



Research Paper

## Developing an Integrated ISM and DEMATEL Method for Economic and Political Factors Influencing Investors' Decision-Making in Investing in the Stock Exchange

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### ABSTRACT

This study examines the political and economic factors influencing the decision of investors in the stock exchange. For this purpose, first, by using the Meta Synthesis method, the factors affecting investment decisions were extracted from previous research, and then, using the Delphi technique, the identified features were evaluated and approved by experts. Then, the using DEMATEL method, the relationships between the factors were analysed, and finally, the sequence and rank of each factor were determined based on the Interpretive Structural Modeling method. Based on the results obtained from the DEMATEL method, "Foreign political news and revolutionaries" and "International economic revolutionaries" are the most influential factor on other factors, and "Predicting the country's economic situation in the future" is the most influential factor among other factors. Also, the results of the Interpretive Structural model approach show that Political factors such as the "Comments of political officials", "Iran's political relations with other countries" and "Internal Security and Stability" have the greatest impact on investment decisions.

## 1 Introduction

Achieving economic growth requires the optimal allocation of financial resources at the level of the national economy, and the existence of capital markets can make this possible. The existence of a strong and efficient capital market is one of the indicators of economic growth and development of any country; Therefore, the impact of the stock exchange on the economic development of the country is undeniable [1-12]. One of the basic tasks of a stock exchange is to allocate financial resources optimally. In order to fulfil this important task, recognizing the factors influencing the decision of investors in this market is very important. Investors today consider many factors for investing. Classical financial economics theories are based on the efficient market hypothesis, the complete rationality of factors in the use of information, and decisions based on maximizing the expected utility. These assumptions play an important role in the determinants of the asset price, risk attitude, and financial management in classical economics [19]. Based on current approaches in this field, investors' decisions are not only based on

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quantitative and rational approaches and analyses but also include many other factors such as environmental, individual and other factors. Undoubtedly, identifying the factors influencing investors' decision-making and prioritizing them in terms of their level of importance in decision-making can provide the necessary basis for investors to make favourable decisions and help the investment development process, as a result of the country's economic prosperity. Identifying these factors and their characteristics and ranking can be useful in understanding the decision-making process of investors. Investors must consider all the factors and characteristics to make their investment decision because they convert their most liquid assets into securities. If they invest without considering these factors, they will not get the desired results [13-17]. The goal of investors in investing in the stock market is to maximize the profit and welfare of the investment. To achieve this goal, investors must identify all the economic and political factors in order to make the right decisions. On the other hand, identifying these factors in different market conditions will help analysts to predict market trends and indicators and move the market towards efficiency. Also, if the behaviours of investors in different market conditions are identified, policymakers can make more correct decisions and reach their goals faster [10]. In financial matters, decision-making is defined based on an individual's influence on information, knowledge, and market elements, and shareholders and investors make decisions based on their expected priorities with the aim of reducing risk [18-22].

When decision-makers analyse a certain type of information, they make decisions based on it. It is important to note that risk and return are always present as two factors in the decisions of shareholders and investors in the financial arena, and individuals can reduce risk and gain greater returns depending on a better understanding of the environment. One of the factors influencing investment decisions is economic factors. According to the research of Gill et al. [7] and Sarbabidya and Saha [23] and other macroeconomic factors, current indicators of the economy have been effective in making appropriate decisions for investors. In principle, investors should make a broad study of macroeconomic indicators and consider many factors when deciding to invest in the stock market. If investors invest without considering a number of factors, they will not get the desired results. Investing in the stock market has a significant role in the economic growth and development of the country, and this is important when information on macroeconomic indicators such as unemployment, inflation, etc. is available. Bialowolski [4] also examined the external characteristics influencing corporate investment decisions in Poland. The two factors that determine the investment decisions are: macroeconomic factors such as growth rate forecasting, tax policies, and interest rates, and another factor is the existence of a legal environment. Salehi et al. [20] in a comprehensive study of the factors influencing the investment decisions of individual investors in the Indian capital market. He studied demographic, individual, corporate, and economic factors. The most important factors identified include financial needs, consultants' proposals, share prices, the attractiveness of dividends, and macroeconomic analysis. Political factors also have a significant impact on investment decisions. Another important factor influencing investment decisions is political factors. Ebrahimi Sarv Olia et al. [6] have considered domestic and international political news and developments, Iran's political relations with other countries, and stability and security in the region as influential indicators of the behaviour of real investors.

Khaksarian et al. [13] stated that stability or instability in the political situation in the domestic and international arena, war, peace, severance of political and economic relations with other countries, change of political pillars, and the emergence of rival political parties can increase stock prices. Undoubtedly, the calmness of the political atmosphere of the countries, because it provides the ground for

the continuation of the growing activity of economic enterprises, also creates the confidence for investors that by buying the shares of these companies, they can make a profitable profit [23-27]. This study first identifies the factors influencing investment decisions by studying the past research using the meta-combined method. Then, using decision-making methods based on test and laboratory evaluation method (DEMATEL) and interpretive structural modelling (ISM) method, ranking factors, the impact of each feature on each other, and their level of importance is determined, and finally by presenting a model of factors affecting the decision. Invests in Tehran Stock Exchange.

## 2 Research Methodology

This research seeks to determine the relationships and priorities related to each of the factors affecting investment decisions through a combined method of interpretive structural modelling and DEMATEL. Research in terms of purpose is part of applied research. Data collection and identification of required indicators and features in both qualitative and quantitative sections are performed as follows.

In the qualitative part of the research, the meta-combined method has been used in order to collect data, and identify the required indicators and components. The aim is to integrate the findings of different studies. The reason for choosing this method for conducting the present study was to collect and combine literature related to the subject of the reasons for investing in the Tehran Stock Exchange. The steps of determining the components and indicators based on the meta-combination method are arranging research questions, systematic search of texts, selecting appropriate articles, extracting textual information, analysing qualitative findings, quality control, and presentations [14]. In this study, various databases, magazines, and search engines between 2012 to 2019 were studied. In the following, based on the steps taken in the meta-combination method, the main and sub-factors and indicators are identified. Then, using this researcher-made checklist, the opinions of experts, including professors of accounting and financial management in two Delphi processes, are obtained to confirm or eliminate the above indicators. The average index was used to analyse, confirm and reject each of the sub-characteristics based on the opinions of the panel members. For this purpose, the average Likert 7-choice spectrum must be calculated first:

$$\text{Average range} = (1 + 2 + 3 + 4 + 5 + 6 + 7) / 7$$

The average of the experts' opinions for each sub-attribute is then calculated, and the attributes whose mean is higher than the mean of the spectrum (number 4) are confirmed and the attributes that are less than it is removed. In the quantitative part, the research of the indicators and factors approved in the qualitative part first turned into acronyms. Then, the opinion of 18 experts working in investment and brokerage companies was obtained through the DEMATEL questionnaire. Then, based on the method of interpretive structural modelling and the formation of initial and final access matrices, the characteristics and factors affecting the decision of investors to invest in the stock market were ranked. Research questions are stated as follows:

1. What economic and political factors influence the decision of investors in the stock market?
2. What is the impact or influence of each of the economic and political factors according to the DEMATEL method?
3. What is the interpretive structural model of economic and political factors and the rank of each factor?

### 3 Research Findings

In the meta-combined method section, at the end of the literature review, 4 Persian and 9 Latin articles were selected to extract the main and sub-components. Table 1 shows the process of searching and selecting the appropriate resources. Based on the content of the reviewed sources, the first Delphi trend checklist containing 2 main features and 18 sub-features was prepared as described in Table 2. This checklist was provided to panel members based on a Likert scale of 7 options. In order to confirm the validity of the questionnaire, the first process score checklist was provided to the panel experts and professors. Accordingly, all 16 panel members approved the questionnaire.

**Table 1:** Search and resource selection process

Number of resources found	48
Number of rejected sources in terms of title	9
Number of resources to review the abstract	39
Number of sources rejected in terms of abstract	10
Number of resources to review content	29
Number of sources rejected in terms of content	6
Number of resources to review the research method	23
Number of rejected sources in terms of research method	10
Number of final articles	13

**Table 2:** Delphi First Trend Checklist

Main features	Related research	Sub-features
Political characteristics	[3,7,8,10-14,19]	Domestic political news and developments
		Foreign political news and developments
		Comments and statements of government officials
		Iran's political relations with other countries
		Internal political security and stability
		Security and stability of the region
		Company affiliation with political parties
Economic characteristics	[2,5,9,15,21,26]	Inflation rate changes
		Changes in interest rates and bank interest
		The unemployment rate
		Per capita income
		Recession or economic boom
		Volume of liquidity
		Government tax policies
		International economic developments
		Return on investment in other sectors of the economy
		Predict the economic situation of the country in the future
		Fluctuations in oil, gold and currency rates

For reliability of the questionnaire, Cronbach's alpha coefficient was used, the results of which are described in Table 3.

**Table 3:** Cronbach's alpha coefficient of research variables

Main features	Political	Economic	Total
Number of sub-features	7	11	18
Cronbach's alpha coefficients	0.78	0.71	0.83

The results of the first Delphi process are listed in Table 4. Experts on the subject did not make any new proposals. According to the information in Table 4, it was determined that out of 18 sub-features, 14 features were removed because the average of comments is below the average of the spectrum. Now, according to the deleted features, the second Delphi trend was again held among the members of the experts in order to finally confirm the features of the research, the results of which, as well as the abbreviations, are as described in Table 5. According to Table 5 of the second round of Delphi, all sub-features are based on the average of the upper spectrum of the number 4.

**Table 4:** Results of the first round of Delphi

Main features	Sub-features	Average	Result
Political characteristics	Domestic political news and developments	5.94	Confirm
	Foreign political news and developments	5.63	Confirm
	Comments and statements of government officials	5.13	Confirm
	Iran's political relations with other countries	4.69	Confirm
	Internal political security and stability	5.06	Confirm
	Security and stability of the region	3.81	Remove
	Company affiliation with political parties	2.25	Remove
Economic characteristics	Inflation rate changes	4.5	Confirm
	Changes in interest rates and bank interest	5.19	Confirm
	The unemployment rate	2.94	Remove
	Per capita income	4.19	Confirm
	Recession or economic boom	4.69	Confirm
	Volume of liquidity	4.06	Confirm
	Government tax policies	2.44	Remove
	International economic developments	4.19	Confirm
	Return on investment in other sectors of the economy	6	Confirm
	Predict the economic situation of the country in the future	4.06	Confirm
	Fluctuations in oil, gold, and currency rates	6.13	Confirm

As a result, all 14 features were approved by experts. Due to the identification of the main and sub-characteristics of the research, in order to design the research model, the analysis of the relationships between the factors as well as the ranking of the identified factors was used by the combined method of DEMATEL and interpretive structural modelling as follows:

**Table 5:** Results of the second round of Delphi

Main features	Sub-features	Symbol	Average	Result
Political characteristics	Domestic political news and developments	P1	6.25	Confirm
	Foreign political news and developments	P2	5.81	Confirm
	Comments and statements of government officials	P3	5.06	Confirm
	Iran's political relations with other countries	P4	4.38	Confirm
	Internal political security and stability	P5	4.94	Confirm
Economic characteristics	Security and stability of the region	E1	4.31	Confirm
	Company affiliation with political parties	E2	5.31	Confirm
	Inflation rate changes	E3	4.25	Confirm
	Changes in interest rates and bank interest	E4	4.75	Confirm
	The unemployment rate	E5	4.13	Confirm
	Per capita income	E6	4.25	Confirm
	Recession or economic boom	E7	13.6	Confirm
	Volume of liquidity	E8	4.19	Confirm
	Government tax policies	E9	6.13	Confirm

## 4 Combined Method of Interpretive Structural Modelling and DEMATEL

An important feature of the DEMATEL method is its application in the field of multi-criteria decision making, which structures the interrelationships between variables. Once the relationship between the variables has been identified, DEMATEL results can be used in the network analysis process to measure dependencies and feedback between specific criteria. When the DEMATEL approach is used as part of hybrid decision-making models, its results can affect the final decision-making [1]. The DEMATEL-ISM hybrid technique is one of the most widely used techniques in multi-criteria decision-making and soft operation research. In this hybrid method, the problem is started first with the DEMATEL method, and then the DEMATEL output is used as the ISM input.

### 4.1 DEMATEL Method

Demeter is a mathematical method developed by the Bethel Institute for Genetic Research that is designed to address important issues in the global community. This method converts cause-and-effect relationships of elements into observable structural models. The DEMATEL technique is based on graph theory and helps us to plan and solve problems visually. Therefore, it is possible to divide the problem-related factors into cause and effect groups to better understand the relationships between the variables. This methodology confirms the relationship between the variables and helps to show the relationship between the variables by creating a directional graph. DEMATEL's approach in the five main steps is as follows:

Step 1: Build a survey matrix of respondents

In the first step, each respondent is asked to identify the direct effect that he or she thinks element  $i$  has on element  $j$ . This effect can be specified with a  $p_{ij}$  score. For example, we can use integers between 0 and 4 to determine the effect of element  $i$  on element  $j$  (Table 6). Thus, for each decision-maker we have:

$$pk = [p_{ij}]n \times n$$

**Table 6:** The effect of element  $i$  on element  $j$

The effect of element $i$ on element $j$	Score
Effect less	0
Low impact	1
Medium impact	2
high impact	3
Too much impact	4

Step 2: Build the initial decision matrix

This matrix is actually extracted from the simple average of the respondents' opinions in the previous step. We call the initial decision matrix  $A$  and denote it as  $A = [a_{ij}]n \times n$ . Where  $a_{ij} = \frac{1}{k} \sum_{k=1}^k p_{ij}$ . Table 7 shows the initial decision matrix.

**Table 7:** Initial decision matrix (matrix A)

X	P1	P2	P3	P4	P5	E1	E2	E3	E4	E5	E6	E7	E8	E9
P1	0.00	0.00	3.11	2.83	2.22	3.67	3.61	0.17	3.67	0.56	0.00	3.22	3.22	3.61
P2	1.50	0.00	2.44	2.44	2.00	2.28	2.22	0.83	2.00	0.72	3.33	1.50	2.72	3.33
P3	3.06	1.44	0.00	2.50	2.22	3.67	3.67	3.67	3.67	3.67	2.83	3.67	3.67	3.67
P4	2.83	1.33	2.50	0.00	2.28	3.00	3.00	3.00	3.00	3.00	2.11	2.94	2.94	3.06
P5	2.28	0.50	2.44	2.28	0.00	3.61	3.61	1.56	3.61	1.50	0.00	3.33	3.33	3.50
E1	2.67	0.00	3.17	2.33	2.67	0.00	3.83	3.61	3.83	3.83	0.00	3.78	3.78	3.83
E2	2.67	0.00	3.17	2.44	2.67	3.83	0.00	3.78	3.83	3.83	0.00	3.78	3.78	3.83

**Table 7:** Initial decision matrix (matrix A)

X	P1	P2	P3	P4	P5	E1	E2	E3	E4	E5	E6	E7	E8	E9
E3	0.28	0.00	3.17	2.39	1.33	3.56	3.72	0.00	3.56	3.72	0.00	1.00	3.33	3.33
E4	2.67	0.00	3.17	2.44	2.67	3.83	3.83	3.56	0.00	3.67	0.00	3.67	3.67	3.83
E5	0.00	0.00	3.17	2.44	1.33	3.83	3.83	3.50	3.44	0.00	0.00	3.56	3.56	3.83
E6	0.33	3.39	2.61	1.50	0.72	2.33	2.39	0.44	0.83	0.33	0.00	0.28	2.78	3.28
E7	0.67	0.00	3.17	2.39	1.17	3.78	3.78	1.00	3.67	3.61	0.00	0.00	3.33	3.56
E8	0.17	0.00	3.17	2.44	0.78	3.78	3.78	3.33	3.67	3.61	0.00	3.33	0.00	3.72
E9	2.83	0.00	3.17	2.44	2.83	3.83	3.83	3.33	3.83	3.83	0.00	3.61	3.78	0.00

Step 3: Calculate the initial effect matrix

The initial effect matrix D is obtained by normalizing the initial decision matrix A. In this matrix, the elements on the original diameter are all equal to zero. The D matrix shows the primary effects of an element, both impact and effectiveness. The following equations should be used for normalization.

$$D = S.A \quad , \quad S > 0$$

$$[d_{ij}] n \times n = S[a_{ij}] n \times n \quad , \quad S > 0 \quad , \quad i, j \in \{1, 2, \dots, n\} [1]$$

$$s = \text{Min} \left[ \frac{1}{\max_{1 \leq i \leq n} \sum_{j=1}^n |a_{ij}|} , \frac{1}{\max_{1 \leq j \leq n} \sum_{i=1}^n |a_{ij}|} \right]$$

Step 4: Extract the complete direct and indirect effect matrix

At this stage, the total effect matrix, called T, is calculated based on the following equations [1]. In this step, we must first subtract the unit matrix (I) minus the normal matrix, then invert the resulting matrix. Finally, multiply the inverse matrix by the normal matrix to obtain the total effect matrix (T) (Table 8).

$$T = D1 + D2 + D3 + \dots + Dm = D(I - D)^{-1} \quad , \quad m \rightarrow \infty$$

If in the matrix T, the sum of the rows is represented by the vector r and the sum of the columns by the vector d, we have:

$$T = [t_{ij}] n \times n \quad R = [r_i] n \times 1 = \left( \sum_{j=1}^n t_{ij} \right) n \times 1 \quad D = [d_j] 1 \times n = \left( \sum_{i=1}^n t_{ij} \right) 1 \times n$$

**Table 8:** Complete direct and indirect effect matrix (T matrix)

X	P1	P2	P3	P4	P5	E1	E2	E3	E4	E5	E6	E7	E8	E9	R	D	R+D	R-D
P1	0.10	0.02	0.22	0.18	0.15	0.26	0.26	0.15	0.26	0.18	0.02	0.23	0.24	0.26	2.54	1.89	4.43	0.66
P2	0.11	0.02	0.19	0.16	0.13	0.21	0.21	0.14	0.20	0.16	0.09	0.17	0.21	0.23	2.22	0.37	2.59	1.85
P3	0.18	0.05	0.20	0.22	0.18	0.31	0.32	0.26	0.31	0.29	0.09	0.29	0.31	0.31	3.32	3.14	6.46	0.18
P4	0.16	0.05	0.23	0.14	0.16	0.27	0.27	0.22	0.26	0.24	0.07	0.24	0.26	0.27	2.84	2.53	5.37	0.31
P5	0.15	0.03	0.21	0.18	0.11	0.27	0.27	0.19	0.26	0.21	0.02	0.24	0.25	0.26	2.65	2.10	4.75	0.55
E1	0.17	0.02	0.26	0.20	0.18	0.23	0.30	0.25	0.30	0.28	0.03	0.28	0.29	0.30	3.09	3.69	6.78	0.61-
E2	0.17	0.02	0.26	0.20	0.18	0.30	0.23	0.26	0.30	0.28	0.03	0.28	0.29	0.30	3.11	3.70	6.81	0.59-
E3	0.10	0.01	0.22	0.17	0.13	0.26	0.26	0.15	0.25	0.24	0.02	0.19	0.24	0.25	2.51	2.89	5.40	0.38-
E4	0.17	0.02	0.25	0.20	0.18	0.30	0.30	0.25	0.22	0.28	0.03	0.27	0.29	0.30	3.06	3.59	6.65	0.52-
E5	0.10	0.02	0.23	0.19	0.14	0.28	0.28	0.23	0.27	0.19	0.02	0.25	0.26	0.28	2.74	3.25	5.99	0.51-
E6	0.08	0.08	0.16	0.12	0.09	0.17	0.18	0.11	0.14	0.12	0.02	0.12	0.18	0.19	1.77	0.51	2.28	1.25
E7	0.11	0.02	0.22	0.18	0.13	0.26	0.26	0.18	0.26	0.25	0.02	0.17	0.25	0.26	2.57	3.26	5.83	0.69-
E8	0.11	0.02	0.23	0.18	0.13	0.27	0.27	0.23	0.27	0.25	0.02	0.24	0.19	0.27	2.69	3.57	6.26	0.88-
E9	0.17	0.02	0.26	0.20	0.19	0.30	0.30	0.25	0.30	0.28	0.03	0.28	0.29	0.22	3.09	3.70	6.79	0.61-
D	1.89	0.37	3.14	2.53	2.10	3.69	3.70	2.89	3.59	3.25	0.51	3.26	3.57	3.70	38.20	38.20	76.39	0.00

If  $r_i$  represents the sum of the rows of row  $i$  of the  $T$  matrix, then  $r_i$  represents the sum of the direct and indirect effects of factor  $i$  on other factors (criteria). If  $d_j$  is the sum of the columns of the  $j$ -th column of the  $T$  matrix, then  $d_j$  represents the sum of the direct and indirect effects that the  $j$ -th factors accept from the other factors. Therefore, if  $r_i - d_j$  is positive, it indicates that element  $i$  affects other elements and if it is negative, it indicates that element  $i$  is affected by other elements [1]. In other words, if  $r_i - d_j$  is negative, it means that element  $i$  is affected or disabled, and if it is positive, element  $i$  is effective or cause.

Step 5: Communication Map Chart - Effect and Final Analysis

To plot the relationship-effect map diagram,  $r_i + d_j$  are placed on the X-axis and  $r_i - d_j$  on the Y-axis. The values of  $r_i + d_j$  indicate the importance of each factor (Figure 1).

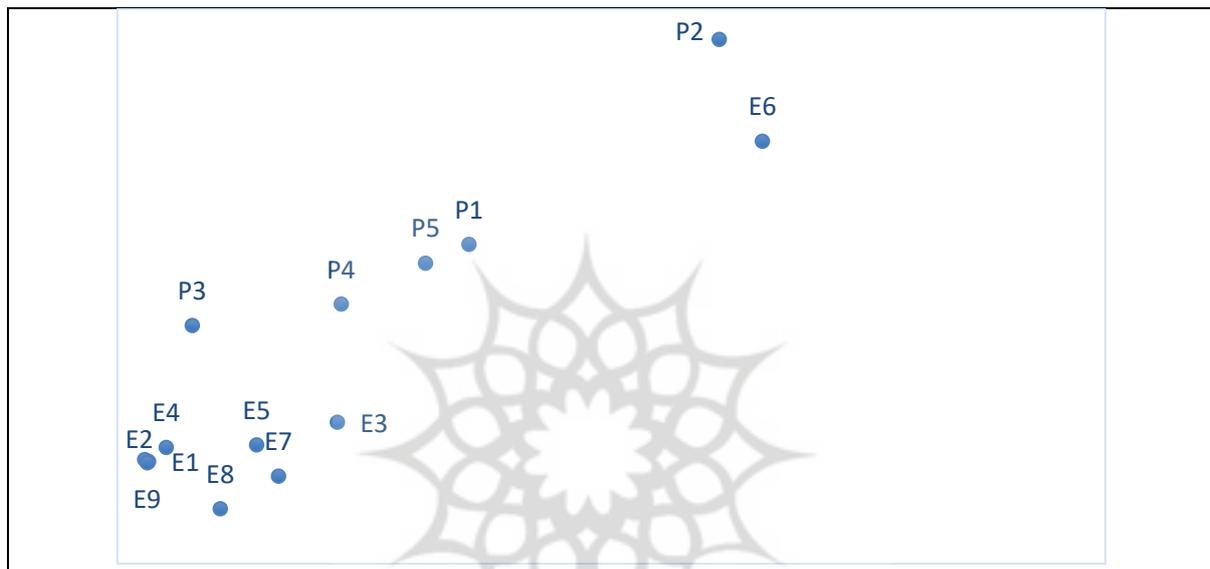


Fig. 1: Relationship diagram – effect

Table 9: Table of analysis of cause and effect relationships

x	Results	Affects the following features	It is affected by the following features	Analysis
P1	effective	P3, E1, E2, E4, E7, E8, E9		Core criteria and priority in planning
P2	effective	E1, E3, E4, E8, E9		Core criteria and priority in planning
P3	effective	P4, E1, E2, E3, E4, E5, E7, E8, E9	P1, P4, P5, E1, E2, E4, E5, E7, E8, E9	Core criteria and priority in planning
P4	effective	P3, E1, E2, E3, E4, E5, E7, E8, E9	P3, E1, E2, E4, E9	Core criteria and priority in planning
P5	effective	P3, E1, E2, E4, E5, E7, E8, E9		Core criteria and priority in planning
E1	Impressive	P3, P4, E2, E3, E4, E5, E7, E8, E9	P1, P2, P3, P4, P5, E2, E3, E4, E5, E7, E8, E9	The main criteria and planning based on it
E2	Impressive	P3, P4, E1, E3, E4, E5, E7, E8, E9	P1, P2, P3, P4, P5, E1, E3, E4, E5, E7, E8, E9	The main criteria and planning based on it
E3	Impressive	P3, E1, E2, E4, E5, E8, E9	P3, P4, E1, E2, E4, E5, E8, E9	The main criteria and planning based on it
E4	Impressive	P4, P5, E1, E2, E3, E5, E7, E8, E9	P1, P2, P3, P4, P5, E1, E2, E3, E5, E7, E8, E9	The main criteria and planning based on it
E5	Impressive	P3, E1, E2, E3, E4, E7, E8, E9	P3, P4, P5, E1, E2, E3, E4, E7, E8, E9	The main criteria and planning based on it
E6	effective			Core criteria and priority in planning
E7	Impressive	P3, E1, E2, E4, E5, E8, E9	P1, P3, P4, P5, E1, E2, E4,	The main criteria and planning based on it

**Table 9:** Table of analysis of cause and effect relationships

x	Results	Affects the following features	It is affected by the following features	Analysis
			E5, E8, E9	
E8	Impressive	P3, E1, E2, E3, E4, E5, E7, E9	P1, P2, P3, P4, P5, E1, E2, E3, E4, E5, E7, E9	The main criteria and planning based on it
E9	Impressive	P3, P4, E1, E2, E3, E4, E5, E7, E8	P1, P2, P3, P4, P5, E1, E2, E3, E4, E5, E7, E8	The main criteria and planning based on it

To reduce the complexity of decision-making, it is necessary to set a threshold value for the levels of influence to eliminate the effect of less important factors. For this purpose, to calculate the threshold value from the matrix T, an arithmetic mean is taken and this value is considered the threshold value. Accordingly, the value will be 0.195 thresholds. To determine the relationship between the factors, according to the assumptions of this method, the following should be done:

1. If  $r_i - d_i < 0$  is said, this factor is the main criterion and planning should be done based on it.
2. If  $r_i - d_i > 0$  is said, this factor is the core criterion and should be given priority in planning (Table 9).

## 4.2 Interpretive structural modelling method

Structural and interpretive modelling is a technical method that makes it possible to study the complexity of the system and structure the system in a way that is easy to understand. This method converts opaque mental models of systems into clear and explicit models for useful purposes and includes the following steps:

Step 1: Create an access matrix

To obtain the access matrix, the elements of the matrix T are added to the unit matrix, then the arithmetic mean of the resulting matrix is taken. If each of the elements of the matrix is greater than the mean number, we equate it to one, and if it is less than that, we equate it to zero (Table 10).

**Table 10:** Access matrix

X	P1	P2	P3	P4	P5	E1	E2	E3	E4	E5	E6	E7	E8	E9	Output
P1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
P2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
P3	0	0	1	0	0	1	1	0	1	1	0	1	1	1	8
P4	0	0	0	1	0	1	1	0	0	0	0	0	0	1	4
P5	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
E1	0	0	0	0	0	1	1	0	1	1	0	1	1	1	7
E2	0	0	0	0	0	1	1	0	1	1	0	1	1	1	7
E3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
E4	0	0	0	0	0	1	1	0	1	1	0	1	1	1	7
E5	0	0	0	0	0	1	1	0	1	1	0	0	0	1	5
E6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
E7	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
E8	0	0	0	0	0	1	1	0	1	0	0	0	1	1	5
E9	0	0	0	0	0	1	1	0	1	1	0	1	1	1	7
Input	1	1	1	1	1	8	9	1	7	6	1	6	6	8	

Step 2: Determine the level of features

In this step, by obtaining the final access matrix to determine the level of criteria, define two achievable sets (output) and the first set (input) and then obtain their subscription so that the accessible set is a set that in the final access matrix, the number of criteria Appears in a row as a row and the preceding set

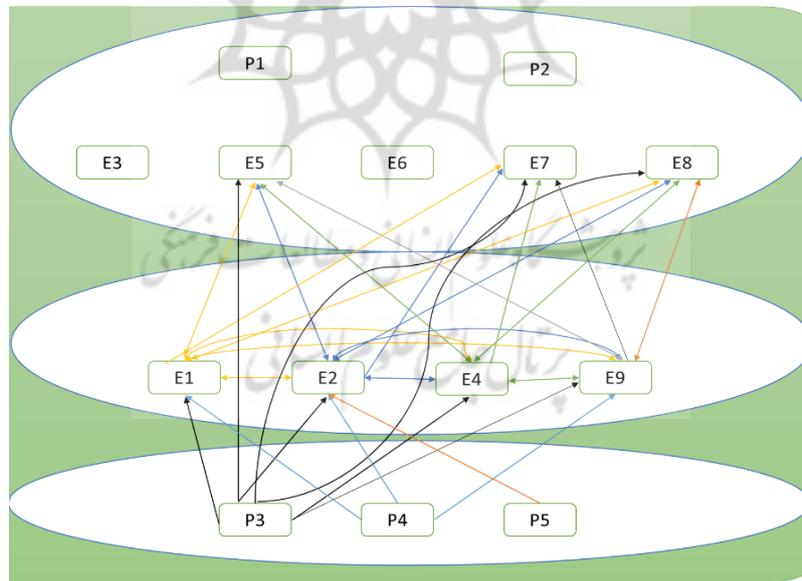
(input) is a set in which the number of criteria in the columns; Appears as one. By obtaining the subscription of these two sets, the next column of the table (subscription) will be completed. In the first row where the subscription of the two sets is equal to the available set, the first level of priority will be determined. After determining the level, we remove the criteria or criteria whose level is specified from the table and repeat this operation until all the remaining variables are determined, and after determining the final level, the final shape of the variables will be drawn using the specified levels (Table 11).

**Table 11:** Determine the level of features

X	Input	No.	Output	No.	Subscription	No.	Level
P1	1	1	1	1	1	1	1
P2	2	1	2	1	2	1	1
P3	3	1	3	1	3	1	3
P4	4	1	4	1	4	1	3
P5	5	1	5	1	5	1	3
E1	3,4,6,7,9,14	6	6,7,9,14	4	6,7,9,14	4	2
E2	3,4,5,6,7,14	6	6,7,9,14	4	6,7,9,14	4	2
E3	8	1	8	1	8	1	1
E4	3,6,7,9,14	5	6,7,9,14	4	6,7,9,14	4	2
E5	3,6,7,9,10,14	6	6,7,9,10,14	5	6,7,9,10,14	5	1
E6	11	1	11	1	11	1	1
E7	3,6,7,9,12,14	6	12	1	12	1	1
E8	3,6,7,9,13,14	6	6,7,9,13,14	5	6,7,9,13,14	5	1
E9	3,4,6,7,9,14	6	6,7,9,14	4	6,7,9,14	4	2

**Step 3: Draw the model**

To draw the model of the interpretive structure, the table for determining the level of properties and the access matrix is used (Fig. 2).



**Fig. 2:** Interpretive structural model

**5 Conclusion and Discussion**

This study aims to identify and rank the political and economic factors affecting the investment decision of investors in the stock market using the combined method of DEMATEL and interpretive structural modeling. Therefore, its results can be divided into two parts. The first part, which is related to the

identification of the mentioned factors, using the meta-combined method of previous studies and research, was studied and as a result, 18 features were identified. These features were then made available to experts and professors in the fields of finance and accounting. Finally, experts approved 14 features in two Delphi fan trends. The second part is related to analysing and determining the relationships between features and ranking them. For this purpose, the DEMATEL method was used to determine the effectiveness and susceptibility of the identified factors and characteristics. The results of Dematel's method show that all political characteristics affect other factors and economic factors, except the characteristics of economic developments, are influenced by other factors. Accordingly, the two features of foreign news and political developments and international economic developments have the greatest impact on other features. This indicates the influence of political and economic factors on international events, although it is sometimes observed that this influence is reversed depending on the government's economic policies. The three characteristics of predicting the country's economic situation in the future, investment profits in other sectors of the economy, and fluctuations in oil, gold, and currency rates are the most affected by other factors. In recent years, the exchange rates of gold and foreign exchange and the economic activities of other sectors of the economy other than the stock market have been influenced by the comments of political officials and Iran's political and economic relations with other countries. Then, the interpretive structural modeling method was used to rank the features.

For this purpose, the output of the DEMATEL method was used as the input of the interpretive structural modeling method. The results of this method show that the characteristics of domestic political news and developments, foreign political news and developments, per capita income, liquidity volume, international economic developments, investment profits in other sectors of the economy, and forecasting of the country's economic situation in the future were at level one. These characteristics have less influence on investment decisions. At the second level are the characteristics of changes in inflation, changes in bank interest rates, recession, and economic prosperity, and fluctuations in oil, gold, and foreign exchange rates. According to experts, these factors have a moderate impact on investor decisions. At the third level, there are three political factors, including the comments of political officials, Iran's political relations with other countries, and internal security and stability. The characteristics of this level have the greatest impact on the investment decisions of investors and are the basis of other characteristics and should be given priority in investment-related planning. It is suggested that in future research, the impact of other environmental factors such as social, cultural, market, and industrial factors should be studied. Also, the statistical population of this research includes experts working in investment and brokerage companies. It is suggested that in future research, the opinions of managers of investment companies and other investors be obtained.

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