

The Rankings of Stock Exchange Brokerage Companies by According to the Model of Network Analysis (ANP) and VIKOR (VIKOR)

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Received: March 13, 2015

Accepted: June 21, 2015

ABSTRACT

Capital Market, the heart of any economy, and forces companies involved in this market, and the main body of its powers. Investors and owners, through the body that are connected to the market and intermediary between buyer and seller brokers who, as representative of the customer and the customer's account, the fees, the purchase and sale of securities deals. Means the ranking of various companies in different industries can be mirrors of the various companies, considered in relation to its competitors, and the strengths and weaknesses internal and external opportunities and threats of the specified companies. The important issue ratings models, criteria and proper mathematical techniques to be ranked. From different companies, stock brokerage co, as an intermediary between customers (owners), and manufacturing enterprises and economic, of greater importance. In this study, primarily based on BSC, assessment indicators, the ANP and VIKOR models, determining the weights involved, and 10 companies were brokerage rankings. Weight obtained suggest that indicators of internal processes and customer order, more important than the other indicators are, therefore, components thereof, in the ranking of the stock should be rated higher than others. According to the model of the administrative office, the number of customers, human resources expert, brokerage and accounting systems, components are involved in the two indices. Therefore, these components must be rated higher score in the table, and respectively.

KEYWORDS: model, index, ranking, brokerage co, Tehran Stock Exchange, multi-criteria decision-making techniques, ANP model, VIKOR model.

1. INTRODUCTION

Capital Market, the heart of any economy, and forces companies involved in this market, and the main body of its powers. Investors and owners, through the body that are connected to the market and intermediary brokers between buyer and seller which, as a representative of the customer and the customer's account, the fees, the purchase and sale of securities deals. In other words, brokers are significant owners of trustees and partners. Check the status of these companies, and to find criteria to rank them, have always been part of the economic requirements of the military. What factors are the most important aspects of any brokerage firm?, explains the importance of each of these indicators, how ?, rankings based on these indicators, based on what is to be done?, and many models Other questions, such as through academic research, to be answered, as the cornerstone of strong customer confidence on the one hand and on the other hand be encouraged enforcement agents (Modrres and Abdollahzadeh, 1994). Due to the passing of the economy, which is considered a developing country, and great strides towards economic liberalization, in the form of "economic development plan" has begun, a strong presence brokerage co, as impressive and deserves to the economic and capital market issues in the country has played and could play an important role in the guidance of investors, and practitioners in the field of their economic activity. According to Article 1 of the law enforcement agents of the Tehran Stock Exchange, approved 16.07.1967, traded securities, the Tehran Stock Exchange, exclusively only by stock brokers, done (Esmailpoor, 1998).

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2 Statement of problem

Each financial system is made three pillars of financial instruments, financial institutions and financial markets have been formed, and for the development of these elements is essential in all aspects. Securities markets, commodity markets, currency markets and among financial markets that not only meet the needs of sustainable liquidity for the purposes of production, trade and services play a major role, but also the needs of investors in providing sustainable benefits, and long-term play a major role. In financial markets, liquidity turning the surplus space, the space is a lack of liquidity, and a link to this rotation through financial intermediaries, brokerage co is that (Sheikh, 2010).

Following the development and growth of the capital market be analytical, reporting and various services brokerage co active in the country has increased. In recent years, and after the boom in the stock brokerage co, both quantitatively and qualitatively, have been associated with a wide developments. As of now, 108 brokerage companies in various areas, including securities and commodities have been active. With this interpretation, understanding more and more of these institutions, as a significant operating leverage, in the eyes of investors and entities, and can increase the volume of investment activity of these groups have a vital role. Given the key role of brokerage co, one of the most important issues for shareholders, investors and the best selection and the best company for buying and selling operations is assigned.

The main challenges in the ranking are: the discrete measures, the same lack of weight each criterion, was not appropriate computational model, and above all doubt that, if these criteria determine the actual performance of brokerage co, or not .

In this study, we try to provide a comprehensive model based on ANP and VIKOR models, so it can be based on more comprehensive, to pay brokerage rankings.

3. LITERATURE

3.1 Internal researches

Mohammad Javad Sheikh et al (2010), to study the financial performance of companies engaged in securities. In this study, the method of fuzzy AHP and TOPSIS, brokerage co to assess the Tehran Stock Exchange, is used. In the study, the five main criteria of liquidity, profitability, security, efficiency and growth, and 19 sub-criteria in the assessment process, and ratings were used. In this method, the weighting of criteria by experts in the field, and the use of fuzzy AHP method were calculated, and then by way of TOPSIS, the companies were evaluated and ranked (Sheikh, Javad, 2010).

Madani Mohammadi (2006), in his thesis, a model for rating and evaluating the stock brokerage co offer. The main theme of his model, the Balanced Scorecard was inspired, then the other patterns, such as financial assessment and evaluation of the efficiency of the company, to complete the final model. He used the pattern of TOPSIS, brokerage co assess, and rank the contract (Mohammadi, 2006).

Roohbakhsh Amoli Moghadam (2004) in a survey ranking the stock brokers Khorasan, using the numerical taxonomy. To achieve this objective, 9 was designed operational parameters, and then classified using numerical taxonomy, stock brokers Khorasan during 2004 were rated. The study found that, of 12 brokers in 83 years, the highest degree of enjoyment of the bank's housing and stock brokerage experts, make contributions, the Kashavarzi Bank, the retrospective, the Melli capital, Bank Sepah, Bank Saderat, Bank Refah, Donya Khobreh and Tejarat Bank, the following were ranked respectively (Hamid, 2004).

3.2 External research

Wu et al. (2009), the analytic hierarchy process (FAHP), and TOPSIS method to evaluate the performance of banks in Taiwan used. After the weighting of criteria, using fuzzy AHP was determined, the results using the TOPSIS, in order to rank the banks, were used. They work on the Balanced Scorecard model, were used.

Bai (2009), in an article a fuzzy AHP model, in order to solve the problem of vendor selection, has to offer. In this research, his main criteria and 12 sub-criteria dealers in 4-evaluated. Her research results showed that the fuzzy AHP method as an effective method to evaluate vendors, since the ability to eliminate ambiguities in human judgment is.

Ho (2008) in an article in the online stock brokerage co in Taiwan, evaluated. The researchers in their study of a two-stage data envelopment analysis to evaluate 28 Online stock brokerage firm in Taiwan

from 2003 to 2005. His results showed that, of the 28 companies, only 7 were operational performance, and only 5 companies had operational effectiveness.

Huang and Chen (2008) fuzzy model, to assess the operating performance of securities brokerage co, offered in Taiwan. To evaluate the 5 key, and some specific sub-criteria, and then use the experts, and with the questionnaire, the relative importance of the criteria was determined. The quality of these values, the numbers became fuzzy. After determination of weight criteria, and with the financial statements for 2007 were companies and enterprises was found.

4. The objectives of the study

4.1 The main aim

The overall goal of this study, ranking the stock brokerage co, according to the model of network analysis (ANP) and VIKOR (VIKOR) is.

4.2 Sub-goal

1. brokerage co to rank in the components of financial, customer, internal processes of development and innovation, human resources and effective management. 2. In the ranking of brokerage co, do not have the same weight components of the first hypothesis.

5. The conceptual model

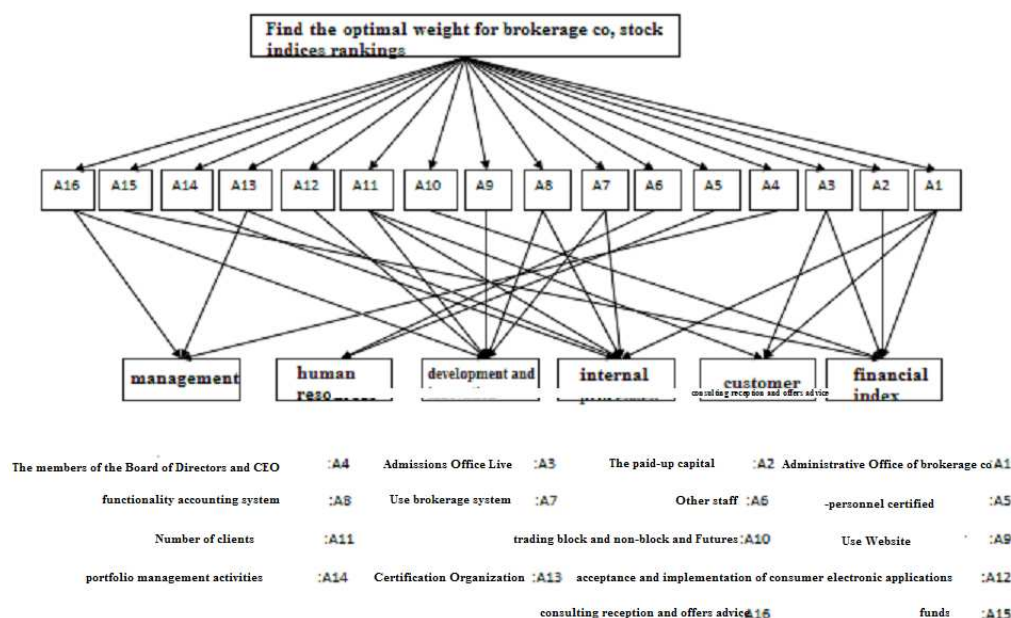


Figure 1. Analytical model variables and their relationship

6. RESEARCH METHODOLOGY

The purpose of this research study is an applied research. The method of data collection, research libraries, as well as field research and descriptive - survey for this research is considered. BSC evaluation model, as the main form of financial models to assess and evaluate the productivity of companies, in order to complete the final model was used. The model of the six aspects (major components) has been established. The five primary aspects of the model (i.e. aspects of financial, customer, internal processes, development and innovation, and human resources) of BSC is taken. The sixth aspect of the model (management), to evaluate the statistical community, on the impact or lack of impact on the ranking of brokerage co, were added to the model, and the model was actually more comprehensive.

Table 1. The number of indicators to assess the following aspects

Number of indicators	Feature	No
6	Financial	1
3	Customer	2
5	internal processes	3
3	Development and Innovation	4
1	HR	5
1	Management	6

7. Society and statistical sample

The population of this research, brokerage co and securities exchange organization. 70 companies have been established in the market, and population research. In this field of research tools, including the questionnaires and to collect data, and studies necessary investigation on the basis of research, literature research, records and research the issue, using the library and study resources, end Letters and related studies has been done. The questionnaire in person, or via fax to the number of these companies, was sent after the initial synchronization. The questionnaire was sent, 36 questionnaires were completed.

8. Data analysis

Therefore, to test hypotheses, 6 hypothesis is examined. To operationalize the above assumptions, ordinal scale, the ratio of success and failure have become. Thus, the choice of medium, high and very high as a success, and the percentage compared to the total scores, we call success rate P. On the other hand, to test the hypothesis, P0 the data we have, if in effect, equal to or greater than this amount, the components in the ranking of companies in the market are effective (P0 value for two reasons. We have more than 0.5 First option was average as a success, and secondly P0 tolerance 0.1 to 0.6 with sampling error, coverage was certainly the open ratios above 0.5).

To test the hypothesis, the hypothesis of success in the community, was used.

The test procedure is the following:

A) hypothesis indifferent (neutral), (which is actually a research hypothesis)

"The effect of the above factors in the ranking of brokerage companies, is larger than 0.6. "

$$H_0: P \geq 0.6$$

$$H_1: P < 0.6$$

P values for each of the components are summarized in the table below:

Table 2. The success of each of the components of the BSC model

The ratio of success in the sample	index	No
0.767	Financial	1
0.833	Customer	2
0.774	internal processes	3
0.827	Development and Innovation	4
0.750	HR	5
0.718	Management	6

Given the critical value Z, 5% error level that is equal to 1.645, can be 95 percent stating that all components in the ranking of brokerage co, are effective.

To evaluate the importance of each of the components, the ANP method we use. Paired comparison criteria, the 16 criteria considered in the ranking, 7 criteria were involved in more than one measure to prevent error and fatigue were compared, were considered, and the criteria were not included. The table below shows the final result rankings.

Table 3 . Matrix of paired comparisons between 7 Criteria

	Co office	Active Admissions Office	Ability of Brokerage system	Ability of accounting system	Customer number	Organizational Certificate	Admission Counseling And Consulting of offers
Co office	1	5.24	0.9	3.998	0.65	8	2
Active Admissions Office	0.18	1	2.32	2	0.47	2.15	3.13
Ability of Brokerage system	5	7.86	1	1.99	0.24	1	2
Ability of accounting system	0.25	0.654	0.47	1	0.35	2	3.14
Customer number	8	8.21	7.21	7.31	1	7.85	7.46
Organizational Certificate	0.12	0.13	0.5124	0.47	0.5	1	2
Admission Counseling And Consulting of offers	0.5	0.5	0.46	0.22	0.13	0.57	1

Normalization mining priorities of paired comparisons

Normalization of the rankings, based on indicators

Table 4. Normalized indicators

Co office	Internal processes	Customer	Financial Indicators	Priority
Internal processes	0.10	0.10	0.10	0.10
Customer	0.06	0.14	0.81	0.33
Financial Indicators	0.12	0.13	0.76	0.33
	Customer	Financial	Priority	
Customer	0.83	0.18	0.5	
Financial	0.83	0.17	0.5	

Normalized indicators

Table 5. normalized indicators

	Co office	Active Admissions Office	Ability of		Co office	Active Admissions Office	Ability of
Co office	0.04	0.24	0.04	0.18	0.03	0.37	0.09
Active Admissions Office	0.02	0.09	0.20	0.18	0.04	0.19	0.28
Ability of Brokerage system	0.26	0.41	0.05	0.10	0.01	0.05	0.10
Ability of accounting system	0.03	0.08	0.06	0.12	0.04	0.25	0.40
Customer number	0.17	0.17	0.15	0.15	0.02	0.17	0.18
Organizational Certificate	0.03	0.03	0.11	0.10	0.11	0.22	0.42
Admission Counseling And Consulting of offers	0.15	0.15	0.14	0.06	0.04	0.17	0.30

The priority of the criteria

Table 6. priorities calculated for indices

Co office	0.1312
Active Admissions Office	0.121315
Ability of Brokerage system	0.112
Ability of accounting system	0.1134
Customer number	0.1823
Organizational Certificate	0.1123
Admission Counseling And Consulting of offers	0.098

The final calculation of weighted indicators

The part weight is calculated for each measure and each index is given.

Table 7. weights and measures

	Co office	Active Admissions Office	Ability of Brokerage system	Ability of accounting system	Customer number	Organizational Certificate	Admission Counseling And Consulting of offers
	0.13	0.12	0.11	0.11	0.18	0.11	0.098
Financial	0.10	0.5			0.33		
Customer	0.33	0.5			0.33		
Internal processes	0.33		0.5	0.5	0.33	0.5	0.42
Development and Innovation			0.5	0.44			
HR							
Management						0.5	0.5

By averaging the weight, the weight of each of the six indicators, intended to determine the model of the BSC.

Table 8. The final weight indicators

Index	weight
Financial	0.13
Customer	0.22
Internal processes	0.31
Development and Innovation	0.11
HR	0.11
Management	0.11

The indicators obtained from the ANP method for ranking VIKOR model we use.

9- Applying the VIKOR model to ranking

Because brokerage co participating in the ranking data would not be publicly exposed, the name given rankings done.

Indicators are low, and the value of any option in respect of any Index is a numerical value, and the first set 6 Index indicator (cost of internal processes), is negative in nature. In addition, the indicators have different units.

The first step is to determine the best and worst value among the values for each criterion in the decision matrix

Table 9. The companies participating in the ranking of the best and lowest indicators

	The volume of financial investments	Customer number	The cost of internal processes	The cost of development and innovation	Management rating (maximum 10)	The number of human resources
A	130028.4922	150	29906.55321	7801.709534	5	6
B	661517.4409	200	152149.0114	39691.04646	6	5
C	813398.9123	160	187081.7498	48803.93474	9	8
D	71237.9997	125	16384.73993	4274.279982	8	9
E	988533.1675	300	227362.6285	59311.99005	4	10
F	931656.8138	246	214281.0672	55899.40883	7	12
G	6196.026156	325	1425.086016	371.7615693	9	9
H	555439.214	453	127751.0192	33326.35284	6	7
J	553821.4898	235	127378.9427	33229.28939	8	6
K	385181.6142	421	88591.77126	23110.89685	7	11
Best Value	988533.1675	453	1425.086016	59311.99005	9	12
Worst Value	6196.026156	125	227362.6285	371.7615693	4	5

Second, calculate the amount of R and S:

The majority of the desirability of a maximum of S are shown, and the person at the other side regrets that, with R displayed.

$$S_j = L_{i,j} = \sum_{i=1}^n w_i (f_i^* - f_{ji}) / (f_i^* - f_i^-)$$

$$R_j = L_{w,j} = \max_i [\sum_{i=1}^n w_i (f_i^* - f_{ji}) / (f_i^* - f_i^-)]$$

Table 10. Table unfortunate person

Co	R
A	0.20
B	0.21
C	0.26
D	0.22
E	0.31
F	0.30
G	0.13
H	0.18
J	0.18
K	0.12

Third step: Calculate Q

At this point, due to the combination Q, R and S and consider the values of v, Q can be calculated.

$$Q_j = v(S_j - S^*) / (S^- - S^*) + (1 - v)(R_j - R^*) / (R^- - R^*)$$

Table 11. Calculation of Q

	R	S	Q
A	0.20	0.64	0.61
B	0.21	0.64	0.59
C	0.26	0.56	0.34
D	0.22	0.54	0.50
E	0.31	0.56	0.07
F	0.30	0.49	0.13
G	0.13	0.38	0.85
H	0.18	0.43	0.67
J	0.17	0.55	0.72
K	0.12	0.35	0.9
Positive	0.31	0.35	
Negative	0.12	0.64	

To sort the data in ascending order, based on Q we have:

Table 12. Ascending companies, according to The Q

E	0.072
F	0.135
C	0.336
D	0.497
B	0.588
A	0.610
H	0.673
J	0.717
G	0.847
K	0.9

The best option, an option that has the least amount Q. As a result, brokerage firm, with code E as the best option is selected.

10. The test of research hypotheses

Ranking of different companies, different industries can, view mirror all of the different companies, considered in relation to its competitors, and the strengths and weaknesses internal and external opportunities and threats of companies, indicate. However, the issue that is important, model ranking, criteria and proper mathematical techniques to be ranked. The ranking of companies that interface with the public, industry and services are much more important in terms of the confidence of investors. The financial system of the three pillars of financial instruments, financial institutions and financial markets, has been established. Undoubtedly, the development of the financial system in the economy, the development of these pillars, is desired. Securities market, stock market, currency market and, as financial markets are not only stable cash needs for the purposes of manufacturing, commercial and services have a major role, but also the needs of investors, the benefit sustainable and long-term, have a major role. Rotation of liquidity in financial markets, the extra space to the space is the lack of liquidity, and a link to this rotation, through financial intermediaries, is that brokerage co. According to Article 1 of the law of the Tehran Stock Exchange brokers, adopted on 16/7/1967, traded securities, the Tehran Stock Exchange, exclusively only by stock brokers, done. Different market activities such as trading, market makers, and so, in the control of the companies. Development and expansion of the stock market, to different parts of the country, the development of the activity of these companies have. The interpretations of the most significant institutions as a significant operating leverage, with private investors and legal, and could be an increase in investment activity of these groups have an important role.

Represents the only ownership of company stock it. Company shareholders are the last people that receive benefits and also the one who, for the company is deciding. Shareholders who wish to be the only way to go to a broker or brokerage firm is. Brokerage companies as official dealers in the market, not only in providing an important part of the market, the trades, but also to balance and makers, have an essential role, and can help regulate the market significantly, as well.

In this study, the research on models of evaluation of company performance, such as financial analysis, evaluating the productivity of companies, models and balanced performance evaluation model (BEM), organizational effectiveness, organizational excellence and complete models It was done using the BSC, and finally, and inspired by the model (BSC), financial ratios and productivity ratios, the model was presented. The model of the six aspects (major components) has been established that these aspects are: financial perspective, internal process perspective, customer perspective, aspects of human resources, development and innovation, and the management aspects. Every aspect, including their components and criteria, and a total of sixteen indicators for all aspects, was recognized. The point that should be mentioned is that in fact this model is a comprehensive assessment of company performance, and but due to the fact that, in order to rank the companies based on their performance made, so naturally read model ranking is.

On the other hand, the Securities and Exchange instructions in Section 6, and 3. Note that the board approved on 04.10.2010, in which the index with different scores to the ranking of brokerage co, provided Hypothesis: proposed measures by the Securities and Exchange, the BSC model matches.

This hypothesis is equivalent to the following hypothesis:

"The ranking of brokerage co in Iran, the components of financial, customer, internal processes of development and innovation, human resources and effective management."

So to test the first hypothesis, the hypothesis was tested 6. The results can be said with 95% confidence that all components in the ranking of brokerage co are effective. Important to note that, as the ratios obtained, the difference is not significant, so this method can not be indicators, prioritized.

In order to prioritize factors and weighting them ANP model was used.

Weight obtained from ANP, as the following table:

Table (13. the results weighted index with ANP model

index	weight
Financial	0.134674519
Customer	0.221859948
Internal processes	0.31451901
Development and innovation	0.106151874
management	0.10515
Human Resources	0.11245

Weight obtained suggest that indicators of internal processes and customer order, more important than other indicators, are, therefore, components of the rating of the stock, it should be rated higher than others have.

According to the model, indicators Office, the number of customers, human resources expert, brokerage and accounting systems, components are involved in the two indices. Therefore, these components must be rated higher score in the table, and respectively.

Rating with model VIKOR

Methods, MCDM like VIKOR and TOPSIS both are based on the functions that show how close to ideal. VIKOR method of ranking, based on a specific size that's close to ideal solution, shows, measures (Opricovic s. T., 2007). VIKOR method of multi-criteria decision-making models of compensation is a decision-making tool for optimizing complex systems, especially those pertaining to incompatible standards, and the proportion of non-associated, is. This ranking, and selection of a set of variable focus, and helps decision-makers to take the final decision. This approach to solving a discrete decision based on the most optimal choice from among the options available, based on the rating assigned.

Ranking of brokerage co, according to various criteria such as the incompatibility of standards, not uniform units of measurement, and the importance of each in accordance with the basic assumptions of the model.

In this study, according to the brokerage co did not want their names associated with the spread of information, rather than the name of the code was used.

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