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Identifying the Key Risk Factors of Oil and Gas Mega Construction Projectsin Kazakhstan

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Abstract
Purpose – The present study investigates the risk factors and their risk management in Kazakhstanoil and gas mega-construction projects.
Design/methodology – Through a quantitative research approach, 384 were stratified into ten listed companies in Kazakhstan that were selected randomly. By stratification, 38.4 persons wereselected for interviews from each company.
Findings – The study findings through a statistical analysis revealed that internal risks and other significant risks were showing a moderate correlation with the performance of mega projects, while external risks were not affecting the performance with a weak correlation. **Practical Implications** – The present research is the initial step towards the risk identification process for producing strategic policies for risks and discussing their sources and consequences onperformance. It is awareness for the workers and employees working in the mega constructions projects in Kazakhstan to know the possible risk factors for the project for the improvement in theperformance.
Theoretical Contribution –The study possesses theoretical implications for the academics and the researcher to know the risk factors of the projects, including internal, external and other significant risks in mega construction projects. It helps recognize the practical advantages and disadvantages of all the risk factors in the industry. The study would benefit future theoretical researchers examining other categories and their effect on other enterprises.
Limitations/Originality/Value – The study has not used the theoretical framework for oil and gas mega-construction projects' risk factors. Thus, future researchers can work on applying and expanding the theory related to the risk factors impacting performance. Other factors affecting Kazakhstan's oil and gas projects are needed to focus on influencing the performance of the specific industry.
Keywords: Mega constructions, Internal Risks, External Risks

1. Introduction

The mega-construction industry is considered the primary source of income for many countries and an engine of economic development that creates job opportunities for various professionals and engineers (Abdulmoneim, Samadony, & Nosair, 2021; Shayan, Kim, & Tam, 2022). Countriessuch as China, Hong Kong-Zhuhai-Macao Bridge, Three Gorges Dam, and Sichuan-Tibet Railway mega construction projects have been built to develop the country's economy such as (Li et al., 2021). Further, mega-construction projects have also interestingly become significant to the awareness of sustainability in Kazakhstan (Ghalib, Elkhorazaty, & Serag, 2020). However,external factors can significantly affect the progress of these projects in oil and gas fields, especially in developing countries where there are unstable policies, weak economies and enhanced security unrest that often fails to meet the objectives of the mega construction projects (Kassem, Khoiry, & Hamzah, 2020). The mega construction projects are considered large-scale engineering conveniences such as water supply systems, communication systems, and transportation systems that deliver various public services for residents of livelihoods, social production and economic development (Li et al., 2021). In mega construction projects, international oil and gas organizations aim to support the profit growth external to native countries.These projects involve uncertainties in native construction projects and complex risks, mainly in international transactions (Kassem, Khoiry, & Hamzah, 2020).

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Oil and gas projects are among the inclusive global sectors in Kazakhstan, which is among the 15oil-producing countries and has 3% of reserves worldwide. It provides around 60% of hydrocarbon derivatives to the world and is the biggest taxpayer giving 44% of tax revenues to the state budget.The manufactured oil is transported through pipelines, and 80% of export exported to other countries (Petrenko, Denisov, & Metsik, 2022). In 2020, according to Kazakhstan's strategic development, oil production was forecasted to increase by 100-200 million tons every year, 1.5 times more than the rate in the previous years (Ziyadin, Malayev, Yessenova & Beyzhanova, 2019). The expansions in oil production occurred due to the giant Paleozoic deposits at Caspian. The total number of hydrocarbon fields in Kazakhstan is 280, situated in six gas and oil basins: Zaisan Basins, Shu-Sarysu, Mangyshlak, Yuzhno-Torgai, the Caspian Sea, and Ustyurt-Bozashi. Additionally, there are a total of 3.0 trillion dissolved and free gas and 5.5 billion tons of recoverable oil reserves. Among 233 fields, eight are discovered in the North and Middle water area of the Caspian region, 162 in the Caspian basin, 18 in Ustyurt-Bozashi and 55 in Mangyshlak. Therefore, expanding hydrocarbon resources and discovering and studying present and future fields in the oil and gas industry is essential in Kazakhstan for economic growth and development(Azhgaliev, Karimov, & Isaev, 2018). In 2020 more than 50% of oil in Kazakhstan comes from domestic energy production of 159 Mtoe, whereas, in 2020, oil production was less than it was two years earlier (IEA, 2022). Kazakhstan produces annually around 55% of the GDP growth, mainly through the oil and gas industry, as reported by (Kim & Comunian, 2022).

Small and medium infrastructure projects and mega construction projects are characterized by the number of stakeholders, a substantial investment, long life cycles, and political impacts (Chattapadhyay, Putta, & Rao, 2021). Combining these features reveals that the risks are more complicated and significantly influence mega-construction projects by increasing the complexity and scale of the projects. Hence, the development of mega-construction projects mainly depends on the effective management of risks (Nawaz, Waqar, Shah, Sajid, & Khalid, 2019). The risk factors are unpredictable in this scenario, yet they can have a positive and negative impact on theprogress of the projects; the positive risks are reflected as opportunities, while adverse risks are reflected as threats for mega construction projects (PMI, 2019). This highlights the importance ofmanaging the risks prior to the commencement of the project so that the objectives are fulfilled smoothly. The risk management process includes risk identification, risk assessment, risk analysis,risk planning, risk implementation of response and risk monitoring. Project risk management intends to reduce the probability of adverse risks while enhancing the probability and influence of positive risks to the opportunity of mega construction projects' development (Pheng, 2018). The studies predicted that risks occur due to inappropriate management (Abdulmoneim, Samadony, &Nosair, 2021). The improper management in terms of various managerial perspectives of the megaprojects related to the oil and gas industry highlights the failure in the realization of the project mainly in the context of risk management which denotes the mega construction projects resulted in mega risks (Kassem, Khoiry, & Hamzah, 2020). In the current research, the oil and gas mega- construction projects are studied, and the risks are identified based on both the internal and externalfactors given by previous findings by various scholars, such as (Kassem, 2022; Raszewski, 2022).

International mega-construction oil and gas projects have more loss possibilities because of the exposure to complex and varied risks compared to other projects (Kamal, Abas, Khan, & Azfar, 2022; Rawat, Gupta, & Rao, 2022). Due to political concerns, economic and financial crises, rising unemployment, postponed investments, and high global prices (Kassem, 2022) results in changingthe behaviour of the construction companies and clients (Andi, 2021; Li et al., 2021; Ongkowijoyo,Gurmu & Andi, 2021). Previous literature has lacked consideration when implementing sustainability principles to identify different risk factors influencing mega-construction projects. These risks hinder development due to the exposure of mega risks (Abdulmoneim, Samadony, &Nosair, 2021) and directly and indirectly influence the project's time and cost (Shoar & Chileshe,2021). Hence, the risk factors have interestingly become so vital that they need to be carefully defined, studied and determined to reduce the impact of risks on mega construction projects (Chattapadhyay, Putta, &

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Rao, 2021). The need to focus on significant risk factors is essential because the evaluation takes time, money and effort; otherwise, it would adversely affect the construction processes. The traditional gas, oil, and other resource deposits are depleting and manufacturing companies are forced towards complex fields such as shale gas, deep water deposits, and oil sands; thus, the industries require specialists in Kazakhstan (Petrenko,
Denisov & Metsik, 2022). The project would face challenges if risks are not appropriately handledand strategies are applied accordingly. Thus the present study investigates the impact of risk factorson oil and gas mega-construction projects in Kazakhstan. Based on the research aims, the targetedresearch objectives include the implementation of effective tactics in managing the risk factors of mega construction projects by risk identification, risk assessment, risk analysis, risk planning, risk implementation of response and risk monitoring to understand the risks of the project's objectives fully. Especially its time and cost; in Kazakhstan, thus following research objectives are presented.

1. To identify the internal and external risk factors influencing the oil and gas mega construction projects in Kazakhstan
2. To recognize the major risk factors that may influence the goals of oil and gas mega construction projects in Kazakhstan
3. To analyze the recognized risk factors by quantitative research method in order to examine the risks severity and the risk important index (RII) for every identified risk
4. To recommend the researchers and practitioners in order to manage the identified risks in the context of Kazakhstan

2. Literature Review

Risk Management

Risk management identifies, assesses and controls *threats to an organization's capital and earnings* (Chattapadhyay, Putta & Rao, 2021). The procedures in risk management include risk identification, risk assessment, risk response planning, risk monitoring, and risk analysis (Kulikova & Balovtsev, 2020). The primary purpose of risk management is to decrease or reducethe negative impacts, risks and probability of risks while increasing the positive factors to enhancethe quality and success of the project (Hassanen & Abdelalim, 2022). Abdel-Basset (2019) investigated risk mitigation strategies, including incorporating proper risk management. The companies should consider the risks in decision-making and strategies for immediate events. Moreover, the study recommends risk analysis, control and mitigation to make proper decisions.

Samimi (2020) also investigated the progress in risk management to recognize the industry's threats and opportunities so that they can be addressed appropriately. Organizational risk management helps the company to move in the right direction and achieve the target goals of the company by making specific changes. By developing support activities in the company, identifying the proper owner of the responsibilities for managing and facilitating the risks can be beneficial for mitigating risks related to supervisors. In addition, they are making risk committeesin the industry and the managers so that the risks can be reported to the senior management for thesuccessful evaluation of issues. Despite the available literature on risk factors and mitigation, lessresearch has been conducted on oil and gas mega projects in Kazakhstan. Thus the present study aims to investigate the impact of risk factors on oil and gas mega-construction projects in Kazakhstan.

Shibani et al. (2022) claimed that construction risks might be designated as the probability of an event that can harm the feasibility of construction projects. The major risks in the oil and gas mega-construction projects are construction, technical, contractual, political, socio-economic, and environmental risks (Dixit, Sharma, & Singh, 2020). Other risk factors of mega construction projects in the oil and gas industry include lack of communication among stakeholders, inappropriate scheduling and planning of the projects by contractors, issues with sub-contractors, inadequate

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interaction in procurement and engineering with vendors and poor supervision. The mega construction projects are unsafe and riskier than other small and medium projects. Therefore, it is essential to minimize the adverse effect of risk factors on the mega construction market by inspecting and handling the risk factors prior to taking place.

The current capital-Almaty is understood as a symbol of Russian control in Kazakhstan, due to which Kazakhs cannot introduce their governance system in the state (Singer, 2022). Additionally, Kazakhstan has been perceived as susceptible to significant threats from neighboring powerful countries such as China and Russia (Kazantsev, Medvedeva, & Safranchuk, 2021). Furthermore, exposure to the threats can cause natives to line up with security concerns and admit external political restrictions on civil authorities (Radnitz, 2022). Another report by Yu, Khalid, & Ahmed(2021) claimed that Kazakhstan is a newly independent state and has encountered by a number ofinternal and external challenges that need to be addressed by the firms to determine its independence, such as oil and gas mega construction risks factors; these factors were studied by various scholars in different countries such as Kuwait (Alrashidi & Adesta, 2021), Thailand (Prateepasen & Aumpiem, 2021), Lebanon (Shibani et al., 2022) and Kazakhstan (Hossain, Raiymbekov, Nadeem, & Kim, 2022).

Li et al. (2021) studied the dimensions and definitions of Mega Infrastructure Projects (MIPs) to recognize their risk factors. Through a conceptual model, MIP risk factors were identified, and 77risks were identified through interviews. The study results revealed a high probability of economicrisk in the sustainable development of MIPs, high loss of social risks and loss and probability of environmental risks. Furthermore, other risk factors were identified in the construction process; these are, but are not limited to: installation and construction cost overruns, resettling and land acquisition cost attacks, and information distribution with people.

Risks Influencing Mega Construction Projects

Innovative technologies in modern times have been introduced in the mining industries, which can decrease production costs, raise production efficiency, and adopt and develop unprofitable mining projects. Recently, Kazakhstan and different Central Asian countries have been on the way to producing opportunistic situations to explore and reproduce efficient mineral resources andincrease their control of the integrated and rational use of subsoil. In addition, efficient technologies and new high-tech exploration, proceeding and production of raw minerals are manufactured through a controlled automated process.

Delgado et al. (2019) reported that automated systems and robotics are the potential technical systems to transform and offer benefits to the construction industry and other Engineering sectors.Automation and Robotics systems are very efficient in decreasing labour costs and improving quality and productivity. In addition, it helps reduce injuries to workers and other dangerous tasks, and technological innovations have the potential to address these challenges in the construction industry. However, there is a loss of productivity level with inefficiencies in the construction sectors due toa lack of technical adoptions, which creates barriers to labour forces in mega construction projects.These barriers include complexity in the construction tasks. (Ma & Fu, 2020).

Martin, Wang, Li, & Mends (2018) studied technical risk factors in international construction. The study identified technical risks in engineering companies where power supply shortage, industrial disputes, water supply shortage, and partner difference practice issues of construction internationally were the significantly ranked technical risks. With these ranking systems, international construction firms can effectively improve critical planning, avoid fatalities, and be involved in economically sustainable projects.

There are several consequences of construction risks, such as overruns of expenses and time and effects on the deadlines of the projects. Due to these risks, various construction projects were hindered and over budgeted due to mismanagement by the project managers. The community andtraditional-based earning methods, unable to evaluate and handle construction risks, lead to delayed and deficient constructions (Kassem, 2022).

Contractual risk is also a major issue in mega projects where contractual allocation risk is one risk factor among the parties involved in the mega project because oil and gas mega-projects involve many

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parties working on the same project. Poor contract management can lead to delays in the construction and tie and cost overrun (Seddeeq, Assaf, Abdallah, & Hassanain, 2019). Moreover,the contract can be interfered by the contractors who are incompatible with holding the project.

Political risk is one of the significant risks for oil and gas industries in a country. These risks include government interference in the operator's and contractors' activities, adjustments risks in the taxes and policies, and failure of contracts due to variations in the power and nationalization threats to investments (Mu, Fan, & Xu, 2018). In Kazakhstan, the bargaining power balance of multinational enterprises and enterprises varies in a circular nature. Due to less process of oils, foreign investors are taking advantage in the negotiations of contracts with the country, on the other hand increasing the commodity prices. This inability to underhand the cyclical nature of theoil industry by the government leads to radical strategies like nationalization in which the state gives satisfactory revenues at the time of the agreement; however, they fail to build fair and equalconditions for price fluxes (Orazgaliyev, 2018).

A construction project's financial factors are the rate of return, return on investment, cost, available funds or net present worth. Other financial factors include the cost-to-benefit ratio, leverage, and equity-to-debt ratio, which are the driving factors of risks in the project. Financial factors are the influencing factors for the selection of projects. Sometimes, mega projects are delayed cost overrunand inadequate performed; that is why each organization prefers to have a better insight into the financial factors to attain financial equilibrium and cash back calculation. When finances are not available for the completion of projects in the organization, they take loans which are highly cautious because of risk-taking. If the companies fail to face these risks, it may spoil the capacityof the company to refund the debt. In contrast, organizations with lower financial risk and debt aremore at ease in achieving growth and development, raising the possibility of taking more risks inthe future (Dixit, Sharma, & Singh, 2020).

Oil and gas industries also confront local and international environmental challenges. To achieve maximum economic benefit, industries ignore environmental risks. With the development and advancement in the manufacturing and mining industries, the negative consequences are becoming more highlighted (Babatunde, 2020). The issues include air emissions, soil and groundwater contamination, habitat protection and biodiversity discharges in marine and freshwater, and incidents and oil spills. Moreover, drilling (Epelle & Gerogiorgis, 2020) and exploring may also hinder the marine and land ecosystems in which seismic techniques can be used to find oil reservesunder the oceans, damage marine mammals and fish (Ogolo, Anih & Onyekonwu, 2022).However, spill prevention plans and emergency preparedness, controlling and managing pressurized oil and gas, and controlled venting from wells can regulate drilling (Harkous, 2021). The ability of the environment to recover itself is reducing, but the measures to reduce these effectsare not developing. The dishonesty and incompetency in using subsoil are causing unacceptable environmental situations, such as ecological disasters and equating the mining zones. These issuesare mitigated by using modern technologies to enhance the production level and reduce the negative consequences of the environment resulting from oil and gas industries, for instance, by implementing safe and effective field development (Gorlenko, Murzin, & Belyaevsky, 2020).

Effective communication is essential among the stakeholders in the assessment of projects. For instance, construction projects in Oman are facing communication issues between the stakeholders (Amri & Marey-Pérez, 2020). As a result, the project gets delayed and leads to rework; thus, establishing proper formal communication systems is vital among the stakeholders to reduce suchrisks (Smith, Edwards, Martek, Chileshe, Hayhow, & Roberts, 2021). Moreover, establishing informal communication systems is also necessary to transfer information quickly among the shareholders in less time (Markovic & Salamzadeh, 2018). For this purpose, a balanced flow of information is compulsory to regulate the activities of every subcontractor (Hassanen & Abdelalim, 2022). Projects being inadequately scheduled and planned by the contractors are the leading cause of delay in a project (Amri & Marey-Pérez, 2020). Project delays are one of the significant threats to mega

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construction projects in the oil and gas industry worldwide (Ongkowijoyo, Gurmu, & Andi, 2021; Shibani et al., 2022). According to the report by Yap & Skitmore (2018), the leaders of 10 companies from Europe, the United States and Asia stated that40% of the mega construction projects in the oil and gas sectors were overwhelmed by significantcost overruns and schedules. Another study by Adeleke, Adeniyi, &

Muuka (2021) found that 17.3% of the mega construction projects in Malaysia also faced project delays over three months. While in Oman, 40 mega construction projects were employed for various public companies, 62% of which were completed within the schedule; however, no formalrecords were available to explain the reason for project delays in Oman. Due to contextual problems of project delays, various studies have been performed to examine the problems relatedto the mega construction market in various countries' industries (Hatmoko & Khasani, 2019; Viswanathan & Jha, 2020). These issues are mitigated by adopting the methods in project management with the help of scheduling and planning software packages and enhancing the control data schedule communication between the management of the construction site and field supervision. In addition, they can build a committed team of contractors to follow up on delayed issues and for planning schedules (Alirezaei et al., 2022). Ullah et al. (2022) identified factors such as the board of directors' agility, financial factors, demographics and location of projects. The company's construction projects use these as an initiating point to examine the mage project risks.In addition, identifying these factors lowers the failure, cost overruns and delays in the mega projects. The delays, disputes, defects and cost overruns in the projects may cause due to poor sitemanagement and contractors' supervision which can be mitigated by hiring expert site managers who can run and maintain the operations efficiently without compromising on the quality level (Yap, Goay, Woon, & Skitmore, 2021).
Poor interaction with vendors in the engineering and procurement stages is not a major risk for project delays; however, it is unique to construction projects in the oil and gas industries. As theseindustries are using advanced technologies and making ordered products; therefore, vendors needto be careful at the initial stage of the project so that they can handle interaction issues. This requires the identification of needs and resolutions for technical problems in the first stage of the project. In this way, negative consequences of schedule and cost in the prior stages can be mitigated(Hatmoko & Khasani, 2019).

3. Research Methodology

This study employed a quantitative research method using a deductive approach which enables usto use the available literature for understanding the current risk factors, threats and opportunities in the oil and gas mega construction projects (OGMCP). Through the positivism philosophy that helps find out more information about the known risk factors in Kazakhstan's Mega gas and oil construction projects, hypotheses were formulated on the background of existing knowledge and wild applied statistical tests for accepting or rejecting the hypothesis. The study mainly focused on primary data collection using purposive sampling. The target population was the site engineersthat faced all the operation in OGMCP daily and were aware of the company's overall operations.The energy sector in Kazakhstani is evolving rapidly, due to which the statistics of companies working in OGMCP were not clear about the number of engineers; however, more than 172 oil and Gas projects are working in Kazakhstan. The sample size of 384 was stratified into ten listed companies in Kazakhstan that were selected randomly. However, the sample size calculation wasnot justified. This study assumed the random sample calculation by openepi source. By assuming the random population of 1 million, a 5% chance of error, and a 95% of confidence interval, the calculated sample size is n=384. By stratification, 38.4 persons were selected for interviews fromeach company.
SPSS version 26 was used for data entry and analysis, where data was entered daily after receiving questionnaires from Google forms to avoid information and recall bias. The questionnaire comprised 33 items overall for all three major variables of internal risk factors, external risk factorsand Major risk

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factors, while ten items were added to assess company performance. The instrumentation of the study is necessary for collecting data and measuring the dependent and independent variables for the later analysis of the data in the study. Thus, the instrumentation of the study questionnaire was based on the Likert Scale questionnaire, which comprised ratings from1 to 5, where 1 represented strongly disagreed, and 5 showed strongly agreed. The questionnaire was adopted from various research findings about the risk factors in OGMCP and checked througha pilot study and Cronbach's alpha test.

4. Findings

Table 1: Pearson two tailed Correlation

Correlations

		Performance	TR	CN	CO
Performance	Pearson Correlation	1	.335**	.474**	.394**
	Sig. (2-tailed)		.000	.000	.000
	N	387	387	387	387
TR	Pearson Correlation	.335**	1	.626**	.519**
	Sig. (2-tailed)	.000		.000	.000
	N	387	387	387	387
CN	Pearson Correlation	.474**	.626**	1	.733**
	Sig. (2-tailed)	.000	.000		.000
	N	387	387	387	387
CO	Pearson Correlation	.394**	.519**	.733**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	387	387	387	387

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation of internal risks in Mega Construction projects such as (Technical Risk, Construction Risks and contractual Risks) with the dependent variable (Mega ConstructionProjects performance) indicated that the correlation of technical risk with the performance of the projects was weak, with an p-value p= 0.335, which is less than 1. The construction risks were moderately correlated with the performance of projects with and p-value p= 0.474, which is moderately closer to 1. Moreover, contractual risk had a weak relation with the performance of theMega projects with and p-value of p=0.394, which is less than 1.

The correlation of independent variables (Political Risk, Socio-economic Risks and Environmental Risks) with the dependent variable (performance of Mega Construction Projects) indicated that the correlation between Political risk and the performance of the projects was weak, with an p-value p= 0.350, which is less than 1. The socio-economic risks were moderately correlated with the performance of projects with and p-value p= 0.319, which is weak that is less than 1. Moreover, environmental risk had a weak relation with the performance of the Mega projects with and p- value of p=0.322 which is less than 1.

The correlation of independent variables (Lack of Effective Communication, Inadequate Planningand Scheduling, Poor Site Management and Supervision, Problems with Subcontractors and Poor Interaction with Vendors in the Engineering and Procurement Stages) with the dependent variable (performance of Mega Construction Projects). The correlation analysis indicated that lack of communication had a weak correlation with the performance of the projects with an p-value p= 0.379 because it is near 0. The inadequate planning and scheduling had a weak correlation with the performance of projects with and p-value p= 0.220, near the value 0. Moreover, poor site management and supervision had a moderate relation with the performance of the mega projects with and p-value of p=0.449; problems with subcontractors have an p-value p= 0.449, and poor interaction with

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vendors in the engineering and procurement stages had an p-value p= 0.421 with a moderate correlation with performance.

Regression Analysis

Regression analysis is the more complex statistical analysis that gives insights about the variablesand data. The model summary of the variables indicated an *R* value for above 0.512 that which means the correlation is strong while the R^2 value 0.263 that means the 26% of dependent variablecan be explained or observed by independent variable. The ANOVA analysis showed a p=0.000 that represent that the regression model predicts the dependent variable significantly. This significance showed that regression model is fitting the dependent variable very well.

Table 2. Regression Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.470	.182		8.075	.000
	Internal Risk	.205	.060	.232	3.440	.001
	External Risk	-.074	.067	-.079	-1.103	.271
	Major Risk	.411	.068	.392	6.077	.000

The multiple regression of the coefficient provided the rationale for the acceptance and rejection of the hypothesis. The evidence from the regression coefficient table proposes that internal risks are the significant influencers of the performance of the mega projects in Kazakhstan as the significance value is 0.000<0.05, which is a significant level of the interval with the $\beta 1$ of 0.205.Similarly, other major risks significantly influence the mega construction projects' performance asthe significance value was 0.000<0.05, which is a significant interval level of $\beta 2$ of -0.074. In contrast, external risks are not the significant influencers of mega construction projects performance as the value of significance is 0.271>0.05 with $\beta 3$ of 0.411, where,

Y (Performance of Mega Construction Projects) = 1.470 +0.205 (Internal Risk) + 0.411 (Other Major Risk) + e (Standard Error)

Equation 1: Linear Equation to Predict Risks in Mega Construction Projects

Discussion

The findings of the correlation and regression analysis indicated that there is a moderate and a significance association of internal risks with the performance of mega constructions projects in Kazakhstan. Thus, the findings are consistent with the studies (Ajibike, et al. 2019; Kassem, 2022; Kassem, et al. 2020) which indicated a significance impact of internal risks factors on oils and gasmga projects.

The results from the correlation and regression analysis revealed that there is weak and significance relation of external risks to the performance of mega constructions projects in Kazakhstan. The findings of the present study are consistent with previous findings of (Hussain, et al. 2021; Kassem,et al. 2020; Ongkowijoyo, Gurmu, & Andi, 2021) that suugested a weak relationship of external factors with the success of the projects.

Correlation and regression analysis for major risks concluded that there is a moderate and significant relation of other major risks internal risks with the performance of mega constructionsprojects in Kazakhstan. Thus, the findings are relate with the outcomes of (Ahmed, Hussain, & Philbin, 2022; Basak, Coffey, & Perrons, 2018).

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5. Conclusion

The present study examined the risk factors associated with the performance of oil and gas mega construction projects in Kazakhstan. A total of 384 were selected for the survey, and the data analysis was conducted using SPSS software. The statistical analysis identified three internal risks:technical, contractual, and construction risks, three external risks: political, economic and environmental risks, and five other major risks: Lack of Effective Communication, Inadequate Planning and Scheduling, Poor Site Management and Supervision, Problems with Subcontractorsand Poor Interaction with Vendors in the Engineering and Procurement Stages factor for the evaluation of the performance of Mega projects. Further, the data revealed a moderate correlationbetween internal and other major risks with the performance of mega projects, while external risks indicated a weak correlation. The regression analysis showed a significant relation of internal andother major risks with the performance of mega projects, whereas the external risks factor was notsignificant.

Practical Implications

The present research is the initial step towards the risk identifications process for producing the strategic policies for risks and discuss their sources and consequences on the performance. This can lead to the development and growth of oil and gas mega projects in Kazakhstan that are the main source of the country's economy growth (Kassem, Khoiry, & Hamzah, 2020). The study also poses significant implication for construction industry practitioners, project managers, agencies, and engineering managers to lower the degree of delayed schedules which are affectingand influencing the performance of megaprojects. It helps support the upcoming construction projects performance via escaping the same mistakes that causes delay in the projects as well as affect the progress of the projects in the execution of project and engineering management procedures (Ahmed, Hussain, & Philbin, 2022). By interpreting the relationship between the riskfactors and their influence on the oil and gas mega construction projects, performance supports theteam managers to form risk responses and appropriate plans to mitigate the effects discussed in
the study. Moreover, this study is awareness for the workers and employees working in the mega constructions projects in Kazakhstan to know the possible risks factors for the project which will reinforce the improvement in the performance while executing the work. However, the lack of planning and strategies to confront these risks factors will increase the chances of failure of the project (Kassem, Khoiry, & Hamzah, 2020). Moreover, the findings will help the contractors to know the model for identifying the risk factors as well as helping the prioritizing the budget allotment among each risks secure time overruns (Mohamed, Ammar, & Nabawy, 2022).

Theoretical Implications

The study possesses the theoretical implications for the academics and the researcher to know the risks factors of the projects including internal, external and other major risks that mega construction projects face in Kazakhstan. It helps recognize the practical advantages and disadvantages of all the risk factors in the industry. It also recognizes the groups' risk factors for the influential risk groups, such as communication, economics, safety, stakeholders, managementof projects, and politics, which are primarily used. The study would benefit future theoretical researchers examining other categories and their effect on other enterprises. Clearer risk descriptions and the existing concerns confronting the oil and gas industriousness will aid future investigators in progressing and uncovering solutions. On the other hand, the study poses significant implications for the project and engineering managemnt literature in the framework ofproject performance, schedule delays, role of upper level management and in the adopting a comprehensive methodology. This analysis contributes to knowledge related to project stakeholders by proposing a broad framework for determining, organising, and specifying the proper techniques for adequate stakeholder engagement and dispute solutions regarding the significant oil and gas mega projects in the country (Khalilzadeh, Kebriyaii, & Rezaei, 2021).

Recommendations

The study poses some recommendation of the authorities to enhance the performance evaluation by looking into the risk factors identified in the present study. It is recommended that the stakeholders'

collaboration is the most significant task in improving the project's performance, while maintaining social responsibility in the stakeholder's concept. On the other hand, the dangersof project failure because of dissatisfied project goals and objectives may be evaded and mitigatedby tempting project stakeholders successfully (Khalilzadeh, Kebriyaii, & Rezaei, 2021). Furthermore, it is recommended to employ the capabilities of knowledge, experience and expertiseof regional human resources as possible stakeholders in the present and prospective schemes. Maintaining workshops and conferences can construct scientific connections and enhance the engagement level of stakeholders established on the contemporary transformations and requirements of the projects. Social networks and startups might support in activate the stakeholders and offer them an economical and competitive (Mohamed, Ammar, & Nabawy, 2022).

On the other hand, human resource is also a vital segment in the oil production industry which is being ignored; improvement is required in the segment as this issue needs to be immediately solvedas the share of unemployed foreign workers in the industry are increasing. In addition, there is a requirement for new qualifications for dealing with the transformed technological automation processes and informatization, for instance, managing logistical, technological, and financial activities (Petrenko, Denisov, & Metsik, 2022).

Limitations and Future Direction

The limitation of the present study is that it has not used the theoretical framework for risk factorsin oil and gas mega-construction projects. Thus, future researchers can work on applying and expanding the theory related to the risk factors impacting performance. Apart from this, the studyis limited to specific factors affecting Kazakhstan's oil and gas projects. However, future researchis needed to focus on the other risk factors influencing the performance of the specific industry.

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