0.66	0.71	0.70	0.67	0.66
14	0.63	0.63	0.63	0.65	0.63	0.63	0.64	0.60	0.62	0.63	0.60	0.65	0.65	1.60	0.64	0.62	0.68	0.67	0.64	0.62
15	0.62	0.63	0.63	0.65	0.62	0.64	0.63	0.61	0.62	0.62	0.61	0.65	0.66	0.64	1.60	0.63	0.69	0.67	0.62	0.62
16	0.64	0.66	0.65	0.66	0.64	0.65	0.66	0.63	0.65	0.65	0.64	0.67	0.67	0.65	0.66	1.60	0.69	0.70	0.65	0.65
17	0.63	0.65	0.63	0.64	0.62	0.62	0.64	0.61	0.63	0.62	0.63	0.65	0.64	0.65	0.65	0.63	1.63	0.68	0.63	0.63
18	0.63	0.63	0.63	0.65	0.62	0.63	0.65	0.61	0.61	0.61	0.61	0.66	0.65	0.66	0.66	0.63	0.67	1.63	0.65	0.63
19	0.67	0.68	0.65	0.69	0.65	0.66	0.68	0.64	0.65	0.63	0.64	0.68	0.69	0.68	0.68	0.65	0.73	0.72	1.63	0.69
20	0.66	0.69	0.67	0.71	0.68	0.69	0.70	0.66	0.68	0.68	0.66	0.70	0.71	0.71	0.70	0.69	0.73	0.75	0.70	1.64

Table 9. Average decision matrix of total relation

$$T = D\left(I - D\right)^{-1} = \left[t_{ij}\right]_{n\times 1} \qquad (12)$$

Sixth step: Calculating the sum of rows and columns (cj, ri)

After the formation of the relation matrix, the sum of this matrix rows (ri) indicates total effect of (i)th criterion on other criteria, and the sum of this matrix columns indicates total effect of other criteria on (j)th criterion. Values are presented in Table 10.

Criterion	ri	cj
1	14.07	12.96
2	13.94	13.32
3	13.03	13.09
4	13.19	13.62
5	14.00	13.00
6	13.00	13.11
7	12.45	13.39
8	12.91	12.69
9	13.39	12.96
10	13.91	12.95
11	13.06	12.79
12	14.09	13.48
13	13.41	13.57
14	12.69	13.44
15	12.69	13.43
16	13.10	13.02
17	12.74	14.20
18	12.76	14.09
19	13.44	13.37
20	13.86	13.25

Table 10. Calculation of ri and ci

Seventh step: calculation of ri+cj, ri-cj and weight of indicators
The calculation results of ri+cj, and ri-cj are presented in Table 11.

Criteria	r+c	r-c
1	27.035	1.115
2	27.262	0.615
3	26.125	-0.060
4	26.811	-0.436
5	27.001	1.007
6	26.110	-0.116
7	25.840	-0.935
8	25.608	0.221
9	26.349	0.431
10	26.857	0.955
11	25.850	0.267
12	27.574	0.612
13	26.984	-0.155
14	26.123	-0.752
15	26.116	-0.740
16	26.121	0.072
17	26.941	-1.464
18	26.852	-1.325
19	26.813	0.072
20	27.104	0.614

Table 11. Calculation results of ri+ci and ri-cj

Eighth step: cause and effect diagram

Diagram showed in Figure 2 is showed the relation of cause and effect between criteria. Horizontal axis indicates ri+cj, and vertical axis indicates ri-cj. Criteria above horizontal line indicate causes and criteria below it show the effects. In this diagram and according to values of Table 13, if ri-cj is positive, (i)th factor will be cause, and if it is negative, it will be effect. So, according to this diagram, factors in positive area are causes and the others are effects.

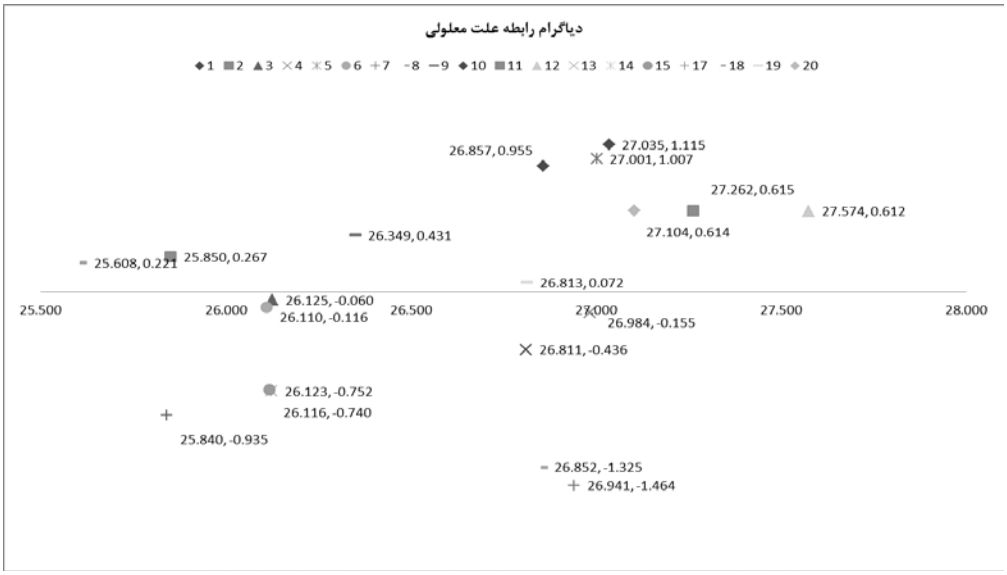

Figure 2. cause and effect diagram of main criteria

Ninth step: calculation of p-value threshold and drawing cause relation map (CRM) diagram

Each array in total relation matrix shows i factor has how much effect on j factor. To determine the p-value threshold for the separation of small causes, only factors with their effects in total relation matrix more than p-value threshold are shown in the CRM diagram. P-value is defined as mean value of total relation matrix arrays. Mean value of total relation matrix for main factors is obtained 0.664. According to this p-value threshold, total relation matrix will be as Table 12.

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معیار / معیار	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.00	0.71	0.70	0.72	0.68	0.70	0.70	0.68	0.69	0.69	0.68	0.72	0.71	0.71	0.73	0.69	0.76	0.75	0.71	0.70
2	0.67	0.00	0.68	0.72	0.70	0.69	0.71	0.67	0.69	0.68	0.68	0.72	0.72	0.71	0.71	0.69	0.75	0.73	0.70	0.70
3	0.00	0.00	0.00	0.68	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.71	0.69	0.67	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.68	0.67	0.67	0.00	0.71	0.71	0.67	0.67
5	0.68	0.72	0.69	0.74	0.00	0.69	0.70	0.67	0.68	0.69	0.67	0.71	0.73	0.71	0.71	0.69	0.74	0.74	0.71	0.70
6	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.67	0.00	0.00	0.00	0.70	0.69	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.66	0.00	0.00
8	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.69	0.00	0.00
9	0.00	0.67	0.67	0.67	0.66	0.67	0.68	0.00	0.00	0.00	0.00	0.68	0.67	0.68	0.67	0.00	0.72	0.71	0.68	0.68
10	0.69	0.69	0.69	0.72	0.69	0.68	0.70	0.00	0.69	0.00	0.67	0.71	0.72	0.71	0.70	0.68	0.74	0.73	0.70	0.71
11	0.00	0.67	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.67	0.66	0.00	0.00	0.69	0.69	0.66	0.00
12	0.69	0.70	0.70	0.72	0.69	0.70	0.71	0.69	0.70	0.68	0.68	0.67	0.71	0.72	0.72	0.69	0.76	0.75	0.71	0.70
13	0.66	0.69	0.67	0.69	0.00	0.00	0.68	0.00	0.66	0.00	0.00	0.68	0.00	0.67	0.68	0.00	0.72	0.70	0.68	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.67	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.67	0.00	0.00
16	0.00	0.66	0.00	0.67	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.67	0.67	0.00	0.00	0.00	0.69	0.70	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00
19	0.67	0.68	0.00	0.69	0.00	0.66	0.68	0.00	0.00	0.00	0.00	0.69	0.70	0.69	0.68	0.00	0.74	0.72	0.00	0.69
20	0.66	0.69	0.68	0.71	0.68	0.69	0.71	0.67	0.68	0.68	0.67	0.70	0.72	0.71	0.70	0.69	0.73	0.75	0.70	0.00

Table 12. total relation matrix according to p-value threshold

In this step, by using fuzzy DEMATEL method, sub-criteria are compared to each other and results are given in Table 13:

Table 13. final result of factors comparison

Row	Sub-criterion	Weight	Rank	Cause/Effect
1	Quality of customer services	0.1452	4	Cause
2	Price, discounts, free products	0.1464	2	Cause
3	Correlation with customers	0.1402	15	Effect
4	Building trust in services	0.1439	10	Effect
5	Creating value for customers	0.1450	5	Cause
6	Staff empathy	0.1401	17	Effect
7	Quality of information and communications	0.1388	18	Effect
8	Staff skills	0.1374	20	Cause
9	Appropriate monitoring system on relationship	0.1414	12	Cause
10	organization complexity	0.1442	9	Cause
11	Barriers of customers and competitors	0.1387	19	Cause
12	Seller's contact assets	0.1480	1	Cause

13	Buyer's contact assets	0.1448	6	Effect
14	Conflict management	0.1403	13	Effect
15	Learning about customers	0.1402	14	Effect
16	Different approaches to the customers	0.1402	16	Cause
17	Set out realistic goals	0.1448	7	Effect
18	Short term and long term comprehensive plans	0.1443	8	Effect
19	Avoiding use of complicated and incomprehensible scenarios for customers	0.1439	11	Cause
20	Lack of attention to monitoring system and continuous supervision	0.1455	3	Cause

5. Conclusion

Findings of this study shows that the priority of the key success factors of the Bank Mellat Iran's customers clubs and customers loyalty programs are respectively as below:

1. The seller's contact assets
2. Price, discounts and free products
3. Lack of attention to monitoring system and continuous supervision
4. Quality of customer services
5. Creating value for customers
6. The buyer's contact assets
7. Set out realistic goals
8. Short-term and long-term comprehensive programs
9. Organizational complexity
10. Building trust in services
11. Avoiding use of complicated and incomprehensible scenarios for customers
12. Appropriate monitoring system on relationship
13. Conflict management
14. Learning about customers
15. Correlation with customers
16. Different approaches to the customers
17. Staff empathy
18. Quality of information and communications
19. Barriers of customers and competitors
20. Staff skills

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