Petroleum Business Review

Research Article-Oil & Gas Economics & Management

Petroleum Business Review, Vol. 5, No. 2, pp. 41–51, Summer 2021

Designing an Inter-organizational Cooperation Management Model in Oil Companies

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ARTICLE INFO

Keywords:
Inter-organizational
Cooperation Management
Oil Companies
Pars Energy Special
Economic Zone

Received: 15 May 2021
Revised: 14 June 2021
Accepted: 03 July 2021

ABSTRACT

The present study aimed to provide an inter-organizational cooperation management model in oil companies in the Pars Energy Special Economic Zone. This study was conducted in two stages: conceptual research framework design and validation. The first part included the senior managers of oil companies in the Pars Energy Special Economic Zone, and 10 subjects were selected as the sample. In the second part, the population included all employees, from whom 116 samples were selected. After identifying the components, indicators, and criteria, the Delphi questionnaire and a 5-point Likert scale were used to collect data. The validity of the questionnaire was confirmed using the CVR index and exploratory and confirmatory factor analysis, while its reliability was evaluated using Cronbach's alpha. Data analysis was performed using the Delphi technique, one-sample t-test, and structural equation modeling in SPSS and Lisrel statistical software. The results identified four dimensions, 17 components, and 63 indicators for the inter-organizational cooperation management model in the Pars Energy Special Economic Zone oil companies. Environmental, cultural, organizational, and leadership style dimensions are the dimensions of inter-organizational cooperation management in oil companies in the Pars Energy Special Economic Zone. Such factors are the most significant among the identified dimensions of environmental dimension with a load factor of 0.99, cultural dimension with a load factor of 0.82, organizational dimension with a load factor of 0.79, and a leadership style dimension load factor of 0.89 respectively than other dimensions to the concept of inter-organizational cooperation management model in oil companies in the Pars Energy Special Economic Zone. The results indicated that designing the inter-organizational cooperation management model is divided into four environmental, leadership, cultural, and organizational

DOI:10.22050/PBR.2021.286407.1197

dimensions. The environmental dimension includes political, business process, economic, developmental, legal, and technology, and the cultural dimension includes the components of conflict management, information sharing, participation, and commitment. The organizational dimension consists of the components of philosophy, processes, coordination, and strategy, and the leadership style dimension encompasses the components of collaborative leadership, multidisciplinary decision-making, and adaptation to management style.

1. Introduction

In today's complicated conditions, primarily resulting from the lack of resources and increased costs, inter-organizational cooperation is required, and the success of inter-organizational cooperation depends on the preparation of practical frameworks for inter-organizational cooperation. Studies have almost failed to address the necessity for inter-organizational cooperation and the effective constructive frameworks of such cooperation, especially where the cooperation is not directly aimed at increasing the revenue or reducing the costs of the cooperation (Khosravi & Jaafari, 2020). In most studies, only the statistics on the success or failure of inter-organizational cooperation has been mentioned. Inter-organizational cooperation is not limited to the private sector and has become increasingly common among government agencies, charities, and nongovernmental organizations during recent years because society will take more advantage of the benefits of this cooperation and inter-organizational coordination (Conteh, 2013)

Despite the benefits of inter-organizational collaboration in various projects, it should be noted that many organizations fail to enter the field due to problems in their management. Inter-organizational communication and cooperation fail to guarantee the achievement of privileges and do not always mean success for the different figures in references referring to the failure of inter-organizational cooperation and for reasons such as inconsistencies between norms and goals, insufficient environmental pressure, lack of open cooperation due to cultural differences, lack of trust and referral to resource dependence, and the general lack of measured frameworks (Biermann, 2015). Such problems have a more significant effect in a situation where the project of joint inter-organizational cooperation has large dimensions and is highly complex (Jabarzadeh Karbasi et al., 2019).

Although some emphasized the interdependence of organizations and the need for coordination between them to improve performance (Pennec et al., 2018; Pouwels et al., 2017; Bengtsson and Raza-Ullah, 2016; KOŻUCH et al., 2016; Ye et al., 2013; Pouwels, 2012; Conteh, 2012; Chen Li and Len, 2013), there are few studies on the management of inter-organizational cooperation in the public sector. This study aimed to develop this field by developing tools and presenting an appropriate model for measuring inter-organizational cooperation and identifying the factors affecting its promotion and cooperation model. The main focus is on modern industrial organizations, especially the oil, gas, and petrochemical industries.

Thus, the Pars Energy Special Economic Zone is the largest specialized economic zone in the oil, gas, and petrochemical industries and covers a wide range of downstream, mixed, and semi-heavy industries, as well as service and commercial uses in the world (Zareie et al., 2020). On behalf of the Ministry of Oil and the National Iranian Oil Company, this organization manages the South Pars, Pars Kangan, and North Pars operational areas. The main activities include definition, approval (design, implementation, operation, and maintenance), and construction of public infrastructures such as railway, port, airport, water, electricity, and management of the region. Thus, the primary objectives of establishing the Pars Energy Special Economic Zone Organization are providing the necessary conditions to take comparative advantages in the field of oil and gas industry, creating the necessary infrastructure for the presence of domestic and foreign investments in the downstream petrochemical industries, diverse industries, semi-heavy industries; using upstream gas and petrochemical industries to create added value; improving employment and increasing national income; importing foreign technology and new management knowledge; using the region's transit capacities to support the sector; encouraging investors to implement investment projects; developing the special zone; expanding and increasing the level of cultural, sports, health and medical services for residents; and finally performing the comprehensive and sustainable development of the particular zone focused on human

development (Vahedi et al., 2020). One of the significant challenges of companies located in the Special Zone, including parent companies specializing in oil, gas, petrochemical, and downstream industries, is the lack of a definite structure for organizing inter-organizational relations based on an interactive approach (Dara; Moghadas and Lalalizadeh, 2020:).

In this regard, inconsistency among executive organizations is one of the major management issues in oil companies in the Pars Energy Special Economic Zone, which appears in crisis conditions and integrated management of oil areas. The reluctance or inability of policymakers to develop comprehensive policies is considered one of these factors. Based on organizational and management consequences (risk, start-up time and cost, and amount of control), environmental conditions, partner companies and the role of each, the degree of formality and transparency of cooperation, type of allocated resources, as well as the management of operations, activities, and ownership of results and outputs in the use of modern technologies play an essential role in inter-organizational cooperation. However, this inter-organizational cooperation means taking steps toward formulating policies and strategies to overcome the challenges of inconsistencies and probable crises between the oil companies in the Pars Energy Special Economic Zone so that the effect of companies on each other is very high. Due to the lack of research on designing an inter-organizational cooperation management model, identifying the factors affecting inter-organizational cooperation and inter-organizational cooperation management can be practical and helpful. Based on the description mentioned above, the problem is that the desired objectives have not been achieved yet despite the efforts of human resources and the management of inter-organizational cooperation (Nasresfahani and Rasoulinezhad, 2020). Accordingly, this study seeks to whether it is possible to achieve a comprehensive management model for inter-organizational cooperation for oil companies in the Pars Energy Special Economic Zone. Based on which elements, can this model be designed, and what is the relationship between the elements?

Considering the role and significance of the managers of an organization in the life and success of cooperation in oil companies in the Pars Energy Special Economic Zone, inter-organizational cooperation management can play an essential role in different stages of the value chain and each of the research sectors, product development, production, marketing and distribution, and after-sales service. Therefore, the significance and necessity of designing a management model for inter-organizational cooperation in oil companies in the Pars Energy Special Economic Zone are as follows:

- The development of inter-organizational cooperation management can provide organizations with an appropriate solution to achieve sustainable competitive advantage in today's dynamic and rapidly changing environments.
- Considering that the conducted studies have been formed on inter-organizational cooperation and the design of the management model of inter-organizational cooperation has been neglected, the researcher intends to model the case based on inter-organizational cooperation management.
- Considering that the oil companies of the Pars Energy Special Economic Zone have dedicated one of their primary goals to cooperation, implementing the results of this study and observing its effect in the short term will significantly contribute to the high goals of the company. In addition, it can be a mechanism for leveraging competencies. Thus, it increases survival in turbulent market conditions. Some concerns such as identifying the ways to control costs, improving quality for organizations facing pressure in a competitive environment, increasing effectiveness, and especially risk management can be great helpful.
- The success of implementing this model in oil companies in the Pars Energy Special Economic Zone can be a basis for using this model in other similar companies.

The present study will initially present a model for managing inter-organizational cooperation in Pars Energy Special Economic Zone oil companies. Therefore, in two stages of conceptual framework design, research and validation of the conceptual framework will be done. In the first and second parts, the statistical population will be selected from the senior managers and all employees of oil companies in the Pars Energy Special Economic Zone. In the third stage, to collect information from the Delphi questionnaire and after identifying the components, indicators, and criteria to confirm them, a questionnaire with a 5-point Likert scale will be used. The validity of the questionnaire will be evaluated using the CVR index and exploratory and confirmatory factor analysis, and its reliability will be evaluated using Cronbach's alpha. In the fourth step, data analysis will be performed using the Delphi

technique, one-sample t-test, and structural equation model in SPSS and Lisrel statistical software so that the authors can design components and indicators of the inter-organizational collaboration management model of oil companies in the Pars Energy Special Economic Zone.

2. Research background

Although extensive studies have been conducted on cooperation, no comprehensive theory has been proposed for inter-organizational cooperation. The conceptual structures, applied methods, data, and experimental findings mentioned in the studies are very diverse. Cooperation has been portrayed from different angles, and evaluating these attitudes helps understand more about inter-organizational cooperation and its success factors. There are few sources on the research subject, and the below presents some of the previous studies addressing this issue:

Jabbarzadeh Karbasi et al. (2017) indicated that the commitment of top management, communications, motivation, shared vision, interpersonal relations, aligned goals, the culture of cooperation, trust, joint planning, power distribution, conflict management, creation of control and monitoring systems, creation of information systems, and the non-consideration of economic–political considerations affect the effectiveness of inter-organizational cooperation. In addition, based on this model, inter-organizational cooperation can effectively create value and business success.

Behmanesh Shakib et al. (2017) confirmed that inter-organizational cooperation in the strategic management of natural disasters is affected by the integrated command, communication management, information management, and resources management. Musa Khani et al. (2014) analyzed the maturity models, and five levels of independent, temporary, coordinated, standardized, and optimized were obtained. Then, seven dimensions of the structure, behavior, process, data and information, strategy, systems, and innovation, as well as 25 indicators, were extracted using the “design science” approach and “meta-synthesis” methodology. Pennec et al. (2018) reported that businesses, policymakers, and researchers had supported the need to create value potentially through inter-organizational cooperation. Pouwels et al. (2017) showed that cost transfer and inter-organizational trust are the determinants of cooperation for buyers. Uncertainty in technology and the return of relationships are significant determinants for suppliers. In both sets of samples, the stability of the goal significantly affects inter-organizational cooperation. Ye et al. (2013) retrieved scientific documents based on organizational affiliation, and the co-authors from the science citation database calculated the T-index (UIG) for different countries. In addition, they analyzed the effect of globalization on inter-organizational cooperation, especially in the US and China.

3. Theoretical literature

3.1. Inter-organizational cooperation

The concept of cooperation in Webster’s Dictionary (1828) is translated as the process of organizing individuals or groups so that they can work together appropriately and harmonious functioning of components for effective results. Several definitions of cooperation have been raised in management literature. Some researchers consider cooperation to achieve specific goals by working together, while others consider cooperation due to this process (Alexander, 1995).

Cooperation is a process in which individuals or organizations often work together through sharing knowledge, learning, and building consensus at a common intersection of goals. In cooperative processes, individuals or organizations build the relationships in which organizations act based on honest cooperation to achieve a common goal and are characterized by trust and commitment; the durability varies according to its nature (Dietrich et al., 2010: 60). Matsic and Monsi have defined inter-organizational cooperation as a beneficial relationship defined by two or more organizations to achieve common goals. Such a relationship includes a commitment to defining interrelationships and goals, creating a standard structure and shared responsibility, having mutual responsibility and accountability for success, and sharing resources and rewards (Le Pennec et al., 2016).

Hokor et al. (2011) identified five elements of purpose and strategy, incentives, individuals, side mechanisms such as building social capital, and structure for cooperation. In their study, Thompson and Perry considered five elements of governance, management, organizational independence, interrelationships, and norms as the elements of cooperation.

In his typology of inter-organizational relationships, Witen introduced four primary forms of two-way communication, organizational set, action set, and network. Two-way communication refers to cooperation between two independent organizations with limited

resources (Le Pennec et al., 2016), and organizational set refers to a set of inter-organizational relationships by the central organization, known as the central organization. Action set refers to a system of firms that pursues a specific goal. Finally, a network is a kind of policy subsystem including different combinations of inter-organizational relationships (Conteh, 2013; Jabbarzadeh Karbasi et al., 2019).

3.1.1. Factors affecting inter-organizational cooperation:

Due to the needs of today's competitive market and global trade, using alliances has increased significantly. Based on the previous studies, partner selection has been mentioned as one of the critical parts of forming inter-organizational cooperation (Hocevar and Jansen, 2011). Every cooperation begins with the analysis of potential partners, and the realization of the benefits of inter-organizational cooperation depends on the correct choice of partners (Verdacho, 2011). More companies have shifted to inter-organizational cooperation and strategic alliances over the past decade, but a significant number of such alliances have failed (Hain and Beck, 2010). The lack of cooperation and compatibility between partners is one of the most important reasons for the failure of inter-organizational cooperation. The decision-making process related to partner selection is highly complex and challenging, especially when looking at the high failure rate of alliances (Musa Khani, 2014).

Criteria for partner selection vary in different countries and different business regions according to political conditions and business regulations (Shojaei, 2013). Based on the field of activities and the type of inter-organizational cooperation, such criteria can be somewhat different. Nielsen has stated this issue in his study. For example, Danish companies' knowledge of access to local rules and regulations for partner selection has been mentioned as a minor factor in relation to Western Europe. However, this factor is more important in American companies than in Asian companies and other parts of the world (Jamali and Hashemi, 2011).

3.1.2. Theories describing inter-organizational cooperation

Although extensive studies have been conducted on cooperation, no comprehensive theory has been proposed for inter-organizational cooperation yet. The conceptual structures, applied methods, data, and empirical findings cited in the studies are diverse, as mentioned earlier. Cooperation was portrayed from different angles in these studies. Evaluating these attitudes helps understand inter-organizational cooperation and its success factors (Hoffman, 2001).

a. Cost-trade theory

The cost-trade theory was first proposed in 1930 (Kaz, 1997). This theory sought to answer the significant question of why some activities, whether providing a service or producing a product, should occur in an organization while others take place in the market. This question, despite its significance, remained unanswered until about 1970.

After this period, some such as Oliver Williamson (1975 and 1993), devoting about 25 years of his scientific work to trade theory, developed this idea. He divided the question raised above in the form of the following two questions:

A. Why do organizations exist?
B. Why do not all activities occur in a large organization?

His answer to these two questions was that trade costs determine what needs to be fulfilled in the organization and what needs to be fulfilled outside the market. According to Williamson, the most significant trade costs related to the market are the cost of pricing services and products, negotiating with a beneficiary outside the organization, the cost of signing contracts, and filling the information gap. He considered the most critical trade costs related to the organization in the form of administrative for answering questions such as "what", "when", and "how" in selecting and conducting activities, the costs due to misallocation of resources, and the costs due to low employee motivation, especially in large companies (Morgan, 1986).

The classification of trade costs in the organization and the market indicated that the factors affecting trade costs are related to a set of human and environmental factors, and they can be classified into three groups (Jones 1988; Klein, 1987; Lawler, 1992). Such factors are as follows:

- Environmental uncertainty and limited rationality;
- Opportunism (abuse) and the small number of actors in the field of trade;
- Special assets and risk;

This theory proposes selecting an organizational form that reduces fixed and variable trade costs. Cooperation is the most effective form of organization in this discussion (Hoffman, 2001: 358).

b. Resource-based theory

This theory considers the organization a set of resources such as capital, capabilities, and processes. Cooperation arises when a company needs more resources and cannot procure them from the market at an acceptable price, risk, and time (Hoffman, 2001: 359).

The resource-based theory allows researchers to understand how companies can achieve their critical strategic goals, create or strengthen competitive advantage, and increase their economic benefits and profitability through cooperation. The resources of strengthening advantage should be valuable, durable, and difficult to copy, or, if copied, they can be quickly compensated. Cooperation is mainly a means of expanding a company's capabilities by connecting with other companies (Tunsand, 2003). Non-harmonious (tangible or intangible) resources of the company are a potential source of competitive advantage. Based on this theory, companies use cooperation to create an optimal combination of more valuable resources than other possible combinations. Thus, cooperation can contribute to the development of resources that creates value, and the company alone cannot create such resources (Ireland, 2002).

c. Knowledge-based theory

The development of strategic management thinking is affected by the significance of the economic role of knowledge to some extent. Organizations that can leverage knowledge and make effective use of implicit knowledge are more likely to combine traditional resources and capabilities in new and distinct ways to provide more value to their customers than their competitors. The prospect of using knowledge as a primary source of competitive advantage is known as the knowledge-based perspective, which arises from the development of a resource-based perspective. The limitation of the knowledge-based attitude is that it considers both implicit and explicit knowledge as objectively definable things. Based on knowledge-based theory, knowledge is a static internal resource in organizations that can be controlled, used, and traded like most physical resources. As a result, information systems are often developed to capture, store, improve, and transfer knowledge between units, departments, organizations, and individuals.

Although knowledge-based theory considers that knowledge as an asset is a significant concept, this perception has been significantly distorted because it emphasizes the development of information technology. This issue limits the understanding of intellectual dimensions, especially tacit knowledge for value creation in non-profit organizations (Motalebi Asl, 2008). Cooperation is the best environment for creating value through exchanging or combining scattered knowledge. The companies facing uncertain environments can use cooperation to accelerate organizational learning, reshape their environment, and reduce strategic ambiguities (Hoffman, 2001).

d. Network-based theory

Chen (2002) examined one of the essential types of inter-organizational cooperation, i.e., strategic cooperation, from a network-based perspective. Accordingly, all companies are located in one or more networks and work together to create value. No company is big enough to be fully independent. Resource sharing is a necessity, not a choice. The philosophy of strategic cooperation is to create a formal and lasting relationship between partners to facilitate the exchange of resources. Thus, strategic cooperation addresses long-term needs rather than short-term ones. A network approach is a process approach in which dynamic changes are magnified. In this attitude, strategic cooperation is not regarded as a competition between partners to share common or distinct resources to reduce transfer costs but as a formal agreement between partners to invest in relationships and exchange resources.

Therefore, partners should learn and adapt to form cooperation and gradually introduce a resource exchange mechanism. Experimental studies have indicated that effective learning and adaptability between partners are the most significant factors for success in cooperation. The creation of strategic cooperation demonstrates a commitment to investing in specific relationship assets with the potential to increase partners' competitiveness by reducing the total cost of the value chain, increasing product differentiation, reducing errors, and accelerating product development time.

However, investing in these particular relationships increases the partners' mutual dependence and vulnerability. Thus, such investments should be accompanied by preconditions. For instance, reputation and level of trust between partners are significant preconditions for the formation of cooperation. In this attitude, the emphasis is on organizational integrity and commitment of resources, increasing through trust, while in the traditional attitude, the emphasis is on control.

Smith, Carroll, and Ashford categorized cooperation theories into five categories.

1- Exchange theory

Exchange theories are among the theories in which cooperation is regarded as a tool for maximizing economic or psychological benefits. Such theories are applied in psychology, sociology, political science, and economics, and these different fields have similar approaches to the relationship between the exchange process and cooperation. Related groups tend to cooperate when the benefits outweigh the costs. The exchange theories include exchange cost theory, social psychology of exchange theories, micro and macro theories of exchange sociology, reinforcement theory, symbolic interaction theory, and rational or normative decision theories. Exchange theories have excellent conscious reasons that make groups come together and maintain their cooperative relationship.

2- Attraction theories

Such theories emphasize what attracts individuals and groups to each other and the establishment of their natural interests and connection. Although these theories overlap with exchange theories, they explain cooperative relationships based on unaccounted and non-economic benefits and costs. These theories emphasize the non-economic aspects of relationship formation.

3- Theories of power and conflict

Some scientists have emphasized the tendency to conflict or the opposite, i.e., cooperation. In this framework, the diversity of goals, values, and resources which can lead to injustice or oppression represents a conflict. Such theories overlap with attraction theories but are highly useful for predicting the dynamics of relationships over time. For example, the more significant the power difference between related groups, the more formal cooperation required than the informal form.

4- Modeling theories

Such theories emphasize the process of social learning and its significance or modeling in the emergence of cooperation between individuals and organizations. Thus, some cooperative behaviors or arrangements arise because individuals, groups, or organizations act accordingly and give them a legal dimension accordingly.

These theories emphasize the significance of adaptation, coherence, and the creation of behavioral norms based on cooperation through pre-planned social, organizational, and group cultures. As an important point, such theories point to predictive factors beyond cooperation.

5- Theories of social structure

These theories emphasize the role of structural factors in the emergence of cooperation and explain the emergence of cooperation relations in terms of the general conditions of the system in which they occur. Structures consist of the social status of individuals, groups, organizations, and networks which are interrelated while distinguished from each other. Social variables can be the number of colleagues, homogeneity and heterogeneity, distance, history, and power. These theories consider the external dimensions of a relationship to predict cooperation like modeling theories. As a well-known example of social structure theories, network theory explains cooperation based on colleagues' position in a network of relationships (Smith et al., 1995).

5. Method

The present study investigated the practical methods and presented a management model for inter-organizational cooperation in the oil companies of the Pars Energy Special Economic Zone. Thus, this study had an integrated approach used qualitatively and quantitatively by deductive and inductive methods. This study's initial content was first prepared based on the existing literature on inter-organizational cooperation management. Then, some experienced experts and managers of oil companies, along with a qualitative description of the management of inter-organizational cooperation from the mental conditions about the desired people, selected the options extracted from the literature according to their adaptation to the conditions in oil companies. Content analysis was conducted based on agreement tables between responses and their coding on qualitative responses, along with components extracted from the literature. In the second stage, it was considered a reserve to assess the overall management of inter-organizational cooperation and then distributed randomly in the population through a questionnaire. The results of this step were extracted as different structures using exploratory factor analysis and then were examined using confirmatory factor analysis. Accordingly, the population included quantitative and qualitative groups. The population in the quantitative part included 10 senior managers and experts of oil companies who participated as a decision team in identifying the components and indicators of inter-organizational cooperation in this study. The statistical

population in the qualitative section included 168 employees of oil companies in the Pars Energy Special Economic Zone in 2020. The statistical sample of the study was divided into two groups based on the population so that the census method was used to determine the volume of the first group (N=10). For the second group, Krejcie and Morgan table was used, so the sample size of the second group was determined as 116 and 135. Of these questionnaires, 116 healthy questionnaires were collected by random sampling after distribution among the sample. Library studies and field research were used to collect data. Books, theses, and scientific articles were used in the library studies, while a questionnaire was used in the field section. For this purpose, a researcher-made questionnaire was used based on the results of the qualitative step, including 63 questions in a 5-point Likert scale

The validity of the questionnaire was evaluated and confirmed by the CVR index and confirmatory factor analysis. The reliability of the questionnaire was confirmed by Cronbach's alpha (0.833), and the relevant results are presented in Table 1.

Table 1. Validity and reliability indicators.

Dimension	CVR	Cronbach's Alpha
Environmental	82.58	0.89
Cultural	82.73	0.78
Organizational	80.17	0.84
Leadership	87.88	0.86

The results of CVR were higher than 0.5 for all dimensions, indicating the content validity of the research tool. The composite reliability CR was calculated to be higher than 0.7 as a necessary condition for the validity of internal consistency and correlation of structures. In addition, Cronbach's alpha of all components was greater than 0.7, confirming the reliability of all the components. This study used content analysis and Delphi technique, Kolmogorov-Smirnov test, confirmatory and exploratory factor analysis, and structural equation model in Lisrel and SPSS software to analyze the data.

6. Findings

6.1. Findings from content analysis and Delphi technique

First, the content analysis method and Delphi technique were used to identify the indicators of inter-organizational cooperation management, in which the opinions of experts were used. The interviews were reviewed in the content analysis section, and the basis for identifying inter-organizational cooperation management indicators was provided. In this section, 70 basic categories were identified. Then, the identified categories were confirmed using the opinion of experts and the Delphi technique. In the first round of the Delphi method, a questionnaire was first designed using the identified indicators. Then, the designed questionnaire was distributed among 10 identified experts and then returned. Based on the average opinions of experts for each question, it was found that out of seven questions or indicators from 70 questions had a lower average than the average of the range, i.e., 3. Thus, these criteria were removed, and the rest were known as the significant criteria. At least 70% of experts should have given the same answer to one of the answer options for each question to examine the condition of consensus among experts. The general survey of the consensus among experts indicated that some consensus had not been reached yet. In the second round of the Delphi method, a new questionnaire was designed using the results obtained in the first round. The questionnaire and the results of the first round of the study were provided for the experts. Then, the second round of the questionnaires was collected and analyzed. In the second round, the experts introduced no new indicators, indicating that the indicators presented in the questionnaire covered all study aspects. The general review of the consensus among experts indicated that the consensus in the second round increased compared to the first period, 70% of the consensus on the questions was reached, and the indicators were considered significant. The questionnaire and the second round results were provided for the experts. Then, the questionnaires of the third round were collected and analyzed. In the third round of the study, no new indicators were introduced by experts as in the previous round, indicating that the indicators presented in the questionnaire covered all aspects of the study.

The consensus increased among experts in the third round compared to the second round so that all of the questions had the desired degree of consensus, i.e., 70%

of consensus. The consensus among experts was accepted in the third round based on the results.

Finally, 63 final indicators were identified among 17 criteria and four dimensions.

6.2. Descriptive statistics

Among 116 participants, 33.62% was 30–40 years old, 41.38% was 40–50 years old, and 22%–59% was over 50 years old. Moreover, 18.10% worked for less than 10 years, and 53.45% worked for 10–20 years; 28.45% worked for more than 20 years. In addition, 30.17% had a bachelor's degree, and 61.21% had a master's degree; 8.62% had a Ph.D. Furthermore, 40.18% was female, and 59.82% was male.

6.3. Findings from structural equation modeling

The structural equation model was used in Lisrel software to develop an inter-organizational cooperation management model. The results of the relevant structural equation model are shown in Figure 1.

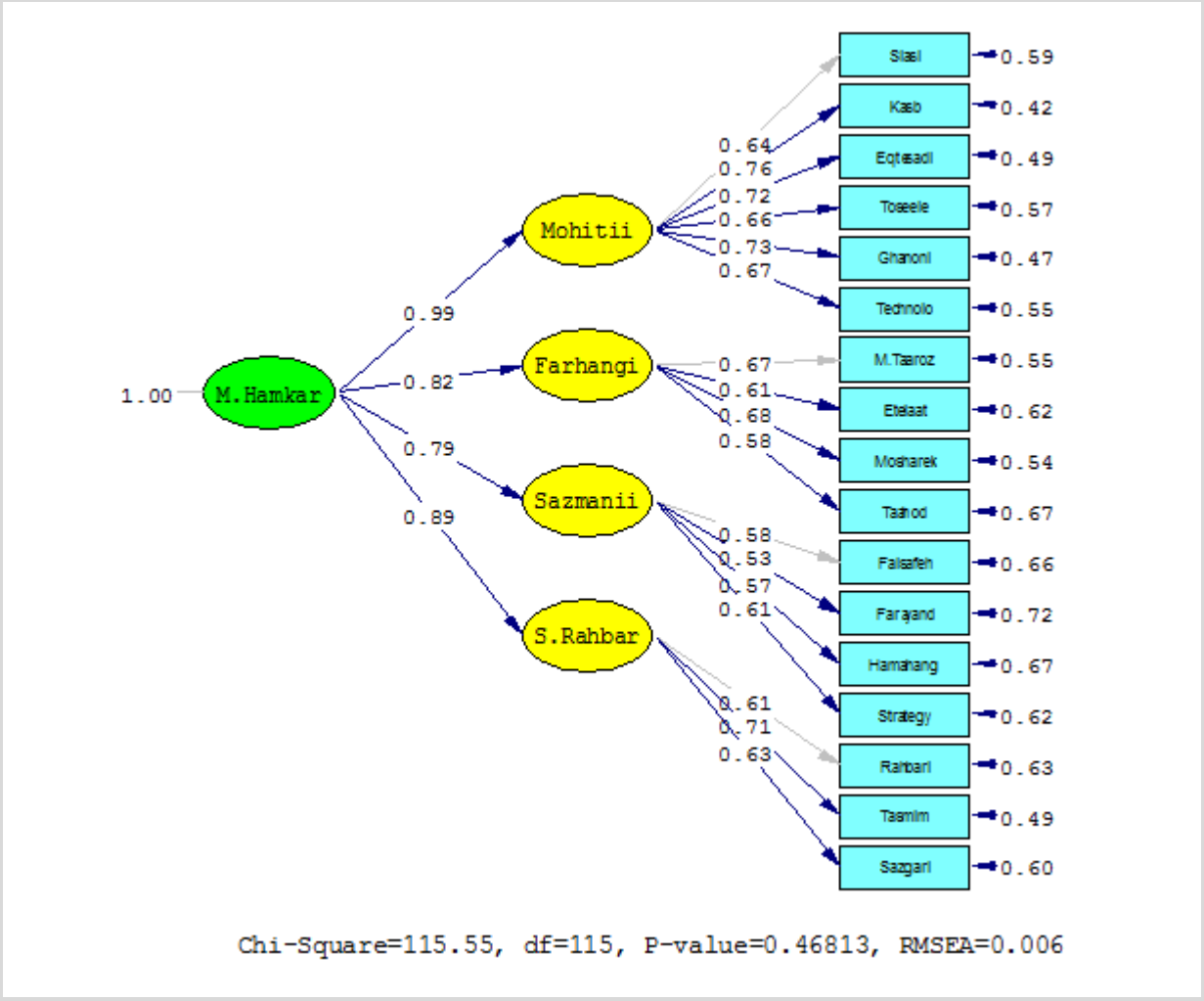

Figure 1. Structural equation model based on standardized coefficients.

The main features of the inter-organizational cooperation management model in oil companies in the Pars Energy Special Economic Zone in Iran's petrochemical industry are as follows.

First, this model has some specific innovations compared to other inter-organizational cooperation management models in the Pars Energy Special Economic Zone oil companies.

Second, the possibility of establishing inter-organizational cooperation management in oil companies in the Pars Energy Special Economic Zone in terms of components identified for inter-organizational cooperation management in oil companies in the Pars Energy Special Economic Zone in this study can confirm the capability of this industry in the field of inter-organizational cooperation management.

7. Conclusions

The results identified four dimensions, 17 components, and 63 indicators for the inter-organizational cooperation management model in the oil companies of the Pars Energy Special Economic Zone. Environmental, cultural, organizational, and leadership style dimensions are the dimensions of inter-organizational cooperation management in oil companies in the Pars Energy Special Economic Zone and are the most significant among the identified dimensions. Among the identified dimensions, the environmental dimension of inter-organizational cooperation management in oil companies in the Pars Energy Special Economic Zone with a load factor of 0.99, the cultural dimension with a load factor of 0.82, the organizational dimension with a load factor of 0.79, and the leadership style with a load factor of 0.89 respectively, had a more sense of belonging than the other dimensions to the concept of inter-organizational cooperation management model in oil companies of the Pars Energy Special Economic Zone.

The results of this study are consistent with the findings of Jabarzadeh Karbasi et al. (2019). In addition, the results of Sheikhol-Eslam et al. (2017) are consistent with those of this study in terms of organizational, legal, political, cultural, and environmental components. Behmanesh Shakib et al. (2017) conducted a study entitled "A theoretical model of inter-organizational cooperation in the strategic management of natural crises with the meta-synthesis method", which is in line with the present study's results in terms of legal, organizational, and environmental components. Regarding components, strategies, and systems, the results of this study are consistent with those of Ghasempour et al. (2014). In addition, the results of Shojaei et al. (2013) are in line with those of this study in terms of technology and organizational components. The results of data analysis indicated that the inter-organizational cooperation management model in oil companies of the Pars Energy Special Economic Zone includes four dimensions of environmental, organizational, cultural, and leadership style. The environmental dimension includes political, business process, economic, developmental, legal, and technology components. The cultural dimension includes the components of conflict management, information sharing, participation, and commitment.

The organizational dimension includes the components of philosophy, processes, coordination, and strategy. The leadership style includes the components of cooperative leadership, multidisciplinary decision-making, and adaptation to management style. The political component includes the indicators of regional, national and strategic policies, political considerations, the general political structure of the country, as well as the influence of some representatives and the main shareholder. The component of the business process includes the indicators of export expansion, increase of production, increase in employment, accumulation of capital, an increase of production and export, improvement in the national economy, and providing conditions for investment. The economic component includes attracting domestic and foreign capital, increasing income and reducing costs, lack of financial resources, economic business interactions, development of the economic activity, and support for a good investment. The development component includes organizational leadership, organizational development, organizational synergy, moving towards value creation. The legal component includes the indicators of rules and regulations, internal rules of the organization, enforceability, reduction of administrative formalities, and easy follow-up. The technology component includes mechanization of affairs, use of business intelligence mechanism, creation of infrastructures, general control of equipment collection, component of conflict management, including indicators of reduction in inter-organizational contradictions, closer organizations, and reduction of organizational misunderstandings. The shared information includes creating integrated databases, visualization in information system, technical knowledge, and participation component (including indicators of participatory management, social responsibility, sharing experiences, commitment, voluntary affairs, responsibility, and organizational commitment) and philosophy components such as the indicators of organizational development, organizational support, and public service delivery. The process includes the processes governing the organization, performance improvement, and acceleration of activities. The coordination includes inter-organizational relationship training, communication platforms and necessary infrastructure, and organizational flexibility in creating relationships. The strategy includes organizational strategy components, use of opportunities, threat management, and cooperation leadership component, including organizational manager strategy indicators, workforce communication management, and leadership perspective. The multidisciplinary decision includes management decision integration, decision-making in crises, and risk-taking in decision-making.

Adaptation with the management style includes the alignment of management style, the leadership of the organization, and organizational development programs of leadership and managers' willingness to cooperate.

The results of this study are consistent with the results of Jabarzadeh Karbasi et al. (2019) in terms of commitment, communication, culture, conflict management, and creation of information, political, and economic systems. Further, the results align with those of Sheikhol-Eslam et al. (2017) regarding organizational, legal, political, cultural, and environmental components. In another study, Behmanesh Shakib et al. (2017) conducted a study on the theoretical model of inter-organizational cooperation in the strategic management of natural crises with the meta-synthesis method, which is consistent in terms of legal, organizational, and environmental components with our findings.

Regarding components, strategies, and systems in this study, our results align with Ghasempour et al. (2014). Finally, the result of Shojaei et al. (2013) is consistent in terms of technology and organizational components with this work's findings.

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