

Providing a model of factors affecting the selection of financing strategy using the fuzzy Delphi technique

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Abstract

The purpose of this study was to present a model of factors affecting the selection of financing strategy for the petrochemical industry supply chain in petrochemical companies located in the Mahshahr Port Petrochemical Special Economic Zone. One of the methods used to acquire group knowledge is the fuzzy Delphi technique, which is a structured process for predicting and assisting in decision-making during survey rounds, gathering information, and finally, group consensus. In this technique, a questionnaire containing the extracted criteria is first sent to each member of the expert group separately and confidentially. Members are then asked to assign a score of 1 to 10 to each criterion. In the second step, the questionnaires will be collected and the criteria with an average score of less than 7 will be removed. The remaining criteria are sent in the form of a new questionnaire. These steps continue until you reach a set of criteria that scores above seven. The results showed that the components obtained from the study include Rial Internal Finance, Currency Internal Finance, LC, Combined Internal Finance (Currency-Rial), Participation Bonds, Usance, International Loan, Foreign Direct Investment, Bank Loan, Public-Private Partnership (PPP), Off-Balance Financing, Government Grants, Corporate Transparency, Restrictions on Financing, Capital Structure, Collateral assets, Firm Value, Firm Size, Managers' attitudes, Financing Policies, Funding Source Criteria, Political Factors, Religious and Legal Restrictions.

Keywords: Financing Strategy, Petrochemical Industries, Fuzzy Delphi Technique
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1 Introduction

Capital in any business is one of the most important factors of production and entrepreneurs and producers need to supply capital for their product or service. Financing is very important for companies; Because continuing the activities of companies depends on financing [14]. The issue of financing projects and economic enterprises in recent years has become one of the main challenges for private sector development and as a result an obstacle to accelerating the country economic growth. There are various methods and tools for financing companies, each with its own features;

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These tools and methods are explained and used in relation to the needs, financial capacity, economic conditions, and diversity of people's behavior in investing and facing risk [33].

Corporate financing strategy is one of the most important topics for scientists in the field of economy and accounting. One of the important goals of financing is to invest in companies for greater profitability. Different financing methods include domestic and foreign financing or a combination of these two types. Managers of businesses in the current era, due to limited financial resources, especially in the field of global trade and the tightening of competition, are under increasing pressure to reduce operating and final costs and choose the least expensive type of capital structure to carry out the activities of the enterprise in order to increase the value of the enterprise, timely payment of debts, continuity of activity and greater presence in domestic and foreign markets. These pressures are usually exerted on corporate executives by various groups such as shareholders, consumers, and other stakeholders. To achieve the aforementioned goals, the strategies of managers are to provide the desired financial resources at the lowest cost for the economic growth and development of the firm's activities, increase profits and maximize shareholder wealth [6]. The most important function of a financial system is to facilitate financial flow and direct it towards the most efficient type of investment. Financial tools, as facilitators of financial flows, allow producers to change economic resources more quickly and accurately, relying on monetary and financial resources. Obviously, the more competitive conditions are provided and there are suitable financial tools, this action will help more in the efficient allocation of resources [9].

The Association of Integrated Supply Chain Management defines it as a strategic asset that creates value and competitive advantage for the organization [20]. The existence of global competition has made business environments more complex. Intense competition has placed companies in conditions of uncertainty such as the constant change in demand and product diversity [18]. One of the consequences of this uncertainty is the complexity of the supply chain, the unpredictability of supply chain conditions, the difficulty of management, and the difficulty of controlling the supply chain [24].

Organizational complexities have provided the conditions for managers to place more emphasis as key decision-makers to achieve their organization's goals and ensure the management and proper use of resources. Firms' access to finance increases their competitiveness. In addition, access to finance significantly facilitates the growth of the firm. Researchers point out that credit constraints have a negative effect on innovation and investment spending, and that good financing methods and strategies have a positive effect on firm growth. Accordingly, one of the most important financial decisions is how to finance enterprises, which has a significant role in their continuity and profitability growth [26].

Theoretically, managers' decisions about the optimal financing structure are influenced by various factors such as political, economic, and legal factors. Therefore, determining the strategy of financing structure, in addition to being affected by some macroeconomic variables such as inflation, interest rates, lending policies in the banking system, and taxation, is affected by factors such as financing costs, financial and commercial risk of companies, asset composition along with contractual restrictions on attracting resources through debt creation and revision of stock exchange laws [17].

Various financing strategies are used differently for different companies and each firm tries to choose the most optimal combination of financing strategies according to different factors. Because each of these strategies, tools, and methods of financing has its characteristics and is explained and used concerning the needs, financial capacity, economic conditions, and diversity of people's behavior toward investing and facing risk [14][14].

On the other hand, one of the most important goals that financial managers should consider in order to maximize shareholder wealth is to determine the best combination of firm resources or capital structure. It is the responsibility of each financial manager to optimize the structure of assets, liabilities, and equity in order to maximize shareholder wealth. Proper financing is one of the most difficult and complex elements in the business start-up process, which plays a very important role in starting and developing a business. In our country, there are many challenges in this regard that it is necessary to identify and develop the necessary practical and executive solutions for them [19]. Capital structure refers to a specific combination of long-term debt and equity that is used to finance a firm's operations. The capital structure shows how a firm provides the financial resources needed for all of a firm's operations and growth in a variety of ways. The capital structure of companies is generally affected by the amount of capital required and the composition of funding sources. Capital structure policy balances risk and return. On the one hand, using more debt increases the risk of the firm's profitability flow, and on the other hand, it leads to a higher expected rate of return. The risk of using more debt reduces the stock price and on the other hand, the higher expected rate of return increases the stock price. As a result, the optimal capital structure is the capital structure that maximizes the stock price of the firm, and this always happens when the debt ratio is lower when the expected earnings per share are maximized and create an optimal balance between risk and return to maximize stock prices [19].

Table 1: Seven fuzzy degrees for evaluating indicators

Linguistic variable	Fuzzy value	Fuzzy number scale
Completely insignificant	1	(0, 0, 0.1)
Very insignificant	2	(0, 0.1, 0.3)
Insignificant	3	(0.1, 0.3, 0.5)
Medium	4	(0.3, 0.5, 0.75)
Important	5	(0.5, 0.75, 0.9)
Very important	6	(0.75, 0.9, 1)
Quite important	7	(0.9, 1, 1)

The supply chain of the petrochemical sector, like other important industries in the country, needs optimal financing methods. Therefore, the main question is what is the optimal financing framework in the supply chain of petrochemical industries? To answer this question and considering the importance of the issue, the purpose of this study is to providing a model of factors affecting the selection of financing strategy using the fuzzy Delphi technique.

2 Methodology

One of the methods used to acquire group knowledge is the fuzzy Delphi technique, which is a structured process for predicting and assisting in decision-making during survey rounds, gathering information, and finally, group consensus. In this technique, a questionnaire containing the extracted criteria is first sent to each member of the expert group separately and confidentially. Members are then asked to assign a score of 1 to 10 to each criterion. In the second step, the questionnaires will be collected and the criteria with an average score of less than 7 will be removed. The remaining criteria are sent in the form of a new questionnaire. These steps continue until you reach a set of criteria that scores above seven. There is disagreement about the composition and volume of the Delphi technique panel. The usual recommendation is to use a combination of people with multiple specialties, and heterogeneous groups are better than heterogeneous groups. In this study, a combination of experts with different specialties has been used. Habibi et al., [12] believes that six to 14 members are ideal for the Delphi technique, and according to Gurrera et al., [11] between 5 and 10 members is sufficient, if a combination of experts with different specialties is used.

Triangular fuzzy numbers will be used to fuzzify the experts' points of view. Experts' views on the importance of each indicator are collected with a 7-degree fuzzy spectrum.

The next step is to consolidate the views of experts. Various methods have been proposed to aggregate the opinions of "n" respondents. In fact, these aggregation methods are experimental methods that have been proposed by various researchers. In this study, the fuzzy mean method is used. Calculate the mean of triangular fuzzy numbers

$$F_{AVE} = \left(\left\{ \frac{\sum l}{n} \right\}, \left\{ \frac{\sum m}{n} \right\}, \left\{ \frac{\sum u}{n} \right\} \right). \tag{2.1}$$

It is usually possible to summarize the average of triangular and trapezoidal fuzzy numbers by a definite value which is the best corresponding mean. This operation is called defuzzification. There are several ways to defuzzify. In this study, the surface center method proposed by Van Leekwijck and Etienne [31] is used for defuzzification:

$$DF_{ij} = \frac{[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})]}{3} + l_{ij}. \tag{2.2}$$

The defuzzified value greater than 0.7 is acceptable and any index with a score less than 0.7 is rejected [12].

2.1 Analysis of research data

Experts' point of view is used to measure the importance and validation of indicators with the Delphi technique. Although experts use their mental competencies and abilities to make comparisons, it should be noted that the traditional process of quantifying individuals' perspectives does not fully reflect the human thinking style. In other words, the use of fuzzy sets is more compatible with linguistic and sometimes ambiguous human explanations, and therefore, it is better to use long-term forecasting and real-world decision-making using fuzzy sets (fuzzy numbers) [13].

Table 2: The view of fourteen experts on the importance of each indicator

R1	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11	E12	E13	E14
C01	TH	H	TH	H	H	TH	VH	TH	M	VH	TH	TH	TH	L
Q02	H	TH	M	L	VH	TH	H	M	VH	TH	L	VH	TH	H
Q03	VH	H	VH	M	H	M	VH	M	M	H	H	VH	VH	M
Q04	VH	H	L	M	TH	VH	M	H	VH	TH	TH	TH	H	VH
Q05	H	L	H	TH	M	VH	VH	VH	TH	VH	H	TH	VH	H
Q06	VH	M	TH	VH	H	TH	H	TH	H	VH	H	VH	TH	M
Q07	M	H	L	VL	TL	TH	VH	H	TH	VH	TL	VH	M	VH
Q08	VH	H	VH	TH	VH	VH	H	TH	TH	VH	TH	VH	TH	VH
Q09	H	VH	H	TH	H	TH	VH	VH	M	L	H	H	VH	H
Q10	VH	TH	VH	VH	TH	TH	TH	VH	TH	VH	VH	TH	TH	VH
Q11	L	VH	TH	TL	H	M	TH	VH	TH	H	VH	TH	TH	TH
Q12	TH	VH	TH	H	TH	VH	TH	H	VH	TH	TH	TH	H	VH
Q13	H	VH	M	VH	TH	VL	H	TH	H	VH	L	VH	H	TH
Q14	VH	H	TH	TH	VH	TH	M	TH	H	TH	H	M	L	H
Q15	TH	TH	VH	TH	TH	VH	TH	VH	TH	TH	TH	TH	VH	VH
Q16	TH	TH	H	VH	VH	VH	TH	VH	VH	VH	TH	TH	H	H
Q17	VH	TH	VH	TH	VH	TH	TH	TH	VH	H	TH	VH	H	L
Q18	TH	TH	TH	H	TH	VH	VH	VH	TH	TH	TH	TH	VH	H

2.2 The first round of the Delphi technique

The views of 14 experts on the importance of each indicator based on the seven-point Likert scale are shown in Table 2.

Fuzzifying the views of the experts’ panel for each of the research indicators is presented in Table 3.

The next step is to consolidate the views of experts. Various methods have been proposed to aggregate the opinions of “n” respondents. In fact, these aggregation methods are experimental methods that have been proposed by various researchers. For example, a conventional method for aggregating a set of triangular fuzzy numbers is the minimum “l”, the geometric mean “m”, and the maximum “u”.

$$F_{AGR} = \left(\min\{l\}, \prod\{m\}, \max\{u\} \right) \tag{2.3}$$

$$F_{AGR} = \left(\min\{l\}, \left\{ \left(\frac{\sum m}{n} \right) \right\}, \max\{u\} \right) \tag{2.4}$$

$$F_{AVE} = \left(\left\{ \frac{\sum l}{n} \right\}, \left\{ \frac{\sum m}{n} \right\}, \left\{ \frac{\sum u}{n} \right\} \right). \tag{2.5}$$

Each triangular fuzzy number resulting from the aggregation of experts’ views for the index *j* is represented as follows:

$$\begin{aligned} \tau_j &= (L_j, M_j, U_j) \\ L_j &= \min(X_{ij}) \\ M_j &= \sqrt[n]{\prod_{i=1}^n X_{ij}} \\ U_j &= \max(X_{ij}). \end{aligned}$$

Index *i* refers to an expert. So that

X_{ij}: The value of the *ith* expert evaluation of the criterion *j*

L_j: The minimum value of evaluations for the criterion *j*

M_j: The geometric mean of the experts’ evaluation of the performance of criterion *j*

U_j: Maximum value of evaluations for the criterion *j*

In this study, the fuzzy mean method was used.

Table 3: Fuzzifying the views of the experts' panel for each of the research indicators

Fuzzifying	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7
Index 1	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)
Index 2	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.3, 0.5, 0.75)	(0.1, 0.3, 0.5)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)
Index 3	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)
Index 4	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.1, 0.3, 0.5)	(0.3, 0.5, 0.75)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)
Index 5	(0.5, 0.75, 0.9)	(0.1, 0.3, 0.5)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
Index 6	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)
Index 7	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.1, 0.3, 0.5)	(0, 0.1, 0.3)	(0, 0, 0.1)	(0.9, 1, 1)	(0.75, 0.9, 1)
Index 8	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
Index 9	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)
Index 10	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)
Index 11	(0.1, 0.3, 0.5)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0, 0, 0.1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.9, 1, 1)
Index 12	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)
Index 13	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0, 0.1, 0.3)	(0.5, 0.75, 0.9)
Index 14	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.3, 0.5, 0.75)
Index 15	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)
Index 16	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)
Index 17	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)
Index 18	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
Fuzzifying	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12	Expert 13	Expert 14
Index 1	(0.9, 1, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.1, 0.3, 0.5)
Index 2	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.1, 0.3, 0.5)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)
Index 3	(0.3, 0.5, 0.75)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)
Index 4	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
Index 5	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
Index 6	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.3, 0.5, 0.75)
Index 7	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0, 0, 0.1)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)
Index 8	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
Index 9	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.1, 0.3, 0.5)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
Index 10	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
Index 11	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)
Index 12	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
Index 13	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.1, 0.3, 0.5)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)
Index 14	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.1, 0.3, 0.5)	(0.5, 0.75, 0.9)
Index 15	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
Index 16	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)
Index 17	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.1, 0.3, 0.5)
Index 18	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)

2.3 Defuzzification of values

It is usually possible to summarize the average of triangular and trapezoidal fuzzy numbers by a definite value which is the best corresponding mean. This operation is called defuzzification. There are several ways to defuzzify. In most cases, the following simple method is used for defuzzification:

$$x_m^1 = \frac{(L + M + U)}{3} \tag{2.6}$$

Another simple method to defuzzify the mean of triangular fuzzy numbers is as follows:

$$F_{ave} = (L, M, U) \tag{2.7}$$

$$x_m^1 = \frac{L + M + U}{3}; x_m^2 = \frac{L + 2M + U}{4}; x_m^3 = \frac{L + 4M + U}{6}$$

$$\text{Crisp number} = Z^* = \max(x_{max}^1, x_{max}^2, x_{max}^3)$$

The values of x_{max}^i are not much different and are always a number close to M. M is the mean of the probable values “m” from different triangular fuzzy numbers. Nevertheless, the definite value of the largest x_{max}^i is considered to be calculated [29]. In this study, the surface center method is used for defuzzification according to [31]. as follows:

$$DF_{ij} = \frac{[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})]}{3} + l_{ij} \tag{2.8}$$

The fuzzy mean and defuzzified output of the values for the indicators are given in Table 4. A fuzzy value greater than 0.7 is acceptable and any index with a score less than 0.7 is rejected [13].

Table 4: Results of screening indicators (first round)

Indicators	Fuzzy average	Definite value	Result of Round 1
Rial Internal Finance	(0.693,0.846,0.925)	0/821	Accepted
Currency Internal finance	(0.582,0.754,0.871)	0/736	Accepted
LC	(0.518,0.714,0.882)	0/705	Accepted
Combined Internal Finance (Currency-Rial)	(0.629,0.796,0.907)	0/777	Accepted
Participation bonds (bonds)	(0.632,0.807,0.918)	0/786	Accepted
Usance	(0.657,0.829,0.936)	0/807	Accepted
International loan	(0.464,0.607,0.736)	0/602	Rejected
Foreign direct investment	(0.768,0.914,0.986)	0/889	Accepted
Bank loan	(0.586,0.779,0.904)	0/756	Accepted
Public-Private Partnership (PPP)	(0.825,0.95,1)	0/925	Accepted
Corporate Transparency	(0.646,0.786,0.868)	0/767	Accepted
Restrictions on financing	(0.771,0.918,0.979)	0/889	Accepted
Capital structure	(0.579,0.75,0.868)	0/732	Accepted
Collateral assets	(0.621,0.793,0.9)	0/771	Accepted
Attitudes of managers	(0.846,0.964,1)	0/937	Accepted
Financing policies	(0.75,0.904,0.979)	0/877	Accepted
Criteria of the funding source	(0.732,0.879,0.95)	0/854	Accepted
Macroeconomic variables	(0.8,0.936,0.986)	0/907	Accepted

At this stage, the prevention and preparedness index scored less than 7 and was eliminated. The reason for the elimination of these indicators was that although these indicators were important in choosing the financing strategy of the supply chain of the petrochemical industry, experts in the second round because the two are not used much today, gave it less score and less importance.

2.4 The second round of Delphi techniques

Fuzzy Delphi analysis continued for the indicators remaining in the second round. At this stage, 23 indicators were evaluated based on the views of 14 experts. The results of fuzzy Delphi in the second round are reported in Table 5.

2.5 The third round of the Delphi technique

Based on the output of the second round and by deleting and adding the indicators, finally, 23 indicators remained. To validate these indicators, fuzzy Delphi continued in the third round. The views of 14 experts on the importance of each indicator are shown in Table 6.

In the next step, the overall mean of the fuzzy means of individuals' scores must be calculated. To calculate the mean of "n" respondents' comments, the fuzzy mean will be calculated as follows. Each triangular fuzzy number for each of the indicators is represented as follows:

$$\tau_j = (L_j, M_j, U_j)$$

$$L_j = \min(X_{ij})$$

$$M_j = \sqrt[n]{\prod_{i=1}^n X_{ij}}$$

$$U_j = \max(X_{ij})$$

Index "i" refers to an expert. So that

X_{ij} : The value of the i^{th} expert evaluation of the criterion j

L_j : The minimum value of evaluations for the criterion j

M_j : The geometric mean of the experts' evaluation of the performance of criterion j

Table 5: Fuzzy mean and fuzzy screening of indicators (round two)

Indicators	Fuzzy average	Definite value	Result of Round 2
Rial Internal Finance	(0.654,0.804,0.904)	0/787	Accepted
Currency exchange finance	(0.614,0.75,0.836)	0/733	Accepted
LC	(0.579,0.764,0.9)	0/748	Accepted
Combined Internal Finance (Currency-Rial)	(0.7,0.864,0.954)	0/839	Accepted
Participation bonds	(0.779,0.921,0.986)	0/895	Accepted
Usance	(0.696,0.854,0.943)	0/831	Accepted
International loan	(0.846,0.964,1)	0/937	Accepted
Foreign direct investment	(0.818,0.946,0.993)	0/919	Accepted
Bank loan	(0.807,0.939,0.993)	0/913	Accepted
Public-Private Partnership (PPP)	(0.632,0.786,0.871)	0/763	Accepted
Corporate Transparency	(0.714,0.882,0.964)	0/854	Accepted
Restrictions on financing	(0.564,0.743,0.857)	0/721	Accepted
Capital structure	(0.829,0.954,0.993)	0/925	Accepted
Collateral assets	(0.696,0.861,0.961)	0/839	Accepted
Attitudes of managers	(0.621,0.779,0.871)	0/757	Accepted
Financing policies	(0.779,0.914,0.968)	0/887	Accepted
Criteria of the funding source	(0.693,0.836,0.918)	0/815	Accepted
Off-balance financing	(0.668,0.843,0.954)	0/821	Accepted
Grants from the government	(0.646,0.821,0.936)	0/801	Accepted
Firm Value	(0.721,0.879,0.954)	0/851	Accepted
Firm Size	(0.7,0.864,0.954)	0/839	Accepted
Political Factors	(0.682,0.839,0.925)	0/815	Accepted
Religious and legal restrictions	(0.721,0.871,0.95)	0/848	Accepted

U_j : Maximum value of evaluations for the criterion j [31, 32, 13].

In fact, these aggregation methods are experimental methods that have been proposed by various researchers. For example, a conventional method for aggregating a set of triangular fuzzy numbers is the minimum “l”, the mean “m”, and the maximum “u”. $F_{AGR} = \left(\min\{l_j\}, \left\{ \frac{\sum m}{n} \right\}, \max\{u_j\} \right)$ [32].

In this study, the method (minimum, mean, maximum) has been used.

2.6 Defuzzifying values

The surface center method is used for defuzzification as follows:

$$DF_{ij} = \frac{[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})]}{3} + l_{ij}.$$

The fuzzy mean and defuzzified output of the values for the indicators are given in Table 6. A fuzzy value greater than 0.5 is acceptable and any index with a score less than 0.5 is rejected [31]

2.7 End of Delphi technique rounds

In the second round, no questions were asked, which is a sign that the Delphi rounds are over. In general, one approach to the end of Delphi is to compare the average scores of the first round and second round questions. If the difference between the two stages is much smaller than the threshold (0.2), then the survey process stops [23].

According to the results of Table 8, the value of the Kendall coefficient in the first round of the Delphi technique is 0.412, which shows that the consistency among the views of experts is moderate. Also, a significant value of 0.001 has been obtained, which shows that the results can be relied on with 95% confidence. As a result, regardless of the indicators that scored below 6, other indicators were used to study in the second round. Kendall coefficient in the second round of the Delphi technique is 0.587 which shows that the consensus among experts is good. Also, a significant value of 0.001 has been obtained, which shows that the results can be relied on with 95% confidence. Also, the average score of all items is about 7, which indicates that the views are close. Therefore, the Delphi technique has been stopped and the identified indicators have been used for the final analysis.

Table 6: Fuzzification expert panel view for each of the research indicators

R3	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7
C01	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C02	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)
C03	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)
C04	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.3, 0.5, 0.75)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
C05	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.9, 1, 1)
C06	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C07	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)
C08	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.9, 1, 1)
C09	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C10	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
C11	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)
C12	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.3, 0.5, 0.75)
C13	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C14	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.9, 1, 1)	(0.75, 0.9, 1)
C15	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)
C16	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)
C17	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)
C18	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C19	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C20	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)
C21	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)
C22	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)
C23	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
R3	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12	Expert 13	Expert 14
C01	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)
C02	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)
C03	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C04	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.9, 1, 1)
C05	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C06	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)
C07	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C08	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.9, 1, 1)
C09	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C10	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C11	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.3, 0.5, 0.75)	(0.3, 0.5, 0.75)
C12	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C13	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)
C14	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C15	(0.5, 0.75, 0.9)	(0.3, 0.5, 0.75)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C16	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)
C17	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C18	(0.9, 1, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C19	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)
C20	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C21	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)
C22	(0.75, 0.9, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.9, 1, 1)	(0.75, 0.9, 1)	(0.75, 0.9, 1)
C23	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)	(0.5, 0.75, 0.9)	(0.5, 0.75, 0.9)	(0.75, 0.9, 1)

3 Discussion and Conclusion

The results showed that the components obtained from the research are Rial Internal Finance, Currency Internal Finance, LC, Combined Internal Finance (Currency-Rial), Participation Bonds, Usance, International loans, Foreign Direct Investment, Bank Loans, Public-Private Partnership (PPP), Off-balance Financing, Government Grants, Corporate transparency, Constraints on Financing, Capital Structure, Collateralized Assets, Firm Value, Firm Size, Managers' Attitudes, Financing Policies, Criteria of the Financing Source, Political Factors, Religious and Legal Restrictions. These results are consistent with the reports of Ghadrddan [8] on the financing of stock companies, Shahrabi et al. [30], and Ibidini et al. [17]. Corporate financing strategy is one of the most important topics for financial and accounting scientists. One of the important goals of financing is to invest in companies for greater profitability. Different financing methods include domestic and foreign financing or a combination of these two types. Managers of business agents in the current era, due to limited financial resources, especially in the field of global trade and tightening the competition, are under increasing pressure to reduce operating and final costs and choose the least expensive type of capital structure to carry out the activities of the enterprise in order to increase the value of the enterprise, timely payment of debts, continuity of activity and greater presence in domestic and foreign markets. These pressures are usually exerted on corporate executives by various groups such as shareholders, consumers, and other stakeholders.

Table 7: Fuzzy means of the experts' panel view for each of the research indicators

R3	L	M	U	Mean	Crisp	Result
C01	0.735	0.885	0.965	(0.965,0.885,0.735)	0.862	Accepted
C02	0.554	0.754	0.896	(0.896,0.754,0.554)	0.735	Accepted
C03	0.758	0.908	0.985	(0.985,0.908,0.758)	0.884	Accepted
C04	0.538	0.735	0.885	(0.885,0.735,0.538)	0.719	Accepted
C05	0.665	0.842	0.942	(0.942,0.842,0.665)	0.816	Accepted
C06	0.623	0.815	0.935	(0.935,0.815,0.623)	0.791	Accepted
C07	0.515	0.719	0.885	(0.885,0.719,0.515)	0.706	Accepted
C08	0.623	0.815	0.935	(0.935,0.815,0.623)	0.791	Accepted
C09	0.731	0.892	0.969	(0.969,0.892,0.731)	0.864	Accepted
C10	0.685	0.854	0.950	(0.95,0.854,0.685)	0.830	Accepted
C11	0.562	0.758	0.904	(0.904,0.758,0.562)	0.741	Accepted
C12	0.723	0.877	0.965	(0.965,0.877,0.723)	0.855	Accepted
C13	0.600	0.800	0.935	(0.935,0.8,0.6)	0.778	Accepted
C14	0.731	0.881	0.973	(0.973,0.881,0.731)	0.862	Accepted
C15	0.631	0.819	0.942	(0.942,0.819,0.631)	0.797	Accepted
C16	0.719	0.885	0.969	(0.969,0.885,0.719)	0.858	Accepted
C17	0.750	0.904	0.977	(0.977,0.904,0.75)	0.877	Accepted
C18	0.765	0.904	0.973	(0.973,0.904,0.765)	0.881	Accepted
C19	0.769	0.915	0.985	(0.985,0.915,0.769)	0.890	Accepted
C20	0.723	0.877	0.965	(0.965,0.877,0.723)	0.855	Accepted
C21	0.727	0.888	0.977	(0.977,0.888,0.727)	0.864	Accepted
C22	0.781	0.923	0.985	(0.985,0.923,0.781)	0.896	Accepted
C23	0.658	0.846	0.954	(0.954,0.846,0.658)	0.819	Accepted

To achieve the aforementioned goals, the strategies of managers are to provide the desired financial resources at the lowest cost for the economic growth and development of the firm's activities, increase profits and maximize shareholder wealth [6]. The most important function of a financial system is to facilitate financial flow and direct it towards the most efficient type of investment. Financial tools, as facilitators of financial flows, allow producers to change economic resources more quickly and accurately, relying on monetary and financial resources. Obviously, the more competitive conditions are provided and there are suitable financial tools, this action will help more in the efficient allocation of resources [9]. Organizational complexities have provided the conditions for managers to place more emphasis as key decision-makers to achieve their organization's goals and ensure the management and proper use of resources. Firms' access to finance increases their competitiveness. In addition, access to finance significantly facilitates the growth of the firm. Researchers point out that credit constraints have a negative impact on innovation and investment spending, and good financing methods and strategies have a positive effect on firm growth. Accordingly, one of the most important financial decisions is how to finance enterprises, which has a significant role in their continuity and profitability growth [26]. Different financing strategies are used differently for different companies and each firm tries to choose the most optimal combination of financing strategies according to different factors. Because each of these strategies, tools and methods of financing has its own characteristics and is explained and used in relation to the needs, financial capacity, economic conditions and diversity of people's behavior in investing and facing risk [14]. Organizational complexities have provided the conditions for managers to place more emphasis as key decision makers to achieve their organization's goals and ensure the management and proper use of resources. Firms' access to finance increases their competitiveness. In addition, access to finance significantly facilitates the growth of the firm. Researchers point out that credit constraints have a negative impact on innovation and investment spending, and good financing methods and strategies have a positive effect on firm growth. Accordingly, one of the most important financial decisions is how to finance enterprises, which has a significant role in their continuity and profitability growth [26]. Different financing strategies are used differently for different companies and each firm tries to choose the most optimal combination of financing strategies according to different factors. Because each of these strategies, tools, and methods of financing has its own characteristics and is explained and used concerning the needs, financial capacity, economic conditions, and diversity of people's behavior in investing and facing risk [14].

Findings of Howell [16] show that increasing financial constraints and thus reducing the level of financial resources of companies negatively affects the performance of innovative activities of companies. Guariglia & Yang [10] and Gautam and Vaidya [7] also found that financial constraints were significantly associated with stock returns, investment efficiency, and firm growth. Also, studies in the field of transparency show that information transparency is affected by various variables. Deboskey & Gillett [4], Negintaji and Hashemi Gol Sefidi [27], Elliott et al. [5], Li - Chiu [22], Leuz and Winsock [21], Mashayekh and Sadat Nasiri [25], Hashemi et al. [15], BadavarNahandi et al. [1] in their studies showed that corporate transparency (information) has a significant relationship with the variables of capital cost, stock return, pricing, firm performance and value, shareholder wealth and investment efficiency. On the

Table 8: The distance between the final value of the first round and the second round

Indicators	The result of round 1	The result of round 2	Difference	Result
Rial Internal Finance	0/821	0/787	0/035	Approved
Currency Internal Finance	0/736	0/733	0/002	Approved
LC	0/705	0/748	0/043	Approved
Combined Internal Finance (Currency-Rial)	0/777	0/839	0/062	Approved
Participation bonds	0/786	0/895	0/110	Approved
Usance	0/807	0/831	0/024	Approved
International loan	0/889	0/937	0/048	Approved
Foreign direct investment	0/756	0/919	0/163	Approved
Bank loan	0/925	0/913	0/012	Approved
Public-Private Partnership (PPP)	0/767	0/763	0/004	Approved
Corporate Transparency	0/889	0/854	0/036	Approved
Restrictions on financing	0/732	0/721	0/011	Approved
Capital structure	0/771	0/925	0/154	Approved
Collateral assets	0/937	0/839	0/098	Approved
Attitudes of managers	0/877	0/757	0/120	Approved
Financing policies	0/854	0/887	0/033	Approved
Criteria of the funding source	0/907	0/815	0/092	Approved
Off-balance financing	-	0/821	-	Approved
Grants from the government	-	0/801	-	Approved
Firm Value	-	0/851	-	Approved
Firm size	-	0/839	-	Approved
Political factors	-	0/815	-	Approved
Religious and Legal Restrictions	-	0/848	-	Approved

Table 9: Kendall coefficient is used to show the coherence of the research experts' views

	Number of indicators	Number of experts	Kendall coefficient	Degree of freedom	Significance value
First round	18	14	0/455	19	0/001
Second round	17	14	0/587	25	0/001

other hand, many studies have been conducted on the relationship between funding constraints and various aspects of transparency; For example, Biddle et al. [2] have shown that high-quality financial reporting reduces the negative effects of financing constraints on investments by reducing information asymmetry. On the other hand, a significant number of experimental studies have focused on the consequences of increasing information transparency in terms of impact on performance, efficiency, and other variables [7, 28]. Increasing the disclosure of accounting information and transparency reduces information asymmetry. Transparency also affects the forecasting behavior of financial analysts in terms of reducing incorrect pricing and increasing their forecasting accuracy. On the other hand, the effect of ownership structures on corporate governance and transparency of financial information has also been considered in the empirical literature. Chen et al. [3] by studying the effect of the level of disclosure of investment activities on the level of financing constraints, found that companies that explicitly disclose investment activities in capital projects face fewer restrictions on funding for innovative projects.

References

- [1] Y. BadavarNahandi, S. Ghaderi, and R. BeheshtiNahandi, *Transparency of accounting information impact on investment inefficiency of the companies listed in Tehran Stock Exchange*, Quart. J. Econ. Res. Polic. **21** (2014), no. 68, 49–64.
- [2] G. Biddle, G. Hilary, R. Verdi, *How does financial reporting quality improve investment efficiency?*, J. Account. Econ. **48** (2009), no. 2-3, 112–131.
- [3] Y. Chen, X. Hua, and A. Boateng, *Effects of foreign acquisitions on financial constraints, dose the role of disclosure transparency matter?*, Int. Bus. Rev. **25** (2016), no. 6, 218–235.
- [4] D.G. DeBoskey and P.R. Gillett, *The impact of multi-dimensional corporate transparency on us firms' credit ratings and cost of capital*, Rev. Quant. Finan. Acc. **40** (2014), no. 1, 101–134.
- [5] W.K. Elliott, D. Brooke, and E. Peecher, *Expected mispricing: the joint influence of accounting transparency and investor base*, J. Accounti. Res. **48** (2010), no. 2, 343–381.
- [6] B. Ghanizadeh and Z. Barani, *Financing methods in business enterprises*, J. Certified Public Account. **3** (2016), no. 1, 59–69.

- [7] V. Gautam and R. Vaidya, *Growth and finance constraints in Indian manufacturing firms*, Appl. Financ. Econ. **24** (2013), no. 1, 31–40.
- [8] E. Ghadrddan, *Investigating special cases with the balance sheet approach of financing from the perspective of agency theory*, Invest. Knowledge **8** (2019), no. 29, 297–313.
- [9] D. Ghoreishi and F. Roodpashti Rahnama, *Explaining the effective factors on financing by converting assets into securities in Keshavarzi Bank*, Investment Knowledge **8** (2019), no. 31, 373–393.
- [10] A. Guariglia, and J. Yang, *A balancing act: Managing financial constraints and agency costs to minimize investment inefficiency in the Chinese market*, J. Corporate Finance **36** (2016), 111–130.
- [11] R.J. Gurrera, N. Stanley Caroff, A. Cohen, B.T. Carroll, F. DeRoos, A. Francis, and S. Frucht, *An international consensus study of neuroleptic malignant syndrome diagnostic criteria using the Delphi method*, J. Clinic. Psych. **72** (2011), no. 9, 88–92.
- [12] A. Habibi, A. Sarafrazi, and S. Izadyar, *Delphi technique theoretical framework in qualitative research*, Int. J. Engin. Sci. **3** (2014), no. 4, 8–13.
- [13] H. Hagrass, and C. Wagner, *Towards the wide spread use of type-2 fuzzy logic systems in real world applications*, IEEE Comput. Intell. Mag. **7** (2012), no. 3, 14–24.
- [14] A. Hasan and S.A. Butt, *Impact of ownership structure and corporate governance on capital structure of Pakistan listed companies*, Int. J. Bus. Manag. **4** (2009), no. 2, 50–57.
- [15] S. Hashemi, M. Sadeghei, and A. Soroshyar, *The earnings quality role on pattern, financing policy and investment efficiency of Tehran Security Exchange*, J. Account. Res. **6** (2010), no. 2, 86–102.
- [16] A. Howell, *Firm R&D innovation and easing financial constraints in China: Does corporate tax reform matter?*, Res, Policy **45** (2016), no. 10, 1996–2007.
- [17] A. Ibidini, O. Kehinde, O. Mary, and M. Olukondum, *Data ontherelationshipsbetween financing strategies, entrepreneurial competencies and business growth of technology-based SMEs in Nigeria*, Data Brief **18** (2018), no. 2018, 988–991.
- [18] F. Isik, *Complexity in Supply Chains: A new approach to quantitative measurement of the Supply-Chain-Complexity*, Supply Chain Manag. **21** (2011), no. 4, 417–432.
- [19] B. Jamshid Navid, S. Ahmadi, and H. Anbari, *Capital structure with a view to short-term and long-term financing methods*, Third Ann. Nat. Conf. Modern Manag. Sci., Tehran, Iran, 2014.
- [20] S.M.A. Khatami Firoozabadi, L. Ulfat, M. Amiri, and H. Sharifi, *The complexity of supply chain as a strategic asset and position of financial performance*, J. Asset Manag. Financ. **6** (2018), no. 4, 57–78.
- [21] C. Leuz and P. Winsock, *Economic consequences of financial reporting and disclosure regulation: A review and suggestions for future research*, Working Paper, University of Chicago, 2008.
- [22] C. Li-Chiu, *Do transparency and disclosure predict firm performance? Evidence from the Taiwan market*, Expert Syst. Appl. **36** (2009), no. 8, 11198–11203.
- [23] S. McMillan, M. King, and M.P. Tully, *How to use the nominal group and Delphi techniques*, Int. J. Clinic. Pharmacy **38** (2016), 655–662.
- [24] J. Mangan and C. Lalwani, *Global Logistics and Supply Chain Management*, John Wiley & Sons, Hoboken, New Jersey, 2016.
- [25] S. Mashayekh and N. SadatNasiry, *The impact of financial reporting transparency on value relevance of earning accounting*, J. Empir. Res. Account. **5** (2016), no. 3, 127–154.
- [26] E. Mohammadi, F. Sabzalipour, and F. Dehghani, *Examining the relationship between corporate transparency and financial constraints of Listed Companies in Tehran Stock Exchange*, J. Asset Manag. Financ. **6** (2018), no. 1, 201–216.
- [27] Z. Negintaji and A. Hashemi Golsefidi, *The effect of transparency profit on the capital cost and additional returns of companies listed in Tehran Stock Exchange*, J. Macro Strategic Policy **3** (2015), no. 11, 95–114.

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- [28] M. Ogneva, K. Raghunandan, and K.R. Subramanian, *Subramanian, internal control weakness and cost of equity: Evidence from SOX section 404 disclosures*, AAA Financial Accounting and Reporting Section, (FARS) Meeting Paper, 2006. Available at SSRN: <http://ssrn.com/abstract5766104>.
- [29] H. Rouhparvar and A. Panahi, *A new definition for defuzzification of generalized fuzzy numbers and its application*, *Appl. Soft Comput.* **30** (2015), 577–584.
- [30] B. Shahrabi, M. Ashrafi, and I. Abbasi, *Modeling the factors effective on the financing start-ups (start-up businesses) with DEMATEL technique*, *Financ. Manag. Strategy* **7** (2019), no. 25, 61–89.
- [31] W. Van Leekwijck and E.E. Kerre, *Defuzzification: Criteria and classification*, *Fuzzy Sets Syst.* **108** (1999), no. 2, 159–178.
- [32] M. Voskoglou, *Use of the triangular fuzzy numbers for student assessment*, arXiv preprint arXiv:1507.03257 (2015).
- [33] Z. Zamani and Z. Sohrabi, *Investigating the effect of corporate governance and audit quality on financing through bank loans in private firms*, *Asset Manag. Financ.* **6** (2018), no. 3, 133–146.