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A FUZZY DELPHI METHOD FOR IDENTIFYING EFFECTIVE INDEXES IN ABSORPTION BANKING RESOURCES IN IRANANDPATHOLOGYTHE PERFORMANCE OFA BANKWITHFANP-SWOT (CASE STUDY: MEHR BANK OF IRAN)

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ABSTRACT

Resource absorption is one of key and main aims of banks and financial institutions and it considered as an important index in measuring rate of success of banks. In new banking there are various factors that have effect on equipping financial resources of banks. Identifying and determine the rate of effect of these factors with success of banks in equipping financial resources is an important problem. Nowadays, conditions of various banks are not same and also different branches of a bank are different. In new banking various factors such as services, human force, debts, physical factors and so on are instruments that play main role in absorption the financial resources. The aim of the present study is determining most important factors in absorption bank resources. In the study, the method pf Delphi- fuzzy was used to group decision and fuzzy theory was used to determining most important factors in absorption the financial resources. Based on it, during four stages of panel of Delphi- fuzzy, most important indexes were determined. Finally these indexes that are totally 27 cases were divided to five groups of servicing- debt- personnel- physical and organizational commitment.

Keywords: banking- indexes of absorption bank resources- equipping financial resources- ANP- Delphimethod- fuzzy.

INTRODUCTION

Majority of economists such as Adam Smith and Ricardo considered capital creating as most important factor of economic progress. Economic development in progressed world especially from 20 century to now is dependent on stock and activities of stock markets. Capital market in form of a financial market is main point of demand and efficiency of financial resources in long and middle term. Most of efficiencies of capitals in the market are individual savers, legal persons that have saving, organizations and crediting organizations. As one of the centers of providing capital resources, this market conduct cash saves toward longterm investings. (Gholizadeh, 2003). However some factors such as industrialize of societies, developing and changes in social activities and also appearance of new demands are some of important factors in developing of thesed organizations so it can be indicated that present of these financial markets with using new methods have a direct relationship. In tese conditions, absorbing financial resources and effective competition in the absorbtion by banking groups is one of the subjects that is in attention of crediting and financial institutions. 9 Razani, 2002). Based on theories of economic growth theories, investing and creating capital is early reqirement of each economic activity and are indicating as main variables to production and economic growth. To perform investing in economy, it is necessary that at first saving must be done. To reach to this purpose, the law of banking application without gavel create a form to insert the invests of people in an identified form. In totally, banks in some economics such as Iran that all of economy is depending on bank has a major share in allocating financial resources.

RESEARCH METHOD

In the present research, first, researcher used librarian studies to increasing his awareness about the subject and collecting data to his research. These studies leads to identifying 63 elementary indexes that were interpreted and finally 42 factors were studied that were divided to 5 classes. Figure 1 show the algorithm of Delphi-fuzzy method.

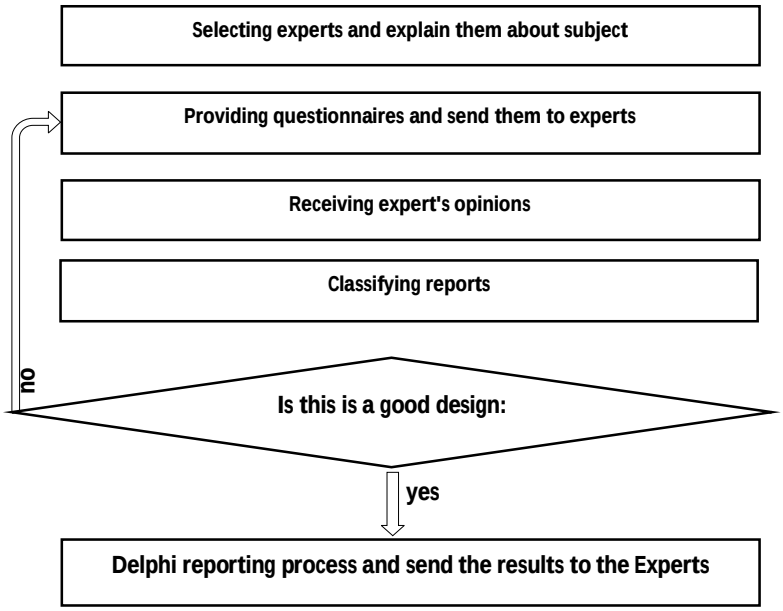

Figure 1: algorythm of delphi- fuzzy method

1-1-beginning Delphi-fuzzy method

Before beginning Delphi process, it must be said that using valuable variables,l exports leads to some problems. So it is clear that qualitatuive variables has more freedom. Using qualitative variables such as low, mean, high, solve mentioned problems so they must define clearly.

Table 1: oral statements to comparing factors of indicating importance degree

Oral variables	Triangle numbers
low	**(0.0.2.4.)**
middle	**(3.4.6.7.)**
high	**(6.8.8.10.10)**

Regarding to proposed options and defining oral variables, the present questionnaire was designed. And its formulas are as following:

$$A^{(i)} = \left(a_1^i, a_2^i, a_3^i, a_4^i\right), \qquad i = 1,2,3,\ldots, \quad n \tag{1}$$

) 2 ($$A_m = \left(a_{m1}^i, a_{m2}^i, a_{m3}^i, a_{m4}^i\right) = \left(1/n \sum a_1^{(i)}, 1/n \sum a_2^{(i)}, 1/n \sum a_3^{(i)}, 1/n \sum a_4^{(i)}\right)$$

$$e = \left(a_{m1} - a_1^{(i)}, a_{m2} - a_2^{(i)}, a_{m3} - a_3^{(i)}, a_{m4} - a_4^{(i)}\right)$$

$$(3) = \left(1/n \sum a_1^{(i)} - a_1^i, 1/n \sum a_2^{(i)} - a_2^i, 1/n \sum a_3^{(i)} - a_3^i, 1/n \sum a_4^{(i)} - a_4^i\right)$$

Table 2: results of computing responses of first questionnaire, second questionnaire and the differences between them

Mean difference	Mean of opinions	Opinion means of questionnaire 1	title	index
0/175	(5/85،7/8،9/8،9/85)	(5/7،7/9،6/9،6/7)	Variety of services	1
0/175	(5/55،7/4،9/4،9/55)	(5/4،7/2،9/2،9/4)	Using expert people	2
0/175	(3/75،5،7،7/75)	(3/6،4/8،6/8،7/6)	Extended advertisement	3
0/15	(4/65،6/2،8/2،8/65)	(4/65،6/2،8/2،8/65)	Appropriate face of employees	4
0/175	(5/25،7،9،9/25)	(5/1،6/8،8/8،9/1)	Designing internal decoration	5
0/175	(5/55،7/4،9/4،9/55)	(5/4،7/2،9/2،9/4)	Using quality standards	6
0/35	(1/65،2/2،4/2،5/65)	(1/95،2/6،4/6،5/95)	Frequency of rewards	7
0/525	(2/1،2/8،4/8،6/1)	(2/55،3/4،5/4،6/55)	Having right of extra money	8
0/85	(3،6/55،9/4،9/55)	(5/4،7/2،9/2،10/1)	Having secure substructures of electronic trade	9
0/35	(4/8،6/4،8/4،8/8)	(4/5،6،8،8/5)	High number of personals	10
0/35	(1/8،2/4،4/4،5/8)	(2/1،2/8،4/8،6/1)	Service tangibility	11
0/525	(5/4،7/2،9/2،9/4)	(5/25،7،9،9/25)	Positive view of employees to crowd days	12
0/175	(5/7،7/6،9/6،9/7)	(5/55،7/4،9/4،9/55)	Using appropriate devices to services	13
0/7	(3/15،4/2،6/2،7/15)	(2/55،3/4،5/4،6/55)	Appropriate responses	14
0/425	(5/55،7/4،9/4،9/55)	(5/25،7،8/9،9/05)	Ordering services of ATM devices	15
0/175	(2/7،3/6،5/6،6/7)	(2/55،3/4،5/4،6/55)	Customer confidant	16
0/875	(5/4،7/2،9/2،10/1)	(4/8،6/4،8/4،8/8)	Like to solve problems of customers	17
0	(5/7،7/6،9/6،9/7)	(5/7،7/9،6/9،6/7)	Having Islamic ethic	18
0/525	(3/15،4/2،6/2،7/15)	(2/7،3/6،5/6،6/7)	Creativity in services	19
0	(6،8،10،10)	(6،8،10،10)	Facility in loans	20
0	(2/7،3/6،5/6،6/7)	(2/7،3/6،5/6،6/7)	Giving special loans to good customers	21
0/35	(2/1،2/8،4/8،6/1)	(2/4،3/2،5/2،6/4)	Appropriate characters of customers	22
0/275	(4/95،7،8/6،8/95)	(4/8،6/4،8/4،8/8)	Correct location in all of country	23
0/15	(3،6/55،9/4،9/55)	(4/95،6/6،8/6،8/95)	Good facilities to bank customers	24
0/2	(3/3،4/4،6/4،7/3)	(3/6،4/8،4/6،7/6)	External increasing among employees	25
0	(6،8،10،10)	(6،8،10،10)	Islamic bases of banking	26
0/175	(2/55،3/4،5/4،6/55)	(2/7،3/6،5/6،6/7)	Fight against money deceiving	27
0/35	(4/8،6/4،8/4،8/8)	(4/5،6،8،8/5)	Speed in error correctness	28
0/175	(5/7،7/6،9/6،9/7)	(5/4،7/2،9/2،10/1)	Seriousness of the managers about customers	29
2/875	(2/55،3/4،5/4،6/55)	(4/5،6،8/8،10/1)	Having night badges to customers	30
0/175	(5/55،7/4،9/4،9/55)	(5/1،6/8،8/8،9/1)	Ethical bases in advertising	31
1/05	(5/55،7/4،9/4،9/55)	(4/65،6/2،8/2،8/65)	Low interesting rate	32
0/35	(4/8،6/4،8/4،8/8)	(4/5،6،8،8/5)	Beautiful designing of out of bank	33
0/175	(2/25،3،5،6/25)	(2/4،3/2،5/2،6/4)	Verbal communication with customers	34
0/35	(2/55،3/4،5/4،6/55)	(2/85،3/8،5/8،6/85)	Appropriate systems to regularity of the customers	35
0	(5/4،7/2،9/2،9/4)	(5/4،7/2،9/2،9/4)	Various loans and debts to customers	36
0/175	(5/55،7/4،9/4،9/55)	(5/1،6/8،8/8،9/1)	Increasing speed in services with protection of quality	37
0/7	(3،4،5/6،6)	(3/6،4/8،6/8،7/6)	Increasing interesting rate of customers	38
0	(2/4،3/2،5/2،6/4)	(2/4،3/2،5/2،6/4)	Appropriate awareness to customers	39
0/175	(4/95،6/6،8/6،8/95)	(4/8،6/4،8/4،8/8)	Having social responsibilities	40
0/525	(2/1،2/8،4/8،6/1)	(2/55،3/4،5/4،6/55)	Allocating loans to good accounting customers	41
1/05	(2/85،3/8،5/8،6/85)	(1/95،2/6،4/6،5/95)	Honesty in promises	42

Recommended factors by experts

High working time during day	1
Honesty in interesting rate of savings	2
Easy access to services	3
Consoling services to customers	4
Appropriate education to customers	5

By using relations between fuzzy numbers of equation 4, the rate of opinion of experts were computed in a way that the computed difference is less than 0.2, so we can stop Delphi-fuzzy mechanism.

$$_4S(A_{m2}, A_{m1}) = \left|\frac{1}{4}\left[(a_{m21} + a_{m22} + a_{m23} + a_{m24}) - (a_{m11} + a_{m12} + a_{m13} + a_{m14})\right]\right|$$

1-1-determine effective factors on adducing banking sources

Table 4: effective factors on adducing bank resources

Sign name	Subscales	scales	
Ser1	Number and variety of services	Services	indexes of bank services
Ser2	Using related experts in each part		
Ser 3	Developed advertising from indicated services		
Ser 4	Appropriate face of employees		
Ser 5	Beautiful internal decoration		
Ser 6	Using quality standards and model of organization		
Ser 7	Number of rewards		
Per 1	Possibility of extra pickup	Personnel	Personnel indexes of banks
Per 2	Using safe structures in electronic services		
Per 3	Number of personnel to responding customers		
Per 4	Tangibility of services		
Per 5	Positive view of employees in busy days		
Per 6	Using devices and technology		
Fac 1	Appropriate responding	Facilities	Loan indexes of bank
Fac 2	Continuous regular services		
Fac 3	Confidence to customers		
Fac 4	Seriousness in solving problems of customers		
Fac 5	Islamic ethic in confronting with customers		
Fac 6	Creativity in services		
Fac 1	Facilitate in loans	Facilities	Loan indexes of the banks
Fac 2	Allocation special loans to good accounting customers		
Fac 3	Appropriate individual characters of the customers		
Fac 4	Correct placing and scientific ones in all branches		
Fac 5	Appropriate facilities to customers		
Fac 6	External increasing among employees		
Phy 1	Islamic bases of banking	Physical	Facilitate indexes of bank
Phy 2	Fight against money deceiving		
Phy 3	Speed in error correctness		
Phy 4	Seriousness of the managers about customers		
Phy 5	Having night badges to customers		
Com 1	Ethical bases in advertising	Organizational Commitment	Indexes of organizational commitmen
Com 2	Low interesting rate		
Com 3	Appropriate systems to regularity of the customers		

4-Damaging of adducing resources

In the present part, we study the damaging discussion of adducing investment in Mehr bank of Iran

1-4-matrice of SWOT

Internal and external environments are including all internal and external variables of organizations. Analyzing environment society is effective in all important factors of organization.

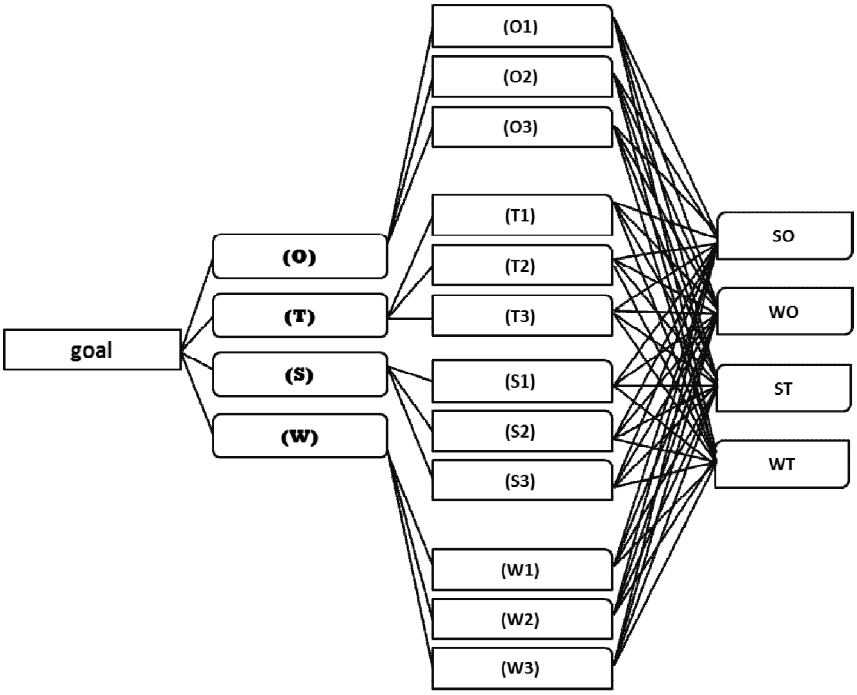

Figure 2: net diagram of research

The case study of the present study is all branches of Mehr bank of Ilam. At first, a group of experts identifying side and main factors that has effect on organization success by analyzing internal and external factors, by using SWOT factors and replace strategies, table 5 show that organization has 4 strategies.

Table 5: SWOT matrices

Strength	Weakness	Internal factors / External factors
:S1presenting electronic substructures to electronic business	:W1Lacking resources	
:S2using new human force	:W2high bureaucracy in offices	
:S3presenting grouping work	:W3lacking good views	
strategies (S_O)	strategies (W_O)	Opportunity
Special attention to services	Using brand of Mehr bank	:O1ability to using technologies

		:O2interesting to using bank facilities
		:O3high demands
strategies (S_T)	**strategies (W_T)**	**Threat**
Using technology	**Developing management**	**:T1lacking cash flowing**
		:T2international boycotts
		:T3powerful competitors

Table 6: fuzzy spectrum and oral statements

Fuzzy number	Oral statements	code
(1,1,1)	Equal preffers	1
(0.5,1,1.5)	Near equal preffer	2
(1,1.5,2)	Low preffer	3
(1.5,2,2.5)	High preffer	4
(2,2.5,3)	Very much prefer	5
(2.5,3,3.5)	Very very much preffer	6

Option names and their signs were indicated in table 7.

Table 7: option names and their signs

Option name	sign
So	A1
Wo	A2
St	A3
Wt	A4

2-5-4-combining SWOT & FANP

In the present section, we study the stages to obtaining weight of SWOT factors by analyzing in Fuzzy net. Based on super matrices, the stages of computing weights are as following:

First stage: to collecting opinions of experts

Second stage: computing special line: to computing it, the relation 5 is use by logarithm relation.

Equation 5 $$w_k^s = \frac{\left(\prod_{j=1}^{n} a_{kj}^s\right)^{1/n}}{\sum_{i=1}^{n}\left(\prod_{j=1}^{n} a_{ij}^m\right)^{1/n}}, \quad s \in \{l, m, u\}$$

$$\tilde{w}_k = (w_k^l, w_k^m, w_k^\mu) \quad k = 1,2,3,\ldots,n$$

Table 8 show geometrical means of experts opinions. In last column of this table, the special line was indicated.

Table 8: The mean of compares in ratio of classifying strategies

goal	s	W	O	T	special line
s	(1,1,1)	(0.846,1.26,1.73)	(0.846,1.116,1.365)	(0.85,1.072,1.55)	(0.22,0.276,0.344)
w	(0.578,0.793,1.182)	(1,1,1)	(0.78,1,1.246)	(0.78,1.225,1.712)	(0.191,0.247,0.313)
o	(0.732,0.896,1.182)	(0.803,1,1.282)	(1,1,1)	(1.035,1.508,1.948)	(0.22,0.268,0.326)
t	(0.645,0.933,1.176)	(0.584,0.816,1.282)	(0.513,0.663,0.966)	(1,1,1)	(0.165,0.21,0.273)
CR^m =0.01 CR^g =0.013 compatible					

The relations between SWOT factors were indicated in figure 3.

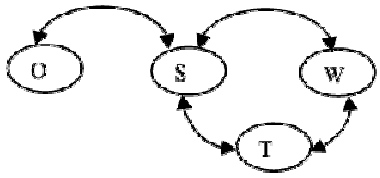

Figure 3: relations between factors of SWOT

Other compares are because of factors SWOT that are such as table 8.

Third stage: establishing Wij matrixes: these matrixes are including special lines that obtained from compares of second stage. Tables 9 and 10 show the matrices in the present study.

Table 9: matrix of specific line of level 2 in compare to level 1

	goal
S	(0.22,0.276,0.344)
W	(0.191,0.247,0.313)
O	(0.22,0.268,0.326)
T	(0.165,0.21,0.273)

Table 10: specific matrix of level 2

	S	W	O	T
S	(0.5,0.5,0.5)	(0.252,0.28,0.311)	(0,0,0)	(0.256,0.298,0.337)
W	(0.111,0.142,0.184)	(0.5,0.5,0.5)	(0,0,0)	(0.178,0.202,0.235)
O	(0.15,0.191,0.23)	(0,0,0)	(1,1,1)	(0,0,0)
T	(0.134,0.167,0.217)	(0.198,0.22,0.244)	(0,0,0)	(0.5,0.5,0.5)

Fourth stage: computing final weights of levels: to computing final weight of components of each level (Wi), we must fo;;ow equation 6:

$$W_i^* = W_{ii} \times W_{i(i-1)} \times W_{i-1}^* \qquad \text{Equation 6}$$

If there is not Wii to a matrix level, it is necessary that a matrix must be replaced it, in other words we must use equation 7.

$$W_i^* = I \times W_{i(i-1)} \times W_{i-1}^*$$

Equation 7

Tables 11-13, show figures 4 to 6 of final weights.

Table 11: matrix of final weights of scales in compare to classifying strategies

Cross final component weight	Final fuzzy weight	component
0.273	(0.2,0.269,0.362)	S
0.209	(0.15,0.205,0.284)	W
0.323	(0.253,0.321,0.405)	O
0.21	(0.15,0.205,0.288)	T

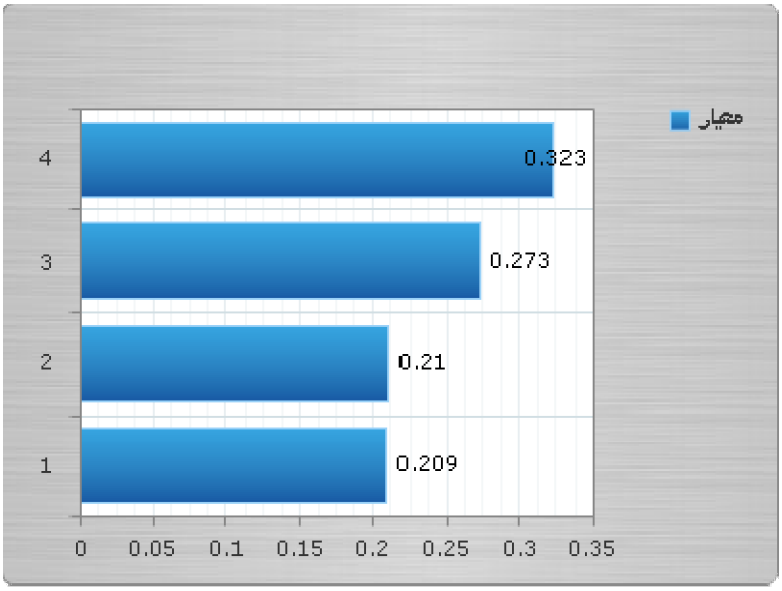

Figure 4: diagram of final weights of scales in compare to classifying strategies

Table 12: matrix of final weights based on scales in compare to classifying strategies

Certain weight	Final fuzzy weight	component
0.061	(0.037,0.058,0.097)	s1
0.113	(0.068,0.11,0.173)	s2
0.105	(0.062,0.101,0.161)	s3
0.105	(0.061,0.102,0.163)	w1
0.053	(0.03,0.051,0.087)	w2
0.055	(0.032,0.052,0.092)	w3
0.082	(0.051,0.078,0.131)	o1
0.146	(0.089,0.143,0.214)	o2
0.103	(0.061,0.1,0.158)	o3
0.07	(0.039,0.067,0.115)	t1
0.067	(0.035,0.061,0.121)	t2
0.08	(0.043,0.077,0.128)	t3

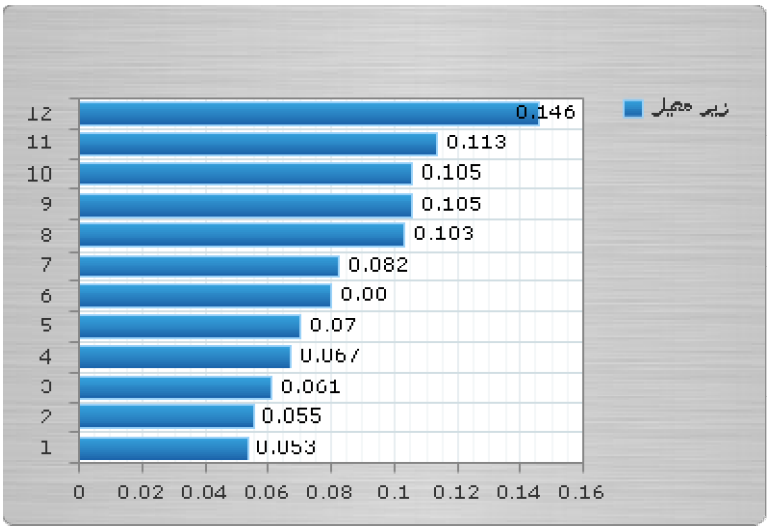

Figure 5: diagram of final weights based on scales in compare to classifying strategies

Table 13: matrix of final weights of options in compare to strategies

Classifying based on cross weight	Final certain weight	Final fuzzy weight	sign	strategy
3	0.243	(0.109,0.222,0.465)	A1	So
4	0.22	(0.098,0.202,0.416)	A2	Wo
2	0.299	(0.136,0.276,0.552)	A3	St
1	0.325	(0.141,0.301,0.609)	A4	Wt

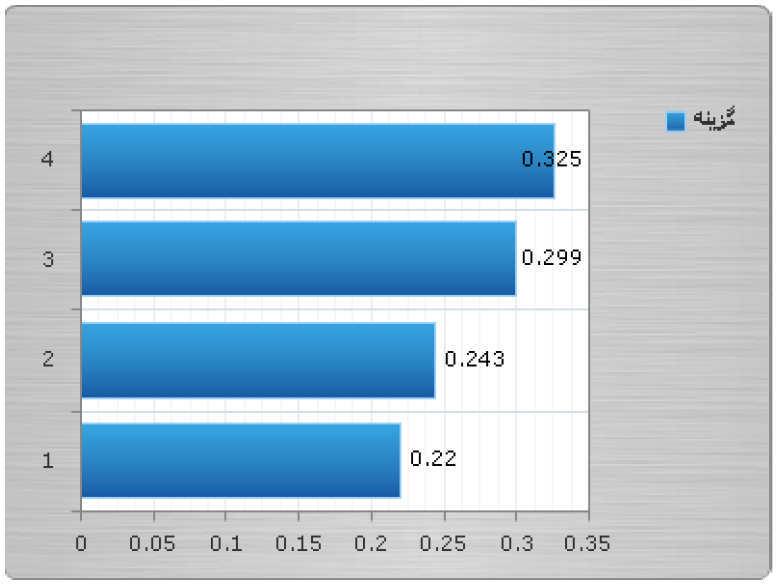

Figure 6: the histogram of final weights of scales in compare to classifying strategies

CONCLUSION

Banking as important devices of producing capital play a key role in economy of countries. The aim of the present study is identifying most important factors on adducing banking resources. So So after study the research literature and interview with some experts and also receiving the opinions of experts, 47 indexes were identified that by using Delphi- fuzzy method, 27 superior indexes were se;lected and were introduced in five forms. This study can help managers to absorb the bank resources. In the future studies it try to study the out organizational factors and classyfing the ranks. Majority of economists such as Adam Smith and Ricardo considered capital creating as most important factor of economic progress. Economic development in progressed world especially from 20 century to now is dependent on stock and activities of stock markets. Capital market in form of a financial market is main point of demand and efficiency of financial resources in long and middle term. Most of efficiencies of capitals in the market are individual savers, legal persons that have saving, organizations and crediting organizations. As one of the centers of providing capital resources, this market conduct cash saves toward long-term investing's. (Gholizadeh, 2003). However some factors such as industrialize of societies, developing and changes in social activities and also appearance of new demands are some of important factors in developing of these organizations so it can be indicated that present of these financial markets with using new methods have a direct relationship. In these conditions, absorbing financial resources and effective competition in the absorption by banking groups is one of the subjects that is in attention of crediting and financial institutions. (Razani, 2002). Based on theories of economic growth theories, investing and creating capital is early requirement of each economic activity and are indicating as main variables to production and economic growth. To perform investing in economy, it is necessary that at first saving must be done. To reach to this purpose, the law of banking application without gavel create a form to insert the invests of people in an identified form. In totally, banks in some economics such as Iran that all of economy is depending on bank has a major share in allocating financial resources. Economic institutions including families, governments and so on are responsible of saving. (Mohammad Ismaeel, 2008).

REFERENCES

Bedendo, M., Bruno, B., 2012. „Credit risk transfer in U.S. commercial banks: What changed during the 2007-2009 crisis?" Journ al of banking&finance, vol. 36, no. 12, pp. 3260-3273

Halkos, G., E., Tzeremes, N., G., 2011. "Modelling the effects of national culture on multinational banks' performance:A condit ional robust nonparametric frontier analysis", Economic modelling, vol. 28, no. 1-2, pp. 515-525 Hoffmann, A.

iBirnbrich, C., 2012. The impact of fraud prevention on bank-customer relationships: An empirical investigation in retail banking, International Journal of Bank Marketing, vol. 30, pp.390 – 407 Howcroft, B., Hewerb, P.

i Durkin, M., 2003. Banker – costumer interactions in financial services, Journal of Marketing Management. Special Issue: Effective Marketing Management in Financial Services Context, vol. 19, no. 9-10, pp. 1001-1020

KPMG International, 2012.Optimizing banking operating models.From strategy to implementation, p. 4. Klein, P., Saidenberg, M.,R., 2010. "Organizational structure and the diversification discount: evidence from commercial bankin g", The Journal of Industrial Economics, vol. LVIII, nr. 1.

Lee, P., Cheng, E., Yeung, A., Lai, K.-H., 2011. "An empirical study of transformational leadership, team performance and servi ce quality in retail banks", Omega, vol. 39, no. 6, pp. 690-701

Oh, C.,H., Rugman A., M., 2012. "Regional integration and the international strategies of large European firms", International business review, vol. 21, no. 3, pp. 493-507

Chang ping-teng. (1998). The fuzzy Delphi method via fuzzy statistics and membership function fitting and an application to the human resources. Fuzzy Sets and Systems 2000; 3: 511-520

Cheng , Ching-Hsue & Lin , Yin . (2002). Evaluating the best mail battle tank using fuzzy decision theory with linguistic criteria evaluation , European Journal of Operational Research , vol.142, p.147

Kangas J., Kurtila M., Kajanus M., Kangas A., (2003), Evaluating the management strategies of a forestland estate-the S-O-S approach,Journal of Environmental Management, pp. 349–358.

Yuksel, E., Dagdeviren, M. (2007). Using the analytic network process in a SWOT analysis: A case study for a textile firm. Information Science , 177, 3364-3382.