

High Performing Team Characteristics for Malaysian Oil and Gas Construction Projects

Davendren Vereya¹, Syuhaida Ismail²

^{1,2}Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia, Kuala Lumpur
54100, Kuala Lumpur, Malaysia.

davendren.v@gmail.com, syuhaida.kl@utm.my

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Abstract

Oil and gas construction industry has been widely criticised for its fragmented approach to project delivery and its failure to form effective teams, where 65 percent of oil and gas construction project failures were found due to softer aspects, such as people, organisation and governance. While integration is desirable, it is not the only requirement or condition for improved team within the context of an oil and gas construction project as the role and value of integration in project teams are also found to be unclear relative to other performance enhancing approaches. This paper hence aims to appraise team integration for oil and gas construction projects in Malaysia. The objectives of this paper are to identify the concepts of team integration and review the characteristics of high performing team for oil and gas construction projects in Malaysia. This conceptual paper produced a definition for concept of team integration which suites best for oil and gas construction project. This paper also found 55 characteristics of high performing team, which can be grouped into three variables: organisational structure, team processes and individual contribution. Based on the understanding of the link between the variables, a framework for team integration in Malaysian oil and gas construction project will be proposed and developed at later stage.

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1 INTRODUCTION

The Malaysian oil and gas industry face one of its toughest periods from a prolonged drop in oil prices which began in June 2014 [1], hence oil and gas companies have to prepare themselves by optimising operations, improving efficiency, and reducing costs to sustain profitability [2]. For instance, a Malaysian oil and gas construction giant, Malaysia Marine Heavy Engineering (MMHE) suffered its third consecutive net loss of RM22.9 million on

its 2018 third quarter ending financial report, stating higher cost provisions for ongoing projects as the main cause [2]. Thus, it is perceived that oil and gas industry must now collectively shape and execute a decisive and potentially transformative response [1] while engaging with the key project stakeholders efficiently to improve existing relationships between the operator, engineering consultant and construction team in developing trust and a true “one team” mentality [3].

A clear understanding of teams will enable to appropriate application of integration practices to realise the benefits of bringing people together to work towards a common goal. An integrated team comprises multi-functional disciplines working together, such as in the oil and gas construction projects can improve productivity and contribute significantly to the performance of companies that implement them but that must be done with a good understanding of the concept of teamwork [4]. Thus, it is important for oil and gas construction project owner to increase awareness on the concept of team and integration prior to new oil and gas construction project commencement. Project owner's expectation on the project performance and efficiency of the delivery has also increased. Hence, it is significant to complement that increased importance by reviewing the high performing team characteristics for oil and gas construction projects in Malaysia.

2 MALAYSIAN OIL AND GAS OVERVIEW

Malaysia is the third largest liquefied natural gas (LNG) exporter in the world and second largest oil and natural gas producer in Southeast Asia [5]. It is also notable to highlight that Malaysia's oil reserves are made of top-quality light and sweet crude, where Malaysia's benchmark Tapis crude is one of the most expensive crudes in the world [6]. Malaysia is also located in a very strategic geographic location for seaborne energy trade [5] [6].

Based on an estimate made by [7], Malaysia has approximate oil reserves of 5.85 bnbbls (billion barrels) and 2.75tcm (trillion cubic meter) of natural gas. A later report by [5] in 2015 estimated a lower value

of 4.0 bnbbls of oil reserve and 2.35 tcm natural gas reserves. In addition, in 2017, a proven figure of 3.6 bnbbls oil reserve were reported [6]. These reserves are mainly located in three basins: the Malay Basin in Peninsular Malaysia, Sarawak and Sabah Basin in East Malaysia [5]. Nearly all of Malaysia's oil comes from its offshore fields [6]. At present, there are 349 offshore platforms in the Malay Basin with 30% of these are Central Processing Platforms (CPP) [8].

Petroleum Nasional Berhad (PETRONAS), being the national oil and gas company, holds exclusive ownership rights to all oil and natural gas exploration and production projects in Malaysia [6]. Based on statistics by [9], oil and gas industry has always been the major contributor to government's revenue, accounting for more than 21.7% of the country taxes and dividends in 2018. The industry is also projected to contribute higher revenue of over 30% in the year 2019 [9]. This signals a higher demand for oil and gas production in the country.

Looking at the country's oil and gas construction strength, there are four major constructors or often referred to as fabricators: Sapura Energy Fabrication Yard (SEFY), Malaysian Marine Heavy Engineering (MMHE), TH Heavy Engineering (THHE) and Brooke Dockyard and Engineering (BDE). These are the first-tier, local based, major construction contractors who have obtained license to operate by PETRONAS [10]. Over the years, these contractors have fabricated multiple local and internal projects, which include construction of many oil and gas facilities encompassing substructures, inter-platform bridges, booms, well head topside platform, central processing platforms, compression

platforms, living quarters, process skids and modular compression skids. Some of the notable oil and gas construction projects in terms of size and technology are Kikeh Truss Spar, GumusutKakap Semi-Submersible Floating Production System, Tapis Enhanced Oil Recovery Unit, Malikai Tension Leg Platform and Keabangan Central Processing Platform.

3 METHODOLOGY

This study is interested in exploring the concept of the team and integration of the construction project team members in Malaysian oil and gas construction project. The unit of analysis for this study is the project team. This study is exploratory and interpretative in nature. Explanation required the development of concepts and generalisable characteristics associated with the unit of analysis. A preliminary thorough literature review focuses on concept of team and integration and characteristics of high performing team was carried out. Secondary data is gathered initially through books, library research, journal databases, conference proceedings, company financial reports, industry reports, academic thesis, as well as other documents available in the public domain.

4 CONCEPT OF TEAM INTEGRATION

4.1 Team

The term team is generally understood as people doing something together [11]. However, by grouping a random number of individuals and having them to talk to each other alone will not constitute a real team. Due to its wide use in various perspectives, each person has his/her own definition of what a team means. This shows a need to be explicit about exactly what is meant by the

term team. Thus, in general, team is defined as two or more people who works together to achieve a common goal [12] [13] [14] [15].

[12] further add that the members of the team generally perform a specific task and interact and communicate among each other. Relatively, as team members are expected to perform a specific task, each team member has their own part or role to play to fulfil the team's greater goal. This may require them to be an expert of their task. To further support this, [4] and [14] include the element of individual skill in their definition of the term team and claimed that team must develop the right mix of skills. Hence, there will be a balance of individual input as one member's strength can be another member's weakness.

[4] on the other hand add team working environmental factor as part of the definition by claiming that team works should be together in a supportive and complementary manner to achieve what cannot be efficiently or effectively achieved by a single individual. It is further claimed by [14] that team members are deemed mutually accountable and to be hold responsible for the commitment that they have made. While a variety of definitions of the term team have been suggested over the years, the key distinction centres on the performance, which is expected to be larger than the sum of all the individual effort [16].

Although teams depend on combined input of members to achieve finest results, the performance of individuals is critical to the overall performance of the team [14].

4.2 Team Integration

Integration at large can be defined as an act of bringing together smaller components into a single system that functions as one. The concept of integration

emerged within the construction industry focused on computer integrated construction [17]. [17] developed a framework stating the dimensions and levels of integration, which is also used to define the term ‘integration’. With reference from the framework as shown in Table 1, a generic definition is proposed by this paper as “sharing of something by somebody using some

approach for some purpose”. By replacing the terms with the words extracted from the framework, a meaningful definition can be presented. For example, a company can define integration as sharing of data, model and knowledge using automations and multiple applications in multiple disciplines for the purpose of increasing profit.

Table 1. Dimension and levels of integration [20]

	<i>Low Integration</i>	—————→		<i>High Integration</i>
Who?	Individuals	Departments	Whole project life	Entire Industry
What?	Data	Models	Goals	All project information
When?	Islands of automation	Multiple applications for multiple discipline in one phase	Multiple applications for multiple discipline and phases	All applications in project delivery process
Why?	Survival, stay in business	Increase market share	Enter new market	Create new market

The use of the term integration continued to progress from computer integrated construction to team integration [18]. There have been variety of definitions of the term team integration suggested over the years, which can be generally broken down into two parts: the concept and the purpose. The most common concept of team integration is defined as merging of different disciplines [19][20][21], alignment of process [19][22] and merging of goals [20][23]. Other concepts used to define team integration in terms of concept are development of governance structure [24], exchange of information [25], merging of

individuals [23] and continuously collaborate [21].

The most common purpose used to define the term integration will be to be cohesive, to align culture and to be mutually supportive [19][21]. This aligns with the most commonly described characteristics of high-performing team in the team process group, namely team cohesion [26][27][28][29]. Other concepts used to define team integration in terms of purpose will be for conformity [22], to achieve collective objectives [4], to align needs, to be efficient [20], systematic and to manage key stakeholders [24].

Hence, since oil and gas construction projects have a chain of process, where each activity in the process chain delivers to its internal customer and the final activity delivers to the external customer, the ultimate goal of each process is to deliver to its internal customer while every team member shall hold responsibility for the final output. Therefore, from the perspective of this paper, team integration is defined as merging of team members from different disciplines to hold unified responsibility to satisfy internal and external customer's expectation.

5 CHARACTERISTICS OF HIGH PERFORMING TEAM

Having defined the term team, it is evident that the primary goal of assembling a team is to enhance individual and overall performance. Based on a model developed by [30] as shown in Figure 1, performance of the team is seen as the function of the effectiveness of the team.

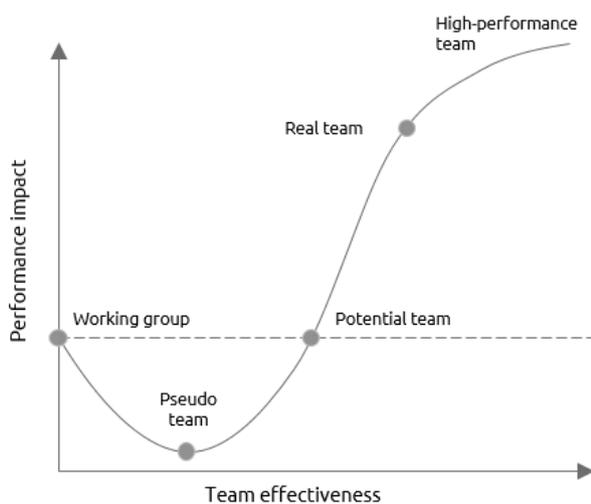


Figure 1. Team effectiveness vs performance impact [30]

Based on the model, high-performance team is formed when the effectiveness of the team is at the peak. It is then imperative to understand the concept of team effectiveness

and its definition. Various researchers have defined team effectiveness in the past. However, most definitions are shaped based on an exploratory research by [31]. [31] conceptualised team effectiveness based on a logic of a process with both input and output (I-P-O) as shown in Figure 2. Input in this concept refers to characteristics and resources at multiple level such as individual, team and organisation. Output refers to outcomes of the team performance. The process in this context refers to the activity that the team members do in order to translate the input to output. [32] further added on the output by defining the team performance in three facets: (a) performance judged by relevant others external to the team; (b) meeting of team-member needs; and (c) viability, or the willingness of members to remain in the team.

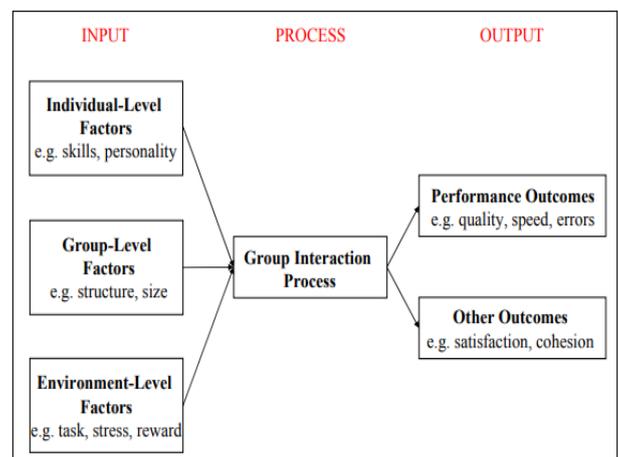


Figure 2. Input-process-output (I-P-O) model [31]

Although there is no one size fits all solution for building team performance, several authors have identified general characteristics that can help teams to become high-performing teams. These characteristics can, however, be grouped into three main categories of organisation structure, team process and individual contribution [27].

5.1 Team

Organisational structure characteristics refers to all aspects which are related to the forming coordination and control of the team. The most commonly described characteristics in this grouping will be clear purpose of the team [14][27][33] and clarity of roles and work assignment [27][29][33]. By having a good clarity on the purpose of the team formation, their individual roles and the work assignment, it encourages the team member to stay a step ahead as it answers the 'why' of the team formation. [34], who infamously quote "life is never made unbearable by circumstances, but only by lack of meaning and purpose. He who has a WHY to live, can bear with almost any HOW", clearly indicates the importance of purpose, where this paper suggests that the same principle can be applicable to a team environment.

Other characteristics in this grouping often quoted will be having the relevant members as part of the team formation [27][30]. There is, therefore, a definite need of getting the right people for the job, which may include technical skills as well as the relevant soft skills. Setting a performance-oriented task-based goal is also another characteristic of high-performing team [30]. [35] suggested that performance-based goals had no distinct impact on course performance. In contrast, task-based goals had large and robust positive effects on the

level of task completion, and task-based goals also increased course performance [35].

Recognition and rewards are also another important characteristic of high-performing team [26][30]. Relatively, a recent study concluded that 83 percent of satisfied employees in an organisation belongs to a company, which has a formal or informal recognition programme [36]. [37] further argued that there are few studies that test the impact of recognition on work performance and concluded based on the findings that there is a positive impact of recognition on work performance.

Other characteristics of high-performing team in the group of organisational structure will be common interest; goals and strategy [28]; adequate resource; appropriate culture; specific task; suitable leadership [27]; established performance standards; new information feed [30]; mix of complementary skill [14]; external relations; style diversity [33]; collaboration between leaders; contract model; former relation between team members; how difficult the goal to reach; involvement in goal setting process; team building [29]; clear goal; leadership; management support; mix of complementary skill and team diversity [26]. Table 2 shows the characteristics of high performing team as defined by various authors.

Table 2. Characteristics of organisational structure for high-performing team
[14][26][27][28][29][30][33]

Characteristics	[14]	[26]	[27]	[28]	[29]	[31]	[30]	[33]	Frequency
Clear purpose	✓		✓					✓	3
Clear roles and work assignment			✓		✓			✓	3
Recognition and reward		✓				✓	✓		2
Relevant members			✓			✓	✓		2
Set performance-oriented task-goal	✓					✓	✓		2
Adequate resource			✓						1
Appropriate culture			✓						1
Clear goal		✓							1
Collaboration between leaders					✓				1
Common interest, goals and strategy				✓					1
Contract model					✓				1
Established performance standard						✓	✓		1
External relations								✓	1
Former relation between team members					✓				1
How difficult the goal to reach					✓				1
Involvement in goal setting process					✓				1
Leadership		✓							1
Management support		✓							1
Mix of complementary skill	✓								1
New information feed						✓	✓		1
Specific task			✓						1
Style diversity								✓	1
Suitable leadership			✓						1
Team building					✓				1
Team diversity		✓							1

5.2 Team Process

Team process characteristics refers to all aspects which occur among team members while performing the team task. The most commonly described characteristics in this grouping will be team cohesion [26][27][28][29]. Cohesion can be defined as the tendency for a team to be in unity while working towards a goal or to satisfy the emotional needs of its members [38]. Highly cohesive teams are more dedicated to the goals and activities, are content when the team succeeds and feel part of something substantial, all of which increases self-esteem which in turn increases performance of the team [39]. As individuals feel they are part of something larger, there is a strong sense of cohesion or wholeness and may find a purpose bigger than their

individual goals. The relationship between cohesion and performance of the team can be bi-directional whereby cohesion can increase performance and vice versa [40].

Other important characteristics in this grouping will be communication among the team members [26][27][33]. It is obvious that a form of interaction must be present for teams to exist. However, there is a significant difference in communications in teams compared to any other communications. [41] distinguish team communication than other communication by emphasising on the purpose of the communication, where without purposeful communication a true team does not exist. A team member must clearly understand what his fellow team members are up to and he/she also holds the same responsibility to

pass on information clearly to other team members. This requirement of clarity further emphasises the importance of effective communication between team members, where agreed team behaviour is also another important characteristic of high-performing team [28][30]. Agreed team behaviour is having a code of conduct to guide the behaviour of the team members. Team members will agree to the professional standards and discourages the team members from behaving appropriately. Rules in daily life tend to help people to stay more focused on what the right course of action is for common situations, and a code of conduct accomplishes the same thing.

Performance feedback is also another important characteristic of high-performing team [27][30]. An assessment conducted by [42] suggests that 57 percent of members of an organisation preferred receiving corrective to positive feedback. When performance negative feedbacks are given properly, it is proven to be effective. The study concluded that, team members wants

performance feedback from their leader, and it is a key skill for team leaders to boost their team performance [42]. Another important characteristic for high-performing team in team process group will be shared leadership [28][33]. Shared leadership is termed as a leadership style which distributes leadership responsibility such that people within organisation lead each other [43]. [44] draw attention that shared leadership influences and direct fellow members to maximise team functioning and its effectiveness.

Other characteristics of high-performing team in the group of team process will be shared values [28]; conflict management; coordination; decision making; social relationship [27]; mutual accountability [14]; civilised disagreement; consensus decision; informality [33]; focus on team development [29]; initial impressions; spend time together [30]; cooperation; and learning activities [26]. Table 3 shows the list of characteristics of team process for high-performing team.

Table 3. Characteristics of team process for high-performing team [14][26][27][29][30][33]

Characteristics	[14]	[26]	[27]	[28]	[29]	[30]	[33]	Frequency
Cohesion		✓	✓	✓	✓			4
Communication		✓	✓				✓	3
Agreed behaviour				✓		✓		2
Performance feedback			✓			✓		2
Shared leadership				✓			✓	2
Civilised disagreement							✓	1
Conflict management			✓					1
Consensus decision							✓	1
Cooperation		✓						1
Coordination			✓					1
Decision making			✓					1
Focus on team development					✓			1
Informality							✓	1
Initial impressions						✓		1
Learning activities		✓						1
Mutual accountability	✓							1
Shared values				✓				1
Social relationship			✓					1
Spend time together						✓		1

5.3 Individual Contribution

Individual contribution characteristics refers to all aspects of a single team member's input to the work process. The most commonly described characteristics in this grouping will be commitment [14][26][27][29] and trust between team members [27][29][33]. Commitment is defined as an awareness, an attitude, a clear and feelingful recognition of being fully present in the moment, making the choice of the moment, and standing by the consequences of these choice whether anticipated or not [45]. Thus, the term team commitment is used as an equivalent to team engagement.

An engaged team member has a positive attitude towards the team, organisation and its values. [46] identifies the three dimensions of team commitment as: (1) affective commitment, which refers to an employee's emotional attachment to, identification with, and involvement in, the team: (2) continuance commitment, which indicates commitment based on the costs that an employee associates with leaving the team: and (3) normative commitment, which refers to an employee's feelings of obligation to remain with the team. [49] provided in-depth analysis of the relationship between team commitment and three criteria of team effectiveness: team performance, quality of team experience and team viability, and found that team member commitment has a positive effect to all three criteria of team

effectiveness. This echoes the finding by [48] that team members with the highest level of commitment perform 20 percent better.

Trust between team members is also another important characteristic of high-performing team [27][29][33]. When team members know they can depend on each other and understand that all contributions are valued, it creates an environment in which morale increases. When there is trust in a team, team members step forward and perform their best work and take risk, think of the box, have each other's back and communicate openly and honestly [49]. Trust enables team members to share their knowledge and skills without fear of being diminished or exploited [27]. Equally, when there is lack of trust on the team, feelings of vulnerability and uncertainty gets higher which certainly effects the individual performance. In a meta-analysis of trust and team performance, [50] confirmed there is a positive relationship between how much team members trust one another and the achievement of team goals.

Other characteristics of high-performing team in the group of individual contribution will be continual improvement; individual responsibilities [28]; flexibility; self-knowledge [27]; listening; participation; self-assessment [33]; elite feeling [29] and effort [26]. Table 4 lists all the characteristics of individual commitment for high-performing team.

Table 4. Characteristics of individual commitment for high-performing team
[14][26][27][28][29][33]

Characteristics	[14]	[26]	[27]	[28]	[29]	[30]	[33]	Frequency
Commitment	✓	✓	✓		✓			4
Trust between Team Members			✓		✓		✓	3
Continual Improvement				✓				1
Effort		✓						1
Elite Feeling					✓			1
Flexibility			✓					1
Individual Responsibilities				✓				1
Listening							✓	1
Participation							✓	1
Self-Assessment							✓	1
Self-Knowledge			✓					1

5.4 Kikeh Construction Project Team Characteristics

As mentioned previously, Kikeh Truss Spar project is one of the very significant projects for Malaysian oil and gas construction fraternity in terms of size and technology, thus it is worth discussed in reviewing the characteristics of high performing team for a selective oil and gas construction project in Malaysia.

Kikeh field is located 110 kilometres offshore Sabah with a water depth of 1341 metre. It is the first deepwater production and first Spar constructed in Malaysia [51][52]. Kikeh Spar is also the first unit installed outside the Gulf of Mexico. Murphy Sabah Oil Company awarded Technip with the full engineering, procurement, construction, installation, and commissioning (EPIC) contract and MMHE were responsible to construct it [51][52]. In 2007, MMHE made history by successful completion of Malaysia's first deepwater facility construction, which was also the biggest deepwater facilities ever built in Malaysia at that time, making an important milestone in Malaysia's oil and gas

construction history [51][52]. In terms of technology advancement, this project has also achieved the many achievements delivering world class completion performance [51][52], such as discovery to first oil in only five years, the first topsides float over onto a Spar, the first turret-moored floating production storage and offloading (FPSO) in conjunction with a Spar, the first to use a tender assisted drilling rig on a Spar and also the first mid-water high pressure flowline.

Since Kikeh is the first major deepwater project in Malaysia that achieved world class completion performance, [51][52] have highlighted some successful project practices from the Kikeh Construction Project team, which involves team integration practices. Six characteristics were highlighted: smaller team, experienced team members, leveraging of key positions, participation, decision making and focus on team development [51]. From the six, three characteristics are smaller team, experienced team members and leveraging key position were not listed in the previous section. All three characteristics can be grouped as

organisational structure as it involved management of team.

As part of the overall execution strategy and Murphy Oil organisation principle, it was decided early in the project to utilise a small but experienced team to manage the Kikeh project. The recruitment for this small team focused on highly experienced individuals with multi-discipline background and good understanding of deep-water projects [51]. Having a smaller team, priorities were established to focus the team's development on the area's most critical to the success of the project only. Murphy Oil also leverage the team providing authority to key positions avoiding unnecessary approval processes [51].

6 CONCLUSION

This paper provided an overview of team integration and how it is applicable for Malaysian oil and gas construction projects. Based on the review of concepts of team integration, team integration is defined as merging of team members from different disciplines to hold unified responsibility to satisfy internal and external customer's expectation. This paper also found 55 characteristics of high performing team, which are grouped into three major group of organisational structure, team processes and individual contribution. Arguably, there is no silver bullet to bring together the whole team together to effective work together. In order to understand the process of integration, further research on the effective team integration practices is suggested. Further studies on this topic can identify the best practices of integrations which encourages the team to perform at optimum. The finding of this paper is expected to contribute to the development of the team integration

framework for Malaysian oil and gas construction projects.

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