

# A Framework of Best Practice by Upstream Oil and Gas Contractors in Malaysia

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## ABSTRACT

Due to unstable global economic conditions, Malaysia's oil and gas industry encounters numerous challenges and uncertainties. Consequently, effective contract management has become a critical factor in ensuring the success of oil and gas projects. Projects undertaken by contractors are often exposed to various risks that can hinder project performance, cause financial instability, and lead to disputes, impacting all parties involved. Furthermore, many industrial practitioners overlook this issue and are unaware of the potential serious consequences. Hence, the primary objective of this study is to establish a theoretical framework for best practices in contract management for oil and gas contractors in Malaysia. A survey was conducted using questionnaires and a quantitative correlational research approach that employed a multistage cluster sampling method, targeting Malaysia's oil and gas contractors. The study aimed to gauge the respondents' level of understanding and assess the effectiveness of their current contract management approaches. The collected data underwent analysis through descriptive methods, Pearson's correlation coefficient, and theoretical integration. The goal was to develop a novel framework comprising six core modules: staff accountability and Key Performance Indicators (KPIs), risk management, tender and award processes, cost management, contract awareness and review, and contractual record-keeping. This framework equipped oil and gas contractors with the tools and practices necessary to navigate the global crisis. The oil and gas sector, particularly contractors, stands to gain substantial benefits from the framework introduced in this study. It is a valuable resource that contractors can leverage to enhance their methodologies, procedures, and contract management tools, enabling them to operate effectively amid the persisting global challenges.

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## INTRODUCTION

As the predominant energy sources on a global scale, the oil and gas sectors hold significant economic importance. As of 2019, Malaysia is the largest exporter of liquefied natural gas (LNG) worldwide and ranks as the second-largest producer of oil and natural gas within the Southeast Asian region (Country

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Analysis Brief: Malaysia, 2021). Within the oil and gas realm, a pivotal aspect is contract management, a process in which both parties are bound by a contractual agreement specifying mutually agreed-upon conditions. These conditions delineate the responsibilities of the contractor and define the scope of work to be executed. To thrive in this industry, individuals must be well-nurtured and adequately prepared to enhance their resilience, robustness, and creativity in addressing various risks, notably in areas such as contract management. This is imperative as the sector continuously faces increasingly formidable challenges.

A lack of understanding of contracts can lead to contractual issues, such as disputes on variation order claims, and may prohibit contracting parties from getting the clause's greater protection. (Mad Zin & Mohd Ahnuar, 2021; Alagiyawadu et al., 2020). The situation assumes critical proportions when disputes are left unresolved, as exemplified by the case of Kebabangan Petroleum Operating Company (KPOC), which initiated a RM125 million claim against Malaysian Marine and Heavy Engineering Holdings Berhad (MMHE) regarding a disagreement concerning an oilfield at the north of Sabah (Chin, 2019). Contemporary stakeholders in the oil and gas sector often lack of understanding of construction contracts when entering into agreements. This led to the adoption of poor contract management strategies. According to Bhattarai (2021), the lack of qualifications, knowledge, skills, and experience of the contract management team is the reason behind the inefficiencies in contract management practice. In the absence of a sound understanding of construction contracts, the effective management of the entire contract lifecycle becomes challenging. Regrettably, many oil and gas contractors have historically prioritised project completion without recognising the value of contract management, thereby exposing themselves to the risk of breaching agreements with clients and subcontractors.

To rectify this situation and ensure diligent oversight of contract management alongside project managers and other stakeholders, the establishment of a specialised team or department is vitally important. Muiywa L et al. (2020) suggest that only experts, such as Quantity Surveyors (QS), who are involved in the coordination of work effort and guidance on a range of legal and contractual issues, should be entrusted with contractual matters. The contract managers carry the pivotal role of decision-makers in this industry.

The primary responsibility of the contractor is to effectively plan, execute, and complete the project on schedule, within budget, and by the defined scope of work. Considering the volatile fluctuations in crude oil prices and the previous disruptions caused by the coronavirus disease (COVID-19) pandemic, this serves as a compelling wake-up call for industry stakeholders and requires a thorough consideration of potential risks and the adoption of the best contract management strategy. A substantial benefit of possessing a sophisticated approach to contract management lies in the ability to prevent and resolve disagreements, claims, and disputes. In reflection of that, it diminished the likelihood of significant cost overruns and schedule delays (Elsayegh et al., 2020). Asiedu & Adaku (2019) identified poor contract and project planning processes cause delays to the project tendering processes and eventually lead to project cost overruns, especially in a project environment where the macroeconomic indicators are unstable, and inflation is very volatile. This poor contract management encompasses issues like change orders, procurement of materials, financial limitations, contractor inexperience, and deficient project management support.

Therefore, it has been identified by Sacklén (2018) that effective contracting can lead to increased efficiency, cost savings, and risk reduction, providing a competitive advantage. Hence, as indicated by Abd. Rahman Sabri et al. (2017), there is a crucial necessity to assess the fundamental components that play a vital role in managing of oil and gas projects in Malaysia, contributing significantly to their successful execution. Furthermore, it becomes crucial to establish a framework that promotes the best practices in contract management within the oil and gas industry to enhance contractor performance.

This study primarily focuses on the upstream segment in Malaysia, which encompasses oil and gas contractors, and it employs a combination of various literature review. The objectives of this study can be summarised as below:

- (i) To investigate the stakeholders' level of understanding of the contract.
- (ii) To identify the relationship between the contractor's contract approach and their level of understanding.
- (iii) To analyse the relationship between the performance of the contractor and their contract management practices.

## LITERATURE REVIEW

The oil and gas sector has employed various contractual arrangements, reflecting the evolving landscape of oil and gas projects characterised by varying sizes, increased international involvement, and growing project intricacies. These arrangements hinge on three key factors; a) the chosen project delivery method, b) the agreement on contract pricing, and c) the crucial contractual clauses specified within the contract document. According to Martin et al. (2016), if a client intends to centralise his role or control over the design of a facility, it is appropriate to utilise a Design-Bid-Build method. However, as defined by Kubba (2017), this could be costly for the client as it relates to disputes and claims as opposed to Design-Build method that involves one single entity and solely responsible to the client for both design and construction.

In the pre-contract phase, after receiving the contract award from the client, the process continues as the contractor selects subcontractors. As Westland (2018) emphasised, the contract bidding processes tend to follow a similar pattern, even though client requirements may vary (refer to Figure 1).

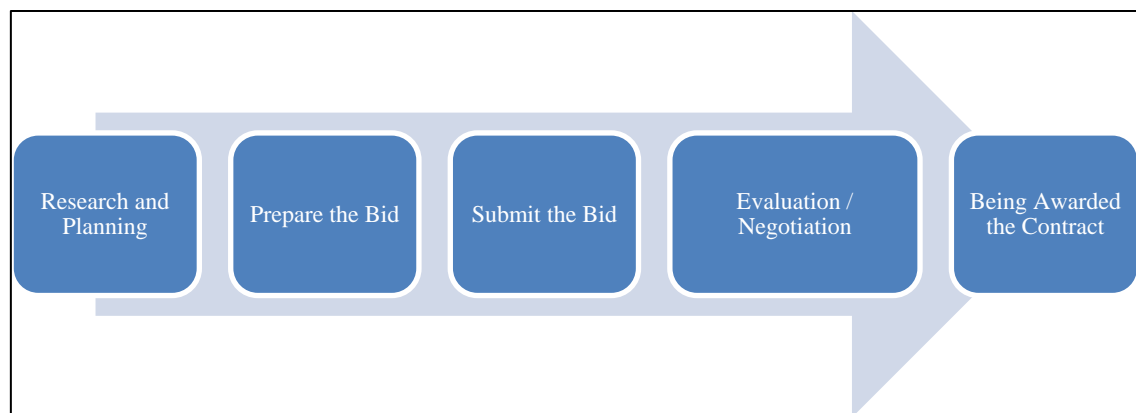


Fig. 1. Five (5) Steps to Contract Bidding

Source: Westland, 2018

Acheamfour et al. (2021) stated that selecting a suitable contractor ensures that the project will satisfy cost, timing, quality, safety, and environmental requirements. These same principles apply when subcontractors are being chosen. To avoid problems that may arise after the contract is awarded, Cheaitou et al. (2018) proposed that the most appropriate contractor be chosen based on a list of factors including technical capability, financial stability, risk, safety, and so on, in addition to cost. Beyond the processes mentioned earlier, a contract management approach can also encompass the need to conduct contract awareness and review sessions, instituting individual and departmental accountability measures and Key Performance Indicators (KPIs), and maintaining comprehensive contractual records to safeguard the

company against a variety of risks and facilitate the achievement of its objectives throughout the contract duration.

The contract's technical and commercial aspects need to undergo thorough review during a contract review session to instill a sense of commercial awareness among employees. The contract review session can be conducted on a few occasions; a) post-contract award meeting between the contractor and the client to discuss their assumptions, expectations, and objectives, ultimately arriving at a mutual understanding of their respective responsibilities, including addressing any errors or omissions (Naughter, 2022), b) during the transition phase from contract signing to implementation to encompass extracting maximum value from negotiated agreements, realising anticipated cost savings, optimising internal resource utilisation, enhancing business alignment, reducing exposure to risks, and streamlining administrative processes to save time and effort. Furthermore, Roger (2015) added that the contract manager shall be pivotal in designing commercial awareness in-house training programs for the project management team. Alternatively, if in-house expertise is lacking, the contractor may opt to engage an external consultant to undertake this task.

Key Performance Indicators (KPIs) should be defined with a clear understanding of respective roles and responsibilities in alignment with the company's contract strategy. This alignment ensures contract managers take ownership, supported by project managers and other stakeholders, for overseeing contract management and compliance. Such collaboration aims to enhance efficiency and mitigate risks effectively. In line with ProcurePort (2020), one of the responsibilities of a contract manager is to keep detailed records of all papers in an organisation and understand that even a signed and settled contract is still alive and active, reducing risks by serving as an audit trail and providing quickly evidence that is readily accessible. This includes the management of receipts, all correspondence related to the contract, client contract information sheets, records of information updates, status reports, and various other project-related documents. In certain organisations, contract managers are the primary contact point for engaging with clients on contractual matters.

Within the framework of the contracting strategy, it is of vital importance for the contractor to employ a structured methodology for managing risks, adhering to established principles that govern risk management and control for the project. An enhanced approach to the implementation of risk management practices is presented by PMArticles (2018), which delineates the risk management process as depicted in Figure 2.

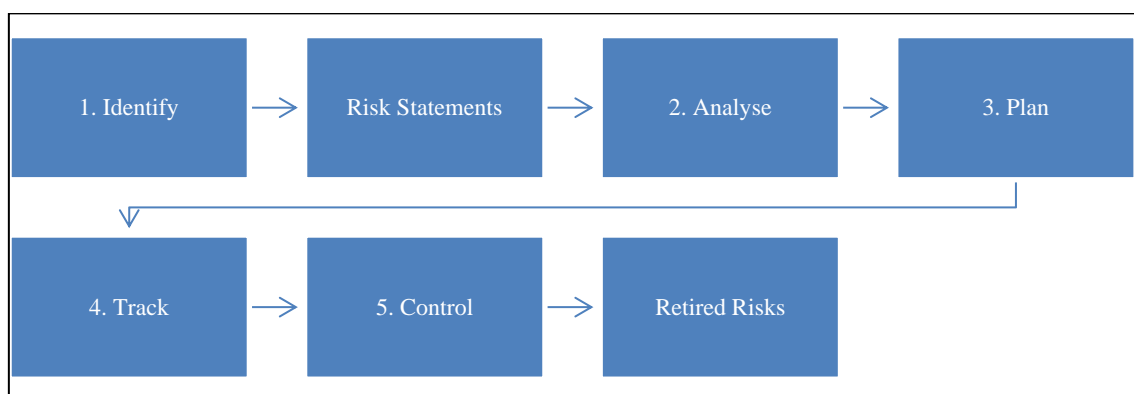


Fig. 2. Risk Stage Assessment Model

Source: PMArticles, 2018

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Jboboshko (2019) stated that cost management is an ongoing process throughout the project to identify and manage the resources required to carry out tasks or produce assets, as indicated in Figure 3.

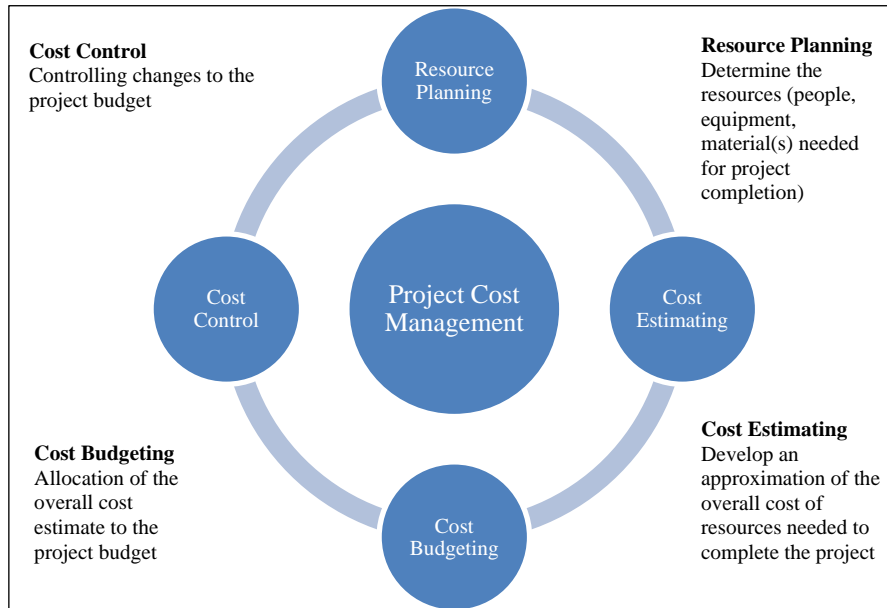


Fig. 3. Project Cost Management Function

Source: Jboboshko, 2019

Therefore, to enhance the contractor's effectiveness, Egboga and Ogohi Daniel (2022) suggest that organisations implement project performance measurement systems that cover quality, cost, and time, collectively known as the "Iron Triangle." Their study reveals the ongoing relevance of this framework from 2000 to 2021, even though there are additional measures that serve as complements to the "Iron Triangle". This framework is considered crucial for facilitating decision-making, motivating employees, fostering a learning culture, and enhancing coordination within the organisation.

## RESEARCH METHODOLOGY

To capture a diverse range of perspectives and viewpoints from the audience, a quantitative correlational research design was employed for this study. The researcher opted to use demographic background variables as antecedent factors linked to employees of the contractor's understanding of construction contracts. Furthermore, the study developed a conceptual framework to explore the connection between two independent variables: the level of understanding of construction contracts and the approach to contract management. These independent variables are considered primary factors influencing the contractor's performance, which is the dependent variable. To investigate these relationships, the study collected samples and data through survey questionnaires constructed based on a literature review and input from oil and gas professionals aligned with the conceptual framework illustrated in Figure 4. In doing so, the research continued to analyse the various responses obtained from oil and gas contractors. The study employed multistage cluster sampling, a probabilistic sampling approach, to select seventy-one (71) participants. These respondents were identified as the sampling population for the questionnaires, comprising employees from different departments within various oil and gas companies, such as contract

management, procurement and supply chain management, project management, sales, and business development.

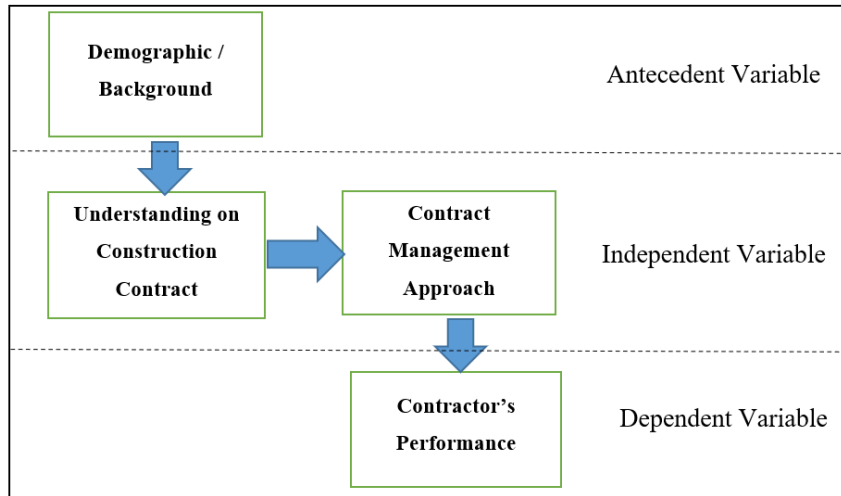


Fig. 4. Conceptual Research Framework

Source: Authors, 2024

## FINDINGS AND DISCUSSION

### Demographic Background

The results indicated that most participants were male, of Malay descent, and fell within the middle-aged bracket. They occupied positions ranging from executive to managerial levels within their organisations, holding critical administrative and supervisory roles vital to their firms' strategies and achievements. These individuals were predominantly affiliated with the project management and operations teams. Additionally, a significant portion of the respondents possessed work histories extending beyond five years and boasted extensive experience across various categories within the oil and gas sector.

### Level of Understanding of Construction Contracts

The first set of the independent variables comprises 10 statements posed to respondents as questions. The responses are structured on a scale ranging from 1 to 5, where 1 indicates "Strongly disagree," 2 represents "Disagree," 3 signifies "Neither agree nor disagree," 4 indicates "Agree," and 5 denotes "Strongly agree." This approach aims to assess participants' understanding of the construction contract, considering insights into the most suitable project delivery method and contract price arrangement as integral factors influencing management decisions.

As illustrated in Table 1, a descriptive analysis was employed, and the results revealed that a majority of the study's participants met the first research objective, which aimed to assess the level of understanding among stakeholders regarding contracts.

Table 1. Respondent's level of understanding of construction contracts

Variables	n (%)	Mean	S.D.	Min	Max
Understanding		3.4141	1.0278	1.40	5.00
Low	3 (43.7%)				
High	40 (56.3%)				

Note: Frequency (n); S.D = standard deviation; Max = Maximum, Min= minimum

Source: Authors, 2024

### Contract Management Approach

The second set of the independent variables consists of 13 sets of questions given as statements and giving respondents a 1 to 5 scale, like the prior set. The objective of this section of the questionnaire is to establish whether the respondent's company has used the essential contract management approach in the execution of projects. As depicted in Table 2, a descriptive analysis was employed to ascertain whether contractors had implemented the primary contract management approach. The results indicated that the majority of the respondents had indeed applied the fundamental contract management approach in their roles within their respective companies.

Table 2. Respondent's contract management approach

Variables	n (%)	Mean	S.D.	Min	Max
Contract Management Approach		3.5883	.9487	1.23	5.00
Low	26 (36.6%)				
High	45 (63.4%)				

Note: Frequency (n); S.D = standard deviation; Max = Maximum, Min= minimum

Source: Authors, 2024

### Contractor's Performance

The third series of questionnaires are employed to evaluate the contractor's performance based on whether they have encountered a considerable number of contract disputes throughout the execution of previous and/or current projects, representing the dependent variables. Like the previous instance, there are 6 questions in total, each featuring a statement and a scale ranging from 1 to 5. For the sake of simplifying both the descriptive analysis and the calculation of Pearson's correlation coefficient, all questions about the contractor's performance were framed in terms of negative outcomes. Additionally, the scale of results was inverted, as outlined in Table 3.

Table 3. Changes in the contractor's performance scale

Statement	Scale as per the Questionnaire	Revised Scale
Strongly Disagree	1	5
Disagree	2	4
Neither Agree nor Disagree	3	3
Agree	4	2
Strongly Agree	5	1

Source: Authors, 2024

Subsequently, as indicated in Table 4, a descriptive analysis was employed to assess the contractor's performance, revealing that the majority of oil and gas companies excel in terms of project execution.

Table 4. Respondent's contractor's performance

Variables	n (%)	Mean	S.D.	Min	Max
Contractor's Performance		2.7958	.8643	1.00	4.67
Low	32 (45.1%)				
High	39 (54.9%)				

Note: Frequency (n); S.D = standard deviation; Max = Maximum, Min= minimum

Source: Authors, 2024

### The Relationship Between Level of Understanding and Contract Management Approach by the Contractor

In this section, we delve into the findings of the Pearson's Correlation Coefficient analysis conducted concerning the relationship between the level of understanding and the contractor's approach to contract management. As revealed in Table 5, it was found that a noteworthy correlation between the contractor's contract management approach and their understanding of contracts exists. The second research objective is achieved through these findings and aligns with those of a previous study by Kariuki & Au Paul (2019), which advocated for training technical employees to enhance their capacity for comprehending and effectively implementing contract conditions.

Table 5. Pearson's correlation coefficient analysis between the level of understanding and contract management approach by the contractor

Variables	r value	
	Understanding on contract	Contract management approach
Understanding on contract	1	
Contract management approach	.655*	.655*

Note: \*p <.001

Source: Authors, 2024

### The Relationship between Contract Management Approach and Contractor's Performance

In this section, we delve into the outcomes of Pearson's Correlation Coefficient analysis carried out to examine the correlation between the contractor's performance and their approach to contract management. As presented in Table 6, the results indicate a significant correlation, reinforcing the findings of a prior study conducted by Moffat & Mwangangi (2019). Moffat & Mwangangi's research determined that contract relationship management and contract cost management exerted a positive and substantial influence on performance, which can be considered as a success of the third research objective.

Table 6. Pearson's correlation coefficient analysis between the contract management approach by the contractor and the contractor's performance

Variables	r value	
	Contract management approach	Contractor's performance
Contract management approach	1	.290*
Contractor's performance	.290*	1

Note: \*p =.014



Source: Authors, 2024

## THEORETICAL FRAMEWORK

Establishing a module for a theoretical framework on Best Practices for Contract Management among Oil and Gas Contractors in Malaysia is founded on two independent variables: the understanding of the contract and the approach to contract management, as outlined in Table 7. These variables are drawn from the survey questionnaire findings and the achievement of the research objectives in the previous section. This initiative aims to enhance the industry's contracting approach, facilitating the implementation of best practices and effective contract management tools to improve the performance of oil and gas contractors.

Table 7. Connection between independent variables and proposed modules for the theoretical framework

Independent variable	Module
Level of understanding of the contract	Accountability and KPI Contract Awareness and Review
Contract management approach	Contract Risk Management Tender and Award Process Contract Cost Management Contractual Record Keeping

Source: Authors, 2024

Figure 5 depicts the flowchart of the Contract Management Best Practice Framework, the study's final output, which consists of six major modules.

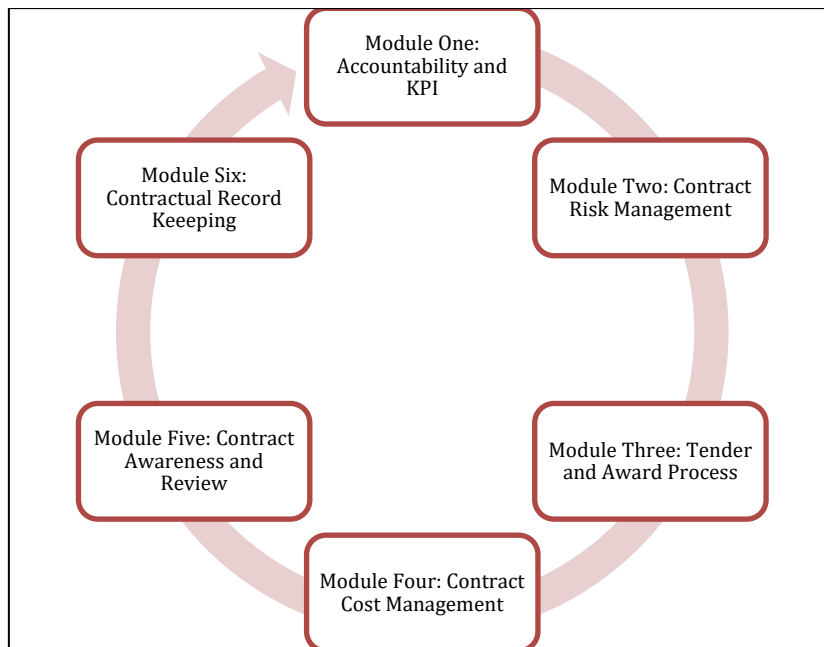


Fig. 5. Contract Management Best Practices Framework Flowchart

Source: Authors, 2024

A detailed description of each of the modules in the theoretical framework is discussed in Table 8.

Table 8. Contract Management Framework Modules

Module	Description
Module One: Accountability and KPI	<ul style="list-style-type: none"> <li>To establish a proficient contract management team, ideally with over five years of professional experience, which has served in multiple oil and gas contractor organisations under the guidance of a contract manager</li> <li>Ensure the definition and adaptation of Key Performance Indicators (KPIs) align with the company's contract strategy</li> </ul>
Module Two: Contract Risk Management	<ul style="list-style-type: none"> <li>To effectively handle risks and unexpected findings while attaining the highest level of security at the most economical expenditure</li> </ul>
Module Three: Tender and Award Process	<ul style="list-style-type: none"> <li>The choice of project delivery method, the agreement on contract pricing, and the critical contract clauses specified within the contract document significantly influence the tender management approach</li> <li>Engaging subcontractors is one of the strategies employed to minimise project risks, enhance quality, and maintain robust relationships among project collaborators</li> </ul>
Module Four: Contract Cost Management	<ul style="list-style-type: none"> <li>To institute cost management measures within organisations to mitigate the likelihood of exceeding budgeted costs</li> </ul>
Module Five: Contract Awareness and Review	<ul style="list-style-type: none"> <li>Before finalising the contract, there should be a meeting between the contractor and client to deliberate on their objectives, assumptions, and expectations</li> <li>In the phase between contract execution and implementation, it is essential to perform a contract handover to relevant stakeholders</li> <li>To provide training sessions focused on commercial awareness</li> </ul>
Module Six: Contractual Record Keeping	<ul style="list-style-type: none"> <li>Exploring the adoption of an automated system for tracking contracts and managing processes to monitor and manage all pertinent information and procedures</li> </ul>

Source: Authors, 2024

## CONCLUSION

In conclusion, a contractor's performance within the oil and gas sector can be significantly influenced by two key factors: the level of understanding among stakeholders and the contractor's approach to contract management. These elements are intricately linked to the establishment of best practices in contract management, which serves as an asset for ensuring the sustainability and growth of the business. It is indeed imperative for oil and gas contractors to recognise the vital importance of nurturing a deep understanding of contracts and effective contract management approaches. The development of a well-structured and optimal framework for best practices in contract management is a valuable long-term investment for oil and gas contractors in Malaysia as they endeavour to enhance their approaches, protocols, and instruments for contract management. This investment not only benefits current market participants but also can be made available to different oil and gas industry contractors to grant them greater authority over their contracts and holds the potential to shape their future performance and success. Doing so can help to ensure that projects are completed within the stipulated timeframes and budget constraints, ultimately contributing to the long-term sustainability of the contractors.

Promoting effective best practices in contract management across the entire contract lifecycle requires active involvement from various stakeholders, encompassing the management team, all company personnel, and every employee within the organisation. Simultaneously, it is essential to underscore the significance of ensuring that employees possess a sufficient level of understanding.

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## CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial, or financial conflicts.

## AUTHORS' CONTRIBUTIONS

Muhammad Shafiq Hashim carried out the research and wrote and revised the article. Mohammad Fadhil Mohammad anchored the review, and revisions and approved the article submission.

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