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PROVIDING AN OPTIMAL MODEL WITH A NEW APPROACH FOR INVESTMENT ATTRACTION IN THE STOCK EXCHANGE MARKET

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ABSTRACT

Of the problems faced by investors in the capital market, especially in the stock market, is the lack of an optimal, functional and innovative model. The gap caused by this lack is felt among investors to attract investment in the stock market. With this in mind, the researchers sought to identify and present an optimal model with a new approach to attract investors to invest in the stock market in order to provide a secure, low risk and high profitable investment. Opinions of experts and investors of the stock exchange market with valid experience of at least two years were collected in 2017. After identifying and determining the effective measures on investment attractiveness, the proposed model interaction was determined by the DEMATEL method and the most effective and the most influenced criteria were determined for ease of use for users and investors. Moreover, for completing the model with a new approach, the researchers used the most prestigious techniques, i.e. Analytic Network Process technique for prioritization and ranking for criteria and sub-criteria.

Keywords: *New Model (Model) of Investment Attractiveness, Capital Market, Analytic Network Process, Dematel Technique.*

INTRODUCTION

The most important issue faced by major investors not only in the capital market and the Iranian stock market, but also in the global markets, is selection of correct criteria for comparing types of stocks. An important point in investing is that this decision cannot always be optimal and desirable on the basis of a single criterion, but several criteria and in fact, different dimensions should be used.

Following this and the need of investors and stakeholders, studies have been carried out globally while the need for more comprehensive research and the provision of an optimal model with a modern and applied approach that addresses all the criteria and dimensions affecting investment attractiveness is fully explicit.

For years, traditional finance has always presumed that investors are rational in their decision making process in the stock market about risk return trade-offs and maximizing utility. However, behavioral finance studies revealed that human beings do not behave as rationally as economists suppose as their decisions at times are affected by their psychological feelings. Numerous studies from ASEAN, Middle East and Western countries have in fact established that psychological factors do have relationships and impacts on the decision making of investors in their stock markets. The findings show that overconfidence, conservatism and availability bias

have significant impacts on the investors' decision making while herding behavior has no significant impact on the investors' decision making. It is also found that the psychological factors are dependent of individual's gender (Bakar & Yi, 2016).

The decision-making is a complex process includes analysis of many factors and following steps. In the stock market, making investment decision is even more accurate and complicate in a stock market and such decisions need better insight, understanding based on some factors, and there are several investment decisions related to stock trading, such as: buying, selling, holding stock, and volume of stock to trade (Khiem & PHUONG, 2014, quotes Jane Njeri Wamae, 2013, p.68). The investment process depends on the decisions made by the investor. First, the investor should consider the time extent expected for the return on investment, and, then decide on the type of properties that are most appropriate (such as stocks, bonds, or immovable property). The investor, after making these decisions, has to think about what specific items of these properties to buy. If an investor seeks to invest in companies' equity, he or she must decide on which one to invest in amongst hundreds of stock exchanges offerd (Raei and Pouyanfar, 2014).

The conventional optimization models assume that the future of the stock market is predicted accurately with historical data. Nevertheless, despite the fact that these data are accurate, this assumption will not exist in financial markets due to severe market fluctuations (Shiang Tai Liu, 2011).

The value of a company is a function of the profitability of investment in that company. Therefore, in order to maximize the stockholders' wealth, managers must provide a balance between the stockholders' expectations and the optimal investment opportunities of the company by identifying the factors affecting the level and attractiveness of investment. This way, they can gain profitable investment opportunities as well as the stockholders' satisfactions (Fazzari et al., 2000).

Fundamentalists are market participants who predict movements of stock prices by analyzing the underlying economic conditions upon which they assume changes in the stock prices. Fundamental Analysis believes that analyzing the economy, strategy, management, product, financial status and other related information will help choose shares that will outperform the market and provide consistent gains to the investor (Raval & Vyas, 2013).

Today, investors have a wide range of investment choices, while no limited research has been done on how to choose between different investments options so far. People financial decisions are becoming more complex and risky every day, while the results of these decisions are very effective in their lifestyle (Sultana, 2010).

John Murphy (2009, pp. 24-53), in his book "Visual Investor: How to Spot the Market Trend" describes how investors focus on risk and return on investment when making a decision. In contrast to institutional investors (legal), real investors (personal) usually do not have wide measures for balancing these two variables. Measures such as the rate of economic and political fluctuations and the volatility of laws and regulations increase risk in decision making in the stock exchange. All of these criteria lead to a secondary risk in the capital market that results from unpredictable behavior of investors. Investigating the factors affecting the decision of investors in the stock exchange, important economic variables such as interest rate changes, inflation rate changes, and the effects of investment alternatives are examined.

He also examined influential social and political variables, such as local and regional changes, political fluctuations, and psychological components, such as the impact of massive news and



rumors in the macro level. At the micro level, he also examined the impact of financial ratios and the risk and returns on stocks. Based on the results of this research, the researcher argued that categorizing the factors influencing stockholders' decision making in the form of two macro variables, including economic and social factors and several micro variables, including financial and managerial factors is unstable. The most important factor of decision making and price fluctuation are investors.

Most financial theories assume that investors are logically considering increasing their capital and pay attention to financial indicators. Investors, when choosing an investment, initially compare its risk and return with other potential investments they can make (Raei and Pouyanfar, 2014).

However, a rational investor would not choose less risky investments in the case of a similar risk of investment. Most recent research on financial psychology states that investors' decisions may be influenced by internal behavioral factors such as self-awareness and external behavioral factors, such as how to choose an investment (Lee, Chung & Kang, 2008).

The wide extend of information exposed to investors and stockholders to decide on investment as well as the existence of multiple criteria that eventually lead to a reduction in attractiveness and confusion to invest in markets such as the stock market, necessitate application of a functional and optimized model that is with prioritized and ranked dimensions and criteria used by investors and stockholders providing the most useful and efficient information.

Therefore, the necessity of having appropriate models with a new approach seems fit to guide investors and help them in attractive investment. Therefore, in this research, we have tried to present a new model based on the opinions of specialists, experts and investors in Tehran Stock Exchange.



RESEARCH BACKGROUND

As stated, many criteria affect the attractiveness of investors to invest in the stock market and to make their decision on stock selection. For example, Mardani, Jusoh & Zavadskas (2015), studying various research on investor decisions, found that cash and non-cash measures using multi-criteria techniques, are a suitable way for the stakeholders.

Kengatharan et al (2014) argued that behavioral factors affect individual investors' decisions on the Columbus Stock Exchange. In addition, the relationships between these factors and investment performance were also examined. The results have shown that too much self-confidence and disruption of availability, prospects of markets factors, all affect individual investment decisions in the Columbus Stock Exchange. Most of the factors have a moderate effect, except for the tendency to keep factor, which has a great influence on the investment decision. On the other hand, only three of the examined variables affect investment performance.

Sun (2010) suggested simultaneous use of fuzzy hierarchy analysis and fuzzy topsis to create a model for evaluating corporate performance. To determine the indicators in this research, a focused group research method has been used. Following this procedure and collecting the required information, the indicators were extracted which were: 1. Production and operation ability, 2. Supply chain capability, 3. Innovation ability, 4. Financial ability, 5. Human resource abilities; 6. Ability to provide quality service.

Brockman, Howe & Mortal (2008), in their article on "Stock market liquidity and the decision to buy again," examined the impact of liquidity on the stock market in managerial decisions, and argued that the liquidity of the stock market affect policy of payment through the effect of the first time decisions on the redemption of the share and the second effect or the remaining in the decision to dividend share. Also, managers compare the tax benefits and flexibility of a redemption compared to their liquidity costs. In equal terms, the higher the liquidity of the market, the higher redemption over dividends.

Merikas et al (2004) tried to identify the factors influencing the behavior of real investors in the Greek capital market through a survey study. The results of their research showed that the criterion of people's decision making in buying a share is a combination of economic criteria and psychological criteria. They found that investors' decision making would not always be a coherent and rational approach, and they will make decisions based on a group of factors. The findings of their research showed that financial and accounting information and general information published in the capital market would shape the investors' expectations for the purchase of a share.

Kadiyala & Rau (2002) investigated the reaction of investors to announcements and event announcements by the company. They concluded that investors seemed to react to previous information as well as the information transmitted by the event, leading to various patterns: continuing and returning to investment, returning, and both documented for long-term return. They have not found any support for the hypothesis of excessive reaction.

According to the previous research sample, the investor should consider a wide range of factors for investing and, as a result, the decision that he takes for his investment, will affect his attractiveness for investment. Therefore, a reliable and valid pattern with the criteria and sub-criteria fundamental and influential in his/her decision to invest in the stock market should be identified and determined to attracts the investor to invest in the stock market.

Details of other literature are summarized in Table (1):

Table 1: Comparative analysis among research backgrounds for Providing an Optimal Model with a New Approach for Investment Attraction in the Stock Exchange (Case Study: Tehran Stock Exchange, Iran)

Research Title	Researcher/ Researchers	Year	Market/ Markets	Research Variables	Research Findings	Strengths & Weaknesses of the Research
Mutual Fund Attributes and Investor Behavior	Nicolas P.B. Bollen	2006	US mutual funds database	1-Net asset value per share 2- total net assets of mutual fund	1- annual flows in socially responsible funds are less sensitive to lagged negative returns than flows in conventional funds, but more sensitive to lagged positive returns	1- Other dimensions & factors have not been investigated 2-Only Determine the effect of economic factors and their differences with other factors
Profitability, investment	Fama & French	2006	the NYSE, Amex, and	1.expected profitabiliy	Controlling for expected profitability &	Other dimensions & factors have not been investigated

and average returns			Nasdaq firms	2.expected investment	investment, firms have expected stock returns	
The Impact of Psychological Factors on Investors' Decision Making in Malaysian Stock Market	Bakar & Chui Yi	2016	Malaysian Stock Market	psychological factor	The findings show that overconfidence, conservatism and availability bias have significant impacts on the investors' decision making while herding behavior has no significant impact on the investors' decision making	Only Determine the effect of psychological factors and Other dimensions & factors have not been investigated
Factors Influencing the Individual Investor and Stock Price Variation	Azam & Kumar	2011	Evidence from Karachi Stock Exchange	Individual investor's Factor	1.earning per share, 2.dividend yield, 3.foreign direct investment, 4.gross domestic product growth rate	Other factors have not been investigated, Just Determine the effect of Individual investor's factors
Investor relations beyond financials	Hoffmann & Fieseler	2012	1.Relying on qualitative interview data collected among 42 equity analysts 2.A subsequent exploratory factor analysis performed on data obtained from a survey among 134 buy- and sell-side analysts.	Non-financial factors	Equity analysts consider the following eight categories of non-financial information when forming an impression of a company
Toward an Understanding of the Risky Choice Behavior of Professional	Hunton, McEwen & Bhattacharjee	2001	309 Investors in Chicago	Effect of market flow on investor decision making	1.News and rumors have a huge impact on investors' decision making.	1.Pay attention to the level of risk taking according to different criteria 2.Determining the



Financial Analysts				The effect of economic and political factors on decision making	2. Investors do not pay much attention to financial variables at the company level.	effect of economic factors and their differences with other factors
How investors react to political risk The political determinants of investors behavior	Hill	1998	1450 investors with an investment of at least \$ 30,000	1. Political Economy Expectations 2. Political Leadership 3. Government Programs	1. Unpredictable Political Factors and High Impact on Decision Making. 2. Difference in the influence of political factors in different countries	1. Defining Political Indicators Affecting Decision Making. 2. Comparison of the Effect of Economic System Type on Investment Decision Making

Design, compilation and adjustment of table information (1): Research author

According to Table (1) and the literature, as well as the need of investors for a comprehensive model, we attempted to achieve the following goals:

- Identifying and describing the criteria (factors) affecting the attractiveness of investment in companies admitted to the Tehran Stock Exchange.
- Identifying and examining the interactions and intensity and extent of impact of the main criteria on each other.
- Prioritization and ranking of criteria and sub-criteria related to each of the factors affecting the attractiveness of investment in companies admitted to the Tehran Stock Exchange.

The purpose of this study was to answer research questions in accordance with the research purposes. The researcher attempted to answer these questions in each step after the completion. The research questions are as follows:

- ✓ What are the most important factors affecting the attractiveness of investment in listed companies in Tehran Stock Exchange?
- ✓ Are these identified key criteria interacting with each other, and what are the most effective and influential ones?
- ✓ What are the priorities and rankings of criteria and sub-criteria related to factors?

MATERIALS AND METHODS

It was a mixed study as it simultaneously identified and described the criteria (dimensions) affecting the attractiveness of investment in companies listed in Tehran Stock Exchange. Then, the weight and value (prioritization and ranking) of each of the dimensions and indicators of each dimension are determined, and also, the ranking of the indicators of each dimension is dealt with. This study has been conducted in a tactical, purposeful, real, and dynamic organization, and the results can be applied in a very practical manner. As a result, this study was an applied-descriptive research.

Prodecure design of the research

Before entering the process, the research process must first be expressed in the schematic diagram (1):



Figure 1: Research process

Designing, arranging and compiling information (1): Research author

Identifying and describing the criteria and sub-criteria of the model

Considering the studies carried out in valid papers and journals, and especially, the main goal of the research to provide an optimal model with a new approach to attract investment in the stock market and the research process, the most important criteria (model dimensions) and sub-criteria should be Identified and described. As you can see in the research background, there are studies only addressing some of the criteria that influence the decision of the investor, but these criteria are not efficient alone. Therefore, criteria and sub-criteria with high reliability and validity that are applicable are extracted and the questionnaires are designed and distributed in order to measure, evaluate and use them and present them in the proposed model. The investors and experts opinions in the stock exchange market have been compiled and tailored in Table (2) considering the criteria and their sub-criteria:

Table 2: The Final Criteria (factors) and Sub-criteria (Indices) Influencing Investment Attraction in Tehran Stock Exchange

Source	Sub-criteria (indices)	Criteria (Factors)
(Bollen, 2007) (Chang Iv CIA, 2003)	Applying and using internal corporate finance ratios (such as the ratio of price to earning (P / E), debt ratio, etc.)	Financial dimension including (expected returns factors and internal

(National Association of Securities Dealers (NASD), 2005) (Hunton, McEvon & Bhattacharjee, 2001) (Fama and French, 2006) (Dreman, Johnson, McGregor and Slovic, 2001) (Armin, Bavaghar, and Sajjadinia, 2017, pp.). 130-139) (Pashaei, 2017, pp. 186-202)	Use and recognition of items in the balance sheet of companies	financial factors of companies)
	Trust and confidence in corporate financial balance sheet data	
	Tracking seasonal reports and company releases	
	Relations between items of balance sheet and profit and returns on stocks and corporate securities	
	Paying attention to share trading volume	
	Investigation and follow up of decisions and activities of legal (institutional) and major investors	
	The effect of liquidity	
	The extent of liquidity of stock	
	Review the trend of past stock prices at the time of the decision	
	Trust and confidence in earning profit and believing in the follow-up of the process and future returns of past performance	
	Awariness of the risk and stock market	
(Ojeaga, Victor Folajin & Paul, 2001) (Zhou, 2004) (Dreman, Johnson, McGregor and Slovic, 2001) (Zaranejad and Motamedi, 2011) (Saeedi and Amiri, 2010) The (Darabi and farahi, 2010) (Oberlechner and Osler, 2008)	The tendency to substitute and critique the stock at the time of other markets growth	The economic dimension including (economic factors and performance factors and investment efficiency)
	Information on interest rates and mean interest rates on bank deposits	
	Understanding the meaqn inflation rate and its flow	
	Influence of Inflation Rate on Tehran Stock Exchange Indexes	
	Influence of inflation on other investment options	
	Impact of international economic developments onTehran Stock Exchange	
	The return on investment in the stock market compared to other markets	
	Adaptation of investment returns in securities and new or recent equity with expectations	
Investor Satisfaction, the likelihood of caring about the last year investment (including selling, buying, selecting stocks and deciding on stock volumes) compared to other markets		
(Sun and Hsiao, 2006) (Lintner, 1956) (Ali Hosseinzadeh and Mohammadi, 2017, pp. 158-171)) (Sarvolia, Babajani, Hanafizadeh, and Ebadpour, 2017, p. 131-145)	Suggestions and comments from Stock Exchange officials about future of market	Subjective and mental dimensions including (psychological factors and psychology of the market)
	News and rumors published in newspapers, the Internet and virtual space	
	Interviews and talks with corporate executives about the plans announced by them	
	Recommendations of relatives, friends and acquaintances	
	Announcements from Companies annual general meeting	
	Unofficial news from the associations and sessions of the companies	
	Suggestions and Opinions of Stock Exchange Brokers	



	The rate of using consulting services for the buy and sale of securities and shares	
Hill, 1998 (Dreman, Johnson, McGregor and Slovic, 2001) (Zhou, 2004)	Tracking domestic political news and its impact on the stock market	The political dimension including (political news and events)
	Suggestions and comments from domestic political officials	
	Suggestions and comments from foreign political officials	
	Following international political news (foreign)	
	Impact of international pressures and organizations on the flow of markets	
	The impact of domestic political developments (such as elections, student movements and changes in the cabinet) on stock indices	
	The impact of events and political relations inside Iran with other countries on stock prices	
	The Impact of Social and Cultural Developments on Stock Exchanges	
	Effects of environmental changes	
	The Influence of Political Relationships on the Market and Exchange Indicators	
Effects and Impact of Contracts and Sanctions		

Design, compilation and adjustment of table data (2): Research author

Based on the findings of Table 2, four main criteria were set for this model and investors were able to increase their attractiveness to invest in the stock with greater certainty and lower risk by taking into account these four main criteria, thus leading to a better decision that, ultimately, bring about satisfactory investment and decision-making and in fact, increased expected returns and return on investment.

This study was a path analysis of criteria affecting investors' decision making and the attractiveness of Tehran Stock Exchange to encourage investors and their satisfaction. In fact, this model will help to make investors more accurate in their future decisions in the stock market, and it is essential, for beginners to decide on the market.

The population consisted of experts and specialists as well as professional tradesmen of Tehran Stock Exchange and all investors in the Tehran Stock Exchange in the period of 6 months in 2017.

Since the population is an unlimited society, in this research, the statistical sample was determined based on the Morgan table and the questionnaire was designed in correspondence with the criteria and sub-criteria of the present study. The Morgan table determined 384 as the sample size.

Methods of Data Collection

The tools were a demographic questionnaire consisting of demographic information and 40 specialized questions corresponding to the criteria and sub-criteria and the paired comparison questionnaire corresponding to the main objective of the study. The Likert scale with seven options was used to answer questions.

In fact, for the Expert Paired Comparisons Questionnaire, during the specified period (6-month period in 2017), a number of experts and specialists in the field of investment in the stock market as well as professional traders of the Tehran Stock Exchange have been interviewed. The



benchmark of expertise was at least a master's degree or higher, and a bachelor's degree associated with at least 3 years of working experience.

Simple random sampling was used in this study. In fact, in this sampling, the probability of selection is the same. In the selection of the sample, no personal tastes were involved. As a result, the findings and results of the research could be generalized to the investors in the Tehran Stock Exchange and used in the proposed model (model). Therefore, the spatial domain of this research was considered to be the Tehran Stock Exchange.

Data Analysis Methods

In this research, library search (articles, theses and books) and the opinions of experts have been used to identify appropriate criteria and sub-criteria. Then, the DEMATEL technique was used to determine the most influential and most effective criteria, and, then the Analytic Network Proces was used to prioritize and rank the criteria in the proposed model. The SPSS version 23 was used for statistical analysis and the Super Decision version 3.0 was used for the ANP technique and network model. Data Normalize Master software was used to check data normality and Amos was used to determine the normality of multivariate.

- ***DEMATEL Technique***

It was developed by Fentla and Gobos in 1971. It is a decision making technique based on pair comparisons, which utilizes the judgment of experts in extracting the factors of a system and gives systematic structure to them by applying the principles of graph theory. Then, it provides a hierarchical structure of the factors in the system, along with the interaction effects. In this way, it determines the effect of these relations as numerical scores. This method is used to identify and investigate the interrelationship between criteria and mapping network relations. DEMATEL technique was generally developed to study the very complex global issues (Habibi et al., 2014, p. 171; Asgharpur, 2013). It should be noted that the it does not provide a rating of criteria, but only shows relations between them, but:

- 1) Considering interactions; the advantage of this approach is that experts are able to be more fluent in expressing their opinions about the effects (direction and severity of effects) between factors. It should be noted that the matrix derived from the DEMATEL technique (the internal communication matrix) actually forms part of the supermatrix, in other words, the DEMATEL technique does not act independently but as a sub-system of a larger system such as ANP (Habibi et al, 2015; Fontela & Gilli, 1977; Fentla, 1976; Gubus and Fentela, 1974).
- 2) Structuring complex factors in the form of causal groups. This is one of the most important functions and one of the most important reasons for its extensive use in problem-solving processes. By deconstructing a wide range of complex factors in the form of cause-effect groups, the decision maker will understand the relationship in a more appropriate context. This issue leads to a better understanding of the place of the factors and the role played by mutual interactions (Habibi et al., 2014; Fontela and Gilli, 1977; Fontela, 1976; Fontela & Gabus, 1974). The graph of DEMATEL method (2):



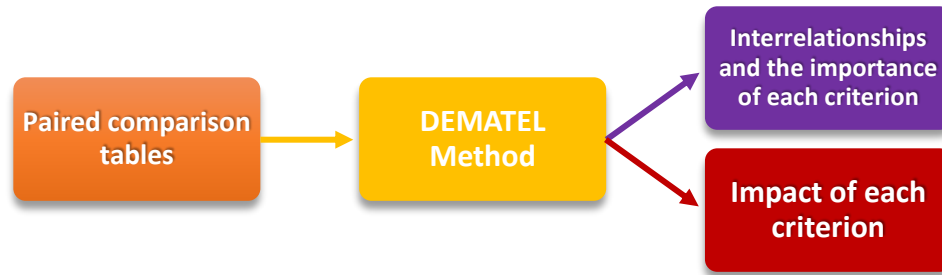


Figure 2: A schematic summary of the DEMATEL method

- *Analytic Network Process (ANP)*

This method was proposed by the Saaty and Takizawa in 1986. It is presented as the follow up to hierarchical analysis. In reality, elements in a hierarchy structure with different criteria are usually independent, but, lower-level components may affect higher-level components. There is a feedback relationship in this process, resulting in a similar structure to a network system. An ANP not only determines the relationship between different criteria but also calculates the relative weight of each component.

The best time is when the opinions of all these experts are used. The network analysis process is a method that is more applicable to the selection of several possible variables. For example, allocation and circulation of resources and increasing the confidence of decisions in the measurement process. It can be said that the hierarchical analysis method is a special case of network analysis, as the network analysis method can be used independently within a cluster and between several clusters (Pourtaghi, 2017).

In Figure 3, the decision making process is shown in the analytic network process. According to this process, the steps of this algorithm are as follows:

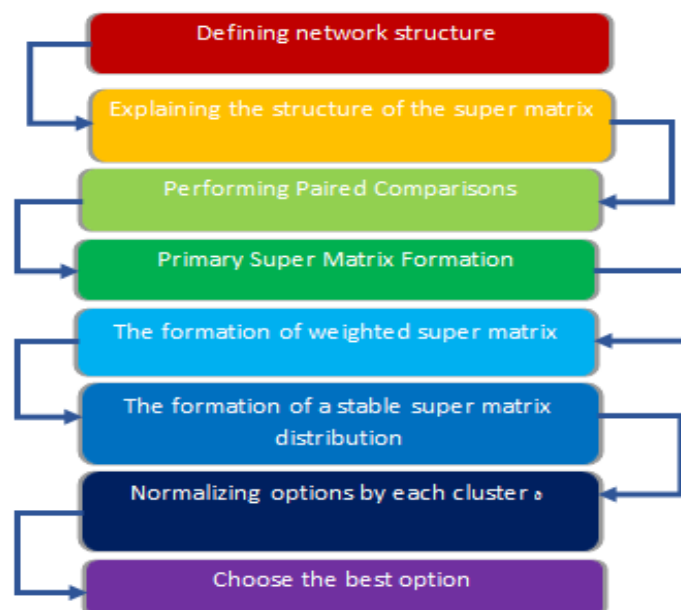


Figure 3: Decision Making Process in Network Analysis Method (ANP)



RESULTS AND FINDINGS

In this section, we intend to present the results and findings of the proposed model. Among respondents, 79.7% were men (N=306) and 20.3% were women (N=78), and 35.4% of respondents (136 people) had less than 30 years old, 44.8% (172 persons) were between 31 to 40 and 1% (4 people) were between 41 to 50 years old and 1% (4 people) were higher than 50 years old. 15.9% (61 people) had Diploma and lower degrees, 41.7% (160) had BA, 3.9% (15 people) had a master's degree and 3.9% (15 people) had a PhD. 50% (192 persons) had less than 5 years of experience, 21.1% (81 people) had 6-10 years, 6.5% (25 People) had 11 to 20 years and 6.5% (25 people) had more than 21 years of age.

In order to analyze the data and select the type of relevant tests, we first need to examine the status of the normal variables (Table 3).

Table 3: Normality of the research variables

status	Skewness	Kurtosis	Significance level	statistics	Variable
Normal	-0.48	0.151	0.094	4.72	Economic Criteria
Normal	-0.128	0.015	0.871	0.28	Political Criteria
Normal	-0.383	-0.184	0.113	4.36	Subjective and mental Criteria
Normal	-0.164	0.029	0.796	0.46	Financial Criteria

Table 3 shows that the significance level of the Jarque-Bera test for research variables was greater than 0.05. So, the null hypothesis is accepted, or in other words, the distribution of variables is normal.

The multivariate distribution of data and the normalization can lead to inaccurate conclusion if ignored. The results of the multivariate normalization were calculated by Amos software and are presented in the first part of Table (4). Also, in the second part of Table (4), the findings showed that among the main criteria, the economic criterion was more important with a mean of 4.57. The "financial" and "political" criteria were ranked second and third respectively with means of 4.49 and 4.18. The "mental and psychological" criterion with a mean of 3.64 was less important than other dimensions, so, the first research was answered.

Table 4: Multivariate normalization and the importance of the main criteria of the model

Result	Z statistics	Multivariate normalization (coefficient)
There is a multivariate normalization	1.437	4.710
Standard deviation	Mean	Variable
0.98	4.57	Economic Criteria
0.90	4.18	Political Criteria
0.01	3.64	Subjective and mental Criteria
0.67	4.49	Financial Criteria

With the information gathered by experts and specialists, the second question was answered. The process of the DEMATEL technique was as follows:

- *Final results of the DEMATEL method*

Table 5: Final results of the DEMATEL technique

R-J	R+J	(Column J Sum)	Row) R (Sum)	Result
1.5873	8.0336	3.2231	4.8105	Economic Criteria
-0.4464	8.9291	4.6878	4.2413	Political Criteria
0.6398	7.4361	3.3981	4.038	Subjective and mental Criteria
-1.7807	8.5254	5.1531	3.3724	Financial Criteria

* Based on Table 5, the significance of the indicators (R + J) and the relationship between the criteria (R-J) was determined. If $0 < (R-J)$, the relevant criterion has been effective and if $0 > (R-J)$, the relevant criterion has not been effective.

Cause and Effect Diagram

According to Table (5), the significance, impact, and interaction of the criteria are shown in figure (4). Horizontal axis shows the significance of the criteria and the vertical axis indicates the impact of the criteria:

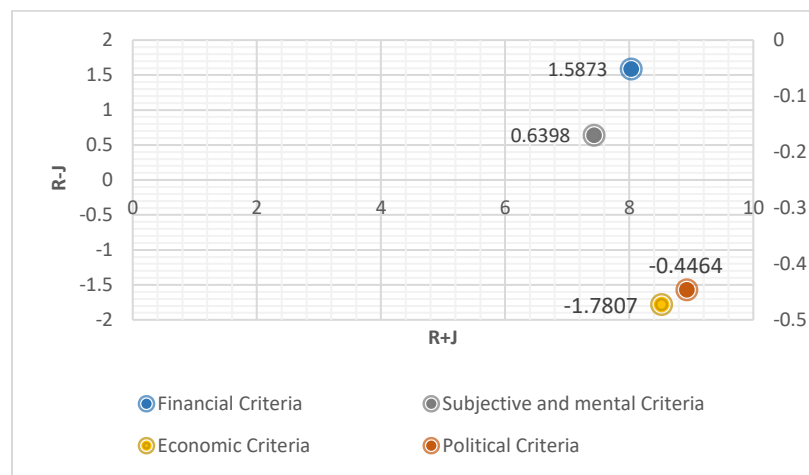


Figure 4: Cause and Effect Diagram for Key Research Criteria (Relationships and Importance of Criteria)

Now we are looking for the answer to the last question, namely, prioritizing and ranking the criteria and sub-criteria of the proposed model using the ANP technique. The research network model is drawn up in the Super Decision software and is presented in Fig. 5. The relationship between the criteria is determined by the output of the DEMATEL.

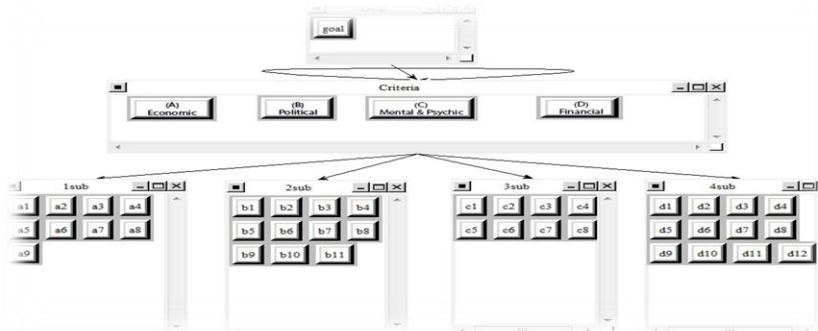


Figure 5: The research network model

We now look at paired comparisons and relative weights of criteria.

Weight and final ranking of the main criteria

After the formation of the initial and weighted matrix in superdecision software, the weights obtained from the matrix are shown in the following table. Table 6 shows the final weight of the criteria.

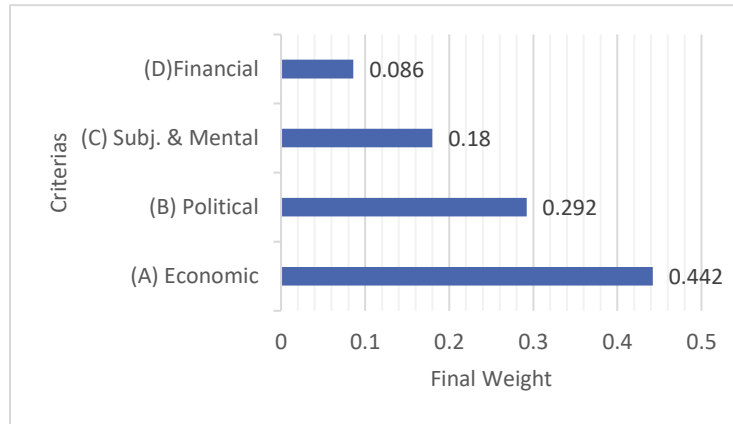


Figure 6: The final weight of the criteria

Table 6: The final Prioritization

Rank	Final Weight	Name of Criterias
1	0.442	Economic (A)
2	0.292	Political (B)
3	0.180	Subj. & Mental (C)
4	0.086	Financial (D)

According to Table 6 and Fig. 6, the following results are obtained:

- ✓ The economic criterion won the first priority with the final weight of 0.442.
- ✓ The political criterion won the second priority with the final weight of 0.292.
- ✓ The mental and psychological criterion was the third priority with the final weight of 0.180.
- ✓ The financial criterion won the fourth priority with a final weight of 0.086.

Weights and Final Ranking of Sub-criteria

After formation of the initial and weighted matrix in superdecision software, the weights obtained from the matrix are shown in the following table. In table (7), the final weight of the sub-criteria is given.

Table 7: Ultimate Prioritization of Sub-criteria

Final Rank	Final Weight	Sub-Criteria	Code
1	0.07669	The tendency to substitute and critique the stock at the time of other markets growth	a7
2	0.07376	Information on interest rates and mean interest rates on bank deposits	a6
3	0.06321	Understanding the mean inflation rate and its flow	a9
4	0.06091	Influence of Inflation Rate on Tehran Stock Exchange Indexes	a1

5	0.05178	Influence of inflation on other investment options	a8
6	0.05141	Impact of international economic developments on Tehran Stock Exchange	c8
7	0.04803	The return on investment in the stock market compared to other markets	b10
8	0.04274	Adaptation of investment returns in securities and new or recent equity with expectations	c3
9	0.03720	Investor Satisfaction, the likelihood of caring about the last year investment (including selling, buying, selecting stocks and deciding on stock volumes) compared to other markets	b7
10	0.03623	Tracking domestic political news and its impact on the stock market	b6
11	0.03563	Suggestions and comments from domestic political officials	b2
12	0.03331	Impact of international pressures and organizations on the flow of markets	a5
13	0.03100	The impact of events and political relations inside Iran with other countries on stock prices	a2
14	0.02915	The Impact of Social and Cultural Developments on Stock Exchanges	b4
15	0.02672	The impact of domestic political developments (such as elections, student movements and changes in the cabinet) on stock indices	c5
16	0.02615	Suggestions and comments from foreign political officials	a3
17	0.02540	Following international political news (foreign)	a4
18	0.02474	The Influence of Political Relationships on the Market and Exchange Indicators	b8
19	0.02024	Effects and Impact of Contracts and Sanctions	b9
20	0.01983	Effects of environmental changes	b11
21	0.01894	Suggestions and comments from Stock Exchange officials about future of market	b3
22	0.01631	News and rumors published in newspapers, the Internet and virtual space	c4
23	0.01630	Announcements from Companies annual general meeting	d7
24	0.01613	Unofficial news from the associations and sessions of the companies	c2
25	0.01601	Suggestions and Opinions of Stock Exchange Brokers	d8
26	0.01579	Recommendations of relatives, friends and acquaintances	c1
27	0.01533	The rate of using consulting services for the buy and sale of securities and shares	b1
28	0.01223	Interviews and talks with corporate executives about the plans announced by them	d5
29	0.00948	Applying and using internal corporate finance ratios (such as the ratio of price to earning (P / E), debt ratio, etc.)	d11
30	0.00811	Use and recognition of items in the balance sheet of companies	d10
31	0.00710	Tracking seasonal reports and company releases	b5
32	0.00655	Relations between items of balance sheet and profit and returns on stocks and corporate securities	d6
33	0.00546	Paying attention to share trading volume	c6
34	0.00536	Investigation and follow up of decisions and activities of legal (institutional) and major investors	d12
35	0.00513	The effect of liquidity	c7
36	0.00313	The extent of liquidity of stock	d3
37	0.00292	Trust and confidence in corporate financial balance sheet data	d1
38	0.00193	Review the trend of past stock prices at the time of the decision	d9
39	0.00186	Trust and confidence in earning profit and believing in the follow-up of the process and future returns of past performance	d4
40	0.00180	Awareness of the risk and stock market	d2



The final weight of all sub criteria is also shown in Fig. 7:

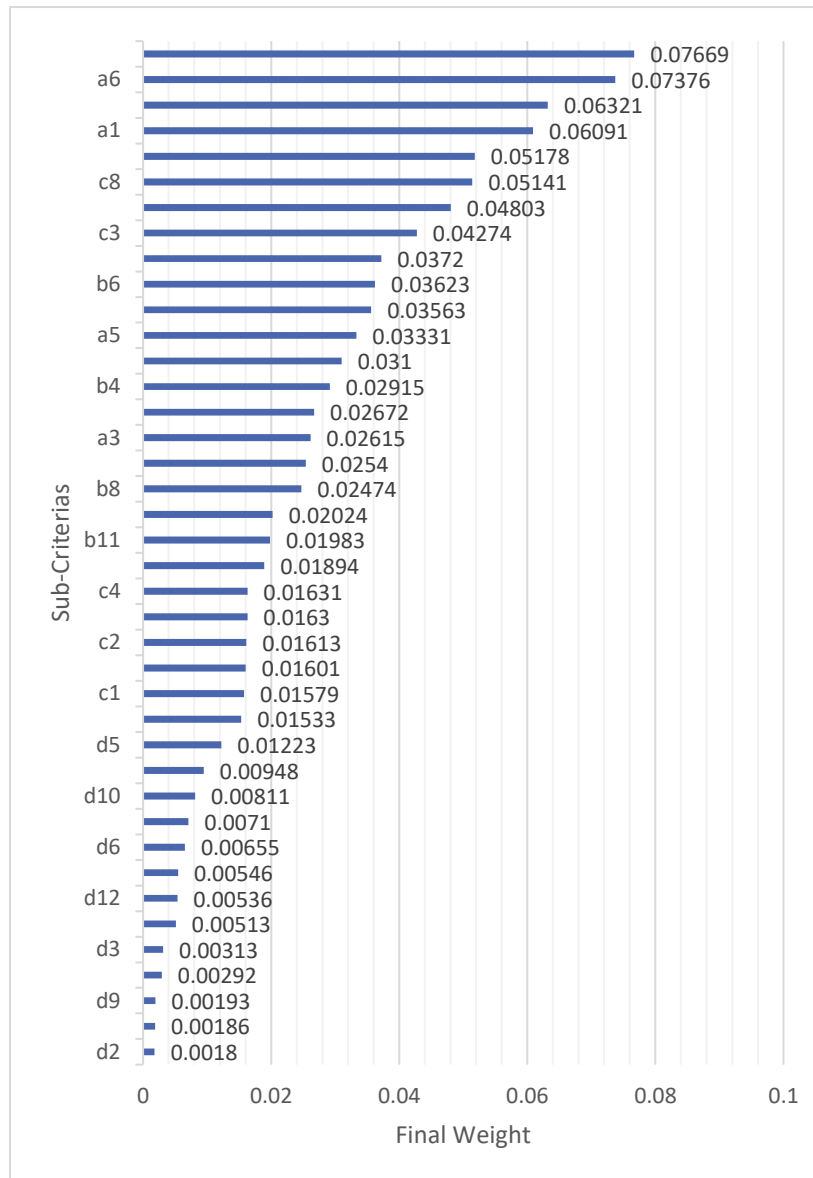


Figure 7: The final weight of all sub-criteria

DISCUSSION AND CONCLUSION

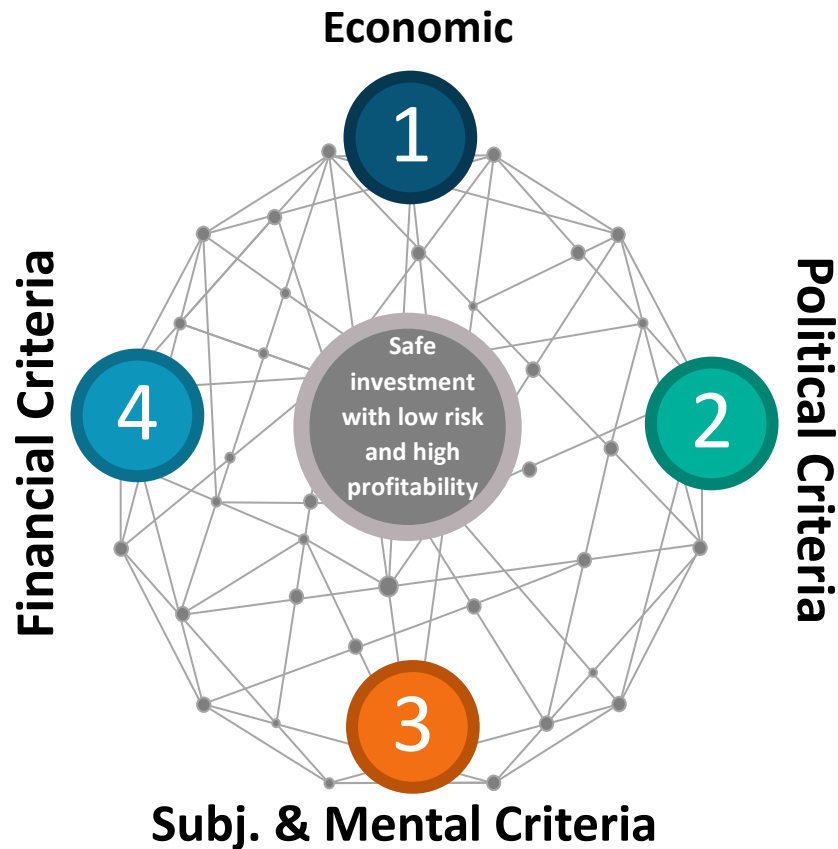
In the present study, we sought to achieve the main purpose of the research, i.e. providing an optimal model with a new approach for the attractiveness of investment in Tehran Stock Exchange. The first question and step i.e. "What are the most significant criteria (factors) affecting the attractiveness of investment in companies listed in Tehran Stock Exchange?" which was sought for providing this model. Based on Table (5), among the main criteria, the economic criterion with a mean 4.57 was more significant. The "financial" and "political" criteria were ranked second and third, respectively, with mean of 4.49 and 4.18. The "mental and psychological" criterion with a mean 3.64 was less significant than other dimensions.

Then, using the DEMATEL technique, we sought to answer the second question, i.e. "Are these key identified criteria related and interacting? And what are their most effective and influential ones?" in order to achieve the proposed model. Based on Table (6), the significance rate of the indicators $(R + J)$ and the relationship between the criteria $(R-J)$ are determined. If $0 < (R-J)$, the relevant criterion is effective and if $0 > (R-J)$ the relevant criterion is affected. Table (6) indicates the above cases which in $(R + J)$, the largest result has the highest interaction with other criteria, therefore, the political criterion has the most interaction with other criteria and the least interaction belongs to the mental and psychological criterion with other criteria. Now, we use the $(R-J)$ in order to determine the most effective factor and the most affected criterion, where the highest number is the most effective criterion. Considering the financial criteria as the most effective criterion and the most affected criterion was the economic criterion. Also, based on the results and findings in Table (6), the significance rate and the effectiveness and affectedness between the criteria can be found in Figure 5. The horizontal axis of the diagram represents the significance of the criteria and the vertical axis indicates the effectiveness and affectedness of the criteria.

Analytical *Network* Process (ANP) was used in order to answer the third and final question, i.e., "How are priorities and ranking of criteria and sub-criteria related to criteria (factors)?" Based on the results of Table 7 and Figure 7, with an incompatibility rate of 0.0018, the final prioritization and ranking of the main criteria of the model are as follows: (1) the economic criterion with the final weight of 0.442 gained the first priority; 2. the political criterion with the final weight of 0.292 gained the second priority. 3) The mental and psychological criterion with the final weight of 0.180 gained the third priority. 4) Financial criteria with a final weight of 0.086 gained the fourth priority. In Figure 7, prioritization for sub-criteria is visible in general.

Considering the results of the data analyzed by the valid techniques, the proposed model is formed and can be represented as Figure 8:





Priorities 21-40 Sub-Criteria

- The tendency to substitute and critique the stock at the time of other markets growth
- Information on interest rates and mean interest rates on bank deposits
- Understanding the mean inflation rate and its flow
- Influence of Inflation Rate on Tehran Stock Exchange Indexes
- Influence of inflation on other investment options
- Impact of international economic developments on Tehran Stock Exchange
- The return on investment in the stock market compared to other markets
- Adaptation of investment returns in securities and new or recent equity with expectations
- Investor Satisfaction, the likelihood of caring about the last year investment (including selling, buying, selecting stocks and deciding on stock volumes) compared to other markets
- Tracking domestic political news and its impact on the stock market
- Suggestions and comments from domestic political officials
- Impact of international pressures and organizations on the flow of markets
- The impact of events and political relations inside Iran with other countries on stock prices
- The Impact of Social and Cultural Developments on Stock Exchanges
- The impact of domestic political developments (such as elections, student movements and changes in the cabinet) on stock indices
- Suggestions and comments from foreign political officials
- Following international political news (foreign)
- The Influence of Political Relationships on the Market and Exchange Indicators
- Effects and Impact of Contracts and Sanctions
- Effects of environmental changes

Priorities 1-20 Sub-Criteria

- Suggestions and comments from Stock Exchange officials about future of market
- News and rumors published in newspapers, the Internet and virtual space
- Announcements from Companies annual general meeting
- Unofficial news from the associations and sessions of the companies
- Suggestions and Opinions of Stock Exchange Brokers
- Recommendations of relatives, friends and acquaintances
- The rate of using consulting services for the buy and sale of securities and shares
- Interviews and talks with corporate executives about the plans announced by them
- Applying and using internal corporate finance ratios (such as the ratio of price to earning (P/E), debt ratio, etc.)
- Use and recognition of items in the balance sheet of companies
- Tracking seasonal reports and company releases
- Relations between items of balance sheet and profit and returns on stocks and corporate securities
- Paying attention to share trading volume
- Investigation and follow up of decisions and activities of legal (institutional) and major investors
- The effect of liquidity
- The extent of liquidity of stock
- Trust and confidence in corporate financial balance sheet data
- Review the trend of past stock prices at the time of the decision
- Trust and confidence in earning profit and believing in the follow-up of the process and future returns of past performance
- Awareness of the risk and stock market

Figure 8: The proposed optimal model with a new approach for investment attraction in Tehran Stock Exchange

No one can predict the future. But the proposed model will definitely be helpful for investors' decision making and their absorption to the market. As discussed at the beginning of the discussion, investors and shareholders of the capital market, especially in the stock market, are not able to extract their own information and use them in their decisions in the face of large amounts of information, therefore the special findings of the present research and the proposed optimal model with a new and fully applied approach is very significant and effective for investors and the capital market of Iran, especially the stock market.

The final model is the result of the opinions of the experts and elites in this field, this is while investors, due to the lack of a proper model that attracts them for investment and informed decisions, and ultimately their satisfaction is obtained through the investment and their decisions. Also for these individuals the investment profit will result with less risk.

Based on studies conducted in countries other than Iran, they were seeking psychological factors that affects investors' decision making on the stock exchange of those countries, or in other studies, they have only examined the performance and financial criteria and indices, and obviously it was very important and studied, while in another study, the political criteria was among the most important and considered criteria. Therefore, in this regard, these studies should be considered. (Baker & Ng Choi Yi, 2016, pp. 328-319), and (Al-Anazi, Liu and Forster, 2011, 157-146)

In addition, behavioral factors were evaluated according to research conducted in this field in Iran and the capital market, (Norouzabad et al., 2016, pp. 69-94) and (Saber, 2017, p. 1-12). It cannot alone be an effective on selecting investor's portfolio. Therefore, in the present study, in addition to the mental and psychological criteria of the investor including the psychological factors in the market, other effective criteria on investment attractiveness were studied for the investor which leads to proper decision-making on his portfolio selection and investment in the stock exchange, but in the area of mental and psychological criteria and the sub-criteria related to it, the present research is consistent with the mentioned research and their most important one were evaluated in the present study. In other researches, some micro and macroeconomic factors were investigated that are effective on investor's motivation, or in another research, only 15 financial criteria were investigated.

The fact that the financial criterion and its sub criteria are important in influencing investment and the attractiveness of the investor in investing in securities has been emphasized, but that is not the only important factor based on the results of this study.

Women have lower risk-taking capacity. For these people, a conservative investment program should be designed by activists in the Tehran Stock Exchange and brokers, or given the importance of mental and psychological criteria, it seems that identifying news and rumor expansion channels, such as Internet sites and channels and telegram groups and improving the information structure affect the market's psychological regulation. Also, the development of knowledge of the investor's attractiveness, especially investors' decisions (due to the lack of financial analysis of the stockholders) and the expansion of the activities of market regulators are the suggestions that are based on this subject.

Each research has some limitations. For this reason, in order to obtain a more comprehensive view of the criteria and sub-criteria affecting the attractiveness of investment in the capital market, it is suggested that researchers should explore issues such as identifying barriers affecting capital buy decisions as well as review and evaluate the proposed model in financial



markets of other countries and global financial markets to make this model more complete, developed and functional.

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