Designing a model of effective factors in the failure of manufacturing contracts in the field of oil and gas: Using the AHP technique

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Abstract

This research uses the Analytic Hierarchy Process (AHP) to design a model of factors affecting the failure of manufacturing contracts in the field of oil and gas. The present study is applied based on the purpose and from the point of view of how information is collected; it is a type of mixed (qualitative-quantitative) research. In this research, the statistical population consists of two parts, the quality department includes 21 in-university experts and specialists and experts aware of the subject of construction contracts and the quantitative part includes 384 contractors, consultants, employers, project stakeholders, and people related to the construction contracts in the field of oil and gas. The theme analysis method was used to analyze the data of this research. The hierarchical analysis (AHP) method was used to rank the components and Spss and Expert Choice software were used to analyze the data. The results of the Hierarchical Method (AHP) showed that; comparing the five main dimensions, the technical dimension is in the first place with 32.42% Therefore, the technical dimension has the greatest impact and the political dimension has the least impact on the failure of construction contracts in the field of oil and gas.

Keywords: Oil and Gas Construction Contract, Multi-Criteria Decision Making, Analytic Hierarchy Process (AHP)

1 Introduction

The oil and gas industry is one of the largest and most complex industries in the world. In countries facing a shortage of this resource, there was a demand for oil and its products. As a result, countries began exchanging oil. This issue involved the producing and consuming countries in the complexities of oil and gas contracts [16]. In some existing contracts in the world and Iran, disputes have arisen between employers and consultants, and contractors, which have led to the suspension of the implementation of projects and plans. Resolving these disputes is time-consuming and increases the cost, or operation is delayed, Lack of production on time causes a country's capital to be wasted and the completion of the project after the time specified in the contract increases the contract amount. To improve the quality of implementation of projects and plans, including oil and gas, and the occurrence of minimal

disputes between employers, consultants, and contractors, it is necessary to design a model for construction contracts (in the field of oil and gas) through multi-criteria decision-making techniques which eliminate all the disadvantages of existing contracts and to be implemented and exploited in the best possible way [6]. Four desirable features in oil and gas contracts include: Sovereignty and ownership of oil and gas resources, observance of national rights and interests during oil and gas operations, transfer of appropriate knowledge and technical skills, and increasing the government's share of oil and gas revenues are important and considered by all oil and gas countries [10].

Carefully in the structure of all oil and gas contracts, it is specified that; these agreements do not pay serious attention to national energy policies in the oil and gas sector, because these policies are either not fundamentally formulated or their implications for the regulation of oil and gas contracts are not very clear. Favorable features such as the exercise of national sovereignty and ownership over oil and gas resources, the observance of national rights and interests in oil and gas operations, and the transfer of knowledge and technical skills have not been realized as expected in oil and gas contracts and in all the contracts that have been concluded so far, no attention has been paid to improving the management capacity of the National Oil and Gas Company and upgrading it to the level of national international companies. The reason for these three shortcomings should not only be sought in the attitude of government officials to the oil and gas sector, as the main provider of the country's foreign exchange needs. Rather, there has been a lack of sufficient knowledge and expertise, especially in interdisciplinary studies in the technical, economic, financial, legal, and political fields of oil and gas, and the failure to design new models of contracts in the field of oil and gas to meet all reasonable demands and expectations [6].

2 Review of The Theoretical Foundations and Research Background

2.1 Definition and types of construction contracts

From the perspective of the term construction contract is:

"Contracting" is a contract under which the government or public institutions and organizations entrust the performance or sale of goods with certain conditions in return for wages and for a certain period to a natural or legal person named contractor [17]. What is common about a contract is a "contract" in which, under the general terms of the contract, the contractor, who is a legal entity, undertakes the subject matter operations. Also, "contracting" is subject to the General Accounting Law and the Government Transactions Regulations, and the auction and tender procedures are specific to these contracts [1]. A brief look at the treaty and the general terms of the treaty shows that; The contract concluded between the employer and the employment contract certainly cannot be following one of the specific contracts mentioned in the civil law because of the complexity of the relationship between the parties to the contract prevents it from being justified in the form of one of these contracts, because the complexity of the relationship between the parties to the contract prevents it from being justified in the form of one of these contracts. However, some obligations and powers of the parties to the contract are such that they are close and similar to some of the effects and conditions of certain contracts so that sometimes it seems that the parties want their relationship to be compatible with one of these contracts [16].

2.2 Types of oil contracts

Various factors play a role in choosing the type of contract, the most important of which is the volume and type of reserves - exploration and exploitation costs and the recycling factor. The new models of upstream oil industry contracts are designed so that international oil companies have specific work plans based on the dollar or the euro. At the same time, they transfer the necessary technology for the economy and production to the host countries. These contracts are generally divided into Royalty/tax, Production sharing agreements, or Prod Risk service agreements. The purpose of royalty/tax contracts is to increase national influence on production operations [7].

2.3 Public ownership of oil and its effects

One of the most challenging aspects of international oil contracts throughout the history of the oil industry has been the issue of oil ownership. This issue is important both in terms of governance and in terms of law and economics. The issue of transfer of ownership of oil is also of great importance for our country, which is an oil-rich country. While it seems that the issue of oil ownership in an oil contract has not been clearly defined and the citations made in this regard can be legally criticized [9] Public ownership of oil and gas resources and the ownership of this wealth to the general public of a country have led to proprietary legal effects. The principle of national sovereignty over natural resources is one of the effects of public ownership of natural resources and oil and gas [8].The principle of permanent

sovereignty over natural resources means that; Every country has the right to absolute sovereignty, including the ownership, use, and possession of all its wealth, natural resources, and economic activities and can take any action to extract the exploitation and sale and by setting the necessary laws and regulations to control and regulate the ownership, investment, exploitation, and sale of these resources and no person or country can deprive the source country of this right based on having privileges, contracts, etc. [2].

2.4 Oil ownership in Iranian oil contracts

In the original oil contracts, which were concluded on a concession basis, what was the subject of the contract was the granting of concessions, and the issue of oil ownership was not explicitly mentioned in the contract. For example, in a contract called Darcy, as the first international oil contract, the subject of the contract is the granting of "special permits for inspection, exploration, discovery, extraction, expansion, and presentation for trade and transportation and sale of the following products, which include natural gas, oil, and natural bitumen." This phrase indirectly refers to the ownership of oil discovered and extracted by the other party to the contract, but no specific time or place has been specified for it. The same procedure has been repeated in the 1312 concession agreement between the Iranian government and the "British-Iranian Oil Company Limited" which replaces the so-called Darcy contract [11] The "Law on the Exchange of Oil and Gas Sales Contracts and the Managing of Its Operations" called the "Consortium Agreement", which was approved and signed in the political context after the coup d'état of 28 August, constitutes a service contract. With the explanation, that; The members of the consortium that make up the other party to the contract (paragraph c of Article 1) will have the right to "explore and drill and produce and extract crude oil and natural gas" (paragraph one (a) of Article 4) and then they will buy the oil and gas produced by their representatives in the name of trading companies. (Part A and the signifier of Article 18) According to paragraph 3 of the signifier of Article 18, "Crude oil and natural gas sold by the National Iranian Oil Company to commercial companies shall become the property of the said companies at the wellhead." Therefore, unlike previous contracts, this contract, which has the status of a contract (service) and sale of oil, states that; The transfer of ownership will be at the source. We must be careful that this contract has the form of law due to the requirement of approval by the parliament [18].

In the first contract under this law, which was approved as the law related to the agreement on exploration, exploration, extraction, and exploitation of oil between the Iranian Oil Company and the Italian company Agip Mineraria on August 15, 1957, There has been no talk of transferring ownership of the oil to a joint venture or joint venture between the National Iranian Oil Company and the Italian company Ajip Mineraria, ie the Iran-Italy Oil Company or Sirip (Article 2). However, paragraph 12 of Article 12 states: "Sirip will undertake to supply all the oil quantities it has for sale, first of all, to the National Iranian Oil Company and Agip Mineraria" [15].

The second contract under Law 1957 is the contract between the National Iranian Oil Company and Pan American Petroleum Corporation, approved on May 7, 1957. During which a joint venture called "Pan-American Iranian Oil Company" (Article 5-1), whose entire capital is provided in the form of fifty-fifty by the parties, becomes the agent of the contract [3]. In addition to these two contracts, ten other contracts have been concluded and approved under the 1336 law, in all of them, the model of the contract between the National Iranian Oil Company and the Pan-American Petroleum Corporation, ie the establishment of a mixed system and ownership of oil, has been used in fifty-fifty wells [5].

At the time when the 1957 law provided for the conclusion of concession contracts as a partnership, three oil contracts were concluded, which had the form of a contract or a service contract. The first contract was the one signed between the National Iranian Oil Company and the French alf-Enterprise Company Durachers Adaptively Petroleum (ARAP) as the Law of Exchange and Execution of the Oil Exploration and Production Contract with Arak on December 1, 1966 [13].Exploration and production contract between the National Iranian Oil Company and European companies approved on June 6, 1970, (With French, Italian, Spanish, Belgian and Austrian companies) with the agency of the French-owned Iranian Petroleum Company (Sofiran) and the exploration and production contract between the National Iranian Oil Company and Continental Company approved on October 23, 1970, regarding structural ownership similar to the contract with They have ARAP companies [12]. According to the oil, the law approved on August 8, 1974.

"The National Iranian Oil Company may enter into negotiations with any person, both Iranian and foreign, to carry out oil exploration and development operations in the free oil sectors, and may formulate and sign contracts as it deems appropriate on a contractual basis and per the provisions of this law." (Paragraph 2 of Article 3 [19] Under this law, before the victory of the Islamic Revolution, six more contracting contracts were concluded. The structure of these contracts was the same as the structure of the three previous contracts, and in addition to the legal stipulation, the stipulation of the contract was to keep the ownership of the oil for the National Iranian Oil Company. This can be deduced from the fact that a contract is a contract and the oil sales contract below it.

After the victory of the Islamic Revolution until September 30, 1987, when the new oil law is passed, there is no legal event related to the subject of discussion. This law, unlike its predecessors, does not enter into the terms and conditions of oil contracts and considers only "concluding important contracts between the Ministry of Oil or oil operations units with domestic and foreign natural and legal persons and identifying important cases" as subject to regulations that will be approved by the Cabinet upon the proposal of the Ministry of Oil (Article 5). Of course, this regulation will never be prepared and approved [18]. Finally, the Cabinet resolution on the general conditions, structure, and pattern of upstream oil and gas contracts was approved on August 13, 2016. One of the principles governing a contract, which is stated in paragraph A of Article 3, is "the exercise of the right of sovereignty and public ownership overall oil and natural gas resources and reserves of the country through the Ministry of Oil."

Also, according to paragraph c of this article, "reimbursement of all costs ... and payment of wages according to the contract through the allocation of part ... of additional field products or revenues from the implementation of the contract based on the day of the sale price of the product."

It is also stated in paragraph Ch.: "All contractor operations shall be performed in the name and by the employer from the date of commencement of the contract, and all property, including buildings, goods, equipment, wells and surface and subsurface facilities, shall belong to the employer from the same date." However, ownership of extracted oil and gas is explicitly stated in Article 11 (c): "Oil, gas or gas condensate and other materials in the tanks subject to the contract belong entirely to the Islamic Republic of Iran and oil, gas or condensate, as well as any by-products of production, belong entirely to the employer."

2.5 Ownership of oil in contractual forms

In this section, we intend to examine the transfer of ownership in the main forms of oil contracts based on the nature of these contracts and regardless of sub-conditions and based on Iranian law and international custom. The three common forms of contract in oil operations can be considered concession contracts, participation in production, and service (contracting) [14].

2.6 Concession contracts

Concession agreements in Iranian law can be further analyzed and interpreted in two ways. The details of this study are beyond the scope of this article, which will be omitted. We examine the transfer of ownership on the assumption of acceptance of either of these two assumptions.

2.7 Production participation contracts

Given that production sharing agreements consider participation in the final product, in the first encounter, the company's contract comes to mind, however, according to the type of contract and its origin, which has been adopted from the contracts related to agricultural lands, it is more in line with the contract of farming and Sharecropping and even bailment. Of course, these two categories of contracts are complementary to each other. For this reason, the second group is also called partnership contracts. We examine these two.

3 Methodology

The present research is applied based on the purpose and from the point of view of how to collect information; it is a kind of mixed exploratory (qualitative-quantitative) research. The statistical population is in the qualitative section of experts (specialists and experts aware of the issue of construction contracts in the field of oil and gas). Since experts in the field of research are not identifiable, purposive sampling and snowball sampling were used. In this method, after identifying or selecting the first expert and expert, it was used to identify and select the second sampling unit. In the same way, other units of the sample are identified and selected. The number of samples in the qualitative stage was according to the theoretical saturation level. That is, the researcher continued the interviews to the point that more interviews would lead to newer data and more knowledge would be gained about identifying the factors influencing the failure of construction contracts in the oil and gas field. With this process, 21 experts have been identified as sufficient for the interview. In the present study, semi-structured interviews were used to identify the key problems and factors for the success of construction contracts (in the field of oil and gas). Interviews were conducted in a variable period of 35 to 45 minutes. In the first stage, many themes were obtained which, by combining and reducing them using a reciprocal data analysis process, reduced the total set of primary codes to fewer codes. To avoid duplication, all duplicate or similar primary codes that were conceptually very close to each other were put together into a single set,

creating concepts that formed categories, and then the resulting categories were analyzed. To ensure the validity of the research, the researcher has used the methods of triangulation of data sources, review by members, and review by colleagues to determine the validity of his research. To calculate the reliability of the retest, several interviews were selected as a sample from the interviews conducted, and each of them was coded twice at a specific time interval by the researcher himself. The specified codes are then compared at two intervals for each selected interview. In each of the selected interviews, codes that are similar at two intervals are identified as agreement codes and dissimilar codes as disagreement codes. The formula for estimating the reliability between coding at two-time intervals is as follows:

$$\text{Percentage of retest reliability} = (2 * \text{Number of agreements})/(\text{Total number of codes}) \times 100$$

Table 1: Calculations related to retesting reliability

Row	Interviewer code	The sum of the codes of the two coders	Number of codes agreed	Number of failed codes	Reliability of retesting
1	Interview 1	145	66	25	91%
2	Interview 4	159	73	12	91%
3	Interview 10	80	39	4	97%
4	Interview 12	106	48	23	90%
	Total	490	226	64	92%

In this study, to calculate the reliability of the retest, 4 interviews were selected from the interviews conducted and each interview was coded by the researcher at a one-month interval and using the formula for open test reliability, the calculated reliability is 92%, Since this reliability rate is more than 60%, the reliability of the interview coding of this research is confirmed.

Table 2: How to distribute the questions

row	Variable	Dimensions	Number of questions	Arrange the questions
1	Problems of construction contracts in the field of oil and gas	Political dimension	5	1-5
		Legal dimension	4	6-9
		International dimension	5	10-14
		Economic dimension	5	15-19
		Technical dimension	9	20-28

The statistical population of this research is a small part includes all contractors, consultants, employers and project stakeholders, and people related to the construction contracts in the field of oil and gas. The sampling method in this study is stratified random sampling appropriate to the size of the population. In this study, 384 people have been considered using Cochran's formula. The data collection tool in the quantitative part is a researcher-made questionnaire and is taken from the opinions of experts. This questionnaire includes 35 items related to the key factors for the success of the implementation of construction contracts in the field of oil and gas.

4 Validity and Reliability in The Quantitative Part

Quantity of narrative part

Content validity was used to evaluate the validity of the research questionnaire. To evaluate content validity quantitatively, two relative content validity coefficients (CVR) and content validity index (CVI) have been used.

In the present study, 21 people were used.

1. Item 1- Essential (17 people)
2. Item 2- Useful but not necessary (3 people)
3. Unnecessary item 3 (1 person)

$$CVR = \frac{17 - (20 \div 2)}{21 \div 2} = \frac{7}{10.5} = \%66 > \%42$$

Since the CVR value of the scale is now greater than 0.42, so the content validity of this item is confirmed.

Fully related (13 people) - Related but need review (6 people) - Unrelated (1 person) - Need serious review (1 person)

$$CVI = \frac{13 + 6}{20} = \%95$$

Since the CVI value is now greater than 79%, so the content validity of this item is also confirmed.

The reliability of the part is small

To measure reliability, an indicator called "reliability coefficient" is used and its size is usually determined between zero and one.

Table 3: Cornbrash's alpha value for different parts of the questionnaire

row	Variable	Dimensions	Number of questions	Cronbach's alpha
1	Problems of construction contracts in the field of oil and gas	Political dimension	5	0.87
		Legal dimension	4	0.89
		International dimension	5	0.85
		Economic dimension	5	0.92
		Technical dimension	9	0.80
2		-	28	0.91

In this study, descriptive statistics have been used to display demographic information. Kolmogorov-Smirnov test was used to analyze the data of this study to measure the normality of data distribution. A structural equation test was used to confirm the confirmatory factor of the questions. Also, the MADM multi-criteria decision-making technique, Analytic Hierarchy Process (AHP) has been used to rank the approved components and indicators. It should be noted that SPSS, Lisrel, Super Decision, Super Decision, EXCEL, and Expert Choice software were used to analyze the data.

5 Findings

AHP method calculations:

If we have a given set of options as $X = \{x1, x2, x3, ..., Xn\}$, the decision maker must assign a weighting vector to them as follows:

$w = (w1, ..., wn)T$

Where wi is a value that coherently measures the value of option xi. That is, the larger the wi, the higher the value of option i. In fact, if and only if wi is greater than wj, xi is preferred to xj. The weighting vector is the scoring vector, and its components are the priorities or the weights of the options xii. An effective way to overcome this problem is to use "Pairwise Comparison". This method allows you to compare two options at any time. In this way, the main problem is reduced to a few smaller problems. Two-way comparisons are performed in the form of "Pairwise Comparison Matrix" and this matrix is defined as follows:

$$A = \begin{pmatrix} a_{11} & a_{12} & a_{13} & ... & a_{1n} \\ a_{21} & a_{22} & a_{23} & ... & a_{2n} \\ ... & ... & ... & ... & ... \\ a_{n1} & a_{n2} & a_{n3} & ... & a_{nn} \end{pmatrix}$$

The above matrix determines the amount of preference from xi to xj for $aij > 0$. More precisely, according to clock theory, each matrix object represents the approximate ratio between two weights.

$aij \approx wi/wj$

$\forall \ I,j$

That is, if the elements of the matrix represent exactly the ratio between the weights, the matrix A will be visible as follows:

$$A = (wi/wj)n \times n = \begin{pmatrix} \frac{w1}{w1} & \frac{w1}{w2} & ... & \frac{w1}{wn} \\ \frac{w2}{w1} & \frac{w2}{w2} & ... & \frac{w2}{wn} \\ ... & ... & ... & ... \\ \frac{wn}{w1} & \frac{wn}{w2} & ... & \frac{wn}{wn} \end{pmatrix}$$

Considering the two mentioned matrices, we come to the third matrix so that $aij = 1/aji$ and matrix A can be expressed in a simple and rewritten form below:

$$A = (wi/wj)n \times n = \begin{pmatrix} 1 & a_{12} & ... & a_{1n} \\ \frac{1}{a_{12}} & 1 & ... & a_{2n} \\ ... & ... & ... & ... \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & ... & 1 \end{pmatrix}$$

In the following matrix, calculate the compatibility rate

6 Qualitative Data Analysis

One of the important steps of any research is data analysis using appropriate and valid tools. Because extracting novel and practical results require correct and appropriate data analysis. In mixed research projects, the researcher intends to discover basic and accurate information about a phenomenon with an indefinite position. In the research method of quantitative and qualitative data, each is analyzed by specific methods. In this study, according to the priority of the qualitative method, first, the results of the interview are analyzed.

After the interview, all the interviews are recorded on paper, the texts are written in the relevant tables, each row of which is dedicated to raw data. In the next step, using the method of comparison and the constant question about what concept these data are more similar? Raw data is given conceptual titles. Qualitative analysis methods are suitable for revealing the meanings that people give to their experiences.

Research Question: What are the key problems of construction contracts in the field of oil and gas?

7 Open Coding

Naming is the classification of words that represent definite events and other examples of phenomena.

Secondary coding

As Table 4 shows, experts in 21 interviews pointed to a wide range of factors in response to the question. To summarize and identify the main categories (codes), the concepts identified in Table 5 are presented. By comparing different concepts (codes), more commonalities can be discovered between them, which will allow the classification of similar concepts in the form of the same classifications. The result of this stage of the process, which is the formation of components:

At this stage, the commonalities of the components derived from the previous stages were identified and organized into a more general and limited category according to their commonalities. In the first stage, many themes were obtained that by combining and analyzing them using the reciprocal process of data analysis, the whole set of primary codes were imitated into fewer codes. To prevent duplication, all duplicate or similar primary codes that were conceptually very close to each other were placed in a single set and created concepts that formed categories, 28 indicators in the form of 5 components (political, legal, international, economic, and technical) are considered to determine the necessary adequacy to select the main categories to examine the answers to the researcher's question.

Table 4: The most important verbal statements of the interviewees (open coding)

Row	Concept (code)	Mean	Standard deviation
1	Lockout/boycott	3.88	.35
2	Political interference	3.84	.35
3	Confidentiality of oil and gas contracts	3.58	.33
4	Lack of updated rules	3.3	.30
5	Lack of accurate contract information	2.71	.25
6	Old technology	3.68	.33
7	Lack of attention to occupational health and environmental issues	3.64	.33
8	Lack of attention to the volume of oil and gas fields	3.07	.28
9	Existence of opposition	3.64	.33
10	Non-observance of the principles of ownership and national sovereignty over oil and gas resources	3.48	.32
11	Non-observance of national rights and interests during oil and gas operations	3.8	.35
12	Lack of transparency in contracts	3.98	.36
13	Failure to pay attention to the rules and defects of contracts	3.22	.29
14	Lack of timely supply of raw materials	3.78	.34
15	Involvement of aliens	3.91	.36
16	Cumbersome rules	4.09	.37
17	Non-economic nature of the contract	4.02	.37
18	Failure to complete the value chain	3.79	.34
19	Exchange rate decline	4.03	.37
20	Fluctuations in commodity and capital markets	3.28	.30
21	Non-insurance of contracts	3.44	.31
22	No return on investment	3.34	.30
23	Lack of transfer of knowledge and technology and appropriate technical skills and training of specialized human resources	3.25	.30
24	Failure to increase the share of Iranian national oil and gas companies in oil and gas revenues	3.68	.33
25	Lack of cooperation of the world's major oil companies with the country inside the oil tanks	3.64	.33
26	Negative competition of countries with common oil reservoirs for more extraction from common oil reservoirs	3.45	.31
27	Lack of cooperation between oil-producing countries	3.41	.31
28	Failure to upgrade the technical and managerial level of Iran's national oil and gas companies to the level of international companies	3.07	.28

8 The Final Research Model

Finally, based on the research results, the final model of this research is drawn in Figure 1. This model is the new model, namely the Optimized Oil and Gas Contracts (OPC), in which various indicators have been proposed as reasons for the failure of construction contracts in the field of oil and gas. This model is the result of extracting the proposed indicators of the reasons for the failure of the implementation of construction contracts in the field of oil and gas from theoretical foundations and also the result of interviews with experts in the field of oil and gas regarding construction contracts. Among the components discussed in this model, we can mention the economic, legal, political, international, and technical dimensions.

OPC model features:

1. The duration of exploration is 5 years.
2. Capital is provided by a foreign investment company.
3. Investment risk insurance is done by the investor to reduce the risk.
4. Seventy percent of the required manpower is supplied from inside the tank owner and the necessary training is provided and knowledge and technology are transferred.

Table 5: Codes (identified concepts) resulting from interviews with experts (axial coding)

row	Axial code	Open coding
1	Political	Lockout/boycott
		Political interference
		Non-observance of the principles of ownership and national sovereignty over oil and gas resources
		Involvement of aliens
		Existence of opposition
2	Legal	Lack of updated rules
		Non-observance of national rights and interests during oil and gas operations
		Failure to pay attention to the rules and defects of contracts
		Cumbersome rules
3	international	Failure to increase the share of Iranian national oil and gas companies in oil and gas revenues
		Lack of cooperation of the world's major oil companies with the country inside the oil tanks
		Negative competition of countries with common oil reservoirs for more extraction from common oil reservoirs
		Lack of cooperation between oil-producing countries
		Failure to upgrade the technical and managerial level of Iran's national oil and gas companies to the level of international companies
4		Non-economic nature of the contract
		Exchange rate decline
		Fluctuations in commodity and capital markets
		Non-insurance of contracts
		No return on investment
5	Economical	Confidentiality of oil and gas contracts
		Lack of accurate contract information
		Lack of attention to occupational health and environmental issues
		Lack of transparency in contracts
		Lack of transfer of knowledge and technology and appropriate technical skills and training of specialized human resources
		Old technology
		Lack of attention to the volume of oil and gas fields
		Lack of timely supply of raw materials
		Failure to complete the value chain

5. After the exploration of the reservoir, a contract for its exploitation is concluded with the investor company for 30 years or based on the volume and useful life of the reservoir, with due regard to the economy and competence of the reservoir country.

6. The reservoir is considered part of the interests of the foreign investor company and is subject to international law and in case of any tension and conflict between the country of the reservoir and other countries; the maintenance of the reservoir is the responsibility of the country of the reservoir and the country of foreign investment jointly and protect it.
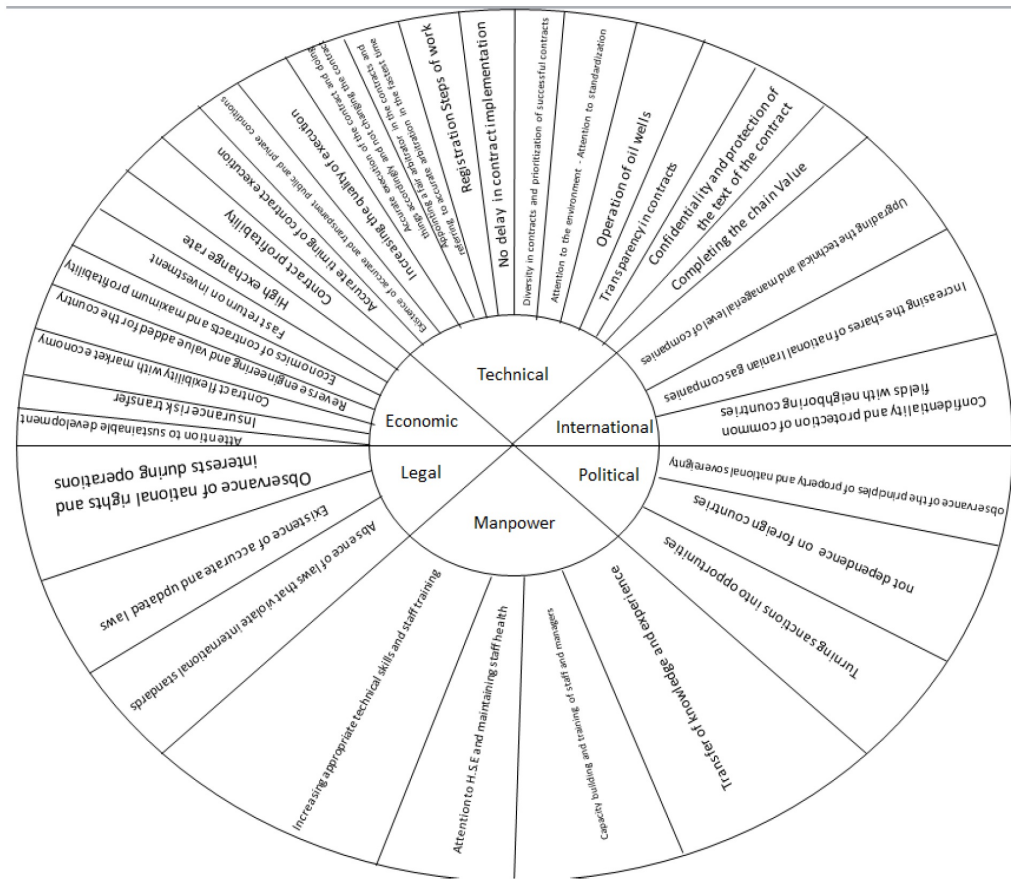
Figure 1: OPC model

7. In the event of any dispute, priority shall be given to the laws of the reservoir country and, in case of ambiguity, to international law.

8. Determining the verdict to resolve disputes and arbitrations is done with the agreement of the parties.

9. In case of abandonment of work at any stage by the contractor and foreign investor, termination or termination of the contract is done unilaterally and following the general and private conditions of the contract and the laws of the reservoir country.

10. Protection and confidentiality are a priority for both parties, and in joint ventures, the foreign investor forfeits the right to any contract with the joint country with the owner of the reservoir and refuses to disclose any field information to others and the information of the reservoir and the oil and gas field is provided only to the country of the reservoir with which it has a contract, and if it is proved otherwise, the host country has the right to unilaterally terminate the contract.

11. In the new method, crude oil products have been converted into upstream and downstream materials required by the petrochemical and oil and gas industries, or gasoline and other petroleum products, regarding the sale of priority with domestic consumption, the country owns the reservoir and the surplus is given to the investor at international rates.

12. Incentives such as tax forgiveness or reduction and payment of bonuses commensurate with the income and currency of the oil and gas field are intended for the investor. That is if the investor observes all the rules and conditions of the contract and leads to more revenue and currency, for them these incentives will be considered in proportion to revenue.

13. Sovereignty and ownership of oil and gas fields and reservoirs are subject to the law of the country that owns the reservoir.

14. The transfer of knowledge and technology is one of the requirements of the contract and in case of violation, the laws of the country that owns the tank will be acted upon.

15. Use of reverse engineering in the manufacture of parts and equipment required by the contract and added value for the country that owns the reservoir.

16. Creating a secure market for the sale of manufactured products.
17. Attention to sustainable development and environmental protection.
18. Use of up-to-date, efficient, and higher technology in joint oil and gas fields.
19. Reducing the impact of sanctions on the market for the sale of manufactured products.
20. Increasing the shares of Iranian oil and gas companies in the implementation of part of the contract.

9 Contract-The Following Items and Points Following The Type of Investment are Mentioned in The Text of The Relevant Contract

Details of the parties to the contract and their legal residence

Subject, duration, stages, and schedule of the contract.

The amount of the contract, determining the share of the parties, and how to divide the benefits and payments resulting from the contract

Obligations of the parties and how to manage and operate

Progress reports

Investor qualification and necessary guarantees and documents (in proportion to the amount brought by the investor and according to the financial regulations of the other upstream laws)

Designation of the contracting party as a party obligated to pay legal deductions such as taxes, duties, and insurance related to the contract

Environmental protection, safety, and security of the workshop and the necessary technical standards and regulations

Supply of required machinery and goods and quality assurance following standards and compliance with relevant regulations

Fixing defects, temporary delivery, and final delivery of the project along with determining the warranty period

Damage resulting from the refusal to fulfill the obligations or the failure to fulfill the obligations for each of the parties to the obligation

Monitoring the implementation of the contract

How to resolve disputes

Terms of contract termination and its process

Emergency (force majeure)

Ensuring the proper execution of obligations/performance of work, the amount and type of which is proportional to the investment side is variable

Assignment to second-hand contractors

Observance of the principle of confidentiality of information

Ownership of materials, equipment, and commonalities (water, electricity, gas, etc.)

Amendments to the contract

Cleaning the workshop

Attachments

Ranking of identified factors using AHP hierarchical analysis method

The fuzzy Delphi technique has been used to rank the identified factors.

Figure 2 shows that the rate of incompatibility for the factors related to the political dimension, which was presented in the form of a pairwise comparison questionnaire, is 0.01, which is acceptable. As can be seen, in comparison with the 5 factors of the political dimension, sanctions are in the first place with 30.11% of the impact, and the existence of opposition is in the last place with 10.37%.

Figure 3 shows that; the rate of incompatibility for the factors related to the legal dimension, which was presented in the form of a pairwise comparison questionnaire, is 0.02, which is acceptable. As can be seen, in comparison with
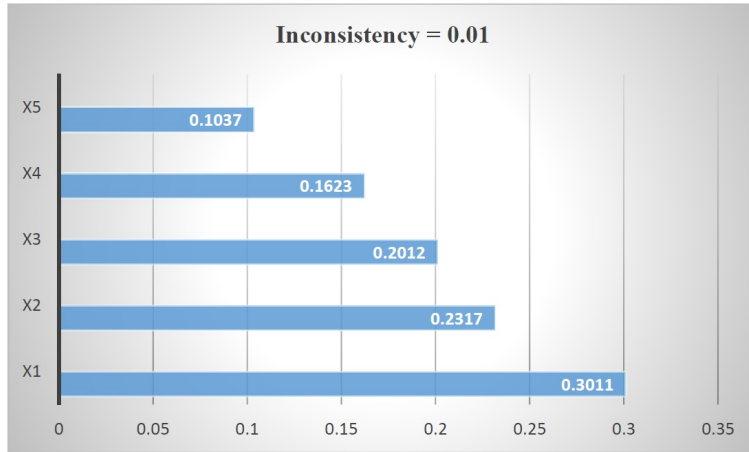
Figure 2: Political dimension adjustment rate

Figure 3: Legal dimension adjustment rate

the 4 legal factors, non-attention to laws and defects in contracts are in the first place with 36.2%, and lack of updated laws is in the last place with 13.41%.
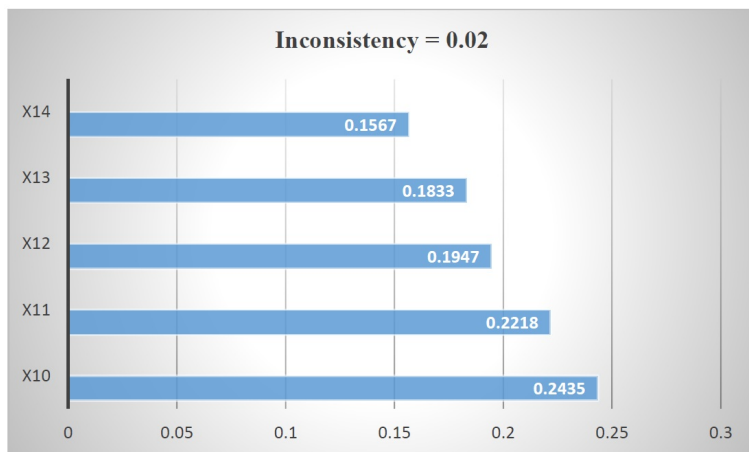

Figure 4: International dimension adjustment rates

Figure 4 shows that; the rate of incompatibility for the factors related to the international dimension, which was presented in the form of a pairwise comparison questionnaire, is 0.02, which is acceptable. As can be seen, Comparing

5 factors of international dimension, the lack of increase in the share of Iranian national oil and gas companies in oil and gas revenues with 24.35% is in the first place, and the lack of upgrading the technical and managerial level of national Iranian oil and gas companies to the level International companies are in the last place with 15.67%.
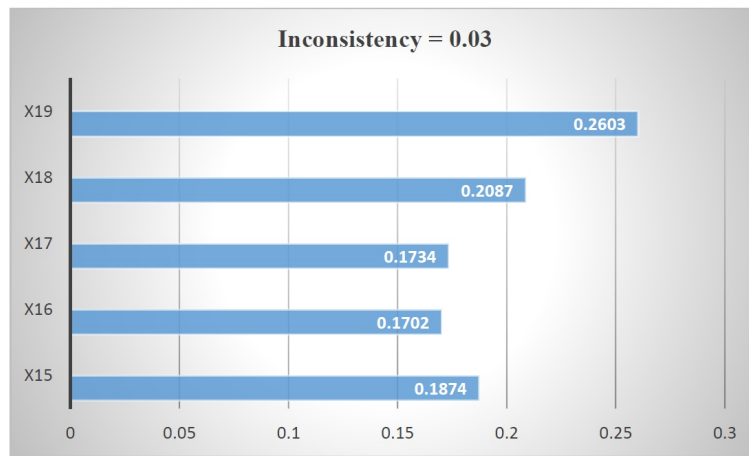

Figure 5: Economic dimension adjustment rates

Figure 5 shows that; the rate of incompatibility for the factors related to the economic dimension, which was presented in the form of a pairwise comparison questionnaire, is 0.03, which is acceptable. As can be seen, in the comparison of 5 factors of economic dimension, non-return of capital with 26.03 percent is in the first place of impact, and exchange rate decrease with 17.02 percent is in the last place.
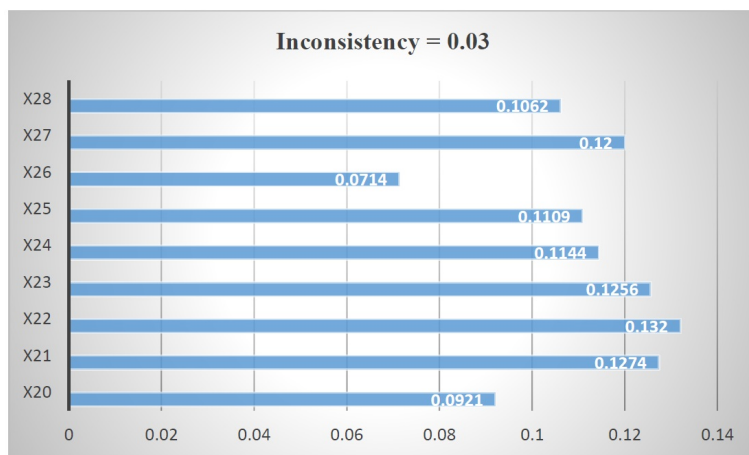

Figure 6: Technical dimension compatibility rates

Figure 6 shows that; the rate of incompatibility for the factors related to the technical dimension, which was presented in the form of a pairwise comparison questionnaire, is 0.03, which is acceptable. As can be seen, in comparison with 9 factors of technical dimension, the lack of accurate contract information is in the first place with 13.2%, and the lack of attention to the volume of oil and gas fields is in the last place with 7.14%.

Figure 7 shows that; the mismatch rate for the main dimension factors, which was presented as a pairwise comparison questionnaire, is 0.015, which is acceptable. As can be seen; comparing the five main dimensions, Technical dimension with 32.42% in the first rank of influence, international dimension with 24.55% in the second rank, legal dimension with 18.31% in the third rank, economic dimension with 15.36% in the fourth rank and political dimension with 9.36% is in the fifth place.

10 Discussion and Conclusion

The research results showed that; the key problems of construction contracts in the field of oil and gas include 28 indicators in the form of 5 components (political, legal, international, economic, and technical). Indicators related to
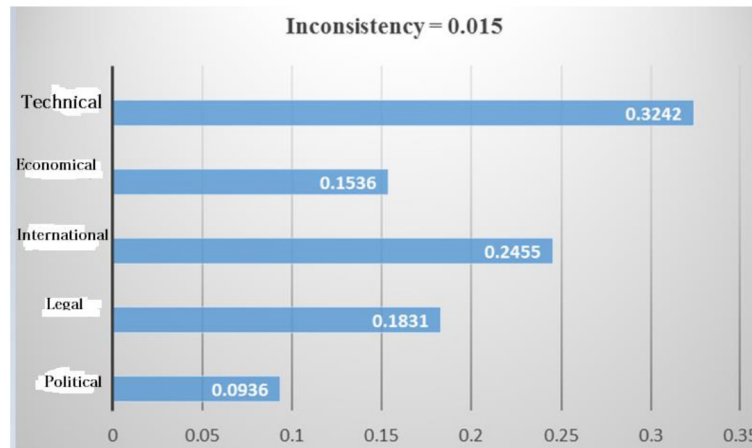
Figure 7: Main dimension compatibility rates

the political component, which according to the respondents are among the problems of construction contracts in the field of oil and gas, include: Sanctions include political interference, non-compliance with the principles of ownership and national sovereignty over oil and gas resources, foreign interference, and the existence of opposition. Indicators related to the legal component that according to the respondents is among the problems of construction contracts in the field of oil and gas includes: Lack of updated laws, non-observance of national rights and interests during oil and gas operations, lack of attention to laws and breaches of contracts and laws are cumbersome. Indicators related to the international component, which according to the respondents are among the problems of construction contracts in the field of oil and gas, include Failure to increase the share of Iranian national oil and gas companies in oil and gas revenues, lack of cooperation of major world oil companies with the country inside oil reservoirs, negative competition of countries with common oil reservoirs to extract more from common oil reservoirs, lack of cooperation between oil-producing countries and lack of upgrading the technical and managerial level of national Iranian oil and gas companies to the level of international companies. Indicators related to the economic component, which according to the respondents are among the problems of construction contracts in the field of oil and gas, include: The non-economy of the contract is the decrease of the exchange rate, the fluctuations of the commodity, and capital markets, the non-insurance of the contracts and the non-return of the capital. Indicators related to the technical component, which according to the respondents are among the problems of construction contracts in the field of oil and gas, include Confidentiality of oil and gas contracts, lack of accurate contract information, lack of attention to occupational health and environmental issues, lack of transparency in contracts, lack of transfer of knowledge and technology and appropriate technical skills and training of specialized manpower, old technology, lack of attention to the volume of oil and gas fields, lack of timely supply of raw materials and failure to complete the value chain.

After identifying the important component and indexes in the problems of construction contracts in the field of oil and gas, in the next stage, all these indicators and components were examined using the structural equation test. The results of structural equation testing using confirmatory factor analysis and software showed that; Model factor loads in standard estimation mode, which shows the degree of correlation between each observer variable (questionnaire question) and the latent variable (factors), the larger the factor load and the closer it is to one, that is, the better the observed variable (question) can explain the latent or hidden variable. It is more than 0.3 for all indicators and components and is an acceptable value. Also, the value of t (path coefficient in a significant state) of all indicators and components is greater than the value of 1.96, therefore, the relationship between the questions and the variable is significant and therefore the questions are a good explanation for the variable. So we can say that: From the respondents' point of view, political, legal, international, economic, and technical components are among the problems of implementing construction contracts in the field of oil and gas.

After analyzing the indicators using structural equations, the priorities were indexed using the Hierarchical Method (AHP). The results of the hierarchical research (AHP) method show that; The mismatch rate for the main dimension factors, which was presented as a pairwise comparison questionnaire, is 0.015, which is acceptable. As can be seen, in comparison with the five main dimensions, the technical dimension is in the first place with 32.42%. The results of the present study are consistent with the results of Ebrahimi and Shirijian (2014) and Kayser (2020)[10, 4].

11 Offers

Considering the role of technical factors in the failure to implement construction contracts in the field of oil and gas, it is suggested that:

- One of the necessary tools for the development of oil fields and investment in upstream sectors is to have a high level of technology, so serious attention to this category seems necessary.

- Obtain detailed technical information on construction contracts in the field of oil and gas.

- Attention to occupational health and environmental issues.

- Transparency in technical issues of construction contracts in the field of oil and gas.

- Paying attention to the volume of oil and gas fields.

- Timely supply of raw materials.

- Complete the value chain.

- Diversify contracts and prioritize successful contracts.

- Strict execution of the contract and doing things according to it and no changes in the contract.

- Precise contract execution schedule.

- Priority should be given to increasing appropriate technical skills and training specialized human resources.

Given the role of international actors in the failure to implement construction contracts in the field of oil and gas, it is suggested that:

- As there are no codified rules for joint reservoirs with neighboring countries and joint reservoirs may only be operated by agreement of the parties. Therefore, it is suggested that in the field of attracting foreign investment, the priority of development and exploration activities be placed on existing and possible future joint reservoirs.

- Increasing the share of Iranian national oil and gas companies in oil and gas revenues.

- Arranging cooperation with the world's major oil companies.

- Arranging cooperation between oil-producing countries.

- Upgrading the technical and managerial level of national Iranian oil and gas companies to the level of international companies.

- Confidentiality and protection of common fields with neighboring countries.

Considering the role of legal factors in the failure to implement construction contracts in the field of oil and gas, it is suggested that:

- Update the rules of construction contracts in the field of oil and gas.

- Observance of national rights and interests during the implementation of construction contracts in the field of oil and gas.

- Completion of incomplete laws and elimination of laws contrary to international and legal rules of construction contracts in the field of oil and gas.

Considering the role of economic factors in the failure to implement construction contracts in the field of oil and gas, it is suggested that:

- Considering the economics of construction contracts in the field of oil and gas.

- Economic measures to deal with exchange rate fluctuations.

- Economic measures to deal with fluctuations in the commodity and capital markets.

- Ensure construction contracts in the field of oil and gas.

- Perform reverse engineering and added value for the country.

- Contract flexibility with the market economy.

- Attention to sustainable development.

Given the role of political factors in the failure to implement construction contracts in the field of oil and gas, it is suggested that:

- Lifting sanctions and reducing the impact of sanctions by building a resistant economy.

- Prevent unnecessary political interference in the construction of oil and gas contracts.

- Observance of the principles of ownership and national sovereignty over oil and gas resources.

- Prevent foreign interference in the construction contracts in the field of oil and gas.

- Non-dependence on foreign countries in the field of construction contracts in the field of oil and gas and elimination of intermediary countries during the conclusion and implementation of construction contracts.

Acknowledgement

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