

An Empirical Analysis on Outsourcing Using Structural Equations: The Model of Outsourcing Development Management of Physical Assets in the Oil and Gas Industry

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ABSTRACT

Despite numerous upstream communications, there is still no comprehensive and reliable model for implementing these tasks; neither in the literature nor in the oil & gas industry. Previously developed models focus more on the outsourcing process and it seems that there is no outsourcing model that has been developed with an eye to utilizing internal capabilities in a portfolio of alliances and be compatible with the unique characteristics of the Iran's oil and gas industry. In an attempt to validate the components of the "Model of development outsourcing physical assets in the oil and gas industry, with the approach of upgrading internal capacity" this study used a questionnaire in a Likert scale (very high, high, moderate, low, and very low). From the population, 102 people participated and a total of 100 completed questionnaires received. Using confirmatory factor analysis the validity of the variables and the questionnaire were examined. In this research, SPSS and Smart PLS softwares were used and the error probability level was considered $\alpha = 0.05$. The results showed that the model has a good fit. According to the Geiser index, the fit of the model was medium to high and the goodness of fit criterion was equal to 461.0 and indicates the optimal fit of the model.

1. Introduction

In recent years, managers have faced an inescapable and definite fact that is the change in the operational

environment. At the beginning of the new century, the accelerating trend towards diversification of new products and services, shortening the life cycle of products and services, increasing demand for specific

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products, rapid segmentation and specialization of markets, and generally competitive production, has left companies with many problems. As a result of these developments, old production methods have lost their efficiency, and need for new methods and philosophies that ensure the survival and development of an organization in the current unstable conditions is well felt. The emergence of global markets and competitors and new competitive strategies (based on quality, speed, and partnerships) have forced managers to adopt new management strategies, structures, and systems. Managers prefer companies and organizations that are agile, flexible, accountable, competitive, innovative, efficient, customer-oriented, and profitable. Small organizations are more flexible and their management is dynamic, and innovation, creativity, and initiative are encouraged in them.

The costs of supply chain management are the main element in managing the total cost and increasing the profitability of the company. Supply decisions are not limited to product process materials and components and can also be generalized to non-productive activities such as service, support, and engineering services. Nowadays Organizations engage in outsourcing a wide range of activities in the areas of design, assembly, product development, marketing, and product delivery to end customers (Mishra et al., 2018). For example, companies in the oil, gas, and petrochemical industries have hundreds of different assets and services that can be outsourced. The result of supply decisions is affected by the quality of the information available and the assumptions used in the analysis. Such decisions take into account, in addition to cost-benefit considerations, strategic issues, financial valuation, performance, and risk dimensions concerning supplier quality, reliability, delivery times, and delivery. A wrong decision can lead to higher product and service costs, wasted resources, and lost opportunities, customers, and market shares. In this regard, outsourcing has been proposed as a new approach that provides accountability and accelerated actions for an organization in the face of possible changes (Daneshi and Delavari, 2008, 2).

Many organizations are now moving from routine internal activities to new technology development and collaboration programs. In outsourcing, we decide on which activities take place within the organization and which outside, which resources we need to have, and which resources we need to procure from outside of the organization. In general, to due to limited resources and financial shortages outsourcing is an issue that most companies have to resort to be able to acquire the

necessary technologies and ensure the performance of all their activities.

What can find a difference between organizations and their capabilities in achieving their goals is the proper management of assets, capabilities, and costs of the organization so that the highest possible efficiency and organizational performance is achieved with the lowest possible cost. Outsourcing can be a great help in achieving organizational ideals and goals and provide benefits for the organization. Meanwhile, identifying and prioritizing the factors affecting outsourcing can help managers to implement organizational structures tailored to the needs of the organization and use the power outside the organization with the approach of achieving the highest productivity (Kavosh and Chenari, 2018).

Langford and Parsa (1999) stated that: "Outsourcing is the procurement of products and services from sources outside the organization." Outsourcing enables a company to focus on its core business (Mishra, quoted by Kakabadse & Kakabadse, 2005), as well as improve its performance (Mishra, quoted by Novak and Bastinza, 2018); Outsourcing means a contractual relationship with a foreign company that enables the provision of goods and services tailored to the company's needs (Mishra, quoted by Kakabadse & Kakabadse, 2005). According to these and other definitions, outsourcing includes the allocation or redistribution of business activities from an internal source to an external source. Using outsourcing as a strategy can bring many benefits to the organization, provided it is properly planned and managed with competence. (Seyed Javadin, Hassangholipour, 2011).

Most companies have chosen outsourcing as a strategy to minimize costs (Mishra quoted by Jiang and Data, 2018) and increase market value (Mishra quoted by Jiang, 2018), however, despite the growing trend of outsourcing, only a handful of practitioners view it as a transformational strategy (Mishra to Nephel from Linder, 2018). It can be imagined that the use of materials and energy and capabilities of organizations outside the scope of the company following the activities of the organization and planning to use this prioritization in organizational programs can pave the way for the right decisions of managers and appropriate organizational strategies to achieve Proper productivity in the field of outsourcing in the organization and benefit the organization from this positive value (Kavosh and Chenari, 2018). Awareness of outsourcing errors will help improve the identification, evaluation, and development of the outsourcing cycle; Therefore,



determining and completing the outsourcing process, including strategic assessment, needs analysis, contractor evaluation, negotiation, and contract management, project initiation and transfer, outsourcing relationship management to follow-up, modification or exit strategies, is critical for organizations.

There is a variety of emerging and different types of outsourcing activities that require unique arrangements, including in-boundaries outsourcing, cross-border outsourcing, transfer outsourcing, co-outsourcing, online outsourcing, trade change outsourcing, trade process outsourcing, U-turn outsourcing, added value outsourcing, corporate outsourcing, and multiple outsourcing. The types of risks that manage an organization depend on several factors, including the type of outsourcing agreed upon. Some authors categorize the types of outsourcing according to each stage or following each type of outsourcing (Chen, 2020).

Despite numerous upstream communications, there is still no comprehensive and reliable model for implementing these tasks; neither in the literature nor in the industry. But previously developed models such as "Outsourcing Process Frameworks" (Perunović, and Pedersen, 2007), "Management of Outsourcing Assets in Municipalities" (Hassani and Saadi, 2005), "Public Sector Outsourcing Model" (Rajabzadeh et al., 2008), A framework for outsourcing in the supply chain (Tracy, 2018), A framework developed for the outsourcing process (Zambary, 2011), Framework for outsourcing IT in transportation (Nikitakos et al. 2007), Conceptual model of IT outsourcing in transportation (Nikitakos et al. 2007), Outsourcing model (ISO37500: 2014), Outsourcing professional knowledge body model (2014IAOP), Physical assets management model (ISO 55000: 2014), Physical assets management model (Statute of physical assets management Ministry of Petroleum, 2018) focus more on the outsourcing process and an outsourcing model that has been developed with an eye to utilizing internal capabilities in a portfolio of alliances and is compatible with the unique characteristics of the oil and gas industry, has not been

designed so the outsourcing development management model in the oil and gas industry with the domestic capability approach (Tavakoli et al., 2020) is a new one of this kind – at least -in Iran.

One of the sectors that have been continuously considered by the Iranian officials in recent decades is outsourcing in the oil and gas industry, but at the national and the industry level, despite the great emphasis, the share of asset outsourcing is still much lower than expected. Meanwhile, the outsourcing of physical assets of the oil and gas industry, as a strategic industry in the country, is important due to its scope and effects on all economic, social, and even security aspects of the country; Especially when, outsourcing leads to the development of domestic capabilities, in terms of simultaneously upgrading the capabilities of current stakeholders and contractors in this field. Evidence shows that achieving superior economic, financial, commercial, organizational, human, systemic, and qualitative results would be possible with a systemic approach to outsourcing physical assets.

Iran Gas Transmission Company, as the largest company exploiting the physical assets of the country's gas industry and a company whose assets are spread throughout the country, is associated with the entire production and import, storage, consumption, and export chain of gas and also has complex engineering, exploitation, processes and management of physical assets and has the potential and actual ability to become a model and driver of outsourcing in the oil and gas industry. There is also a willingness of senior executives and their affiliates to move toward outsourcing goals. So, it can be one of the best case studies to answer the question of how in the oil and gas industry while paying attention to capacity for developing strategies internally to achieve the expected results. In this regard, Tavakoli et al. (2020) developed a "model for the development of outsourcing of physical assets in the oil and gas industry, with the approach of upgrading domestic capacity (Iran Gas Transmission Company)" that the present study seeks to validate and examine the various components of this model set.

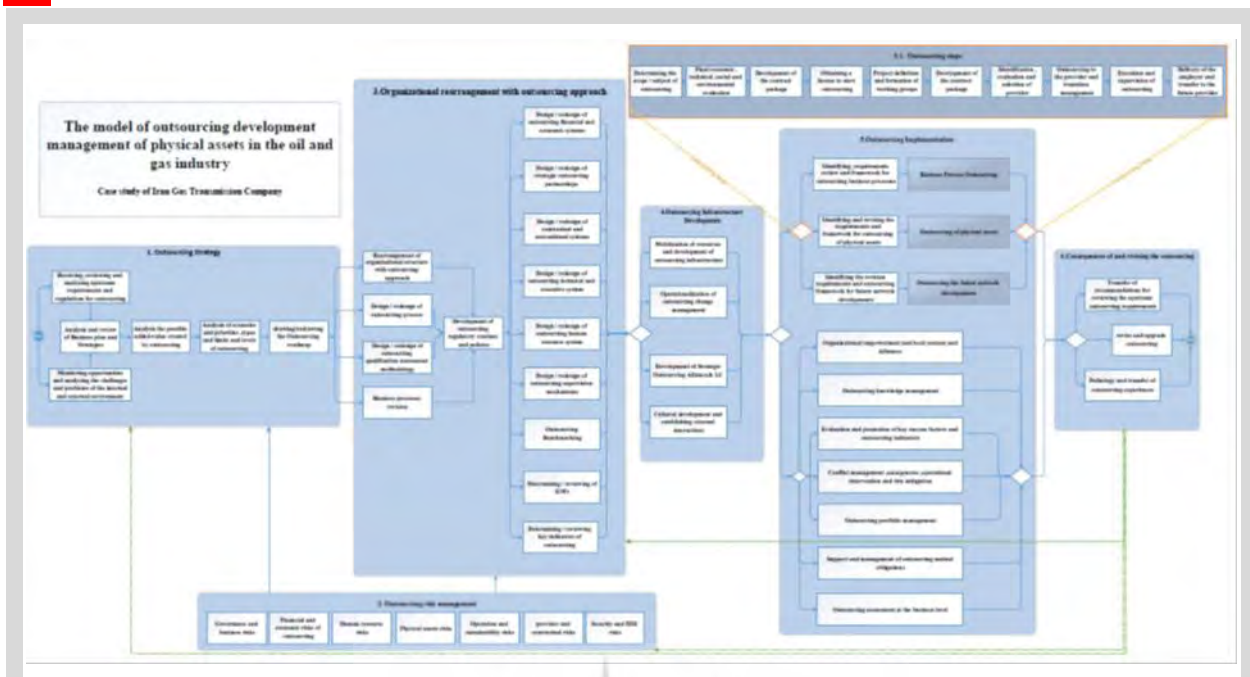


Figure 1. Model for the development of outsourcing of physical assets in the oil and gas industry, with internal empowerment approach (Tavakoli et al., 2020).

2. Materials and methods

Given the importance of outsourcing and the gaps in this field, related studies will be mentioned below:

Kavosh and Chenari (2015) conducted a study entitled "Identification and Prioritization of Factors Affecting Outsourcing in Khuzestan Gas Company" to identify and prioritize the factors affecting outsourcing in that company. For this purpose, a questionnaire consisting of thirty questions was designed based on a Likert scale and distributed among twenty experts working in that company. This Delphi panel was selected by the snowball method. In the second stage, another questionnaire was prepared to assess the preference of the criteria, and six factors were identified and determined based on their preference.

Nourang et al. (2019) in "Study of scheduling in oil and gas EPC projects based on implementation outsourcing strategy and contract", found that the nature of process engineering in oil and gas projects has a special effect on how to outsource implementation. In this study, the business model of project-oriented companies, the life cycle of the oil and gas project, as well as the relationship between outsourcing strategy and contract execution based on process engineering of a refinery, during the project life were examined.

Eslami et al. (2016), in the "Study of outsourcing strategies effects in improving the organizational performance of Iranian industrial companies", indicated that outsourcing of core activities, international outsourcing, and short-term outsourcing, have a positive effect on market value and outsourcing of non-core (subsidiary) activities, internal outsourcing, and long-term outsourcing, do not improve the market value of outsourcing companies.

Fallah et al. (2016), in "Evaluating the effectiveness of outsourcing training courses of the National Iranian Gas Company " collected research data based on three levels of crack Patrick and made a semi-structured interview with a researcher-made questionnaire that its validity and reliability have been confirmed. For one-way analysis of quantitative data, a one-sample t-test, chi-square goodness, and Friedman test were used. Findings indicate the effectiveness of the courses and the good performance of the organizers.

Katato et al. (2020) explored the key perspectives of many research papers from 2000 to 2018 on two types of business process outsourcing and information technology outsourcing. According to the study, many of these studies focused on corporate outsourcing and the reasons for outsourcing in enabling the organization to target their core business and to help them properly develop their ongoing competitive advantage. In this



study, the outsourcing process involves continuous decision-making throughout the life cycle of the outsourcing contract. They conclude that maintaining outsourcing throughout its contract period is the most important issue in the outsourcing management strategy.

Tsay et al. (2018) in "A Review of Production and Operations Management Research on Outsourcing in Supply Chains" compared the theory of the firm with outsourcing the operations and production and sought to establish a stronger link between strategy, economics, and production and operations management from an outsourcing perspective.

Oshri et al. (2015), in "Examining the Shadow of Outsourcing on Reducing Allocation or Costs", introduces tools for monitoring, analyzing, and managing outsourcing for small and medium-sized enterprises. Monitoring and managing aspects of outsourcing relationships can determine how outsourcing efforts are effective and, as a result, reduce risk and costs.

Jiang and Qureshi (2006) tried to establish the necessary relationship between outsourcing implementation and measuring company performance. They identified three main gaps in the literature review, the lack of a unit of measurement to evaluate outsourcing results, the gap in the relationship between outsourcing implementation and firm value, and the research gap on outsourcing contracts.

Embleton and Wright (1998) state in "A Practical Guide to Successful Outsourcing" that, on average, companies using outsourcing strategy have been able to save a 9% of the cost, achieve a 15% increase in capacity and quality, and after enumerating success factors in outsourcing say that outsourcing if properly handled comes with the great promise of cost savings. Successful outsourcing requires advanced analysis, research, planning, and human and managerial resources.

2.1. Purpose of the research

In this study, a bunch of hypotheses was examined: "outsourcing management through organizational rearrangement mediator have an impact on outsourcing implementation; Risk management through the outsourcing management mediator affects organizational rearrangement; Risk management affects the implementation of outsourcing through the mediating variable of organizational rearrangement; Organizational rearrangement affects the implementation of outsourcing through the mediating variable of outsourcing infrastructure development; Rearrangement through

implementation mediator variable affects outcomes; Development of outsourcing infrastructure through implementation mediator has an impact on outcomes.

Also, complementary hypotheses were as follow 'external management affect organizational rearrangement; Organizational rearrangement affects the development of outsourcing infrastructure; Organizational rearrangement affects the implementation of outsourcing; Risk management affects outsourcing management, risk management affects organizational rearrangement; Risk management affects the implementation of outsourcing; Infrastructure development affects outsourcing implementation; Outsourcing steps affect the outsourcing implementation; Outsourcing implementation affects outcomes; Outcomes affect outsourcing leadership; Outsourcing outcomes and outsourcing review affect outsourcing risk management.

2.2. Research methodology

The statistical population of the research includes managers and experts in the field of outsourcing with knowledge of the oil and gas industry. The data collection tool is a researcher-made questionnaire. It should be noted that the questionnaire is based on the model developed by Tavakoli et al. (2020); Factor analysis was used to validate the components and dimensions of the outsourcing development management model and structural equations were used to test the hypotheses.

2.3. Research tools and assessment of validity and reliability

After literature review and conducting interviews, the model and categories of outsourcing development management were determined. Then with the guidance of several experts, the enumerated categories were converted to a questionnaire. The questionnaire was presented to the experts and the Lawshe coefficient was calculated. In fact, in this study, a questionnaire was used to confirm or reject the components, and the experts expressed their opinions about the components in a five-point Likert scale (very high, high, medium, low, and very low). This researcher-made questionnaire consisted of the following three sections: 1) Guidelines for completing the questionnaire, 2) Demographic information, 3) Research questions. Using the questionnaire as a data collection tool in quantitative research is always after ensuring the validity and reliability of this tool. Therefore, in the following, we will discuss the validity and reliability of the

questionnaire.

Validity refers to that the measuring device that can measure the desired feature and not another feature (Hooman 1994, 229). In this study, to calculate the content validity ratio (Lawshe, 1975), thirteen experts in the field of knowledge and practice of outsourcing were selected and after they agreed to participate, operational definitions and explanations related to the content of the questions were explained and they were asked to choose appropriateness or inappropriateness of remaining the questions that their presence in the questionnaire.

$$CVR = \frac{n - N/2}{N/2}$$

In this equation, (n) is the number of experts who have chosen the appropriate option and N is the total number of specialists who are equal to 13 in the current study; Based on the number of experts who evaluated the questions, the minimum acceptable CVR value is

Table 1. Population affected by outsourcing.

Main group	Subgroups	N	Sum	Sample size
Internal to the subject	Managers	24	64	18
	Staff representatives	31		23
	Comity on outsourcing	9		7
Upstream officials	Main comity for the outsourcing of National Iranian Gas Company	14	21	10
	Board of National Iranian Gas Company	7		5
Contractors	Potential contractors	6	20	4
	Actual contractors	14		10
Other beneficiaries	-	34	34	25

Table 2. Descriptive data based on work experience

work experience (years)	F	%f	age	f	%f	education	F	f%
5-15	5	5%	30-45	17	17%	Post-diploma and bachelor's degree	24	%24
16-25	32	32%	45-60	81	81%	MA	64	64%
More than 25	63	63%	>60	2	2%	PhD	12	12%

2.5. Data analysis

After collecting the answers and recording the

determined. In this study, experts are 13 and the content validity ratio is equal to 0.54. Questions for which the calculated CVR value is less than the desired amount excluded from the test. Based on the calculated ratios, out of 83 projected items, 78 items were approved and 5 items were identified as inappropriate; Of the five inappropriate items, two were removed and the other three were modified.

2.4. Population and statistical sample

To determine the statistical population, those affected by outsourcing were identified in three groups and a total of seven subgroups. In the next step, the number of populations affected by outsourcing and the sample size was determined according to the following table of the total questionnaires distributed among the sample of 102 participants (all male), a total of 100 completed questionnaires were collected.:

information, the validity of the variables and the questionnaire were examined using confirmatory factor analysis. The software used is SPSS and Smart PLS.



Also, the level of error probability was considered $\alpha = 0.05$.

Wilk statistics have been used to investigate the normal distribution of variables.

3. Findings

3.1. Normal distribution of research variables

In this section, Kolmogorov-Smirnov and Shapiro-

Table 3. Kolmogorov-Smirnov statistics to check the normality of the distribution of variables

Variables	Kolmogorov-Smirnov			Shapiro-Wilk			result
	statistic	df	(sig)	statistic	df	(sig)	
Outsourcing management	140.0	99	0.000	927.0	99	0.000	abnormal
Management of outsourcing risks	115.0	99	0.002	948.0	99	0.001	abnormal
Organizational rearrangement with an outsourcing approach	088.0	99	0.054	983.0	99	0.207	normal
Development of outsourcing infrastructures	0.87	99	0.059	980.0	99	0.144	normal
Implementing outsourcing	0.71	99	0.20	973.0	99	0.041	abnormal
Outsourcing steps	0.074	99	0.20	979.0	99	0.108	normal
Outsourcing outcomes	0.100	99	0.015	950.0	99	0.001	abnormal

In Table 3, it can be seen that the significance level of Kolmogorov-Smirnov and Shapiro-Wilk tests for organizational rearrangement variables, outsourcing steps, and infrastructure development is higher than the error level of 5% and therefore have a normal distribution. However, since the significance level of variables like management, risk management, outsourcing implementation, and outsourcing outcomes are less than 5% error level and therefore is not normal. Because the distribution of some variables is normal and the distribution of some of them is abnormal, Smart PLS software was used so that the abnormality of the data distribution does not increase the error in estimating the data.

3.2. Check the adequacy of the sample size

Confirmatory factor analysis was used to estimate and validate the research variables and smart-PLS software was used to investigate the effect of the variables on other variables. The KMO sampling adequacy test was used to determine whether the number of samples was sufficient for factor analysis. The Bartlett sphericity test determines whether the variance of the research variables is influenced by the co-variance of some latent and fundamental factors. In other words, can it be said that the variance of the set of variables is due to a series of hidden and fundamental factors and not all variables?

Table 4. Assessing the adequacy of sampling

Kaiser-Meyer-Olkin measure of sampling adequacy		0.776
Bartlett sphericity test	Chi-square	3285.85
	df	666
	sig	0.000

According to the information in the table, the values of the Kaiser-Meyer-Olkin measure are close to 1, so the sample is sufficient, and considering that the significance

level of the Bartlett spherical test is less than the error level of 5%, so factor analysis can be used to estimate variables.

Table 5. Examining the factor loads of the questions

Variables	Primary	Extracted	Variables	Primary	Extracted	Variables	Primary	Extracted	Variables	Primary	Extracted
r1	1	0.878	t6	1	0.933	m10	1	0.888	g4	1	0.96
r2	1	0.927	p1	1	0.895	b1	1	0.916	g5	1	0.821
r3	1	0.883	p2	1	0.935	b2	1	0.896	g6	1	0.816
r4	1	0.915	p3	1	0.909	b3	1	0.934	g7	1	0.89
r5	1	0.931	p4	1	0.812	b4	1	0.858	g8	1	0.946
r6	1	0.966	p5	1	0.887	b5	1	0.918	g9	1	0.924
r7	1	0.943	p6	1	0.935	b6	1	0.914	g10	1	0.929
r8	1	0.854	p7	1	0.921	b7	1	0.902	g11	1	0.952
r9	1	0.891	p8	1	0.94	b8	1	0.868	g12	1	0.912
r10	1	0.923	p9	1	0.96	b9	1	0.907	g13	1	0.921
r11	1	0.932	p10	1	0.915	b10	1	0.892	g14	1	0.96
r12	1	0.847	p11	1	0.897	b11	1	0.889	g15	1	0.893
m1	1	0.856	p12	1	0.926	b12	1	0.813	g16	1	0.877
m2	1	0.928	p13	1	0.908	b13	1	0.924	pb1	1	0.92
m3	1	0.936	p14	1	0.909	b14	1	0.946	pb2	1	0.809
m4	1	0.933	p15	1	0.936	b15	1	0.842	pb3	1	0.895
m5	1	0.932	p16	1	0.873	t1	1	0.94	pb4	1	0.88
m6	1	0.958	p17	1	0.878	t2	1	0.907	pb5	1	0.946
m7	1	0.923	g1	1	0.901	t3	1	0.939	pb6	1	0.923
m8	1	0.936	g2	1	0.937	t4	1	0.895	pb7	1	0.907
m9	1	0.875	g3	1	0.923	t5	1	0.944			

According to Table 5, it can be stated that since the factor or extracted loads of the questionnaire items are at a high level and is close to 1, so it can be concluded that the questions are at a desirable level to enter the factor analysis.

3.3. Estimating the relationships between research variables

In this step, Smart PLS software has been used and via structural equations, the relationships between the variables are examined

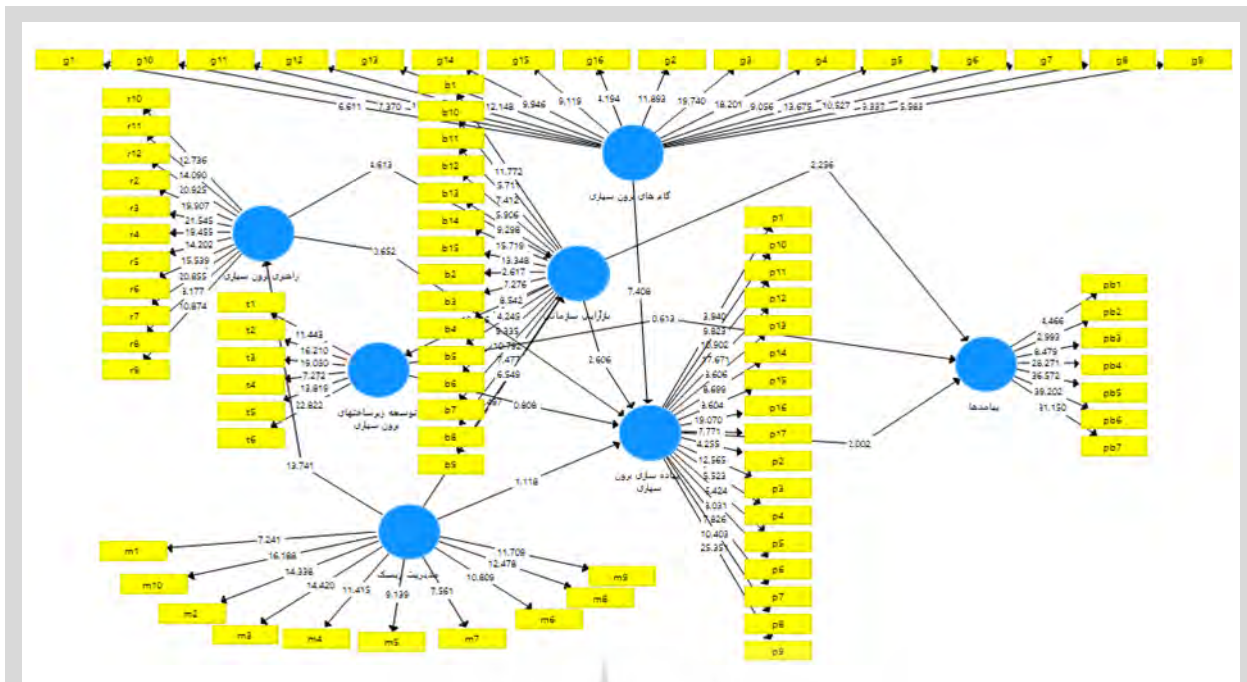


Figure 2: Structural model in t-value

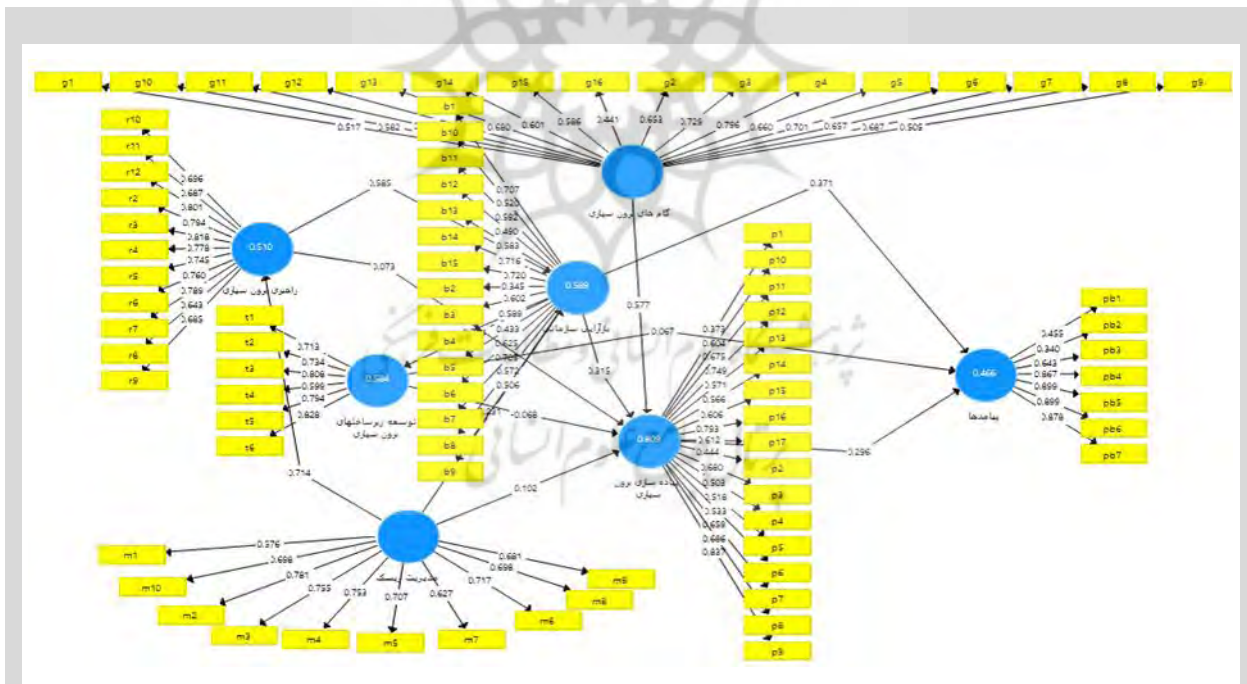


Figure 3: Structural model in the standard coefficient mode

As can be seen in Figures 2 and 3, some variables have a significant effect on other variables. The relationships of all variables are shown in Table 6.

3.4. Model fit indicators

In the PLS technique, the least-squares are used to fit the model, and usually the coefficient of determination of R2, Q2 index, and GOF statistics are used.

Table 6: Determination coefficient R2 and Stone-Geiser index Q2

Variables	R ²	Q ²	Communality	R ²
Organizational arrangement	0.735	0.243	0.250	0.735
Outsourcing infrastructure development	0.502	0.270	0.393	0.502
Outsourcing management	0.672	0.359	0.472	0.672
Risk management	--	--	0.380	--
Outsourcing implementation	0.770	0.285	0.300	0.770
Outsourcing outcomes	0.494	0.262	0.440	0.494
Outsourcing steps	0.309	0.116	0.323	0.309
			0.461	

According to the information in the table above, it is observed that the coefficient of determination R2 of the variables is more than 30% and the fit of the model is at an acceptable level. Q2 index (Stone and Geiser 1975) also shows the predictive power of the model in endogenous structures in three values of 15.0, Defines 2.0, and 35.0 as low, medium, and strong predictive power (Hensler et al., 2009). According to the information in the table above, it can be seen that the Aston Geiser index for each of the variables is more than 25 percent and it can be said that the fit of the model is above average and at a good level.

3.5. GOF index

The most important index of model fit in the technique of partial least squares (PLS) is the GOF

index. Wetzels et al. (2009) introduced three values of 0.1, 0.25, and 0.36 as a weak, medium, and strong values for GOF, respectively. This index can be calculated using the geometric mean of the R2 index and the mean of the redundancy indices.

$$GOF = \sqrt{\text{average (Commonality)} \times \text{average (R2)}}$$

According to Tanenhaus et al. (2005), the GOF index in the PLS model is a practical solution for the general fit of modeling. And is like other fit indexes in covariance-based models. This index is between zero and one, and values close to one indicate the appropriate quality of the model. As seen in the table above, the goodness-of-fit criterion of 461.0 is obtained and indicates the optimal fit of the model.

3.6. Testing research hypotheses

Table 7. Test result of main hypotheses

Hypotheses	Sobel statistic	β		sig	result
		direct	indirect		
outsourcing management through organizational rearrangement mediator have an impact on outsourcing implementation;	2.539	0.073	0.184	0.011	Hypothesis confirmed



Risk management through the outsourcing management mediator affects organizational rearrangement;	4.675	0.231	0.417	0.000	Hypothesis confirmed
Risk management affects the implementation of outsourcing through the mediating variable of organizational rearrangement;	1.402	0.102	0.072	0.160	Hypothesis rejected
Organizational rearrangement affects the implementation of outsourcing through the mediating variable of outsourcing infrastructure development;	0.845	0.315	0.240	0.397	Hypothesis rejected
Rearrangement through implementation mediator variable affects outcomes;	1.69	0.371	0.093	0.090	Hypothesis rejected
Development of outsourcing infrastructure through implementation mediator has an impact on outcomes	0.782	0.067	0.019	0.433	Hypothesis rejected

3.7. Complementary hypothesis

Table 8. Test result of complementary hypotheses

Hypothesis	T	(β)	sig	result
external management affect organizational rearrangement;	4.485	0.585	0.000	Hypothesis confirmed
Organizational rearrangement affects the development of outsourcing infrastructure;	20.317	0.746	0.000	Hypothesis confirmed
Organizational rearrangement affects the implementation of outsourcing;	2.611	0.315	0.009	Hypothesis confirmed
Risk management affects outsourcing management, risk management affects organizational rearrangement;	12.498	0.714	0.000	Hypothesis confirmed
Risk management affects the implementation of outsourcing;	1.522	0.231	0.128	Hypothesis rejected
Infrastructure development affects outsourcing implementation;	1.08	0.102	0.279	Hypothesis rejected
Outsourcing steps affect the outsourcing implementation;	0.821	-0.068	0.411	Hypothesis rejected

Hypothesis	T	(β)	sig	result
Outsourcing implementation affects outcomes;	7.323	0.577	0.000	Hypothesis confirmed
Outcomes affect outsourcing leadership;	2.042	0.296	0.041	Hypothesis confirmed
Outsourcing outcomes affect outsourcing management	8.996	0.553	0.000	Hypothesis confirmed
Outsourcing outcomes affect outsourcing risk management	8.522	0.475	0.000	Hypothesis confirmed

4. Discussion

Since the factor or extraction loads of the questionnaire items are at a high level, so it is concluded that the questions are at a desirable level to enter the factor analysis and can be used factor analysis and software analysis showed that the factor loads of all outsourcing development management indicators are at a high level, and then through the method of structural equations, the relationships between variables were depicted and the model fit was examined; Regarding the coefficient of squares R, according to the obtained values of the coefficient of determination of variables, it can be said that the fit of the model is medium to high and at a good level; The Stone-Geiser index for all variables also confirms that the model fits the medium to high and is at a good level; The results also show that the degree of importance of the goodness criterion of the obtained GOF shows the optimal fit of the model.

5. Suggestions

5.1. Practical suggestions on the main theme of "Outsourcing management":

It is suggested that wider and more measures be taken to "receive and analyze upstream outsourcing requirements and regulations" (0.576) from competent authorities such as the National Iranian Gas Company and the Ministry of Oil so that long-term steps and better and more complete outsourcing approaches can be developed.

Also, "possible value-added analysis of outsourcing" (0.634) needs special attention; because the activities were previously done internally, it was not necessary to

have a comprehensive analysis of value-added separately in the stages of development and activities;

Now that the outsourcing approach has been implemented, it is proposed to ensure the effectiveness of outsourcing, at least financially and with the help of tools such as industrial accounting, parallel determination of outsourcing products and services, added value applied by types of activities, and The production of products and services is determined or estimated (service costing system with ABC) to enable more accurate feasibility and decision making, especially at the strategic level.

5.2. Practical suggestions on the main theme of "Outsourcing Risk Management"

"Management includes identifying, measuring, evaluating and controlling governance and business risks" (0.567), in outsourcing development management has the most challenges and complexity, because the risks in this area that exist in the architecture of the organization and the business environment are numerous. And they may be difficult to identify and measure; Also, taking risk mitigation and control measures in this area requires spending more resources and making extra-organizational coordination; Therefore, it is suggested that the future steps of outsourcing be taken by focusing on proper management of these risks.

Also, considering that a significant portion of risks is transferred to outsiders after outsourcing, the activation of risk management mechanisms to "assess and adjust for outsourced risks" (0.600) can help reduce the likelihood of outsourcing failure; This theme improves the internal



capabilities of contractors and to do so, the company needs to have appropriate information and knowledge of its potential and actual contractors, and to control and mitigate risk, at least in the areas of identification and evaluation and selection of contractors; and later the contract should be gained with constructive interaction between the company and the exporter.

5.3. Practical suggestions on the main theme of "organizational rearrangement with outsourcing approach":

"Outsourcing process design/redesign" (0.331) is one of the most fundamental steps in institutionalizing outsourcing development management at the company level; However, previous studies have focused more on the individual outsourcing process, which processes the outsourcing portfolio from the strategic planning stage to the outsourcing review and promotion phase, and cover all interactions and criteria. It has been less studied and it is worthwhile to design it at the current stage and also to periodically review the parallel stages of outsourcing in the company. The precise definition of this process in the set of the process management system and the failure structure of the company is one of the key factors for the success of this part of the design and can lead to the precise definition of the regulatory role in outsourcing.

"Development of outsourcing monitoring mechanisms" (0.475) is an important and novel category, so it should be properly designed. The executive body of the company has more skills in supervising contracts, and if the same supervisory methods are transferred to outsourcing without special considerations, the outsourcing process will be disrupted. Also, because before outsourcing, the employees of their company were responsible for carrying out their activities, they may be too involved in outsourcing oversight, and even due to the high turnover of outsourcing, office health should be overshadowed; Therefore, it is suggested that monitoring mechanisms be developed more fully with a regulatory approach and internal controls.

5.4. Practical suggestions on the main theme of "Development of outsourcing infrastructure"

The extent of the impact and scope of outsourcing has placed outsourcing beyond the company's routine outsourcings; As a result, it is suggested that it should be performed in the framework of strategic planning and in accordance with the rearrangement and planning, to fully operationalize the outsourcing approach, in terms of allocating various resources such as hardware and software infrastructure, human, financial and knowledge

resources, "mobilize resources and Development of outsourcing infrastructure" (0.694), with a stronger organizational will.

The operationalization of "change management in outsourcing" (0.753) is the next suggestion that causes, in each outsourcing, all the necessary changes to be identified and determined, how to implement them, and responsibilities and schedule to be determined and the necessary changes to be applied.

Although there are a reliable literature and research background in the field of strategic partnerships and collaborations, the theme of "Development of Strategic Outsourcing Partnerships and Alliances" (0.808) in the company requires basic actions and macro-strategic decisions; Network management of these collaborations by covering the interactions between outsiders and even the company's contractors can also lead to the development of internal capabilities, which is also one of the goals of the current research.

5.5. Practical suggestions on the main theme of "Outsourcing Implementation"

Despite the definition of both groups of asset and processes outsourcing in the outsourcing roadmap, and given that operational measures have so far focused on the outsourcing of assets and fewer steps have been taken to outsource processes, in interviews and feedback received in the form of questionnaires, there are more tips for outsourcing business processes; Therefore, it is appropriate for the company to use the lessons learned from asset outsourcing to focus and study more and more deeply on the "accounting/review of requirements and the framework of business process outsourcing" (0.356) and to compensate the existing delays and to process. "(0.456) to operate.

5.6. Practical suggestions on the main theme of "Outsourcing Steps"

"Delivery to the contractor" (0.482) is one of the critical topics after the selection of the contractor, in other words, the operational connection of the two companies is done in the form of this theme, and at the end of this stage, the contractor must be able to manage outsourced field. This theme has formal and content differences with temporary and permanent delivery defined in the technical and executive system of projects and requires careful study and planning and compilation of checklists and explanation of the division of tasks within the employer and between the employer and contractor.

5.7. Practical suggestions on the consequences and review of outsourcing

The limitations and ambiguities of outsourcing and the many questions for which definitive answers have not yet been found, as well as concerns about the development of outsourcing, require the experiences of outsourcing, with "their pathology" (0.339), to be used to the maximum. The next steps, with the help of analytical tools, diagnostics, and risk management, and based on the results of monitoring key indicators and the status of key factors in outsourcing success, can create valuable lessons and in practice complete the outsourcing improvement cycle.

Also, "transferring the recommendations for reviewing upstream outsourcing requirements to decision-making authorities" in the National Iranian Gas Company, the Ministry of Oil, the government of the Parliament of Iran (0.461) has continued to gain attention of experts, and its emptiness has been felt and announced. It is suggested, in particular, that senior management negotiate and play an active role in influencing the imposition of these requirements; Doing so has significant implications, both in terms of social responsibility, in terms of knowledge transfer, and in terms of facilitating the implementation of outsourcing strategies in the company, and removes some administrative and legal barriers to the implementation of outsourcing.

6. Suggestions for future researchers

Given that the following hypotheses were not confirmed in this study, researchers can focus on "The effect of risk management through the mediating variable of organizational rearrangement on outsourcing implementation", "The effect of organizational rearrangement through the mediating variable of outsourcing infrastructure development on outsourcing implementation"; Also study the "Impact of Outsourcing Risk Management on Organizational Rearrangement with Outsourcing Approach and on Outsourcing Implementation", "The Impact of Outsourcing Infrastructure Development on Outsourcing Implementation" to investigate the cases that can achieve useful and reliable results and close the gap in research.

Also, comparing and examining the relationship and distinctions between outsourcing with other categories of value chain relationship and strategic partnerships, such as contracting and privatization, are still interesting and necessary and at the same time relevant and practical topics for future studies in this field of knowledge.

7. Research limitations

The limited scope of the research to the study field, due to the need to an in-depth analysis in the selected context, led to the model being limited to the oil and gas industry, the limited number of experts in the field of outsourcing portfolio development, and the nature of the questionnaire that participants did not give accurate and time-consuming answers, and at the same time, the epidemic of Quid 19 in the country, are the main limitations of this study.

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