CRITICAL SUCCESS FACTORS FOR SUCCESSFUL LIBYAN OIL AND GAS PROJECTS

Abdulbaset A. Frefer*, Mahmoud M. Matoug** and Haleema H. Omer***

Abstract: Libyan oil and gas companies (LOGCs) are facing many kinds of risks and challenges, which make execution of projects increasingly complex. Identification of critical success factors (CSFs) are vital to Libyan oil and gas projects success, as it allows companies to focus their efforts on these factors to ensure success. The main objective of this research is to identify the success factors, which are important for Libyan oil and gas projects success. From the literature review, thirty factors were found to be critical. To seek the opinion of clients, consultants and contractors in the Libyan oil and gas sector on the critical success factors, a questionnaire survey was conducted. The top ten critical success factors were selected based on their individual relative importance index. In addition to that, five semi-structured interviews were conducted with local experts in oil and gas projects in order to add other CSFs. These experts added ten more CSFs, so the total CSF's developed and identified was twenty-one factors. These critical success factors were classified into five groups of factors, which are critical inputs to achieve oil and gas projects success in Libya.

Keywords: Critical Success Factors (CSFs), Libyan Oil and Gas Companies (LOGCs), oil and gas projects, project success.

INTRODUCTION

The oil and gas sector is one of the largest and most important driving force behind many other sectors (Tsiga et al, 2017). The International Energy Agency (IEA, 2007) reported that the world's primary energy needs are expected to grow by 55% between 2005 and 2030 at an average rate of 1.8% per year, with the demand reaching 17.7 billion tons of oil equivalent. The challenges that oil and gas projects will continue to face, fall in the following categories: namely; Technical; Managerial; and Human resources (Badiru and Osisanya, 2013) .

Identification of critical success factors of project management can help mitigating these challenges and contributing to the success of projects. Oil and gas projects are investment projects undertaken by investors or state-owned oil companies or international oil companies with the purpose of making profits (Omer, 2017). Oil and gas projects are executed at different stages of the oil and gas industry value chain, which is broadly divided into upstream, midstream and downstream (Shuen, 2014).

This research focuses on Libyan oil and gas sector, which is considered the most important sector in the country. Libya is located in North Africa, it has the largest amount of proved crude oil reserves and the fifth-largest amount of proved natural gas reserves in Africa (USIA, 2015). Libya is a member of the Organization of the Petroleum Exporting Countries (OPEC) since 1962. National Oil Corporation (NOC) of Libya oversees the operation of the oil and gas sector, which includes implementing Exploration and Production Sharing Agreements (EPSA) and Development and Production Sharing Agreement (DPSA) with International Oil Companies (Omer, 2017).

There are many international oil companies in Libya, such as Total, Eni, Wintershall and Repsol. Tsiga et al (2017) stated that the international oil companies invest heavily in exploration and development. According to the International Monetary Fund (USIA, 2015), the Libyan oil and gas sector was responsible for 96% of the government revenue and 98% of total foreign exchange earnings in 2012. Roughly 79% of Libya's export revenue came from crude oil exports. Therefore; project

*Mechanical and Industrial Engineering Department, University of Tripoli, Tripoli, Libya; Email:drfrefer@hotmail.com
**Mechanical and Industrial Engineering Department, University of Tripoli, Tripoli, Libya; Email: mmmatoug54@ymail.com
***QA/QC Engineer/ Projects & Engineering Department, Mabruk Oil Operations, Tripoli, Libya; Email: haleema.omer@mabruk-oil.com

failure in the oil and gas project will not only affect the oil and gas companies, but the economy of the country as a whole. This highlights the need for the identification of critical success factors for oil and gas projects in Libya. Identification of critical success factors will assist the Libyan oil and gas companies in performing their projects successfully and will help them remain competitive in the international market.

The main purpose of each project is to be successful. In order to increase the chances of project success (Baccarini, 2009), it is necessary for oil and gas companies to have an understanding of what are the critical success factors, to systematically and quantitatively assess them, anticipating possible effects, and then choose appropriate methods of dealing with them.

LITERATURE REVIEW

Project Success

Project success is the most researched and discussed topic in project management area as was reported in the literature. According to Silva et al (2016), project success is an abstract concept; and to determine whether a project is successful and subjective is extremely complex. These researchers stressed that the lack of an agreed definition for project success has long been the reason for failing to define and evaluate success. Silva et al (2016), also noted that there is no such thing as an absolute success in a project and there is only perceived success. (Al-Ageeli and Alzobaee, 2016) stated that measuring the project success is a complex task since the success is intangible and hardly be agreed upon.

The role of different project management techniques to implement projects successfully has been widely established in areas, such as planning and control of time, cost, and quality (Munns and Bjeirmi, 1996). Pinto and Slevin (1988) see a project success as a complex and often-illusory construct, but nonetheless, it is of crucial importance to effective project implementation. Critical

Success Factors in Project Management

The project management is important for every project. According to PMI (Pmbokr, 2018), project management is defined as "the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project." The appropriate application of project management will help the oil and gas companies to execute projects effectively and efficiently.

According to (Iram et al, 2016), researches conducted on project success and critical success factors are important methods through which the effectiveness and efficiency of the projects is further improved. Alias et al (2014) pointed out that the study of project success and critical success factors (CSFs) is often considered as one of the important ways to improve the effectiveness of project delivery. (Iram et al, 2016) stated that effective and efficient management of critical success factors is the basic requirement of project success. They noted that for the achievement of organizational goals, it is necessary for a manager to consider the critical success factors in his/her decision.

The field of project management has directed a significant part of their research efforts to identifying the critical success factors of projects. Despite project success being a dominant theme in the project management literature, there is still few consensuses on the factors that can lead to project success (Müller and Jugdev, 2012). The concept of "success factors" was first coined in 1961 by D. Ronald Daniel of McKinsey & Company (Daniel, 1961), it was refined into critical success factors in 1981 by John F. Rockart (Rockart & Treacy, 1981), and since then many researchers have published lists of critical success factors (Srimathi et al, 2017).

Rockart (1979) defined critical success factors as "the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organization." Dvir et al (1998) defined critical success factors as "the main variables that contribute to projects' success." Amade et al (2015) stated that critical success factors are the few key variables or factors that the manager should prioritize, in order to achieve his/her goals for current or future areas of activity. Kerzner (1987) defined critical success factors as "the elements which must exist within the organization in order to create an environment, where projects may be managed with excellence on a consistent basis. According to Alias et al (2014), critical success factors are inputs to project management practice that can lead directly or indirectly to project success. Success factors contribute to the success or failure of a project, but do not form the basis for judgment.

Developing and identifying the success factors have dominated the field of project management from 1980s to 2000s. Many researchers have tried

to certain extent to identify success factors for project management. The first major contribution of Slevin and Pinto (1986) was the development of a project management tool; named, the project implementation profile (PIP) and identification of ten critical success factors (Slevin and Pinto, 1986). In the same period, Kerzner (1987) in his study identified six critical success factors for successful projects.

In the years that follow, studies have continued to generate new insights and lists with critical success factors (CSFs). Most of these studies were carried out at project level and were aimed at identifying critical success factors applicable to all projects. According to Els et al (2012) in a study they conducted on defining critical success factors based on the literature review, they suggested fifteen factors. In the study by Belassi and Tukel (1996) on critical success factors, they grouped these factors into four areas: factors related to the project; project manager and the team members; the organization and the external environment. A study by Fiberesima and Abdul Rani (2011) on critical success factors in oil and gas project portfolio in Nigeria, they showed in their findings that, thirteen critical success factors are of high importance within the deepwater oil and gas project portfolio management. Hajiagha et al (2016) in their study of critical success factors in oil and gas petrochemical projects, they identified five critical success factors.

Significant efforts were also directed towards comparing the multitude of factors with the purpose of arriving at a definitive list. A comprehensive study was conducted by Fortune and White (2006), who reviewed sixty-three publications on critical success factors (CSFs). Although many researchers have proposed various critical success factors, there is no general agreement. Table 1, shows summary of critical success factors (CSFs) from the seven literature reviews discussed in this research paper.

RESEARCH METHODOLOGY

The potential critical success factors that can be used to increase the chances of a project success were identified from literature review. These CSFs formed the basis for the questionnaire, which was used to seek the opinion of project practitioners; representing clients, consultant and contractors in the Libyan oil and gas sector on the degree of importance of the critical success factors. Through data collection and analysis, the relative importance of the critical success factors was identified using the Relative Importance Index (RII).

Critical Success Factors and Questionnaire Design

A set of 30 critical success factors were initially obtained from the literature reviews of previous studies. These factors formed the basis of the questionnaire survey. The questionnaire consists of two sections. The first section elicits information on the respondents' background, while the second section consists of questions related to the critical success factors. In order to test the clarity and comprehensiveness of the questionnaire, a pilot survey was conducted in Libya with twenty oil and gas professionals, including clients, consultants and contractors. To insure the validity of the questionnaire, it was discussed with experienced oil and gas project practitioners in the Libyan oil and gas sector, whose opinions were duly incorporated. Internal consistency of the data reliability analysis was achieved by employing Cronbach's Alpha coefficient and analysis of the data was done using Statistical Package for the Social Sciences (SPSS). Cronbach's Alpha reliability coefficient ranges from 0 to1. The closer the coefficient value to 1, the greater is the internal consistency of the data (Tsiga et al, 2017; Cronback, 1951). Cronbach's Alpha coefficient for each field of the questionnaire is 0.949, this is considered high, and the result is ensuring the reliability of each field of the questionnaire. Thereby, it can be said that it is proved that the questionnaire is valid, reliable, and ready for distribution.

The questionnaire survey was carried out in Libya in the beginning of 2017. One hundred and twenty (120) questionnaires were administered to experience project practitioners; including clients, consultants, and contractor. These experienced practitioners are working in oil and gas companies that were recommended by National Oil Corporation (NOC), as part of the most important companies, which have great experience in oil and gas projects in Libya. The respondents were requested to indicate their views on the importance of each of the critical success factors. They were asked to use five-point Likert Scale ranging from 1 to 5, where 1-represents strongly agree, 2-agree, 3-not sure, 4-disagree and 5- strongly disagree. Out of the 120 distributed by hand, eighty-eight (88) were received back. Therefore, the response rate was 73.33%.

Table 1. Summary of critical CSFs from the seven literature reviews.

Critical Success Factors \ Source	Slevin et al.	Kerzner	Hauptfleisch et al.	Belassi et al.	Fiberesima et al.	Hajiagha et al.	Fortune et al.
Support from senior management	√			√			√
Clear realistic objectives							√
Strong detailed plan kept up to date							√
Good communication and feedback	√		√		√		√
User and client involvement							√
Stakeholder management			√				
Skilled, suitably qualified team				√			√
Effective change management							√
Competent project manager				√			√
Strong business case and sound basis for project							√
Sufficient and well allocated resources					√		√
Good leadership		√	√				√
Proven and familiar technology							√
Realistic schedule					√		√
Risks addressed, assessed and managed			√				√
Project sponsor and champion				√			√
Effective monitoring and control	√	√	√				√
Adequate budget							√
Organizational adaptation, culture and structure			√	√			√
Good performance by suppliers, contractors and consultants							√
Planned close down, review and acceptance of possible failure							√
Training provision							√
Political stability in the country				√			√
Correct choice of project management methodology and tools							√
Environmental influences							√
Past experience			√				√
Project size, level of complexity and duration				√			√
Appreciating different viewpoints							√
Contractor's capability to manage the project					√		
Innovation			√				

Data Analyzes Tools

The data collected were analyzed with the aid of SPSS. Descriptive statistics were used to analyze the respondents' profiles using SPSS, whereas, Relative Importance Index (RII) used to rank the critical success factors as well. The RII for each critical success factor is calculated using the formula (1) below (Tsiga et al, 2017):

$$RII = \frac{\sum X}{Y*Z} \ (0 \leq RII \leq 1) \quad (1)$$

Where X; is the weight given to a factor by a respondent, in the range of 1 to 5. Y; is the highest score available (5 in this case) and Z; is the total number of respondents that have answered the question.

RESULTS AND DISCUSSION

The results of this research indicate that 48.86% of the respondents come from client companies, 27.27% from contractor companies and 23.86% from consultant companies. The respondents are experienced, with 56.97% having project management experience of 11 years or more. The respondents are very well educated, the highest academic qualifications of the respondents ranging from Higher National Diploma (HND) to Doctor of Philosophy (PhD). About 53.4% having Bachelor of Science (BSc) and 39.7% possess Master of Science (MSc) as their highest academic qualifications. This suggests that they understood the questionnaire, its subject matter, and its intended purpose, so, they were more objective and truthful in their responses. Therefore, and based on their project practitioners background, academic qualifications and experience, the respondents were able of providing reliable information. Table 2, presents summary of the respondents' profile.

Relative Importance Index (RII)

The main purpose of this step is to identify the appropriate critical success factors that can be used to increase the chances of oil and gas project success in Libya. From the perspective of the clients, consultants and contractors, all thirty critical success factors identified in the literature reviews were significant in the Libyan oil and gas sector, as all had RII scores above 0.7. However, the different categories of respondents seem to have different views about the most important CSFs as shown in Table 3.

Table 3, clearly illustrates that most of the respondent ranked good leadership first with (RII = 0.9535), followed by support from senior management with (RII = 0.9326); good communication and feedback was ranked the third with (RII = 0.9256), and skilled, suitably qualified team and political stability in the country, which ranked the fourth with (RII =0.9233), the fifth factor was strong detailed plan kept up to date with (RII = 0.9116). The effective monitoring and control was ranked the sixth with (RII= 0.9093); competent project manager and contractor's capability to manage the project was ranked the seventh and the eighth with (RII = 0.9070) and (RII = 0.8930), respectively. Risks addressed, assessed, managed, which was ranked as ninth with (RII = 0.8837) was followed by realistic schedule with (RII = 0.8791). Fig. 1, clearly show the ten most important critical success factors in the Libyan oil and gas projects.

In contrast with the literature review, good leadership was identified as an important critical success factor by Kerzner (1987) and Fortune and White (2006), the fact that good leadership is a tool for project managers to help achieve success. Dulewicz and Higgs (2005) emphasized that project managers who have an understanding of leadership are more likely to lead the project to success. As well as, support from senior management also identified as an important critical success factor as was suggested by Slevin and Pinto, 1986; Belassi and Tukel (1996) and Fortune and White (2006). Young and Jordan (2008) stated that the top management should make enough time to be aware of the project status and to intercede as necessary, and the time spent should be in proportion to the cost and potential of the project.

Good communication and feedback and skilled was identified as an important critical success factor by Slevin and Pinto (1986) and Fortune and White (2006). Political stability in the country was identified as an important critical success factor, and has the highest rank by respondents, this is likely due to the current political situation in Libya. Libya has been going through civil unrest that started in 2011, which caused damage to many of its oil and gas facilities and curtailed crude oil and production significantly. Elhoush and Kulatunga (2017) pointed out that due to the current risky and unsecured situation in Libya, risk management in the oil and gas sector should be prioritized.

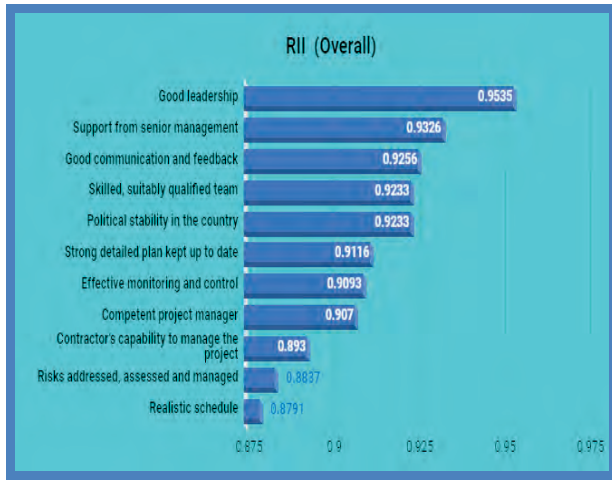


Fig. 1. The overall of most important CSF in oil and gas projects in Libya.

Table 2. Summary of respondents' profile.

Critical Success Factors	RII Client	Rank	RII Consultant	Rank	RII Contractor	Rank	Overall RII	Overall Rank
Good leadership	0.9581	1	0.9429	2	0.9182	2	0.9535	1
Support from senior management	0.9209	3	0.8857	6	0.8727	6	0.9326	2
Good communication and feedback	0.9209	3	0.9524	1	0.9000	4	0.9256	3
Skilled, suitably qualified team	0.9116	4	0.9429	2	0.9273	1	0.9233	4
Political stability in the country	0.9256	2	0.9333	3	0.9091	3	0.9233	4
Strong detailed plan kept up to date	0.8930	6	0.9143	4	0.9091	3	0.9116	5
Effective monitoring and control	0.8884	7	0.9143	4	0.8455	8	0.9093	6
Competent project manager	0.9209	3	0.9429	2	0.8818	5	0.9070	7
Contractor's capability to manage the project	0.9116	4	0.8762	7	0.8727	6	0.8930	8
Risks addressed, assessed and managed	0.8744	9	0.9333	3	0.8091	10	0.8837	9
Realistic schedule	0.8419	13	0.8667	8	0.8818	5	0.8791	10
Clear realistic objectives	0.9070	5	0.8857	6	0.8091	10	0.8767	11
Good performance by suppliers, contractors and consultants	0.8791	8	0.8667	8	0.8727	6	0.8744	12
Adequate budget	0.8791	8	0.9048	5	0.8091	10	0.8674	13
Sufficient and well allocated resources	0.8698	10	0.9048	5	0.8636	7	0.8651	14
Strong business case and sound basis for project	0.8930	6	0.8476	9	0.7818	11	0.8535	15
Correct choice of project management methodology and tools	0.8605	11	0.8286	11	0.8455	8	0.8465	16
Past experience	0.8233	14	0.8667	8	0.8182	9	0.8465	16
Proven and familiar technology	0.8233	14	0.8381	10	0.8727	6	0.8395	17
Training provision	0.7814	16	0.8286	11	0.8182	9	0.8023	18
Project size, level of complexity and duration	0.7674	18	0.8000	13	0.8455	8	0.7953	19
Environmental influences	0.7767	17	0.8381	10	0.7727	12	0.7907	20
Effective change management	0.7767	17	0.8286	11	0.7727	12	0.7860	21
Organizational adaptation, culture and structure	0.7860	15	0.7905	14	0.7364	14	0.7791	22
Stakeholder management	0.7674	18	0.7714	15	0.7091	15	0.7767	23
Planned close down, review and acceptance of possible failure	0.7674	18	0.8095	12	0.7545	13	0.7744	24
Innovation	0.7442	20	0.8286	11	0.7727	12	0.7721	25
Appreciating different viewpoints	0.7535	19	0.7905	14	0.7545	13	0.7628	26
Project sponsor and champion	0.7442	20	0.7714	15	0.7091	15	0.7419	27
User and client involvement	0.8465	12	0.8667	8	0.7818	11	0.7302	28

Table 3. Relative importance index (RII) of 30 factors.

Companies	%
Client	48.86
Consultant	23.86
Contractor	27.27

Qualification	%
HND	4.55
BSC	53.41
MSC	39.77
PHD	2.27
Other	0

Experience (years)	%
1-5	13.95
6-10	29.07
11-15	16.28
16-20	13.95
Above 20	26.74

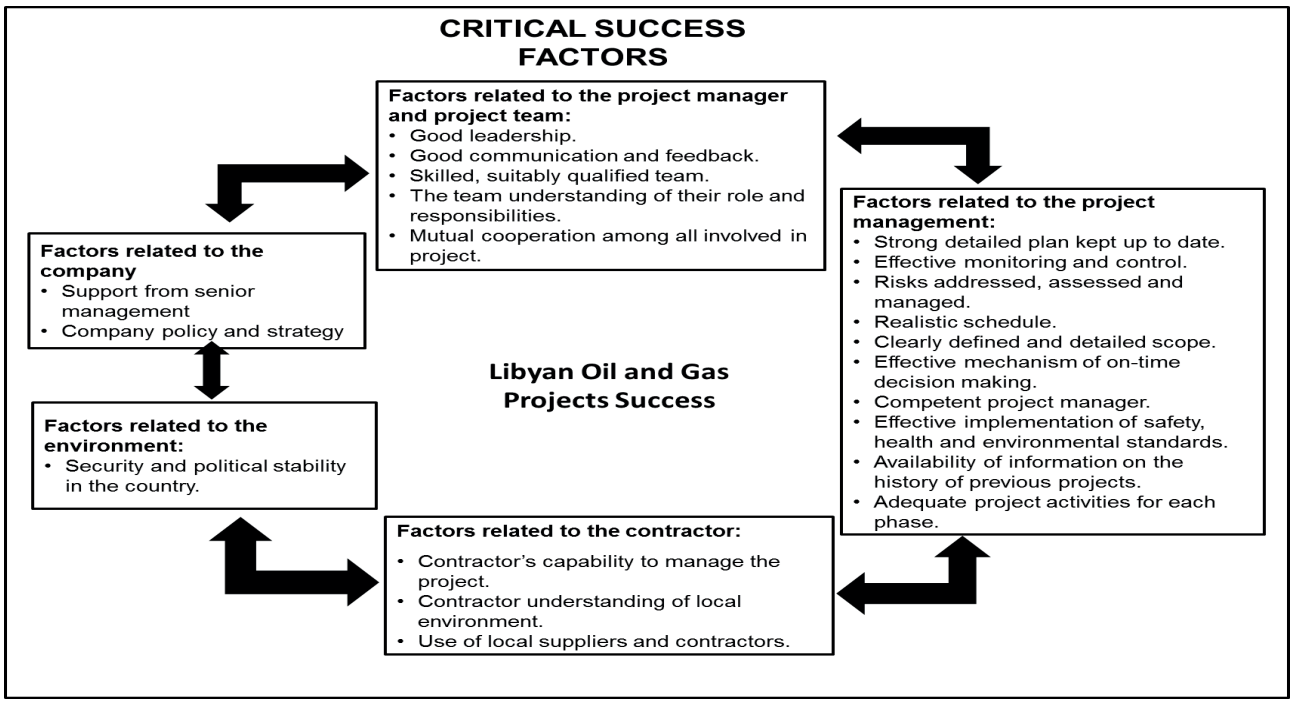


Fig. 2. The critical success factors to deliver oil and gas projects success in Libya.

Interviews

Following the analysis of the questionnaire survey results, interviews were conducted with experts in the Libyan oil and gas projects to validate the results of this research and to add any uncounted for critical success factors in the initial questionnaire survey. Semi-structured interviews were conducted based on the results of the initial survey. Eight interviews invitations were distributed by hand, out of the eight distributed, five were participated. Interviewees were selected carefully to ensure that they were experienced and professionals in their respective fields with a minimum of fifteen (15) years' experience.

Interviewees agreed with the outcome of the analysis of this research that the top ten CSFs identified for Libyan oil and gas projects and they added eleven more of CSFs: namely;

- Clearly defined and detailed scope;
- Effective implementation of safety, health and environmental standards;
- Cooperation among all involved in project;
- The team understanding of their role and responsibilities;
- Contractor understanding of local environment;
- Use of local suppliers and contractors;
- Effective mechanism of on-time decision making;
- Company policy and strategy;
- Availability of information on the history of previous projects;
- Adequate project activities for each phase, and
- Security and political stability in the country.

In fact, two interviewees commented that "security and political stability in the country" is more suitable as CSF than "political stability in the country". The results from the questionnaire survey and interviews were divided into five groups of critical success factors: namely;

1. Factors related to the company;
2. Factors related to the project management;
3. Factors related to the project manager and project team;
4. Factors related to the contractor and
5. Factors related to the environment.

These factors are critical inputs to achieve project success. Fig. 2 demonstrates the critical success factors identified in this research to deliver oil and gas projects successfully in Libya.

CONCLUSIONS

Oil and gas companies in Libya can use critical success factors to improve their project performance management, since complexities

of project management present some challenges for the success of projects in these companies. Identifying critical success factors are very important for effective project management, as well as the improvement in the critical success factors will give better results in project management success in oil and gas projects. Results indicate that the twenty-one CSFs were identified as critical success factors in Libyan oil and gas projects. These critical success factors have been grouped into five groups of critical success factors as was stated earlier, factors related to the company, factors related to the project management, factors related to the project manager and project team, factors related to the contractor, and factors related to the environment.

The most important CSFs are related to project management, project manager and project team, so oil and gas companies should have sustainable training programs in the specialist knowledge of project management and in training of soft skills. It is important to understand and implement these factors for oil and gas project management success in Libya.

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