

# INVESTIGATION INTO THE CURRENT PROJECT RISK MANAGEMENT PRACTICES WITHIN THE LIBYAN OIL AND GAS INDUSTRY

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## ABSTRACT

*The continued increase in the world's population means increasing global energy demands. According to the best estimates available, hydrocarbons will be the main contributor to meet these energy needs. However, oil and gas projects pose significant risks. The literature shows that many projects in the industry fail as a result of improper risk management practices. This research paper focuses on Libya, an important player in fulfilling the world's energy demands, where the oil and gas industry is crucial to the national economy. Given the conditions existing in Libya, appropriate project risk management for the oil and gas industry needs is important. The aim of this paper is to investigate the current project risk management practices in the oil and gas industry in Libya. Thirteen semi-structured interviews with top managers, project engineers and advisors were undertaken to achieve this aim. The results show that awareness of the concept of project risk management is still very low in Libya and there is a lack of project management culture and risk management in particular. The paper also demonstrates that although these practices are already being applied to some extent, this relies on the prior knowledge and experience of specific individuals, rather than on a systematic, documented procedure. The lack of financial resources and the shortage of experienced and qualified personnel due to the country's current situation and as well as a lack of clear organisational vision within the oil and gas industry in Libya, all limit the implementation of effective project risk management.*

**Keywords:** Libya; NOC; Oil and Gas; Project Management; Project Risk Management.

## 1. INTRODUCTION

The oil and gas sector has been identified as one of the most influential economic sectors due to its significant impact on every aspect of all other businesses (Akinremi *et al.*, 2015, Badiru and Osisanya, 2013). The oil and gas industry is one of the most important in the world because its influence does not only structure the economic development of a country, but also affects the development and nature of other sectors (Ajah, 2014). Furthermore, Dayanandan and Donker (2011) have argued that oil is a major resource that has been in great demand, and its effects on national and international financial markets cannot be overlooked. In addition, the largest companies in the world are directly related to the oil and gas industry (Dayanandan and Donker, 2011). According to British Petroleum (BP) (BP, 2016), the need for energy will continue to increase as the world's population increases; they predict that it will increase by approximately 1.5 billion, to reach a total population of 8.8 billion by the year 2035. Hydrocarbons will continue to be the main source of energy (responsible for nearly 80% of total energy sources) in 2035 fuelling the world economy, with the Middle East and North Africa (MENA) region being the main supplier (BP, 2016, IEA, 2015).

The continued need to ensure that projects across the oil and gas sector are managed properly and efficiently has led to increased pressure in both industry and academia to develop reliable project management strategies to reduce project failure; project risk management has been identified as a key factor to ensure project failure is minimised (Al Subaih, 2015, Rabechini and de Carvalho, 2013, Rogers and Ethridge, 2013, Salazar-Aramayo *et al.*, 2013, De Carvalho and Rabechini, 2015, PMI, 2013, Zwikael and Ahn, 2011).

Studying project risk management in the oil and gas sector is vital because the industry is risky. It involves a large number of stakeholders, is technologically difficult, is fitted to tight budgets and schedules and

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incorporates a large amount of uncertainty as a result of incomplete information, particularly during the exploration stages (Briel *et al.*, 2013, EY, 2015, EY, 2014, Deloitte, 2015).

Within the context of Libya, the oil and gas sector contributes significantly to the Libyan economy; indeed, approximately 96% of the government revenue comes from oil and natural gas (EIA, 2015). Libya has the largest established proven crude oil reserve in Africa (9<sup>th</sup> worldwide) and the fifth-largest natural gas reserve in the continent (see Figures 1 and 2); it has been a member of the Organization of Petroleum Exporting Countries (OPEC) since 1962 (EIA, 2015). Exploration for oil in Libya started in 1955; the petroleum law No. 25 was enacted in April of the same year. The first oil fields were discovered in 1959 at Nasser, and Libya began oil exports in 1961 (Inkpen and Moffett, 2011, EIA, 2015).

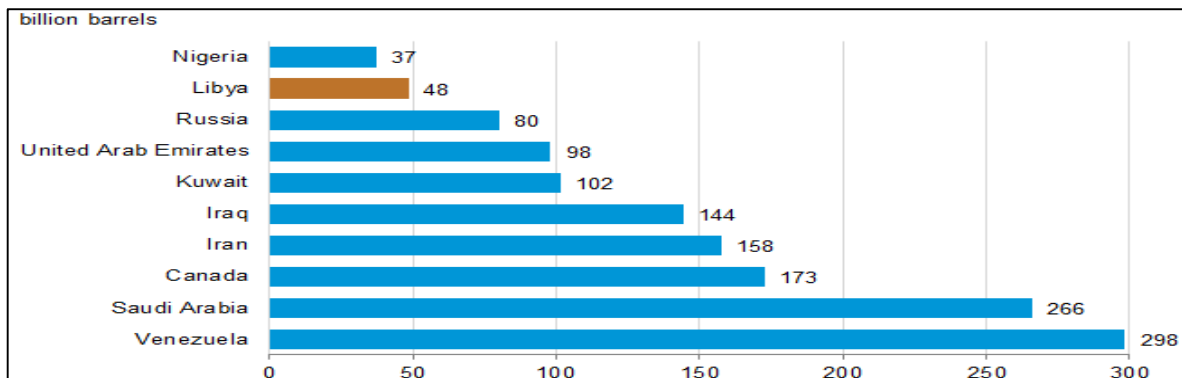


Figure 1: The World's Top 10 Holders of Proved Crude Oil Reserves (EIA, 2015)

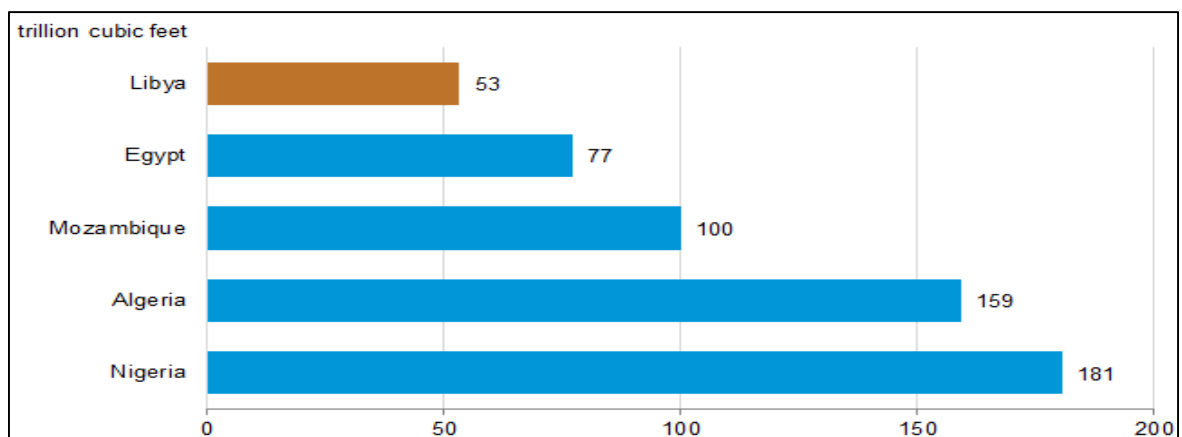


Figure 2: Top 5 Holders of Proven Natural Gas Reserves in Africa (EIA, 2015)

Apart from being the largest oil producer in Africa, Libya is also among Europe's largest North African oil suppliers. Libya has vast oil reserves that allow it to produce oil for domestic and export purposes (Miyoshi, 1999). Libya's economy is built on oil, and exports contribute greatly to the nation's overall revenues (Ottman and Karlberg, 2007).

Therefore, the oil and gas industry plays a very important role in Libya, as this not only makes it the leading oil country in Africa, but also helps to boost its economy. Oil and gas as a natural resource has helped Libya to maintain its autonomy despite the blows caused by the sanctions imposed upon the country (Brown, 2014).

Accordingly, this research paper investigates the current project risk management practices in the oil and gas industry in Libya. The structure of this paper is as follows:

- Literature review on the topic of project risk management with particular reference to the oil and gas industry
- Methodological considerations and data analysis
- Findings and discussion
- Conclusions

## 2. LITERATURE REVIEW

### 2.1. PROJECT RISK MANAGEMENT

Risk management is becoming widely implemented in various industries and societies. It is now generally accepted that risk cannot be eliminated, but rather can be managed. Risk management provides a framework to gain a balance between avoiding accidents and catastrophes and providing opportunities (Aven *et al.*, 2007). According to Besner and Hobbs (2012), project risk management is defined as an organised practice to manage project risks effectively.

Hence, the main goals of risk management are to guarantee the rapid identification of risks and to establish a clear process of assessment, action planning and later reporting of the identified risks. As well, it is vital to stress the identification of opportunities that will certainly have an effect on the decision-making process (Burtonshaw-Gunn, 2009).

Project risk management is a valuable element of project management, as it augments the effectiveness of the other project management processes; it offers support when employed alongside other good practices (Besner and Hobbs, 2012, Benta *et al.*, 2011, PMI, 2013). Currently, project risk management aims to recognise project challenges in multicultural environments, particularly those associated with increasingly global and complex contexts (Thamhain, 2013).

Figure 3 depicts the project risk management processes, as summarised by the Project Management Institute (PMI, 2013). These practices include the five formal project risk management processes: a) Project risk planning, b) Project risk identification, c) Project risk analysis (quantitative and qualitative), d) Project risk response, and e) Project risk control.

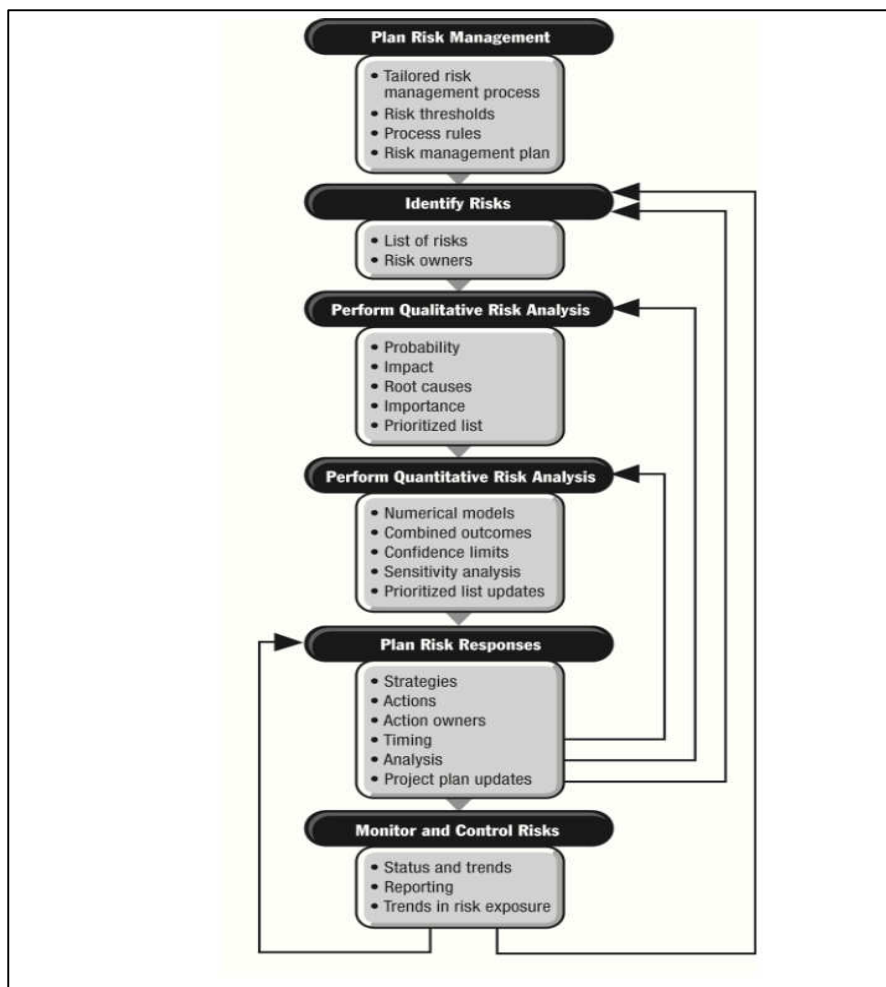


Figure 3: Project Risk Management Process Flow Diagram (PMI, 2009)

## **2.2. PROJECT RISK MANAGEMENT IN THE OIL AND GAS INDUSTRY**

A number of sources have pointed out the importance of risk management and the continuous need for research and improvement on this topic in the oil and gas industry. For example, Cagianelli *et al.* (2015) introduced an Integrated Risk Management (IRM) model, stressing the importance of early project phases through planning and sufficient resource allocation as key success factors for oil and gas projects. Akinremi *et al.* (2015) emphasise the requirement for more sophisticated risk management models; they further developed a three-dimensional approach to sustainable projects (including investment, social and environment risks). They argue that this model is particularly relevant because many oil companies only focus on investment risks while ignoring the two other dimensions. Aven *et al.* (2007) have proposed a decision framework for risk management for offshore oil and gas projects; the framework consists of elements related to the decision-maker's vision, values and strategies, problem definitions and challenges, related stakeholder values, visions and long-term goals and the analyses of the consequences of each decision taken. Although the framework was developed for offshore oil and gas projects, the authors believe it is relevant to other domains.

Other scholars such as Kenzhetayeva *et al.* (2014) proposed a Risk Management Road Map (RMR). Their approach is based on past projects, especially in terms of the knowledge gained, so that traditional risk management practices are enhanced, especially in relation to the assessment and classification of different project risks. Avena and Pitblado (1998) discussed the tools relevant to safety management on the Norwegian and UK continental shelves. Their argument concentrated on the practices of risk analysis, risk communication and risk interpretation.

In the context of the MENA, particularly within the Gulf Cooperation Council, a recent study was done by Muralidhar (2010). The aim of this study was to investigate the practice of Enterprise Risk Management (ERM) among oil and gas companies. Muralidhar (2010) stressed that such a model is needed in the industry and concluded by recommending additional research on this newly recognized topic.

In the case of Saudi Arabia, the oil and gas sector is fully controlled by Saudi Aramco, a fully state-owned company. The company recognises the importance of project risk management as a key integrated element with the company's overall strategy. The firm has recently established what they called 'Saudi Aramco Enterprise Risk Management', to guarantee that risk management processes are coordinated with the company's decision-making and planning processes (Aramco, 2013).

From the above discussion, it can be argued that project risk management is an important aspect of project management, ensuring the iterative identification and treatment of project risks (threats and opportunities), which could help in achieving a positive project outcome.

Having discussed the significance of project risk management and the importance of the oil and gas industry to the Libyan economy, the following sections will focus on the research methodology adopted for this study, followed by the discussion of its findings.

## **3. METHODOLOGICAL CONSIDERATIONS AND DATA ANALYSIS**

This research project follows a single case study. Yin (2013) states that a case study is a relevant strategy when the researcher aims to obtain an in-depth and rich understanding of phenomena in their real-world context. The authors used the National Oil Corporation (NOC) of Libya as a single case, because the NOC is responsible for all the upstream (exploration and production) and downstream (refineries) aspects of the Libyan oil sector. Therefore, the NOC is considered to be a unique and important case.

To achieve the aim of this paper, semi-structured interviews were conducted with thirteen participants. This method was selected for primary data collection to arrive at a deep understanding of project risk management within the Libyan oil and gas industry, whereas other methods such as a questionnaire would not have been likely to achieve this. The flexibility of the interview format gave the authors the opportunity to ask further, more detailed questions when needed. The target population for this study was people who have direct experience with upstream projects in the Libyan oil and gas industry. Therefore, top managers, project managers, project engineers and project advisors made up the participant population for this study.

The interview respondents were asked about their understanding of the term 'risk', as well as concerning current project risk management practices, to capture the maturity and awareness of these practices within the

organisation. Respondents were also asked about the challenges the Libyan industry is currently facing that limit the current project risk management practices.

Once gathered, interview data was transcribed and prepared for analysis. All transcripts were organised and coded, allowing the development of categories and the construction of emerging patterns, themes and subthemes. This process has helped the authors to generate the findings, discussion and conclusions for this paper, which will be discussed in more detail in the next two sections.

## **4. FINDINGS AND DISCUSSION**

### **4.1. PERCEPTIONS OF “RISK”**

Participants were asked about their understanding of the concept of ‘risk’. The primary data revealed that the term was viewed differently among the participants. Interview respondents showed differing understandings of risk within the Libyan oil and gas industry. A majority of the participants perceived risk as representing an uncertain situation, a potential negative impact, or a threat that could affect the project or system. For instance, one participant defined risk as *‘any obstruction or potential obstruction that limits achieving operational targets in a secure and safe manner’*. Another participant added that risk is *‘anything that affects the system that eventually will lead to harm, whether this harm was financial or moral for the employees’*. This difference in the way that risk is perceived is in accordance with the academic literature; Haimes (2009) believed that although there is an enormous quantity of literature available to define risk and uncertainty, researchers and academic authors have not agreed on a common definition of either term. In addition, the topics of risk and risk management have been studied in numerous disciplines, which only adds to the confusion; there is therefore no clear or standardised definition of either term, and different understandings of the concepts can be found in the fields of economics, management, strategic management, and project management, among others (Ehsan, 2013).

While each participant thought of a risk as a threat, none of them defined it as an opportunity. According to the standard definition from the PMBOK, risk can be seen both as a threat and as an opportunity: *‘Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost and quality’* (PMI, 2013). Therefore, it is important to think of risk as representing possible opportunities as well, because such an opportunity could have a positive impact on the project, such as a decrease in material cost, which could lower the cost of the project.

### **4.2. PROJECT RISK MANAGEMENT MATURITY LEVEL WITHIN THE NOC**

The interviews conducted for this research project generally indicated that maturity levels concerning project management and project risk management in the Libyan oil and gas industry lag behind international standards and procedures. This can be summarised by the comments made by one participant in particular: *‘In Libya, and in the oil and gas industry, the culture and the understanding of the concept of project management is not available; if this concept is not presented, then I wouldn’t be surprised about the lack of understanding of the topic of project risk management’*. When asked about the availability of a structured systematic approach to project risk management, all of those interviewed supported the claim articulated by one of the participants: *‘I don’t want to give you the impression that we have a systematic approach for management in general ... we apply all of these on an “as it goes” basis. So as an approach or a system for project management or for project risk management in particular, believe me, it is not available!’* This finding is echoed in the literature; Sawalim (2015) spoke about his experience as a project manager in the NOC, arguing that the situation now is the same as it had been before the civil war. In addition, Sawalim (2015) claimed that current practices have not yet been developed, so managers still follow the old style of project management. As the oil and gas industry is a dynamic sector driven by technological change, one could argue that coping with such a fast-paced environment requires adherence to international project management procedures. The Libyan oil and gas industry fails to meet these standards.

### **4.3. CURRENT PROJECT RISK MANAGEMENT PRACTICES WITHIN THE NOC**

As discussed previously (in subsection 4.2), no systematic approach is currently guiding project risk management practices within the Libyan oil and gas industry; some of those interviewed in this study have

specified that although they do not follow a systematic written process, the practices recommended in project management literature are nevertheless applied. One of the interviewees indicated that: *'for many of our projects, we make sure to identify and assess any obstacles that affect the execution of the project or limit the completion rate; we take these issues into consideration and we address them, but we do not follow a systematic written approach'*. From another perspective, however, such an approach is used primarily to identify and assess risks that are related to health, safety and the environment, rather than other risk factors that might have a negative or positive impact on the project; this argument is supported by one of the participant's responses: *'it might be only in safety studies that we apply these practices'*.

According to the PMBOK (PMI, 2013), a structured project risk management process includes five procedures, 'e.g. project risk planning, project risk identification, project risk analysis (quantitative and qualitative), project risk response and project risk control'; however, it was clear from the results of this study that the NOC does not follow these steps, nor does it have a written policy or procedure to allow for the effective management of project risks. Instead, risk management practices have always been limited to the project manager or project engineer's knowledge and experience, rather than applying a systematic, documented approach: *'what I mean is: if you were an experienced project manager, you may have some feelings about what might affect the budget, schedule or quality, you find yourself (as a project manager) independently solving these issues on your own terms, without really applying a coherent approach ...we do not have this at all'*. Therefore, identifying and assessing project risks within the Libyan oil and gas industry is mainly based on the efforts of project managers and their teams, without following a regulated framework that the organisation and the project manager can benefit from. However, the benefits of applying these practices have been well-documented in the literature; for example, de Carvalho and Rabechini (2015) and Firmenich (2017) have argued that applying project risk management practices have a positive influence on project success and have further emphasised the important role a risk manager can play in contributing to positive project outcomes. Therefore, ensuring the implementation of project risk management practices within the NOC can be expected to produce desirable results.

Although participants reported their belief that applying project risk management practices could improve project performance, the actual implementation of these practices remains challenging in the Libyan oil and gas industry. This might be rooted in the national or organisational culture of Libya; one of the respondents reflected that *'we are not using the science of risk management as part of the management of our projects; we are not using it at all, even our culture does not support this!'* (Liu *et al.*, 2015), offer support for this argument, claiming that project risks are viewed and managed differently among diverse national cultures. In their earlier research, Liu *et al.* (2013) showed that corporate culture influences project risk management. Meanwhile, Summerill *et al.* (2010), found that a proactive organisational culture could improve the project risk management process. Therefore, organisational culture could play an important role in the successful implementation of project risk management practices within the Libyan oil and gas industry. Creating the right organisational environment and increasing the awareness of project risk management within the NOC could enhance the successful delivery of its projects.

#### **4.4. CHALLENGES LIMITING THE EFFECTIVENESS OF PROJECT RISK MANAGEMENT PRACTICES WITHIN THE LIBYAN OIL AND GAS INDUSTRY**

Clearly, as a consequence of the unstable political and security situation in the country, the Libyan oil and gas industry is faced with many challenges that limit the development of formal and effective project risk management. The security situation does not only affect the safety of individuals; as one participant explained, *'The biggest challenge is the security situation of the country. This has led to the reality that good skilled labour, both Libyans and non-Libyans, have left the country. Also, we lost the participation of good international contractors; again, this is as a result of the country's security situation. The unstable political regime has a strong negative effect on our projects and our company; this has led to our budget being limited'*. Therefore, it can be argued that as a result of the country's situation, which led to financial constraints and the departure of many of skilled and experienced individuals, it became difficult for the NOC to manage its projects effectively and benefit from the application of project risk management practices because the company lacked the experienced workforce required. However, even before the Libyan revolution in 2011, when the country was more stable, the NOC already lacked a systematic project management approach to enable it to compete with other global oil and gas suppliers. Abouen *et al.* (2008) conducted a study before the Libyan revolution and found that strategic approaches regarding project management were largely absent in the Libyan

oil and gas industry. Therefore, the challenges that limit the effective implementation of project risk management practices go beyond the current situation of the country, but (as discussed in subsection 4.3) are embedded within the strategic vision and the organisational and the national culture of the NOC.

## 5. CONCLUSIONS

This paper examined the current project risk management practices within the Libyan oil and gas industry. Project risk management is an important topic because it involves the quick identification, assessment, monitoring and controlling of events that might impact projects, negatively or positively. This paper provided an exploration into the current status of these practices specifically in the Libyan oil and gas industry. The findings from 13 interviews demonstrated that risk management literacy within the Libyan oil and gas industry is still very low. This paper also found that the Libyan industry lags behind the international standards for project management. Primary findings also show that there is typically no structured project risk management procedure in the NOC; rather, the application of these practices is limited to identifying and assessing risks that are related to health, safety and the environment; risk assessments in these areas are mainly based on the efforts and prior knowledge of project managers and their teams. Practitioners believe that applying formal project risk management practices could have a positive impact on project performance; however, practical implementation of these is challenging, according to participants, as a result of the current organisational and national culture of Libya. This paper also explored the effect of the country's security and political situation on the oil and gas industry and summarised that this had and continues to have a negative impact not only on the safety of individuals but also on profitability and on the availability of experienced contractors and personnel; each of these factors limits the effectiveness of implementing a successful project risk management process. Thus, this paper concludes that project risk management is an important area of focus as it serves the rapid identification and assessment of project risk impacts and thereby sets in motion the measures required to monitor and control these impacts; therefore, it should become a priority in the Libyan oil and gas industry as the country and the industry undergo many challenging risks.

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