TECHNICAL COMPETENCIES OF OIL AND GAS CONSTRUCTION PROJECT MANAGERS IN MALAYSIA

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Abstract

The oil and gas business is one of the most important and largest industries in the world. Despite the industry's large economic contribution, the output of major projects has not met expectations, particularly with regard to cost and schedule goals. project managers should possess sufficient technical knowledge and skill to perform their jobs, especially in the oil and gas industry. This paper aims to assess the level of technical competencies for oil and gas construction project managers in Malaysia. Data were collected from 75 respondents from different organisations that are involved with oil and gas construction projects in Malaysia by using a questionnaire. The current level of construction project managers in the oil and gas construction in Malaysia are mostly competent and have the most satisfied rating in determining appropriate construction methods, followed by project scheduling, directing and monitoring the project's progress. Hopefully, this study can help the industry sector, especially in oil and gas, to find competent technical PMs to ensure the project can be delivered well.

Keywords Technical competencies, oil and gas, construction project, project manager

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Introduction

A project manager is an essential position in any project as they are the ones that "keeps a project on goal", which also includes working with a wide variety of people. A project manager is accountable for defining and ensuring the project meets the required goals. Not only that, the project manager is the one that will provide the directions to every contributor to ensure that the contributors know what to expect in every phase of the project. Without proper management, the project budget and delivery time can be overestimated, and result in late delivery and over budget.

The oil and gas business is one of the most important and most significant industries in the world (Khalilzadeh, Shakeri & Zohrehvandi, 2021). There are three types of projects in the oil and gas industry usually considered, including offshore, onshore and subsea projects (Rui, Peng, et al., 2017). Global energy demand is met to a large extent by this industry. Despite the fact that the oil and gas project served as an economic catalyst, the project's performance remained poor, particularly concerning cost and schedule goals. This is especially true, as Chanmeka, Thomas, Caldas and Mulva (2012) stressed that poor planning and inadequate project scope definition gave rise to project cost and schedule performance problems.

Throughout the view of the dynamic nature of oil and gas projects, particularly in a competitive working climate, the skills of project management workers are seen to play a major role in overcoming the problems associated with changes and errors in design. According to Sun and Meng (2009) on the causes and effects of changes in construction projects, the ability of the project team to manage unavoidable changes through the life cycle of the project is the one that determines the successfulness of a project. In order to ensure that the team achieves its goal, it is crucial to have a knowledgeable project manager to ensure the project budget, timeline and overall scope. The competency of the project manager is a significant driver for a project's progress. Therefore, it is important to select a professional project manager who meets all the requisite needs to ensure the success of

construction projects based on their construction methods. Thus, in positioning this study, the key questioned to be answered within this study is, what is the level of construction project managers' technical competencies in Malaysian oil and gas construction companies? Hence, to provide that knowledge, factors assessed to the project managers' competencies in oil and gas projects should be assessed.

Literature Review

According to IPMA (2006), the need for project management is no longer debated, but rather what form it will take (ex., methods, tools, and personnel). This is especially true, as there are too many unknowns and project parameter changes as a project progresses (Tam, 2020). Toutounchian, Abbaspour, Dana and Abedi (2018) delineated that oil and gas projects mostly have a construction nature. Thus, project management is an important aspect to be evaluated. Prior studies have been evaluated on the issues of project management of oil and gas projects, including Salazar-Aramayo, Rodrigues-da-Silveira, Rodrigues-de-Almeida and De Castro-Dantas (2013), who developed the conceptual model for project management in the oil and gas industry in Brazil, and found that communication problem, lack of training within the team, failures in project coordination, lack of experience in similar projects, inaccurate cost and budget estimates, inadequate planning of critical resources, and inaccurate time and deadline estimates are among issues emerged within the project management team.

Mega construction projects in the oil and gas industry are regarded as among the most challenging in terms of success in delivery (Sircar, Yadav, Rayavarapu, Bist, & Oza, 2021; Suppramaniam, Ismail, & Suppramaniam, 2018). Apart from the project mega sizes, with budgets that exceed $500 million, there is often an overlap of the construction and the engineering phases (Chanmeka et al., 2012). A knowledge overview from the world-renowned Offshore Magazine estimated that approximately USD 230 billion in oil and gas projects were delayed in several

countries, including Malaysia, due to delays in decision-making variables (Paganie, 2016). Based on the study from Van Thuyet, Ogunlana and Kumar Dey (2007), one of the factors that was identified as the major cause of oil and gas construction project delay is the incompetence of project teams. The delay in the oil and gas construction in Malaysia was also caused by the incompetent site management, and lack of experience and technical knowledge of contractor staff (Suppramaniam et al., 2018).

Taking into account all the issues outlined, Tam (2020) stressed that the project manager should have detailed and in-depth knowledge and understanding of all major issues, so that it can be managed effectively throughout the project life. Following this, Murch (2001) posited that project managers should possess sufficient technical knowledge and skill to perform their jobs. This is particularly significant in the oil and gas industry, whereas the projects are highly technical and complex, and understanding the concepts of engineering in the construction process is vital. The project manager should have at least a working-level understanding on the technical issues that the project team is facing.

Methodology

This study involves three major phases. In phase one (1), scrutinising literature review is conducted by gathering information related to the field of study. The information was gathered from several indirect sources such as books, journals, newspapers, articles, previous research and internet sources.

Prior studies in oil and gas construction sampled 48 respondents in Saudi Arabian (Seddeeq, Assaf, Abdallah, & Hassanain, 2019), 59 sample respondents of project managers in Oman (Ruqaishi & Bashir, 2015) while 40 respondents in the United States oil and gas sector conducted by Rui et al. (2017). Hence, in the second phase of data collection, a questionnaire was sent to a random sample of 150 project managers' clients,

contractors and consultant organisations in oil and gas construction project sectors, using multiple sources such as web-based survey tools and hand delivery. From the numbers, a total of 75 respondents (39 from the main contractor, 29 from consultant firm, 5 from manufacturer or supplier, while 2 from the developer) returned the questionnaire, representing a 50% response rate. Following Creswell (2014), for a study employing a questionnaire, a response rate of 50% is regarded as sufficient and reliable.

Once all the data are obtained and gathered, phase 3 commence, whereas the data will be analysed and interpreted. In this study, the data are interpreted using the relative importance index (RII) method, as akin to similar studies did in classifying risk factors and their ranking in terms of their probability and impact on construction projects in the oil and gas sector (Kassem, Khoiry, and Hamzah, 2020).

Data Collection

The data are collected using questionnaire surveys. In the absence of population data for PMs that works in oil and gas projects, the data will be collected randomly through the clients, contractor and consultant organisations in oil and gas construction project sectors in the area of peninsular Malaysia, prior to getting a satisfactorily large sample. Within the context of this survey instrument, the reliability test (pilot test) was tested using Cronbach Alpha (α), and the alpha values produced are 0.821, which is above the recommended value of 0.70, indicating excellent consistency and reliability (Hair Jr, Black, Babin, & Anderson, 2013).

Results and discussion

Respondents' Organisation

Figure 1 illustrates the percentage of respondents' organisations. The figure shows that the highest number of respondents came from the contractor, which is 52%, followed by the consultant

firms, which are 38.67%. Meanwhile, manufacturer or supplier marks 7% and the least respondent came from developers, which 2.67%.
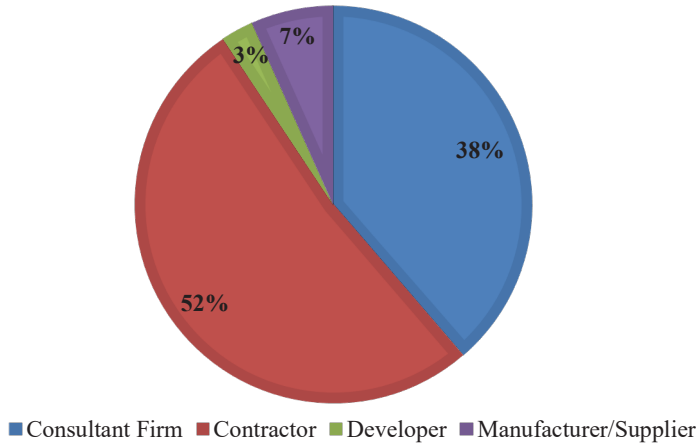
Figure 1: Percentage of respondents' organisation

Respondents' Experience Related to Oil and Gas Construction Projects

As to ensure the relevancy of this study, the respondent were asked for their numbers of involvement in the oil and gas construction projects. Table 1 shows that 72% of the respondents are experienced in 6 to 10 projects in the oil and gas construction project, while 23% of the respondent are experienced in 1 to 5 projects. Meanwhile, only 1% of the respondents experienced above 16 projects in oil and gas. As the majority of project managers have experience with more than five projects, they have the justification as the respondents for this study.

Table 1: Respondents' experience related to Oil and Gas Construction Projects

Oil and gas project	N (%)
1 to 5 projects	17 (22.7)
6 to 10 projects	54 (72)
11 to 15 projects	3 (4)
Above 16 projects	1 (1.33)
Total	**75 (100)**

Current Level of Construction Project Managers' Competencies in Malaysian Oil and Gas Construction Companies

The present study aims to assess the current level of construction PMs competencies in Malaysian oil and gas companies. Premised on the foregoing, Table 2 represents the assessment of the current level of construction project managers' competencies in Malaysian oil and gas construction companies. Ten (10) assessment factors were interrogated with the respondents presented in table 2.

Table 2: Level of construction project managers' technical competencies in Malaysian oil and gas construction companies

Assessment	Choices	Frequency	%	Cumulative %	RII
Determine the appropriate construction method	Poor	0	0	0	4.33
	Fair	1	1.3	1.3	
	Neutral	2	2.7	4.0	
	Good	43	57.3	61.3	
	Excellent	29	38.7	100	
Determine the most effective plan and schedule	Poor	0	0	0	4.08
	Fair	0	0	0	
	Neutral	8	10.7	10.7	
	Good	53	70.7	81.4	
	Excellent	14	18.7	100	
Segregate all required construction activities at the site into logical step	Poor	0	0	0	3.16
	Fair	1	1.3	1.3	
	Neutral	9	12	13.3	
	Good	48	48	61.3	
	Excellent	17	17	100	
Schedule the project	Poor	0	0	0	4.20
	Fair	1	1.3	1.3	

Item	Response				Mean
	Neutral	3	4	5.3	
	Good	51	68	73.3	
	Excellent	20	26.7	100	
Determine labour requirement	Poor	0	0	0	4.00
	Fair	1	1.3	1.3	
	Neutral	10	13.3	14.6	
	Good	52	69.3	83.9	
	Excellent	12	16	100	
Direct and monitor the progress of a project.	Poor	0	0	0	4.19
	Fair	1	1.3	1.3	
	Neutral	4	5.3	6.6	
	Good	50	66.7	73.3	
	Excellent	20	26.7	100	
Frequently assess cost control, and assist in valuation, payment and claims.	Poor	0	0	0	3.08
	Fair	0	0	0	
	Neutral	8	8	8	
	Good	51	51	59	
	Excellent	16	16	100	
Manage performance of all trade contractor	Poor	0	0	0	4.01
	Fair	0	0	0	
	Neutral	13	17.3	17.3	
	Good	48	64	81.3	

	Excellent	14	18.7	100	4.01
Administer productivity of the workers, and the site quality and safety	Poor	0	0	0	4.01
	Fair	0	0	0	
	Neutral	11	14.7	14.7	
	Good	52	69.3	84	
	Excellent	12	16	100	
Capable in project handing over	Poor	1	1.3	1.3	3.87
	Fair	0	0	1.3	
	Neutral	2	2.7	3.6	
	Good	54	72	75.6	
	Excellent	18	18	100	

It is apparent from the results that the oil and gas construction project manager in Malaysia have the most excellent technical competencies in determining appropriate construction method, project scheduling, and in directing and monitoring the progress of a project that have the highest RII value among others. The level of the construction project manager's technical competencies is excellent in determining the appropriate construction method, with the RII value at 4.33. The findings are in agreement with Lalmi, Fernandes and Souad (2021), and Razi, Ramli, Ali and Ramadhansyah (2020), who chose the right construction method to increase the chances of project success by reducing costs, shortening project schedules, optimising results, eliminating waste and increasing project satisfaction.

On the other hand, the second-highest level of construction project managers' competencies in Malaysian oil and gas construction companies is project scheduling. This is especially true, as a project manager, the planning and implementation aspects are very important. Accuracy in decision-making and the courage to bear risks help a PM in achieving the purpose and success of the project. To that end, Ruqaishi and Bashir (2015) put that the issue of inadequate planning and scheduling of projects can be overcame by implementing the techniques for managing projects with planning and scheduling software packages, as well as by improving communication.

Nevertheless, the results also show frequently assess cost control, and assist in valuation, payment and claims (RII – 3.08), segregates all required construction activities at the site into logical step (RII-3.16), and capable in project handing over (RII-3.87) shows the lowest RII values for the level of construction project managers' technical competencies in Malaysian oil and gas construction companies. Therefore, it can be seen that one of the weaknesses for project managers is when it comes to governance, cost and financial management. Utilising evidence from Baloi and Price (2003), poor cost performance of construction projects will cause both clients and contractors to suffer significant financial losses due to cost overruns. It is also found that problems related to financial cost management are due to their lack of effective

techniques and tools to handle these risks.

Conclusion

This study aims to assess the technical competencies of oil and gas construction project managers in Malaysia. Findings reveal that the current project managers in the oil and gas construction in Malaysia are mostly competent and have the most satisfied rating in determining appropriate construction methods, followed by project scheduling, and directing and monitoring the progress of a project. While this study contributes to the body of knowledge in assessing the current level and practice of the project managers' technical competencies, this study can also help to ascertain the technical competencies a project manager requires in assuring project success. Through the findings, it will assist a client of the oil and gas industry in selecting a competent project manager to deliver the projects. In addition, this study may contribute to the contractual parties in minimising risks pertaining to the incompetency of PM in oil and gas construction projects.

Continued research is strongly recommended for the oil and gas construction project manager technical competencies, especially in reviewing health and safety compliance, target achievement, computing quality audit, and assessing cost control, valuation, payment and claims, as these scopes are most likely to bring a great impact to most construction project performance.

Acknowledgement

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