

The Relationship of IQ among Project Managers with Oil and Gas Project Success

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Abstract

This study focuses on intellectual quotients (IQ) dimensions of oil and gas managers in approving or disapproving certain projects. The questionnaires were distributed to one thousand project managers, however, only three hundred and ten responded to the survey giving 31% response rate. Sixteen items identified to measure the project managers IQ with Cronbach's Alpha of 0.951, as such the elements is related to each other, and can be used to measure the dimension on intellectual quotients. The top three most important elements of IQ include abilities in communicating one's knowledge, reasoning using past experiences or procedures, and comprehending quantitative concepts. There is a positive and significant relationship between IQ of project managers and project success. As shown, there is a significant and positive relationship between IQ of project managers with the ability to complete the project on time ($r = 0.398^{**}$; $p = 0.000$), within cost allocated ($r = 0.526^{**}$; $p = 0.000$), and quality of the project delivered ($r = 0.646^{**}$; $p = 0.000$).

Keywords: IQ, oil, gas, project, manager, Malaysia.

I. INTRODUCTION

Industry related to oil and gas is well known for its high risk, huge capital investment, high profit, and high losses. As such, it is critical to ensure decision makers or project managers to make sound decision in ensuring high possibility of success rather than failures. There are few reports and cases related to failures of projects due to poor selection of vendors in oil and gas industry [1], [2], [3]. In addition, project delays and cost overruns of oil and gas projects also being studies by few researchers from differing countries including Nigeria [4], Canada [5], Malaysia [6], Brazil [7], and other countries.

Other than that, studies on oil and gas from Malaysia perspectives are mainly on economic perspectives [8], employee behavior perspectives

[9], fraud cases in oil and gas company [1], energy demand and policies [10], technology for oil and gas [11], [12], and others. Most studies in decision making for oil and gas normally on techniques or process such as analytic hierarchy process [13], fuzzy techniques [14], [15], and others.

However, most cited delays are due to slow decision making for projects in oil and gas industry [16], [17], [18], [19]. This study main purpose is to identify the items of intellectual quotients (IQ) which are critical for oil and gas managers in making decision either to approve or disapprove any projects.

II. LITERATURE REVIEW

This section highlighted the sectors of oil and gas industry, historical background of the industry in

Malaysia including economic contribution, decision making, and intellectual quotients (IQ).

A. Overview of the Sectors

There are three sectors which are upstream, midstream, and downstream. The upstream sector is referring to searching, exploring, drilling, and developing of wells, and extracting crude oil from underground that includes feasibility studies, operations related to rig, machines, and chemical supplies for extraction of oil. The next sector is midstream sector involving storing, and processing by providing facilities such as transportation from the vessels or rig to other site to process crude oil via rail tankers, pipelines, trucks and storage units before reaching the refinery plant. In short, mid stream activities revolves around transportation, and storing of crude oil. The downstream sector includes refining, processing, distilling, and purification of crude oils into consumable products such as any byproduct of petroleum, fuel oils, and gasoline that also includes marketing services to promote the finished products to retailers or end users [20].

B. Historical and Economic Contributions

The first well is found in 1910 at Canada Hill, Miri which is in Borneo Island. The state is known as Sarawak, and part of Malaysia. The first oil and gas company extracted crude oil in Malaysia is Shell [21]. Due to high in demand in crude oil, Malaysia government which had established PETRONAS a government link company to extract oil for Malaysia in 1974 [22].

C. Intellectual Quotients (IQ)

Intellectual Quotient (IQ) as defined by Thurstone in 1947 as the psychometric representation of what is known as the g factor [23]. From Neuropsychology perspective, it established the relationship between brain and behavior by taking on the task of research works aimed in explaining behavioral and cognitive relationship [24].

Whereas, cognitive neuropsychological perspective look into the concept of intellectual capacity as part of the measurement of intelligence and composed of different factors integrated in the ability to reason, to adapt to environment, to use experience in problem solving, and to understand

complex ideas [25]. However, Cattell in 1963 had divided the psychometric g factor into fluid and crystallized intelligence, further Carroll model, which was developed in 1994, had divided into three areas which are primary abilities, broad abilities, and general intellectual ability [25].

Besides that, from a study conducted by [26], more intelligent people are more patient and will invest their money rather than buying lottery. Thus, people that score higher IQ will calculate all potential risks and return, rather than taking any chances in their decision making. Thus, this study has used the Cattell model that was produced in 1963 to measure IQ as shown on Table 1.

Table 1. Reliability Analysis on IQ

Components of IQ	Explanation
1.Fluid intelligence (Gf)	Abilities in reasoning, forming concepts, and solving problems.
2.Crystallized intelligence (Gc)	the breadth and depth in acquiring knowledge, communicating one's knowledge, and reasoning from past experiences or procedures.
3.Quantitative reasoning (Gq)	the ability to comprehend quantitative concepts and relationships and to manipulate numerical symbols.
4.Reading & writing ability (Grw)	Basic skills in writing and reading.
5.Short-term memory (Gsm)	the ability in apprehending and holding information and using it within seconds.
6.Long-term storage and retrieval (Glr)	the ability in storing information and retrieving it.
7.Visual processing (Gv)	ability in thinking, analysing, synthesizing, and perceiving with visual patterns (storing and recalling visually).

8. Auditory processing (Ga)	the ability in discriminating auditory stimuli, analysing, and synthesizing (processing and discriminating speech or sounds under distorted conditions).
9. Processing speed (Gs)	the ability in performing cognitive tasks automatically while maintaining attention and under pressure.
10. Decision/reaction time/speed (Gt)	how fast a person reacting to stimuli or a task in seconds.

III. RESEARCH METHODOLOGY

In this section, a brief discussion on the sampling, items development, data collection and analysis are forwarded.

A. Sampling and Data Collection

The samples were chosen systematically from LinkedIn database and disseminated to project managers to respond to the survey. About 1000 oil and gas project managers were contacted via LinkedIn. About 400 responded however only 310 are usable and can be used for the study. About 90 respondents have not fully completed the survey.

B. Data Analysis

SPSS software version 23 is used for data analysis such as reliability analysis, descriptive analysis, and Pearson Correlation to test the hypotheses.

C. Ethical Issues and Consideration

The ethical issues that were faced include the oil and gas companies unwilling to allow the researchers to contact their employees. As such, the researchers must take alternative action which is to identify the project managers of oil and gas employees via LinkedIn. Messages were sent to potential respondents to invite them to participate in the study those who are willing to participate were given a link for them to respondent the survey on-line.

Hence, the researchers do not influence the respondents during the survey, and responses can

be considered valid as there is no element of influences from the researcher. Other than that, the respondents do not have to include their name in the survey, although it was captured in the system however, it is not reported in the analysis. In short, the privacy of the respondents is ensured.

IV. RESULTS

This section outlines the results generated from the study, such as respondent profiles, reliability analysis, and descriptive analysis to highlight the most important items in intellectual quotients that should be used frequently by project decision makers.

A. Respondent Profiles

Out of 310 decision makers about 56.5 % of the respondents are above 40 years old, and 43.5% of the respondents are below 40 years old. Those respondent's monthly income below RM 20,000 is 52.2%, and above RM20, 000 around 47.8 %. Most of them are male (92.6%), Malaysian (92.6%), with at least a bachelor's degree (64.5%), with more than 15 years working experience (64.8%), holding managerial position (73.9%), and Malay ethnicity (58.7%).

About 53.2% of the respondents works in Malaysian based companies that includes Petra Energy, SUMATEC, Sapura Energy, Petronas, and others. About 46.8% of the decision makers work in international companies that include Talisman Energy, Nippon Oil, RANHIL, Murphy Oil, Lundin Malaysia, Shell, and other oil and gas companies.

On the most frequent project location includes Sarawak, Wilayah Persekutuan, Terengganu, Sabah, Johor, and Selangor. In terms of office location are in Wilayah Persekutuan, Sarawak, Selangor, Sabah, Terengganu, and Johor.

B. Reliability Analysis

As shown on Table 2, all items for IQ are accepted with $\alpha=0.967$ that shows it has an excellent internal consistency.

Table 2. Reliability Analysis on IQ

Construct	Number of Items	Items Deleted	Total Items	Cronbach's Alpha

IQ	16	0	16	0.967
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C. Descriptive Analysis

From table 3, it shows that most of the respondents agreed that IQ is important, and the top three most important elements for IQ are ability to reason using previously learned experiences or procedure, communicates knowledge, and ability to comprehend concepts quantitatively.

Thus, those are the items of IQ agreed as being important by project managers in making decision.

Table 3. IQ Descriptive Analysis

Items	Mean	S.D.	N
To reason.	3.99	0.804	310
To form concepts.	4.05	0.744	310
To solve problem using new information or procedures novelty.	4.09	0.679	310
Acquiring knowledge in depth and breadth.	4.04	0.679	310
Communicates knowledge.	4.18	0.710	310
Reasoning from past experiences.	4.18	0.713	310
Comprehending concept quantitatively.	4.17	0.698	310
Seeing relationships and manipulate numerical symbols.	4.12	0.689	310
Apprehending and holding information in immediate awareness, and then use it.	4.04	0.719	310
Storing information and fluently retrieve it later in the process of thinking.	3.95	0.803	310
Perceiving, analyzing, synthesizing, and thinking with visual patterns.	4.05	0.707	310
Storing and recalling visual representations.	4.05	0.724	310
Analyzing, synthesizing, and discriminating auditory stimuli.	4.08	0.782	310
Processing and discriminating speech sounds that may be presented under distorted conditions.	4.01	0.806	310
Performing automatic cognitive tasks, under pressure and able to maintain focused attention.	3.93	0.723	310

Reflecting the immediacy and reacting to stimuli or a task in seconds.	4.04	0.719	310
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D. Relationship between IQ and Project Success

Referring to Table 4, it shows that there is a significant and positive direct relationship between project success and an IQ of project managers. It shows that IQ of decision makers or managers of project has significant and direct relationship with the ability to complete the project on time ($r=0.398^{**}$; $p=0.000$), within cost allocated ($r=0.526^{**}$; $p=0.000$), and quality of the project delivered ($r=0.646^{**}$; $p=0.000$).

Table 4. IQ Descriptive Analysis

	I Q	Project Success - Time	Project Success Cost	Project Success Quality
IQ	Pearson Correlation	1	0.398**	0.526**
	Sig. (2-tailed)		0.000	0.000
	N		310	310

V. DISCUSSION

This section discusses the findings from the research, the implications derived from this research, and future research direction for researchers.

A. Project Managers IQ and Project Success

The importance of project manager's IQ for project success had been mentioned in previous study by [23]. Hence, when quite similar study had been conducted in Malaysia to oil and gas project managers, most of them agreed that the project manager's IQ is an important contributor towards project success. There is a positive and significant relationship between oil and gas manager's IQ with project success in terms of completion on time, within cost (budget), and time.

B. Implications from the research

The implication of this research would be to oil and gas companies to provide more trainings to enhance the IQ of the managers involves in project decision making. Other than that, to allow those managers to pursue their studies to higher level such as master or doctoral level to enhance their intellectual capabilities in project decision making.

The implication to education industry would be to offer more educational program on building IQ for project manager's decision making at certificates, diploma, degree, or master levels.

C. Future Research Direction

In the future, this research can be conducted in other industries including education, manufacturing, constructions, and other type of industry in Malaysia to identify whether the manager's IQ is important for project success.

CONCLUSION

In conclusion it shows that IQ of project managers oil and gas highly crucial to ensure the success of the oil and gas project. The intellectual abilities of oil and gas project managers highly critical in decision making to ensure the project able to be completed within budget, on time, and within expected quality.

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