Construction Economics and Building

Vol. 22, No. 1
March 2022

Citation: Ajibike, W. A., Adeleke, A. Q., Muuka, G. N., Bamgbade, J. A., Darun, M. R., and Moshood, T. D. 2022. Impacts of Oil and Gas Internal Risk Factors on Project Success: Moderating Role of Government Support. *Construction Economics and Building*, 22:1, 47–69. https://doi.org/10.5130/AJCEB.v22i1.7842

ISSN 2204-9029 | Published by UTS ePRESS | https://epress.lib.uts.edu.au/journals/index.php/AJCEB

RESEARCH ARTICLE

Impacts of Oil and Gas Internal Risk Factors on Project Success: Moderating Role of Government Support

Waliu Adeniyi Ajibike[1,*], Adekunle Qudus Adeleke[2], Gerry Nkombo Muuka[3], Jibril Adewale Bamgbade[4], Mohd Ridzuan Darun[5], Taofeeq Durojaye Moshood[6]

[1] Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, niyifavourite@gmail.com
[2] Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, adekunle@ump.edu.my
[3] College of Business, Al Ghurair University, Dubai, UAE, gmuuka06@gmail.com
[4] Faculty of Engineering, Computing and Science, Swinburne University of Technology, Sarawak Campus, Malaysia, jbamgbade@swinburne.edu.my
[5] Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, mridzuand@ump.edu.my
[6] Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, taofeeqmoshood@gmail.com

Corresponding author: Waliu Adeniyi Ajibike, Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, niyifavourite@gmail.com

DOI: https://doi.org/10.5130/AJCEB.v22i1.7842
Article History: Received: 02/08/2021; Revised: 20/01/2022; Accepted: 27/01/2022; Published: 21/03/2022

Abstract

Organisational internal risk factors, which include management, material, finance and design risk factors, affect oil and gas construction projects' success in emerging nations, in which Malaysia is no exception. The purpose of this study is to examine the effect of these internal risk factors and government support on oil and gas projects. Data were collected from 61 employees of oil and gas firms within Peninsular Malaysia using a questionnaire survey. The data were analysed using the structural equation modelling (SEM) technique. The results revealed that all the exogenous variables (design risk, management risk, financial risk and material risk factors and government support) significantly impact project success. Although the insignificant and unsupported

DECLARATION OF CONFLICTING INTEREST The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. **FUNDING** The study reported in this article was funded by the Fundamental Research Grant Scheme Managed by the Universiti Malaysia Pahang [Grant code: RDU190127].

hypotheses in this study are not unconnected with the current COVID-19 pandemic, which made the government shift attention to medical facilities projects. This study implies that managerial capability is critical in managing risks and ensuring the successful delivery of projects. As a result, project managers are expected to be on top of the triple constraint's essential qualities, which increase the chance of project success. They must be aware of any changes to the essential characteristics, whether unexpected or desired. The study developed an all-inclusive framework that can assist stakeholders within the industry and academia in mitigating internal risk factors in ensuring the success of projects.

Keywords

Project Success; Management Risk; Material Risk; Finance Risk; Design Risk; Government Support

Introduction

The energy demand is growing worldwide. According to the International Energy Agency, global energy demand will rise at a 1.6 percent annual pace by 2030 (Conti, et al., 2016; Prăvălie and Bandoc, 2018). Fossil fuels are the primary source of fuel supply for humanity, emphasizing the importance of the global oil and gas sector (Dehdasht, et al., 2017; Hartmann, et al., 2020). The oil and gas industry accounts for 20 to 30% of Malaysian GDP (Saudi and Tsen, 2017). According to Bank Negara, the sector is a key driver of the Malaysian economy (Sekar, et al., 2018). Current construction projects and high-value developmental projects accounted chiefly for the swift growth in foreign construction imports, contributing approximately 16.9 billion to Malaysian GDP (Hoque, Wah and Zaidi, 2020). However, the input of oil and gas projects within the sector has been and continues to be disappointing as a result of risk concerns that limit the outputs of these projects (Badiru and Osisanya, 2016), leading to litigations, disputes, neglect and failure of the project which also eventually result in financial setbacks.

Risks in oil and gas construction projects, according to De Maere d'Aertrycke, Ehrenmann and Smeers (2017), frequently lead to schedule overruns, cost overruns, and a lack of quality owing to specific risk factors, which this research seeks to explore. Many projects have been delayed or over budget due to project managers' inability to appropriately manage risk, leading to outright abandonment, disagreement, and lawsuits (Badiru and Osisanya, 2016). Today's projects are considerably exposed to more risks and uncertainties as a result of factors such as poor management, inadequate material, complexity in the design, insufficient finance, labour experience, low technology, and equipment, which are the leading risk factors for the majority of the nation's oil and gas construction projects (Mani et al., 2017; Van Thuyet, Ogunlana and Dey, 2007).

Therefore, in order to improve project success rates in oil and gas construction projects, it is necessary to identify and investigate risk factors that may restrict project success within oil and gas construction projects. As a result, this study will delve into the impact of internal risk factors such as design, materials, finance, management, and labour and equipment risk factors on the performance of oil and gas construction projects, which are regarded as megaprojects. This study used structural equation modelling (SEM) to achieve this goal. SEM is a multivariate approach capable of predicting the complicated relationship between variables (Hair Jr., et al., 2014). This study contributes to discourse in oil and gas construction research. Firstly, through theoretical and empirical facts on how risk could be managed from both project and organisational related factors. Likewise, this study's outcomes could serve as a blueprint for stakeholders in the industry and the academic in mitigating against internal risk factors in ensuring the success of projects. The remainder of this article is arranged as follows: literature relevant to oil and gas construction projects is explained, followed by the underlying theory. The formulation of hypotheses to be investigated was then addressed, followed by research techniques, discussions and findings are presented and connected to theory and literature, and conclusions are formed with appropriate implications and recommendations for future investigations.

Literature Review

RISK MANAGEMENT IN OIL AND GAS CONSTRUCTION PROJECTS

Oil and gas construction projects are considered high-risk due to the extensive investment invested, the large number of investors involved, the advanced technology involved, and the unique nature of the projects (Salas and Hallowell, 2016; Van Thuyet, et al., 2007). Recognizing the risk associated with the oil and gas sector is critical for the construction sector's needs and the downstream and upstream oil and gas industry sub-sectors (De Maere d'Aertrycke, Ehrenmann and Smeers, 2017). Furthermore, Kassem, Khoiry and Hamzah (2020) claimed that risk factors that impact the key components of projects (such as cost, schedule, and quality) are typical issues in the construction business globally. Construction projects are critical to the long-term supply chain and oil and gas processing (Bastas and Liyanage, 2018; Raut, Narkhede, and Gardas, 2017). Because of its significance, industry stakeholders are under pressure to guarantee that projects are completed on schedule and with the least level of risk and uncertainty (Ahmadabadi and Heravi, 2019; Bluhm, et al., 2018).

The risk may influence at least one of the project objectives, such as cost, time, quality, etcetera (Hamzaoui, et al., 2015; Taylan, et al., 2014). However, all construction projects include risks that can be mitigated, managed, transferred, accepted, or avoided (Lock and Wagner, 2018), even though it is impossible to eliminate all project risks. As a result, successful projects are those that identify risks early on, analyse and manage them effectively (Durugbo, et al., 2020; Zou, Zhang and Wang, 2007). A lack of appropriate attention and risk assessment in a construction project, on the other hand, is the source of cost overruns, poor performance, and delays (Renuka, Kamal and Umarani, 2017; Taillandier, et al., 2015). Unfortunately, as compared to many other industries, construction projects are not as advanced in risk analysis and assessment (Dehdasht, et al., 2017; Taroun, 2014). The absence of a risk management approach during oil and gas construction projects can result in delays and cost overruns, which is essential for pricing energy policy (Dehdasht, et al., 2017; Sekar, Viswanathan and Sambasivan, 2018). As a result, there is a need to identify the most important organisation risks and related risk factors because of the impact on construction decision-making and increasing the likelihood of success while decreasing potential risk in a construction project.

In addition, risk management in construction projects is critical for meeting project objectives while avoiding cost overruns and delays. Depending on the project's design and planning, the result will be of excellent quality (Kassem, Khoiri and Hamzah, 2020). The risk management system assists project managers in prioritizing resource allocation and making trustworthy decisions that contribute to the project's goals and success. A comprehensive risk management plan is required to reduce costs and enhance competitiveness in the energy industry (Kauppi, et al., 2016). As a result, identifying and assessing the key risks encountered in oil and gas construction projects is critical to assist businesses that plan or work on such projects to develop plans to ensure sustainable energy supply chains. Furthermore, recognising the critical risk elements associated with the oil and gas construction projects and the emphasis on analysis of these risk elements may serve as a catalyst for good planning, successful risk management implementation, and appropriate actions to minimise, transfer, or control the related risks (Dehdasht, et al., 2017).

Theoretical Consideration and Hypotheses Development

THEORETICAL CONSIDERATION

Organizational control theory offers theoretical affirmations to establish the link between project success and external risk factors in the oil and gas industry. According to organisational control theory (Flamholtz, Das and Tsui, 1985; Li, 2021; Liu, Borman and Gao, 2014; Ouchi, 1979), appropriate control established and applied by an organisation must theoretically be able to mitigate against risk occurrence on oil and gas projects within the organisation with the aid of proper monitoring, control, and compensation among stakeholders, project management. Similarly, organisational control theory assumes that risk incidence may be reduced by control implemented by a government-supported organisation, which would undoubtedly encourage compliance and adapt to every organisation (Fairholm, 2009).

Prior literature suggested that mutual agreement exists among academics on the relationship between oil and gas external risk factors, government support and project success, and organisational control. Government plays an essential role in minimizing risk in every business (Moshood, et al., 2020). Similarly, the foundation for the organisational control theory was discovered in a range of life scenarios, such as performance metrics, social and communication interactions (Geiger, et al., 2009; Miao, Evans and Shaoming, 2007; Miao and Evans, 2012), construction risk management (Adeleke, et al., 2018; Aibinu and Odeyinka, 2006), and issues with erratic information in corporate governance (O'Sullivan, 2000).

Abelson, et al. (1968) asserted that conformity and control in most organizations add to a major dilemma due to various parties' perceptions. Likewise, Cooperrider and Srivastva (2013) describe that organisational development is preprogramed, unilaterally determined, where people and organisations' ideas are directly transformed and challenged on an unpredictable scale. In that case, some researchers affirmed that effective control and efficiency within the organization strongly relied on the organisational control theory. As a result, based on the factors that have been determined, Figure 1 depicts the research framework for this study as follows:

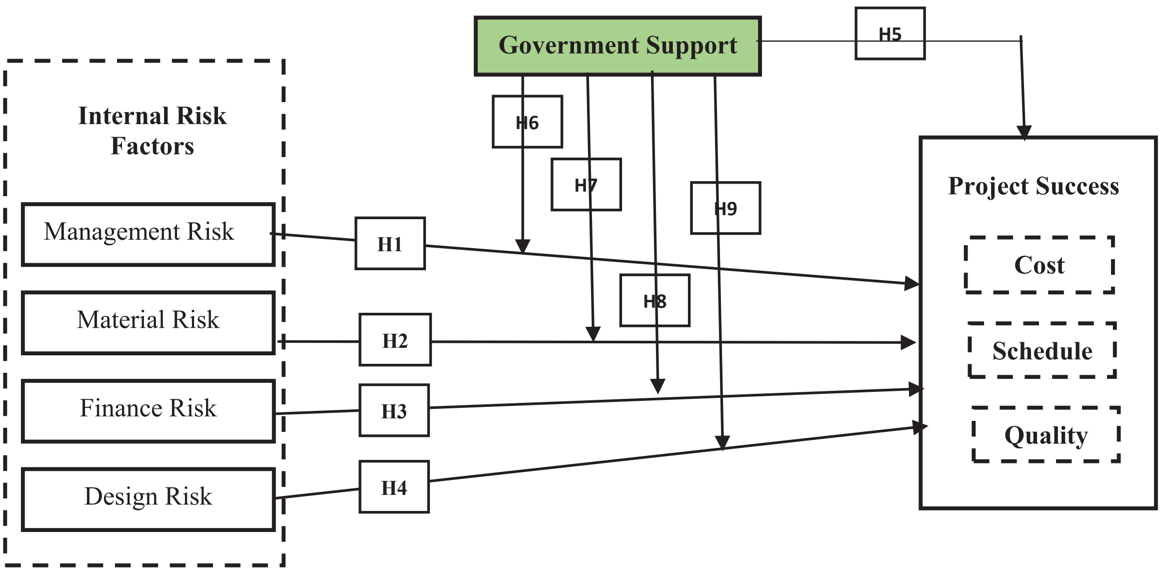

Figure 1. Conceptual Framework.

Hypotheses Development

INTERNAL OIL AND GAS RISK FACTORS AND PROJECT SUCCESS

Construction project risk-related factors are enormous due to different activities and stakeholders involved and their complex relationships (Mok, Shen and Yang, 2015). Project success has traditionally been judged using "the triple constraints" or "the iron triangle" of schedule, cost, and quality of objectives (Williams, et al., 2015). These elements rely on one another. As a result, a change in one will impact at least one other component (Williams, et al., 2015). Over time, the yardstick for measuring project performance has shifted to a more quality-based focus on increased knowledge of stakeholders' demands and incorporating internal-external quality indicators (Mok, Shen and Yang, 2015). A guide to the Project Management Body of Knowledge (PMBOK, 2013 p.35) states that project success "… should be assessed in terms of accomplishing the project within the limitations of scope, time, cost, quality, resources, and risk as approved between the project managers and senior management".

The PMBOK Guide remains the "generally accepted" project management method for project managers and the discipline's existing standard (Ismayilova and Silvius, 2021). The PMBOK Guide employs a systems-based approach centred on "inputs, processes, and outputs," emphasising the three constraints of time, budget, and scope (Crawford and Stretton, 2018). Despite widespread industry acceptance of the PMBOK standards, project failure is common in most sectors, including oil and gas. According to a survey, 42% of engineering projects and 81% of oil and gas projects are behind schedule (Parker, et al., 2013; Wu, et al., 2017), with just 32% of information and communication technology (ICT) projects successful (Kapsali, 2013).

Internal organisational factors are defined as factors influencing the success of construction projects, which are within the management team's control (Gudienė, et al., 2013). These factors include but are not limited to management, finance, design, technology, labour and material factors (Belassi and Tukel, 1996; Gudienė, et al., 2013). Failure to establish and maintain these internal risk factors may result in non-compliance with regulatory expectations and/or fraud from employees and/or clients. The economic environment that regulates cash flow and the affordability of funding comprises financial factors. These include a stable macroeconomic climate, the availability of credit facilities, low-interest rates, and extended payback terms (Gudienė, et al., 2013). The failure of the project finance mechanism seriously jeopardises the development of the oil and gas industry (Shuen, Feiler and Teece, 2014). One of the major risks generating cost overruns has been identified as price volatility. It is related to rising material and labour costs as well as supplier speculation in emerging nations (Lock and Wagner, 2018). Finance is the most important resource necessary for every construction project. The design and specifications of a project are dependent on it, and any project cannot be accomplished without sufficient finances. As a result, proper funding and sound financial management are critical components of every project. Financial management employs financial or accounting information at all levels to aid in company planning, decision-making, and control (Lock and Wagner, 2018). Management of other resources becomes meaningless without competent money or finance management.

Shenhar and Holzmann (2017) studied over 600 corporate, government, and non-profit projects from diverse nations. According to the data, over 85% of projects failed to fulfil their schedule and budget objectives. They argue that most project-based interventions are managerial in nature, stemming from the framework and attitude that underpin the conventional approach rather than a lack of procedures and practices. However, the availability of resources in project delivery may be a critical cause of timeline or cost overruns; a survey found that 46% of Middle Eastern capital and infrastructural projects had substantial delays, with just 36% of projects finishing on time or under budget (Shenhar and Holzmann, 2017). Managerial competence was a significant problem for 47% of organisations, while funding challenges impacted more than 50% of initiatives (Shenhar and Holzmann, 2017). As a result, the project manager must stay on top of all of the triple constraint's essential qualities to increase project success. They must be aware of any changes to the key characteristics, whether unexpected or desired and never presume that other attributes may be kept untouched if one is known to be changing or fluctuating (Sovacool, Gilbert and Nugent, 2014). As previously said, one cannot just reject a modification to one without fully understanding how it will affect the others.

Design risk factors are the chances that a design may fail the requirements for a project because it is ineffective, unstable, infeasible, fundamentally faulty, or falls short of the clients' expectations (Liu, et al., UTS ePRESS

2017). Similarly, equipment resources (materials) have an advantage over personnel resources in that they can constantly work under unfavourable conditions, need fewer human resources, and require fewer additional facilities. The selection and use of equipment in a project must be an essential element of the overall strategy. The kind and quantity of equipment necessary in each project are determined by the nature of the project, which has a substantial impact on the project's cost (Badiru and Osisanya, 2016). Materials are critical components in the construction business, accounting for a significant part of the entire value of the project. A material problem adds to cost overruns (Derakhshanalavijeh and Teixeira, 2017; Raykar and Ghadge, 2016). As a result, effective material management is a critical success factor for every project. A material management system comprises the essential functions necessary in every construction project, such as material identification, acquisition, storage, distribution, and disposal (Raykar and Ghadge, 2016). A consistent and appropriate supply of materials is essential since late or irregular deliveries or improper material provided during construction impact other resources such as personnel and machines. This results in decreased production, time delays, and cost overruns (Derakhshanalavijeh and Teixeira, 2017).

Manpower, or human resources, is another essential resource that is critical to the success of any project. Good outcomes cannot be accomplished without an adequate supply of skilled and unskilled labour, as well as the most appropriate allocation and management of human or manpower resources (Young, 2016). Construction progress may only be expected if effective man-hour effort is put in and specified milestone dates are met. Effective workforce management may minimise labour expenses and hence enhance corporate profitability. Poor labour productivity is a significant issue in developing nations (Alashwal, Fareed and Al-Obaidi, 2017; Wilson and Wilson, 2017). As a result, efficient workforce management and increased labour productivity are essential for lowering labour costs and boosting profitability for oil and gas firms.

The government also plays an important role in ensuring the success of oil and gas construction projects through infrastructure development, a favourable legislative environment, and developer guarantees. This is significant because of the sectors' contribution to the nations' economies (Saudi and Tsen, 2017). According to Shuen, Feiler and Teece (2014), government failure will impact the overall growth of the oil and gas industry. The advent of rapidly evolving digital technologies and rising regulatory pressure are also important elements in the oil and gas sector (Shukla and Karki, 2016). Hence, the following hypotheses are formulated. Figure 1 depicts a hypothetical model for the interplay between internal risk factors and project success.

H1: There is a significant effect of management risk factors on project success.

H2: There is a significant effect of material risk factors on project success.

H3: There is a significant effect of financial risk factors on project success.

H4: There is a significant effect of design risk factors on project success.

Moderating roles of Government Support

According to Baron and Kenny (1986), a moderating variable acts as a third variable that can be either quantitative or qualitative, altering the direction or intensity of the link between a predictor and a criterion variable. In other words, the moderating variable has a significant impact on the relationship between the independent and dependent variables. In other words, "the inclusion of this variable modifies the original connection between the independent and dependent variables" (Sekaran and Bougie, 2016). In this study, government policy refers to the rules and regulations enacted by government agencies in order to expedite the spread of risk management techniques inside the oil and gas industry. It is well acknowledged that government bodies play an essential role in encouraging risk management in building projects. The government is a well-known component that has a considerable impact on risk management (Adeleke, et al., 2018), occupants' and construction workers' well-being (Bamgbade, Kamaruddeen and Nawi, 2017; Wijethilake and Lama, 2019). For example, the study found that governments and construction stakeholders are becoming more committed to risk reduction as a key criterion for project management (Liu, et al., 2016; Wijethilake and Lama, 2019). It was also stated that construction risk management was the duty of the government, its agencies, and construction firms (Bamgbade, Kamaruddeen and Nawi, 2017). However, its execution and final success are dependent on the amount of compliance of the construction players.

Earlier research' propositions (Bamgbade, et al., 2018; Kim, et al., 2016) were examined to support government policy's possible involvement as a moderator in this study. Government subsidy policies have been shown to significantly impact the processes and outcomes of both new and existing companies. According to Moshood, et al. (2020), government policy in the form of rules and regulations is the most successful in preventing or decreasing the impacts of construction risk since it is more result-oriented in construction delivery. Governments, once again, can support tactics through policy formulations on a series of tax-based incentive policies for contractors with little or no risk throughout building processes, albeit there are numerous hurdles to creating it (Li and Shui, 2015; Shafii, Arman Ali and Othman, 2006).

Every company is obliged by good construction laws and regulations to limit and control risk on a construction project caused by a shortage of materials, uncoordinated management, incorrect design, a lack of money or labour, and equipment. As a result, construction businesses are expected to follow laws and regulations (Bamgbade, et al., 2018; Moshood, et al., 2020). Government support for minimizing and controlling risk in construction is considered a moderating variable in this study due to its strategic implications for businesses operating in the sector by pushing to achieve standardized and risk-free building projects. Properly established rules in the built environment raise living standards while mitigating risk (Bommer, Crowley and Pinho, 2015; Spence, 2004). Improvements in project delivery efficiency will be documented when government departments and agencies oversee projects. The management approach is defined by rigorous supervision of all construction processes, as was done in China post-reform era (Qiang, et al., 2015). Moshood, et al. (2020) agreed, arguing that the government might drive risk management agendas through various measures such as budgetary assistance, legislation, and standards. As a result, the following hypotheses suffice:

H5: There is a significant effect of government support on project success.

H6: Government support strengthens the effects of management risk factors on project success.

H7: Government support strengthens the effects of material risk factors on project success.

H8: Government support strengthens the effects of financial risk factors on project success.

H9: Government support strengthens the effects of design risk factors on project success.

Research method

SAMPLE SIZE AND DATA COLLECTION PROCEDURE

The target demographic comprises MPRC-registered oil and gas construction businesses ranging from SMEs to Malaysia's top 100 oil and gas firms. Following Faul, et al. (2007), GPower 3.1 was used in defining the sample size of this study, and proportionate respondents' cluster sampling was arrived at. From the results of GPower, a sample size of 146 was measured having power (1-β err prob. = 0.9). This is also consistent with Sekaran and Bougie (2016), who suggested a sample size of 30 to 500 as optimal and suitable. Only 61 completed copies of surveys issued online were received and judged acceptable for subsequent analysis, representing a 41.78 per cent response rate is consistent with prior findings (Kassem, Khoiri and Hamzah, 2020, 2019; Van Thuyet, Ogunlana and Dey, 2007).

Before distribution, the measurement items were examined by an expert from both industry and academics. This was followed by a pilot study conducted with 50 respondents (In, 2017). After that, the main data was conducted. Participants' anonymity was assured to help prevent common method bias. SPSS software version 26 was used for preliminary data analysis. Additionally, in line with the recommendations of Kock (2015) for assessment of collinearity, the variance inflation factor (VIF) results which range from 1.671 to 2.300 (Table 1), indicates the maximum VIF's value is substantially lower than the recommended value of 3.3. Consequently, it is reasonable to infer that common method bias is not the major problem in this study (Kock, 2015). Respondents' early and late responses to the variables under consideration were compared to assess nonresponse bias. Using the independent sample t-test, early responses of 62% were compared to late responses of 38%. The results indicated no statistically significant differences in any of the variables, indicating normal responses from the target demographic (Armstrong and Overton, 1977).

MEASURES

This research utilized a survey prepared in the English Language. A "5-point Likert scale" ranging from "strongly disagree" to "strongly agree" was used. To examine external risk factors (like management, material, design and finance), five statements each were adapted from (Adeleke, et al., 2018; Aibinu and Odeyinka, 2006). For instance, "in our organization, there is no postponement in resolving contractual issues" is one of the examples of items with reliability ranges from 0.86 to 0.88 (Adeleke, et al., 2018).

A total of 21 items were also adapted from Salapatas (2000) to measure each of the dimensions of project success with a reliability of scale ranging from 0.81 to 0.86 (Hassan, Adeleke and Taofeek, 2019). One of the examples of these measurement items comprise, "in our organization, estimation of the project cost is normally done to establish the cost of the entire project before the project starts", "in our organization, sequencing of activities is normally conducted for all projects and activities so that they are performed in order of priority" and "in our organization, we do hand-over the project on time to the clients without any issue."

Lastly, to measure government support, 6 items were adapted from (Bamgbade, et al., 2018) with a reliability of 0.86. Example of the items includes "government policy promotes healthy competition in the Malaysian oil and gas industry".

ANALYSIS

Initially, this research utilized SPSS version 26 to perform a descriptive analysis. After that, PLS-SEM was deployed to test the study model. Hair, et al. (2019) emphasised that PLS-SEM is soft in the model's distribution assumptions and complexity, specification of the model, ease of interpretation, the "prediction-oriented" and "exploratory nature" of this study. PLS-SEM is equally recognised to concurrently tackle multiple dependence correlation with greater statistical efficacy (Ringle, et al., 2020). It is also recommended because the primary objective is causal predictive instead of theory testing (Sarstedt, et al., 2016). Hence, SmartPLS3 was used for the main data assessment.

Results

The sample of 61 respondents is relatively unequally distributed between male (72.1%) and female (27.9%) respondents. The majority of those who responded were, Executive Directors (13.1%), Managing Directors (11.5%), Construction Managers (29.5%), Project Managers (26.2%), Surveyors (16.4) and others (3.3%) respectively. In general, 62.5 per cent of respondents had between 1 and 5 years of experience working for the oil and gas companies under consideration. The standard deviation's (SD) results from the descriptive statistics fluctuate between 0.756 to 0.895. Simultaneously, mean values also vary from 3.680 to 4.079,

Table 1. Descriptive Statistics, Reliability and Validity of Measurement Model

Construct	N	Mean	SD	CA	CR	AVE	VIF
COST	61	3.870	0.822	0.868	0.905	0.658	Endogenous
DR	61	4.079	0.763	0.879	0.917	0.735	1.671
FR	61	3.789	0.834	0.847	0.896	0.683	2.297
GSP	61	3.697	0.869	0.891	0.920	0.696	2.159
MGR	61	3.826	0.806	0.883	0.920	0.742	1.690
MTR	61	3.787	0.843	0.890	0.924	0.753	2.300
QUALITY	61	3.872	0.756	0.879	0.913	0.678	Endogenous
SCHEDULE	61	3.680	0.895	0.889	0.923	0.750	Endogenous

Note: Observation (N); CR (composite reliability); CA (Cronbach alpha); AVE (average variance extracted); DR (Design Risk); FR (Financial Risk); GSP (Government Support); MGR (Management Risk); MTR (Material Risk); VIF (variance inflation factor).

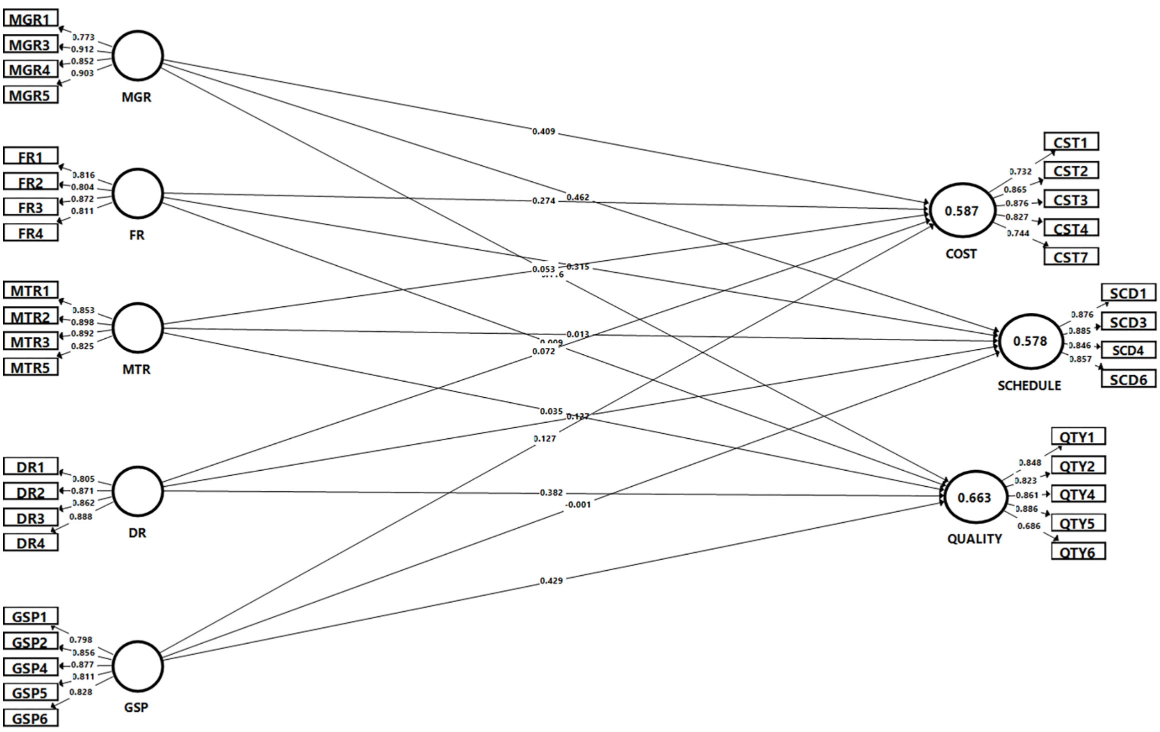

Figure 2. Measurement model

indicating no significant variation among the examined constructs in this research due to the moderately close scores of the constructs. To access the measurement model of this study, preliminary measurement of output was utilized in accessing the characteristics of the outer model as recognized by the constructs and their respective measurement items. Figure 2 shows all the measurement items surpass the recommended value of 0.7 (Hair, et al., 2019; Hult, et al., 2018), indicating that all the items significantly add to their individual constructs (Hair, et al., 2010; Noor, et al., 2019; Ogbeibu, et al., 2021).

Table 2. Heterotrait-Monotrait Ratio (HTMT)

Construct	COST	DR	FR	GSP	MGR	MTR	Quality	Schedule
Cost								
DR	0.448							
FR	0.739	0.437						
GSP	0.625	0.678	0.622					
MGR	0.779	0.315	0.670	0.556				
MTR	0.641	0.545	0.788	0.652	0.586			
Quality	0.576	0.787	0.551	0.829	0.516	0.603		
Schedule	0.881	0.432	0.728	0.541	0.775	0.594	0.467	

HTMT<0.85 (Henseler, Ringle and Sarstedt, 2015)

Note DR (Design Risk); FR (Finance Risk); GSP (Government Support); MGR (Management Risk); MTR (Material Risk).

CA and CR scores range from 0.847 to 0.890 and 0.896 to 0.923 for all constructs examined, respectively, exceeding the minimum criterion of 0.7 and confirming all constructs' internal consistency and reliability. Likewise, the AVE for all constructs studied exceeded 0.60, which is greater than the threshold of 0.50, demonstrating the construct's convergent validity (Hair, et al., 2019). The HTMT results in Table 2 also indicate the constructs' discriminant validity (Henseler, Ringle and Sarstedt, 2015). Likewise, multicollinearity is not an issue in this study, with all the values of VIF well below the threshold of 3.3, as shown in Table 2 (Henseler, Ringle and Sarstedt, 2015).

While the outer model evaluates reflective measurement scales, the inner model assesses project success as a one-dimensional construct. Since project success is measured as a formative latent construct (Hair, Ringle and Sarstedt, 2013), the method for its analysis should be given careful considerations to allow for consistency of all the constructs embodied in the outer model (Hair, et al., 2013). Hence, this study utilizes the two-stage approach recommended by Hair, Ringle, and Sarstedt (2013) and Ringle, Sarstedt and Straub (2012). The technique for testing latent formative constructs was developed by (Ringle, Sarstedt and Straub, 2012) and required obtaining latent variable findings for all sub-constructs except the latent construct, which is only examined in the inner model's "second stage".

Their latent variable findings represent all sub-constructs in the "second stage". As a result, the sub-constructs scores (for example, project success dimensions) explicitly function as measured latent construct variables (project success). They are sufficiently represented and reflected in this case to compute and enable project success projection by other constructions of external risk factors (management, material, finance, and design risk factors, respectively) and government assistance. The relevant Latent Variable Scores (LVS) for all tested constructs were collected and built in the structural model due to the measurement model output in Figure 3 (Ringle, Sarstedt and Straub, 2012).

Regarding the model fit, Hair, et al. (2019) advocated that "the use of model fit in PLS-SEM be carried out with extreme restraint as the assessments of measures are still noncomprehensive, but recently optimistic thresholds are still uncertain, and the concept of model fit as in covariance-based SEM is of questionable value to PLS-SEM in general". Therefore, estimations in PLS-SEM as advocated by Hair, et al. (2014) and Sarstedt, et al. (2016) should retain a "causal-predictive approach" and rely on the model's predicted accuracy and relevance (Q^2, β, and R^2). Hair, Ringle and Sarstedt (2013) promoted a minimum threshold of 1.65 t-statistics values at p≤0.1 confidence interval. Similarly, Cohen (1988) recommended that effect sizes of "0.35", "0.15", and "0.02" signify a "large", "medium", and "small" effect, respectively while Chin,

(1998) emphasized that R^2 values of "0.25", "0.50", and "0.75" indicate "weak", "moderate", and "substantial" values respectively. After that, the PLS bootstrapping was started with 5000 subsamples (Hair, et al., 2014). The coefficient of determination (R2) results, as shown in Figure 3, indicate a very high degree of variance explained in project success by all five exogenous constructs (management, finance, material, and design risk factors, and government support) in this study, implying that all five exogenous constructs significantly reflect the variance explained in project success and are consequently significant (Hair, et al., 2016).

According to Figure 3 and Table 3, the most significant influence and predictive capability on project success is government support, followed by design risk, management risk, financial risk, and material risk factors in that order. The findings of the corresponding levels of significance of the path coefficients in Table 3 demonstrate that all of the exogenous variables (design risk, management risk, financial risk and material risk factors, and government support) substantially influence project performance. This validates the earlier projections of H1 (β = 0.250, t = 3.598), H2 (β = 0.129, t = 2.254), H3 (β = 0.199, t = 3.494), H4 (β = 0.259, t = 4.457) and H5 (β = 0.294, t = 5.817) at p≤0.05 respectively.

Table 3. Structural Model Results with Moderating Effects

Hypotheses	Path	Betta	t-Statistics	p-Values	Confidence Interval		Decision
					5.00%	95.00%	
	Direct Effects						
H1	MGR -> Project Success	0.250	3.598	0.000	0.147	0.385	Supported
H2	MTR -> Project Success	0.129	2.254	0.012	0.033	0.215	Supported
H3	FR -> Project Success	0.199	3.494	0.000	0.104	0.286	Supported
H4	DR -> Project Success	0.259	4.457	0.000	0.152	0.335	Supported
H5	GSP -> Project Success	0.294	5.817	0.000	0.219	0.385	Supported
	Moderating Effects						
H6	GSP*MGR -> Project Success	-0.064	0.979	0.164	-0.214	0.031	Not Supported
H7	GSP*MTR -> Project Success	0.083	1.666	0.048	0.017	0.185	Supported
H8	GSP*DR -> Project Success	-0.046	0.987	0.162	-0.140	0.027	Not Supported
H9	GSP*FR -> Project Success	0.009	0.387	0.350	-0.061	0.150	Not Supported

To foster graphic interpretation of the moderation effects analysis, note that the "red", "blue", and "green" lines in the interaction graphs of Figures 4 to 7 denote the moderator's "low", "mean", and "high" spots, respectively. The results of Figures 4, 5, 6 and Table 3 indicate that government support has no statistical significance and does not moderate the effect of management risk, design risk, financial risk factors on project success. Thus, these results fail to support H6, H8 and H9. Meanwhile, Figure 7 stresses that government support weakens the material risk factor's effect on project success. This interaction implies that an increase in government support would increase project success and the other way around with the material risk factor. However, Table 3 reveals that the moderating impact of government support on this effect is small and significant. This shows the extent of change that would take place in project success if government support were increased by 1, and the material risk factor remains constant. Thus, H7 is supported (government support is a significant positive moderator (see Table 3).

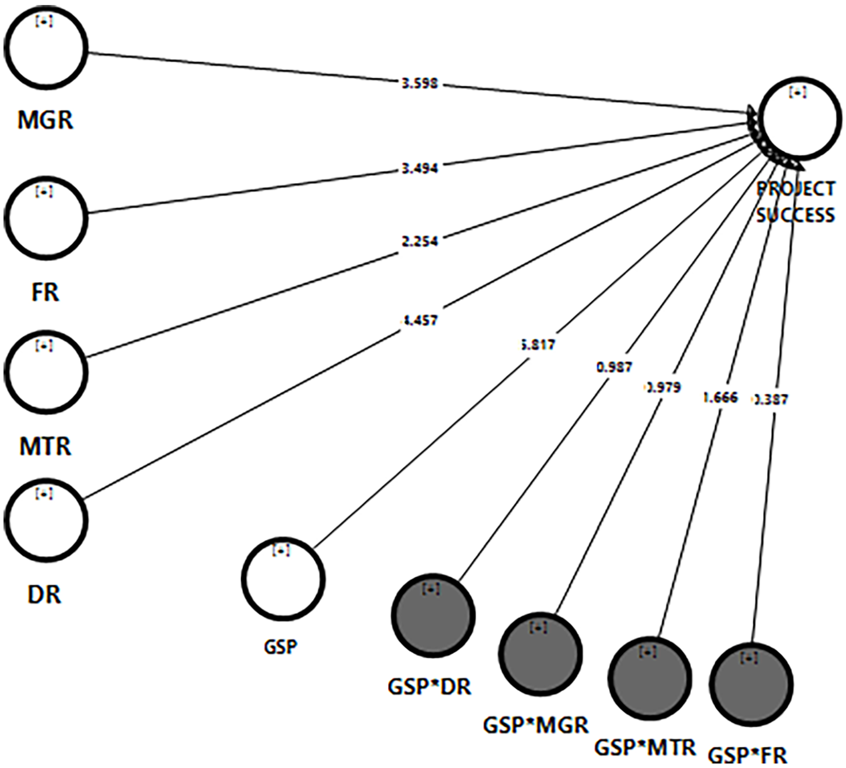

Figure 3. Structural model indicating the significance of product terms

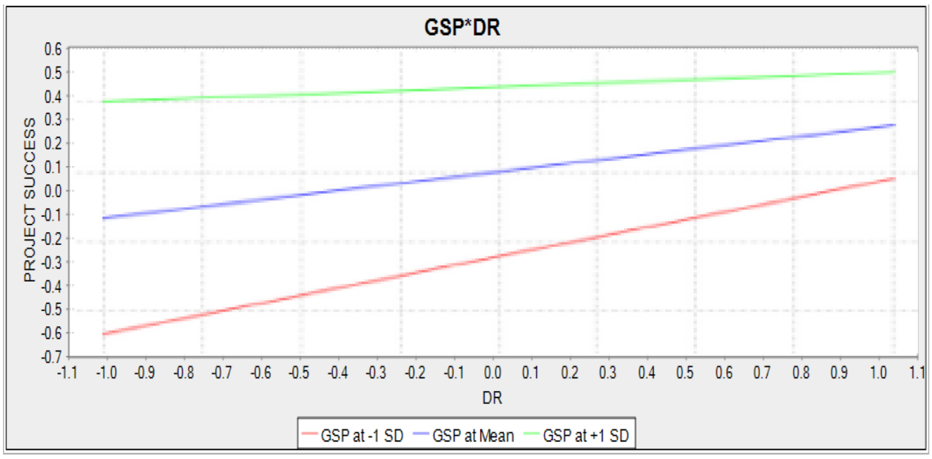

Figure 4. Moderating effect of government support on the effect of *design risk factors on project success.*

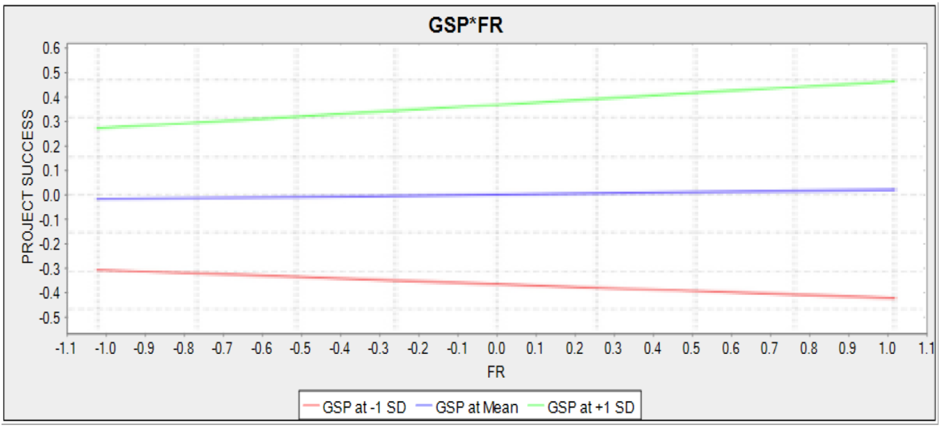

Figure 5. Moderating effect of government support on the effect of *financial risk factors on project success.*

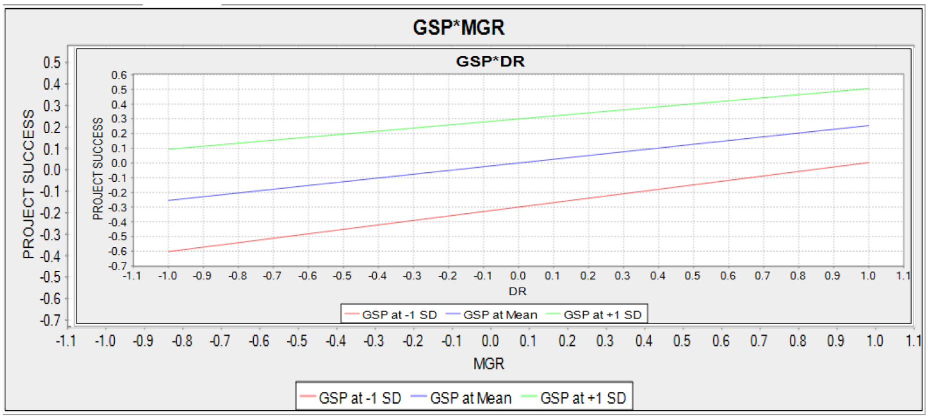

Figure 6. Moderating effect of government support on the effect of *management risk factors on project success.*

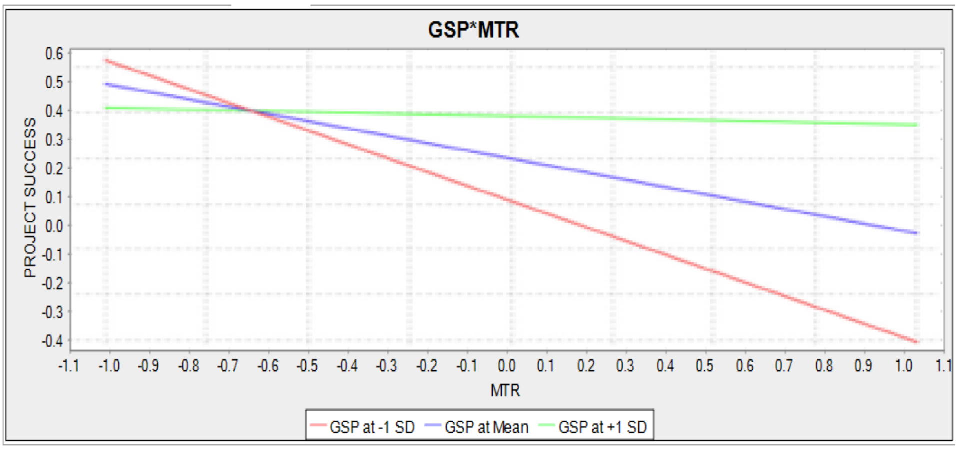

Figure 7. Moderating effect of government support on the effect of *material risk factors on project success.*

The moderating effect of government support on the correlation between a material risk factor and project success, as highlighted in Table 3, is weak. When using the "product indicator" technique in moderation analysis, however, even little impacts suggest significant model interactions (Henseler and Fassott, 2010). Finally, given the predictive significance of the model in this investigation, the Q^2 value of 0.528 for project success demonstrates an appropriate degree of predictive relevance and support for predictive precision (Shmueli, et al., 2016).

Discussions

The findings of this study indicated that all exogenous variables (design risk, management risk, financial risk, material risk factors, and government support) had a substantial impact on project success. These findings are consistent with the findings of other studies that have investigated the impact of organisational internal risk factors and government support on project performance (Baloi and Price, 2003; Denni-Fiberesima and Rani, 2011; Kassem, Khoiri and Hamzah,, 2020, 2019; Van Thuyet, Ogunlana and Dey, 2007). Their research outcomes further strengthen this research's position and prior claim put forward by Alashwal, Fareed and Al-Obaidi (2017) and Musa, et al. (2015). The authors reinforced the importance of a favourable economic system, appropriate design and a favourable legal framework, and government support as crucial to the success of construction projects. They also highlighted excellent governance, and more crucially, government engagement through the provision of subsidies, a readily available financial market, political backing, solid economic policy, and a stable macroeconomic environment as essential determinants in the success of construction projects.

This research's outcomes in one part are similar to that of Bamgbade, et al. (2018) and Moshood, et al. (2020), which confirmed a significant moderating role of government support in construction project success. This is because the government is in the best position to ensure a stable economic condition, thereby encouraging the private sector's investment in oil and gas projects, as many investors will not partake in an unstable economic environment. This is because stable economic conditions play a significant role in mitigating risk for the oil and gas sector (Li and Shui, 2015). In the other part, this study's outcomes are in contrast with Moshood, et al. (2020) and Bamgbade, et al. (2018). This is not unconnected with the current COVID-19 pandemic, which made the government shift attention to projects involving the construction of medical facilities (Alsharef, et al., 2021; Umar, 2022)

Generally, this research found the direct effect of design risk, management risk, financial risk and material risk factors and government support on project success of oil and gas construction projects to be significant and supported. Hence, these organisational internal risk factors should be given proper awareness in designing and implementing oil and gas project development.

Conclusions

The success of oil and gas projects is dependent on the risk control mechanisms that project management teams can deliver. Having discovered the implicit relevance of managerial, financial, material, and design risk factors, this study tested their influence on the success of Malaysia's oil and gas construction projects. All the direct hypothesized relationships (H1 to H5) and one (H7) indirect hypothesis were all significant. These findings revealed that good management and finance systems, suitable design with a consistent and adequate supply of materials, and government supports all have major impacts on the success of oil and gas construction project. The study developed a foundation to help project management team members, policymakers, and other industry stakeholders implement a successful project. The constructs of these factors indicate that while the finance factor can be fixed by both the project team members and government, management, design and material related risk factors can only be controlled by the project team members. Moreso, project success has been explained to have two elements: product success and project management success. Project management success involves achieving project management objectives, while product success is about achieving overall project objectives (Young, 2016).

From the outcomes of this research, it can be said that design risk and finance risk factors can significantly impact product success. This is because proper project design with a good location will strongly affect end-user satisfaction. Equally, an efficient financial system is also essential with regard to the flow of incomes in ensuring projects are completed within the scope and budget. On the other hand, management and material-related risk factors could also affect project management success. For example, materials are essential components in construction activities, representing a substantial proportion of the project's total value. As a result, effective material management is a critical success factor for every project. Although the insignificant and unsupported hypotheses (H6, H8 and H9) in this study contradicts the studies of Moshood, et al. (2020) and Bamgbade, et al. (2018), but it not unconnected with the current COVID-19 pandemic, which made the government shift attention to projects involving the construction of medical facilities (Alsharef et al., 2021; Umar, 2022)

For projects to be successful, it is pertinent that the major risks impacting projects be systematically examined. Their causes and characteristics must be carefully examined in order to assist oil and gas companies in proposing the most effective and feasible mitigation solutions. This research suggests administrative reform from the government and other stakeholders within the industry. The government should create laws that identify policy procedures, deal with and reduce red tape in official transactions, track bribery in oil and gas sector tenders, speed up decisions on projects and their budgets, and everything else. Firms and the industry should work together to train and develop local personnel to become more professional and capable of managing the sector and establish strategies to respond to potential risks that may impede the completion of oil and gas sector projects. Thus, appropriate consideration should be given to these internal risk elements (management, design, finance, and material) in the design and execution of oil and gas project development. Future studies should investigate the interdependence of these factors.

Research Implications

THEORETICAL IMPLICATIONS

The conceptual framework of this study, which was based on previous empirical findings as well as theoretical gaps identified in the existing literature, was reinforced and clarified from the theoretical standpoint of organisational control theory, which demonstrates theoretical reinforcements to support the correlation between project success, oil and gas internal risk factors, and project success (Flamholtz, Das and Tsui, 1985; Li, 2021; Liu, Borman and Gao, 2014; Ouchi, 1979). The current study also included government support as a moderating variable to understand better the relationship between organisational internal risk variables and project performance. Various theoretical contributions were made to investigate external risk variables (management, material, design, and finance), government backing, and project success based on the findings and debates of this research.

PRACTICAL IMPLICATIONS

Following this study's outcome, various practical recommendations regarding risk management practices in megaprojects like oil and gas construction projects are explained. Firstly, this study found managerial capability as a critical factor in managing risk in ensuring project success. As a result, project managers must remain on top of the triple constraint's essential qualities, which increases the chance of project success. They must be aware of any changes to the essential characteristics, whether unexpected or desired.

Similarly, this study discovered that those internal risk factors (management, material, design and finance) are related to project success in construction project delivery. They were found to be positively correlated to project success in the whole sample. Hence, to mitigate against the likelihood of risk occurrence in project delivery and to guide against triple constraints, the organisation's internal risk factors must be given proper awareness.

METHODOLOGICAL IMPLICATIONS

Previous studies on risk management and project success have employed different analytical tools like mean score, "Relative Importance Index" (RII) (Al Zubaidi and Al Otaibi, 2008; Doloi, et al., 2012b), "Spearman's rank correlation" (Abd El-Razek, Bassioni and Mobarak, 2008), ANOVA (Al Zubaidi and Al Otaibi, 2008), "factor analysis" (Doloi, et al., 2012a), "case-study" (Ruqaishi and Bashir, 2015), "Cronbach's Alpha Coefficient" (AlSanad, 2017), "Kruskal-Wallis" (Ruqaishi and Bashir, 2015), "Chi-Square" (Aibinu and Odeyinka, 2006), "Kendall Coefficient of Concordance" (Braimah and Ndekugri, 2009), "Probability Distribution" (Jafari and Love, 2013), "t-Test" (Hampton, Baldwin and Holt, 2012). This study used a relatively new analytic technique (PLS-SEM) to reveal the structural link between the constructs in this investigation. The PLS-SEM is a multivariate technique that effectively determines the complicated dependent connection between variables (Hair, et al., 2014). As a result, this study employs this relatively new analytical technique, which has important methodological consequences.

Another methodological addition made in this study was using PLS path modelling to analyse the psychometric characteristics of each latent variable in this investigation. This study examined these psychometric characteristics using convergent and discriminant validity. When the characteristics of these latent variables were investigated, the item reliability, AVE, and composite reliability of each latent variable were determined.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although this study found evidence for certain hypothesised relationships between exogenous and endogenous variables, the findings must be evaluated in light of the study's limitations. First, the current study used a cross-sectional strategy, which prevents generalization from the study's population. As a result, in the future, a longitudinal design should be considered for testing the theoretical constructs at different points in time to establish the findings of this study.

Similarly, the current study used a proportionate cluster random sample approach (a probability sampling), with states in Peninsular Malaysia classified as mutually exclusive clusters. As a result, the oil and gas businesses in each state of Peninsular Malaysia are evaluated in relation to the total number of samples in each cluster. The use of this sampling technique has limited the extent of this study's ability to reflect local populations' understandings. The results of this study may be too abstract to apply directly to specific local conditions, settings, and individual oil and gas construction businesses under examination. As a result, future research can use a non-probability sampling approach to determine sample size.

Data Availability Statement

This manuscript includes some or all of the data, models, or code that support the conclusions of this investigation. These include raw data from Malaysia Petroleum Resources Corporation (MPRC), quantitative output from the Statistical Package for Social Sciences (SPSS) and SmartPLS, and SPSS and SmartPLS outputs that are included in this paper (like Tables and Figures).

References

Abd El-Razek, M.E., Bassioni, H.A. and Mobarak, A.M., 2008. Causes of delay in building construction projects in Egypt. *Journal of Construction Engineering and Management*, 134, pp.831–41. https://doi.org/10.1061/(ASCE)0733-9364(2008)134:11(831)

Abelson, R.P., Aronson, E.E., McGuire, W.J., Newcomb, T.M., Rosenberg, M.J. and Tannenbaum, P.H. eds., 1968. Theories of cognitive consistency: A sourcebook. Chicago: Rand-McNally

Adeleke, A.Q., Bahaudin, A.Y., Kamaruddeen, A.M., Bamgbade, J.A., Salimon, M.G., Khan, M.W.A. and Sorooshian, S., 2018. The influence of organizational external factors on construction risk management among Nigerian construction companies. *Safety and Health at Work,* 9(1), p.115–24. https://doi.org/10.1016/j.shaw.2017.05.004

Ahmadabadi, A.A. and Heravi, G., 2019. The effect of critical success factors on project success in Public-Private Partnership projects: A case study of highway projects in Iran. *Transport Policy*, 73, pp.152–61. https://doi.org/10.1016/j.tranpol.2018.07.004

Aibinu, A.A. and Odeyinka, H.A., 2006. Construction delays and their causative factors in Nigeria. *Journal of Construction Engineering and Management*, 132, pp.667–77. https://doi.org/10.1061/(ASCE)0733-9364(2006)132:7(667)

Al Zubaidi, H. and Al Otaibi, S., 2008. An empirical approach for identifying critical time-ovrerun risk factors in Kuwait's construction projects. *Journal of Economic and Administrative Sciences*, 24(2), pp.35-53. https://doi.org/10.1108/10264116200800007

Alashwal, A.M., Fareed, N.F. and Al-Obaidi, K.M., 2017. Determining success criteria and success factors for international construction projects for Malaysian contractors. *Construction Economics and Building*, 17, 62–80. https://doi.org/10.5130/AJCEB.v17i2.5319

AlSanad, S., 2017. Megaproject and Risk Management: A Case of Kuwait. In: *Book of Proceedings 5th International Conference On Sustainable Development*. Rome, Italy, 6-7 September 2017. Rome: ECSDEV, p. 79.

Alsharef, A., Banerjee, S., Uddin, S.M., Albert, A. and, Jaselskis, E., 2021. Early impacts of the COVID-19 pandemic on the United States construction industry. *International Journal of Environmental Research and Public Health*, 18(4), p.1559. https://doi.org/10.3390/ijerph18041559

Armstrong, J.S. and Overton, T.S., 1977. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, 14(3), pp.396–402. https://doi.org/10.1177/002224377701400320

Badiru, A.B. and Osisanya, S.O., 2016. *Project management for the oil and gas industry: a world system approach*. Boca Raton: CRC Press. https://doi.org/10.1201/b13755

Baloi, D. and Price, A.D.F., 2003. Modelling global risk factors affecting construction cost performance. *International Journal of Project Management*, 21(4), pp.261–69. https://doi.org/10.1016/S0263-7863(02)00017-0

Bamgbade, J.A., Kamaruddeen, A.M. and Nawi, M.N.M., 2017. Malaysian construction firms' social sustainability via organizational innovativeness and government support: The mediating role of market culture. *Journal of Cleaner Production*, 154, pp.114–24. https://doi.org/10.1016/j.jclepro.2017.03.187

Bamgbade, J.A., Kamaruddeen, A.M., Nawi, M.N.M., Yusoff, R.Z. and Bin, R.A., 2018. Does government support matter? Influence of organizational culture on sustainable construction among Malaysian contractors. *International Journal of Construction Management*, 18, pp.93–107. https://doi.org/10.1080/15623599.2016.1277057

Baron, R.M. and Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, p.1173. https://doi.org/10.1037/0022-3514.51.6.1173

Bastas, A. and Liyanage, K., 2018. Sustainable supply chain quality management: A systematic review. *Journal of Cleaner Production*, 181, pp.726–44. https://doi.org/10.1016/j.jclepro.2018.01.110

Belassi, W. and Tukel, O.I., 1996. A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*, 14, pp.141–51. https://doi.org/10.1016/0263-7863(95)00064-X

Bluhm, R., Dreher, A., Fuchs, A., Parks, B., Strange, A. and Tierney, M.J., 2018. *Connective financing: Chinese infrastructure projects and the diffusion of economic activity in developing countries*. AidData Working Paper 64. Williamsburg, VA: AidData at William & Mary. https://doi.org/10.2139/ssrn.3262101

Bommer, J.J., Crowley, H. and Pinho, R., 2015. A risk-mitigation approach to the management of induced seismicity. *Journal of Seismology*, 19, pp.623–46. https://doi.org/10.1007/s10950-015-9478-z

Braimah, N. and Ndekugri, I., 2009. Consultants' perceptions on construction delay analysis methodologies. *Journal of Construction Engineering and Management*, 135, pp.1279–88. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000096

Chin, W.W., 1998. Commentary: Issues and opinion on structural equation modeling. *MIS Quarterly,* 22(1), pp.vii-xvi.

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. New York: Academic Press Inc.

Conti, J., Holtberg, P., Diefenderfer, J., LaRose, A., Turnure, J.T. and Westfall, L., 2016. *International energy outlook 2016 with projections to 2040*. [pdf] Washington, DC: US Energy Information Administration (EIA). Available at: https://www.eia.gov/outlooks/ieo/pdf/0484(2016).pdf#:~:text=Overview.%20In%20the%20International%20Energy%20Outlook%202016%20%28IEO2016%29,in%202020%20and%2036.5%20trillion%20kWh%20in%202040

Cooperrider, D.L. and Srivastva, S., 2013. A Contemporary Commentary on Appreciative Inquiry in Organizational Life. In: R. Woodman and W. Pasmore, eds. *Research in Organizational Change and Development*, 1, pp.129–69. https://doi.org/10.1108/S1475-9152(2013)0000004001

Crawford, L.H. and Stretton, A.M., 2018. Bodies of Knowledge and Competency Standards in Global Project Management. In: Paul C. Dinsmore and Jeanette Cabanis-Brewin, eds. *AMA Handbook of Project Management*. New York: AMACOM.

De Maere d'Aertrycke, G., Ehrenmann, A. and, Smeers, Y., 2017. Investment with incomplete markets for risk: The need for long-term contracts. *Energy Policy*, 105, pp.571–83. https://doi.org/10.1016/j.enpol.2017.01.029

Dehdasht, G., Mohamad Zin, R., Ferwati, M.S., Abdullahi, M., Keyvanfar, A. and McCaffer, R., 2017. DEMATEL-ANP risk assessment in oil and gas construction projects. *Sustainability*, 9, p.1420. https://doi.org/10.3390/su9081420

Denni-Fiberesima, D. and Rani, N.S.A., 2011. An evaluation of critical success factors in oil and gas project portfolio in Nigeria. *African Journal of Business Management*, 5, pp.2378–95. https://doi.org/10.4043/21336-MS

Derakhshanalavijeh, R. and Teixeira, J.M.C., 2017. Cost overrun in construction projects in developing countries, gas-oil industry of Iran as a case study. *Journal of Civil Engineering Management*, 23, pp.125–36. https://doi.org/10.3846/13923730.2014.992467

Doloi, H., Sawhney, A. and Iyer, K.C., 2012a. Structural equation model for investigating factors affecting delay in Indian construction projects. *Construction Management and Economics*, 30, pp.869–84. https://doi.org/10.1080/01446193.2012.717705

Doloi, H., Sawhney, A., Iyer, K.C. and Rentala, S., 2012b. Analysing factors affecting delays in Indian construction projects. *International Journal of Project Management*, 30, pp.479–89. https://doi.org/10.1016/j.ijproman.2011.10.004

Durugbo, C.M., Al-Balushi, Z., Anouze, A. and Amoudi, O., 2020. Critical indices and model of uncertainty perception for regional supply chains: insights from a Delphi-based study. *Supply Chain Management*, 25(5), pp.549-64. https://doi.org/10.1108/SCM-10-2019-0373

Fairholm, G.W., 2009. *Organizational Power Politics: Tactics in Organizational Leadership.* 2nd ed. Santa Barbara, CA: ABC-CLIO.

Faul, F., Erdfelder, E., Lang, A.-G. and Buchner, A., 2007. G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), pp.175–91. https://doi.org/10.3758/BF03193146

Flamholtz, E.G., Das, T.K. and Tsui, A.S., 1985. Toward an integrative framework of organizational control. *Accounting Organisations and Society*, 10(1), pp.35–50. https://doi.org/10.1016/0361-3682(85)90030-3

Geiger, S., Guenzi, P., Panagopoulos, N. and Dimitriadis, S., 2009. Transformational leadership as a mediator of the relationship between behavior-based control and salespeople's key outcomes. *European Journal of Marketing,* 43(7/8), pp.1008-31. https://doi.org/10.1108/03090560910961498

Gudienė, N., Banaitis, A., Banaitienė, N. and Lopes, J., 2013. Development of a conceptual critical success factors model for construction projects: a case of Lithuania. *Procedia Engineering*, 57, pp.392–97. https://doi.org/10.1016/j.proeng.2013.04.051

Hair, J.F., Celsi, M., Ortinau, D.J. and Bush, R.P., 2010. *Essentials of Marketing Research*. New York, NY: McGraw-Hill/Irwin.

Hair, J.F., Gabriel, M. and Patel, V., 2014. AMOS covariance-based structural equation modeling (CB-SEM): Guidelines on its application as a marketing research tool. *Brazilian Journal of Marketing*, 13(2), pp.44-55. https://doi.org/10.5585/remark.v13i2.2718

Hair, J.F., Ringle, C.M. and Sarstedt, M., 2013. Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning: International Journal of Strategic Management*, 46(1-2), pp.1–12. https://doi.org/10.1016/j.lrp.2013.01.001

Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M., 2019. When to use and how to report the results of PLS-SEM. *European Business Review*, [e-journal] 31(1), pp.2-24. https://doi.org/10.1108/EBR-11-2018-0203

Hair Jr, J.F., Hult, G.T.M., Ringle, C. and Sarstedt, M., 2016. *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks: Sage publications.

Hair Jr., J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G., 2014. Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), pp.106-21. https://doi.org/10.1108/EBR-10-2013-0128

Hampton, G., Baldwin, A.N. and Holt, G., 2012. Project delays and cost: stakeholder perceptions of traditional v. PPP procurement. *Journal of Financial Management of Property and Construction*, 17(1), pp.73-91. https://doi.org/10.1108/13664381211211055

Hamzaoui, F., Taillandier, F., Mehdizadeh, R., Breysse, D. and Allal, A., 2015. Evolutive Risk Breakdown Structure for managing construction project risks: application to a railway project in Algeria. *European Journal of Environmental and Civil Engineering*, 19, pp.238–62. https://doi.org/10.1080/19648189.2014.939416

Hartmann, J., Inkpen, A.C. and Ramaswamy, K., 2020. Different shades of green: Global oil and gas companies and renewable energy. *Journal of International Business Studies*, 52(1), pp.879-903. https://doi.org/10.1057/s41267-020-00326-w

Hassan, A.K., Adeleke, A.Q. and Taofeeq, D.M., 2019. The effects of project triple constraint on Malaysia Building Projects. *Social Science and Humanities Journal*, 3(5), pp.1222-1238.

Henseler, J. and Fassott, G., 2010. Testing moderating effects in PLS path models: An illustration of available procedures. In: *Handbook of partial least squares* (pp.713-35). Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-540-32827-8_31

Henseler, J., Ringle, C.M. and Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), pp.115-35. https://doi.org/10.1007/s11747-014-0403-8

Hoque, M.E., Wah, L.S. and Zaidi, M.A.S., 2020. Do oil and gas risk factors matter in the Malaysian oil and gas industry? A Fama-MacBeth two stage panel regression approach. *Energies*, 13(5), p.1154. https://doi.org/10.3390/en13051154

Hult, G.T.M., Hair Jr, J.F., Proksch, D., Sarstedt, M., Pinkwart, A. and Ringle, C.M., 2018. Addressing endogeneity in international marketing applications of partial least squares structural equation modeling. *Journal of International Marketing*, 26(3), pp.1-21. https://doi.org/10.1509/jim.17.0151

In, J., 2017. Introduction of a pilot study. *Korean Journal of Anesthesiology*, 70(6), p.601. https://doi.org/10.4097/kjae.2017.70.6.601

Ismayilova, A. and Silvius, G., 2021. Cradle-to-cradle in project management: A case study. *International Journal of Circular Economy and Waste Management (IJCEWM)*, 1(1), pp.54-80. https://doi.org/10.4018/IJCEWM.20210101.oa1

Jafari, A. and Love, P.E.D., 2013. Quality costs in construction: case of Qom Monorail Project in Iran. *Journal of Construction Engineering and Management*, *139*(9), pp.1244-49. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000704

Kapsali, M., 2013. Equifinality in project management exploring causal complexity in projects. *Systems Research and Behavioral Science*, 30(1), pp.2-14. https://doi.org/10.1002/sres.2128

Kassem, M.A., Khoiry, M.A. and Hamzah, N., 2020. Assessment of the effect of external risk factors on the success of an oil and gas construction project. *Engineering, Construction and Architectural Management*, 27(9), pp.2767-93. https://doi.org/10.1108/ECAM-10-2019-0573

Kassem, M.A., Khoiry, M.A. and Hamzah, N., 2019. Using probability impact matrix (PIM) in analyzing risk factors affecting the success of oil and gas construction projects in Yemen. *International Journal of Energy Sector Management*, 14(3), pp.527-46. https://doi.org/10.1108/IJESM-03-2019-0011

Kauppi, K., Longoni, A., Caniato, F. and Kuula, M., 2016. Managing country disruption risks and improving operational performance: risk management along integrated supply chains. *International Journal of Production Economics*, 182, pp.484-95. https://doi.org/10.1016/j.ijpe.2016.10.006

Kim, S., Kim, E., Suh, Y. and Zheng, Z., 2016. The effect of service innovation on R&D activities and government support systems: the moderating role of government support systems in Korea. *Journal of Open Innovation: Technology, Market, and Complexity*, 2(1), p.5. https://doi.org/10.1186/s40852-016-0032-1

Kock, N., 2015. Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (ijec)*, 11(4), pp.1-10. https://doi.org/10.4018/ijec.2015100101

Li, J. and Shui, B., 2015. A comprehensive analysis of building energy efficiency policies in China: status quo and development perspective. *Journal of Cleaner Production*, 90, pp.326-44. https://doi.org/10.1016/j.jclepro.2014.11.061

Li, M., 2021. Uses and abuses of statistical control variables: Ruling out or creating alternative explanations?. *Journal of Business Research*, 126, pp.472-88. https://doi.org/10.1016/j.jbusres.2020.12.037

Liu, J., Xie, Q., Xia, B. and Bridge, A.J., 2017. Impact of design risk on the performance of design-build projects. *Journal of Construction Engineering and Management*, 143(6), p.04017010. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001299

Liu, L., Borman, M. and Gao, J., 2014. Delivering complex engineering projects: Re-examining organizational control theory. *International Journal of Project Management*, 32(5), pp.791-802. https://doi.org/10.1016/j.ijproman.2013.10.006

Liu, Z.Z., Zhu, Z.W., Wang, H.J. and Huang, J., 2016. Handling social risks in government-driven mega project: An empirical case study from West China. *International Journal of Project Management*, 34(2), pp.202-18. https://doi.org/10.1016/j.ijproman.2015.11.003

Lock, D. and Wagner, R. eds., 2018. *The Handbook of Project Portfolio Management*. Abingdon, UK: Routledge. https://doi.org/10.4324/9781315206592

Mani, V., Delgado, C., Hazen, B.T. and Patel, P., 2017. Mitigating supply chain risk via sustainability using big data analytics: Evidence from the manufacturing supply chain. *Sustainability*, 9(4), p.608. https://doi.org/10.3390/su9040608

Mok, K.Y., Shen, G.Q. and Yang, J., 2015. Stakeholder management studies in mega construction projects: A review and future directions. *International Journal of Project Management*, 33(2), pp.446-457. https://doi.org/10.1016/j.ijproman.2014.08.007

Noor, S., Rasoolimanesh, S.M., Jaafar, M. and Barghi, R., 2019. Inscription of a destination as a world heritage site and residents' perceptions. *Asia Pacific Journal of Tourism Research*, 24(1), pp.14-30. https://doi.org/10.1080/10941665.2018.1541183

Miao, C.F. and Evans, K.R., 2012. Effects of formal sales control systems: A combinatory perspective. *International Journal of Research in Marketing*, 29(2), pp.181-91. https://doi.org/10.1016/j.ijresmar.2011.09.002

Miao, C.F., Evans, K.R. and Shaoming, Z., 2007. The role of salesperson motivation in sales control systems—Intrinsic and extrinsic motivation revisited. *Journal of Business Research*, 60(5), pp.417-25. https://doi.org/10.1016/j.jbusres.2006.12.005

Mok, K.Y., Shen, G.Q. and Yang, J., 2015. Stakeholder management studies in mega construction projects: A review and future directions. *International Journal of Project Management*, 33(2), pp.446-57. https://doi.org/10.1016/j.ijproman.2014.08.007

Moshood, T.D., Adeleke, A.Q., Nawanir, G., Bamgbade, J.A. and Ajibike, W.A., 2020. Does government policy matter? Factors influencing contractors' risk attitudes in the Malaysian construction industry: A structural equation modelling analysis. *International Journal of Construction Supply Chain Management*, 1, pp.1-29. https://doi.org/10.14424/ijcscm100120-01-29

Musa, M.M., Bin Amirudin, R., Sofield, T. and Mus, M.A., 2015. Influence of external environmental factors on the success of public housing projects in developing countries. *Construction Economics and Building*, 15(4), pp.30-44. https://doi.org/10.5130/AJCEB.v15i4.4514

O'Sullivan, M., 2000. The innovative enterprise and corporate governance. *Cambridge Journal of Economics*, 24(4), pp.393-416. https://doi.org/10.1093/cje/24.4.393

Ogbeibu, S., Senadjki, A., Emelifeonwu, J., Gaskin, J. and Pereira, V., 2021. Augmenting environmental sustainability through the exchange of green creative ideas–evidence from an emerging economy. *Sustainable Production and Consumption*, 26, pp.275-87. https://doi.org/10.1016/j.spc.2020.10.007

Ouchi, W.G., 1979. A conceptual framework for the design of organizational control mechanisms. *Management Science*, 25(9), pp.833-48. https://doi.org/10.1287/mnsc.25.9.833

Parker, D., Charlton, J., Ribeiro, A. and Pathak, R.D., 2013. Integration of project-based management and change management: Intervention methodology. *International Journal of Productivity and Performance Management*, 62(5), pp.534-44. https://doi.org/10.1108/IJPPM-10-2012-0108

PMBOK, P.M.I., 2013. A Guide to the Project Management Body of Knowledge (PMBOK® Guide): *Project Management Institute*.

Prăvălie, R. and Bandoc, G., 2018. Nuclear energy: Between global electricity demand, worldwide decarbonisation imperativeness, and planetary environmental implications. *Journal of Environmental Management*, 209, pp.81-92. https://doi.org/10.1016/j.jenvman.2017.12.043

Qiang, M., Wen, Q., Jiang, H. and Yuan, S., 2015. Factors governing construction project delivery selection: A content analysis. *International Journal of Project Management*, 33(8), pp.1780-94. https://doi.org/10.1016/j.ijproman.2015.07.001

Raut, R.D., Narkhede, B. and Gardas, B.B., 2017. To identify the critical success factors of sustainable supply chain management practices in the context of oil and gas industries: ISM approach. *Renewable and Sustainable Energy Reviews*, 68, pp.33-47. https://doi.org/10.1016/j.rser.2016.09.067

Raykar, P. and Ghadge, A.N., 2016. Analyzing the critical factors influencing the time overrun and cost overrun in construction project. *International Journal of Engineering Research*, 5(1), pp.21-25.

Renuka, S.M., Kamal, S. and Umarani, C., 2017. A model to estimate the time overrun risk in construction projects. *Theoretical and Empirical Researches in Urban Management*, 12(2), pp.64-76.

Ringle, C.M., Sarstedt, M., Mitchell, R. and Gudergan, S.P., 2020. Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, 31(12), pp.1617-1643. https://doi.org/10.1080/09585192.2017.1416655

Ringle, C.M., Sarstedt, M. and Straub, D.W., 2012. Editor's comments: a critical look at the use of PLS-SEM in" MIS Quarterly". *MIS Quarterly*, pp.iii-xiv. https://doi.org/10.2307/41410402

Ruqaishi, M. and Bashir, H.A., 2015. Causes of delay in construction projects in the oil and gas industry in the gulf cooperation council countries: a case study. *Journal of Management in Engineering*, 31(3), p.05014017. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000248

Salapatas, J.N., 2000, June. Best practices—the nine elements to success. In: *Project Management Institute Annual Seminars & Symposium.* Houston, TX. Newtown Square, PA: Project Management Institute.

Salas, R. and Hallowell, M., 2016. Predictive validity of safety leading indicators: Empirical assessment in the oil and gas sector. *Journal of Construction Engineering and Management*, 142(10), p.04016052. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001167

Sarstedt, M., Hair, J.F., Ringle, C.M., Thiele, K.O. and Gudergan, S.P., 2016. Estimation issues with PLS and CBSEM: Where the bias lies!. *Journal of Business Research*, 69(10), pp.3998-4010. https://doi.org/10.1016/j.jbusres.2016.06.007

Saudi, N.S.B.M. and Tsen, W.H., 2017. The impact of oil and liquefied natural gas (LNG) prices on economic sectors in Malaysia. *Journal of BIMP-EAGA Regional Development*, 3(2), pp.90-100.

Sekar, G., Viswanathan, K. and Sambasivan, M., 2018. Effects of project-related and organizational-related factors on five dimensions of project performance: A study across the construction sectors in Malaysia. *Engineering Management Journal*, 30(4), pp.247-61. https://doi.org/10.1080/10429247.2018.1485000

Sekaran, U. and Bougie, R., 2016. *Research methods for business: A skill building approach*. John Wiley & Sons.

Shafii, F., Arman Ali, Z. and Othman, M.Z., 2006. Achieving sustainable construction in the developing countries of Southeast Asia. In: *Proceedings of the 6th Asia-Pacific Structural Engineering and Construction Conference(APSEC 2006)*, 5–6 September 2006, Kuala Lumpur, Malaysia.

Shenhar, A. and Holzmann, V., 2017. The three secrets of megaproject success: Clear strategic vision, total alignment, and adapting to complexity. *Project Management Journal*, 48(6), pp.29-46. https://doi.org/10.1177/875697281704800604

Shmueli, G., Ray, S., Estrada, J.M.V. and Chatla, S.B., 2016. The elephant in the room: Predictive performance of PLS models. *Journal of Business Research*, 69(10), pp.4552-64. https://doi.org/10.1016/j.jbusres.2016.03.049

Shuen, A., Feiler, P.F. and Teece, D.J., 2014. Dynamic capabilities in the upstream oil and gas sector: Managing next generation competition. *Energy Strategy Reviews*, 3, pp.5-13. https://doi.org/10.1016/j.esr.2014.05.002

Shukla, A. and Karki, H., 2016. Application of robotics in offshore oil and gas industry—A review Part II. *Robotics and Autonomous Systems*, 75, pp.508-24. https://doi.org/10.1016/j.robot.2015.09.013

Sovacool, B.K., Gilbert, A. and Nugent, D., 2014. Risk, innovation, electricity infrastructure and construction cost overruns: Testing six hypotheses. *Energy*, 74, pp.906-17. https://doi.org/10.1016/j.energy.2014.07.070

Spence, R., 2004. Risk and regulation: can improved government action reduce the impacts of natural disasters?. *Building Research & Information*, 32(5), pp.391-402. https://doi.org/10.1080/0961321042000221043

Taillandier, F., Taillandier, P., Tepeli, E., Breysse, D., Mehdizadeh, R. and Khartabil, F., 2015. A multi-agent model to manage risks in construction project (SMACC). *Automation in Construction*, 58, pp.1-18. https://doi.org/10.1016/j.autcon.2015.06.005

Taroun, A., 2014. Towards a better modelling and assessment of construction risk: Insights from a literature review. *International Journal of Project Management*, 32(1), pp.101-115. https://doi.org/10.1016/j.ijproman.2013.03.004

Taylan, O., Bafail, A.O., Abdulaal, R.M. and Kabli, M.R., 2014. Construction projects selection and risk assessment by fuzzy AHP and fuzzy TOPSIS methodologies. *Applied Soft Computing*, 17, pp.105-16. https://doi.org/10.1016/j.asoc.2014.01.003

Umar, T., 2022. The impact of COVID-19 on the GCC construction industry. *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)*, 13(2), pp.1-17. https://doi.org/10.4018/IJSSMET.20220301.oa1

Van Thuyet, N., Ogunlana, S.O. and Dey, P.K., 2007. Risk management in oil and gas construction projects in Vietnam. *International Journal of Energy Sector Management*, 1(2), pp.175-94. https://doi.org/10.1108/17506220710761582

Wijethilake, C. and Lama, T., 2019. Sustainability core values and sustainability risk management: Moderating effects of top management commitment and stakeholder pressure. *Business Strategy and the Environment*, 28(1), pp.143-54. https://doi.org/10.1002/bse.2245

Williams, P., Ashill, N.J., Naumann, E. and Jackson, E., 2015. Relationship quality and satisfaction: Customer-perceived success factors for on-time projects. *International Journal of Project Management*, 33(8), pp.1836-50. https://doi.org/10.1016/j.ijproman.2015.07.009

Wilson, C. and Wilson, P., 2017. *Make poverty business: increase profits and reduce risks by engaging with the poor*. London, UK: Routledge. https://doi.org/10.4324/9781351280488

Wu, G., Liu, C., Zhao, X. and Zuo, J., 2017. Investigating the relationship between communication-conflict interaction and project success among construction project teams. *International Journal of Project Management*, 35(8), pp.1466-82. https://doi.org/10.1016/j.ijproman.2017.08.006

Young, T.L., 2016. *Successful Project Management*. London: Kogan Page Publishers.

Zou, P.X., Zhang, G. and Wang, J., 2007. Understanding the key risks in construction projects in China. *International Journal of Project Management*, 25(6), pp.601-14. https://doi.org/10.1016/j.ijproman.2007.03.001