A Critical Analysis of How Enterprise Risk Management Impacts Organisational Performance: A Study of the Oil and Gas Industry in Qatar

Candidate: Bakhit Hazaa Derah

Student Number: 20051852

Supervisor: Dr. Lawrence Akwetey

Director of Studies: Dr. Daba Chowdhury

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ABSTRACT

This research aimed to investigate the impact of enterprise risk management (ERM) on the organizational performance of oil companies in Qatar. The study uses two case studies of ORYX GTL and Qatar Petroleum in investigating the influence of implementing ERM practices on the performance of the companies. The ERM implementation is captured in respect of the different components of internal environment, objective setting, event identification, risk assessment, risk performance, information and communication, control activities, and monitoring. Organisational performance was assessed in respect to profitability, improved decision making, strong shareholder confidence and compliance with the government requirement.

In order to establish the impact of ERM practices on organisational performance, a mixed methods research approach was adopted. This involved the administration of 300 questionnaires (158 in ORYX GTL and 142 in Qatar Petroleum) and the use of semi-structured interviews which provided additional context to the study.

The study found that the critical success factors for the effective implementation of ERM were culture, risk appetite and top management commitment. With respect to culture, the promotion of an organisational culture that is attuned to risk mitigation is significant. This implies an organisation that promotes a high safety culture (whose attitudes, values and perceptions that are attuned to risk management). A high safety culture was observed in both ORYX GTL and Qatar Petroleum, with a relatively better performance in ORYX GTL.

Further, in both companies, the ranking of internal environment, objective setting, event identification, risk response, control activities, information and communication, and monitoring was highly implemented whilst risk assessment aspect was found as moderately implemented in respect of Qatar Petroleum. In addition, the study highlighted that there were no significant differences observed in the companies at either 5% or 10% significance level in 5 aspects (internal environment, objective setting, risk assessment, control activities, and information and communication). However, significance differences were found at 5% significance level with respect to risk response and at 10% significance level with respect to event identification and monitoring. In all these 3 aspects, ORYX GTL had better performance than Qatar Petroleum.

When risk management performance level was assessed at departmental level, significant differences were observed at 1% significant level for internal environment, event identification, risk response and monitoring whilst at 5% significant level, objective setting and control activities were identified as significantly different. The study further showed that risk management implementation has most influence on strong stakeholders' confidence and compliance with government requirements than decision making and profitability. Significant differences were not found between the two companies with respect to profitability, improved decision making, and compliance with government requirements.

In the oil and gas industry, the importance of promoting a safety culture through implementing a robust ERM strategy is significant. This, however, requires good corporate governance that fosters an effective risk management strategy.
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Thank you all.
DEDICATION

This thesis is dedicated to the memory of my late parents Mr Hazaa Derah and Mrs Farha Alowair. May their souls rest in eternal peace. Amen!
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LIST OF ABBREVIATIONS

BCF – Billion Cubic Feet
BOD – Board of Directors
BSC – Balance Score Card
COSO – Committee of Sponsoring Organizations of Treadway Commission
EOR – Enhanced Oil Delivery
ERM – Enterprise Risk Management
EVA – Economic Value Addition
FMEA – Failure Modes Effect Analysis
GTC – Gas to Liquids
HAZID – Hazard Identification
HAZOP – Hazard Operability
HPC – High-Performance Computing
ICD – Inflow Control Devices
KPI – Key Performance Indicators
LNG – Liquified Natural Gas
IMEX – International Mercantile Exchange
MMTPA – Million Metric Tonnes Per Annum
MOC – Management of Change
PA – Performance Appraisal
PMS – Performance Management System
R&D – Research and Development
ROA – Return on Assets
ROE – Return on Equity
QDG – Qatar Development Goals
QIA – Qatar Investment Authority
QFCRA – Qatar Financial Center Regulatory Authority
QGPC – Qatar General Petroleum Corporation
QPPA – Qatar Petroleum Producing Authority
QRA – Quantitative Risk Analysis
SIF – Safety Instrumentation Function
SIF – Safety Integrity Level
TCF – Trillion Cubic Feet
TQM – Total Quality Management
TRIR – Total Recordable Incident Rate
UAE – United Arab Emirates
1 INTRODUCTION

1.0 Introduction

This research sets out to critically examine how the efficient enhancement of organizational performance using enterprise risk management would impinge and impact on the oil and gas industry in general, and in Qatar in particular. The research also critically examines the efficacy of knowledge, performance management systems, as well as, best practices that could be advantageous and help tackle operational affairs in the oil and gas sector.

Risk and uncertainty are inherent in any business operation (Aven and Thekdi, 2019; Protiviti, 2006). The inherent nature of these two aspects and their potential impact on organisational operations means that organisations must be proactive to observe, manage and control the numerous internal and external variables that pertain to risk and uncertainty, including their potential outcomes. The ability to predict and manage both positive and negative outcomes that could result from various kinds of risk is important for business continuity in the complex and competitive business environment (Florio and Leoni, 2017). In a growing, dynamic and complex business environment, balancing and managing risk is an effective strategy to remain competitive and sustainable (Aven and Thekdi, 2019; Muslih, 2019). Thus, the managing of risk and uncertainty, risk management, forms a fundamental part of any business (Arena et al., 2010; Power, 2013). In this vein, risk management has been depicted as an integral part of sound business management (Carey and Turnbull, 2001) that plays a significant strategic role.

Enterprise risk management (ERM) has arisen as a concept with wider remit that moves beyond an initial financial risk agenda to include strategic and operational issues (Butterworth, 2001; Hopkin, 2012; Ittner and Oyon, 2014). The Committee of Sponsoring Organisations of the Treadway Commission (COSO) (2018, p. 1) define ERM as the “the culture, capabilities and practices, integrated with strategy-setting and its performance, that organizations rely on to
manage risk in creating, preserving and realizing value”. Central in this definition is the objective of managing the risk for value creation. Further, ERM is a systematic and integrated approach to managing holistically all of the risks that an organisation faces in order to achieve its objectives (Dickinson, 2001). As a holistic approach to managing organisational risks, its become a popular business strategy (Bohnert et al., 2019; Callahan and Soileau, 2017) with firms employing it as a tool for evaluation of risk attitude, identification and prioritisation of risk in order to determine which risks to accept, mitigate or avoid. Many companies have ERM structures and processes in place to serve this purpose; identifying, assessing, managing, monitoring and communicating risk (Committee of Sponsoring Organisations of the Treadway Commission (COSO), 2018). The underlying aim of implementing ERM is to enhance the probability of companies achieving their objectives and enhancing their shareholder value (Nocco and Stulz, 2006; Power, 2013).

However, academic research on ERM is still limited (Bromiley et al., 2014) especially research on the effect of ERM implementation in companies on their performance (Ochieng et al., 2016; Pagach and Warr, 2010). Ochieng et al. (2016) observed that there are very limited empirical studies on the strategies and practices of ERM which contribute to improved performance, innovation and continuous improvement in the oil and gas sector. Thus, the purpose of this study is to ascertain how organizational performance could be improved through effective enterprise risk management strategies and practices in the oil and gas sector; thus, contribute new knowledge to an area that has received limited attention.

The implementation of ERM strategies and practices is posed to have a favourable effect on an organisation’s performance. However, Hoyd and Liebenberg (2011) argue that the lack of clear empirical evidence that shows this positive impact of ERM implementation on organisational performance might continue to limit its implementation; and the overall value of ERM. Thus, studies that demonstrate empirically the value of ERM on organisational performance are
imperative. This study makes a contribution in this respect through providing evidence from the oil and gas sector in Qatar. The contribution is to provide empirical evidence that shows the relationship between ERM implementation and organisational performance. In the oil and gas sector, the management-based systems in this industry require deliberate and cautious planning and action to develop an environment for success. This requires effective risk management which makes a holistic approach of ERM more useful. Companies in this sector also need to recognize their positioning of appropriate strategies, management, goals, operations, skills, systems, conflict resolution, and structure to direct and utilize the dynamic nature of their projects.

1.1 The study context

Qatar is a small country in the Persian Gulf. Most people use the old British description of tiny Persian Gulf state wanting to “punch above its weight” (Beirut and Nuruzzaman, 2015). Qatar, which was formerly ranked as one of the poorest countries in the Persian Gulf, has realistically metamorphosed into an economic giant in the Persian Gulf. Comparing recent statistics Qatar is one of the richest countries in the Middle East. In September 2007 last year, the Qatar Investment Authority bought 20 per cent of the London Stock Exchange (recently diluted to 14.9 per cent by the LSE-Borsa Italiana merger) and 9.8 per cent of the Nordic/Baltic OMX exchanges (Khatib, 2014; Khatib and Khatib, 2014).

With only about 200,000 natives, backed by almost 800,000 foreign workers, in a country smaller than the state of Connecticut, Qatar is indeed a demographic lightweight compared with its big neighbours, Saudi Arabia and Iran with populations of 27 million and 70 million respectively (Khatib, 2014).

Qatar’s oil and gas revolution is managed by the Qatari Al-Thani royal family and a handful of top tribal clans that rule the country. They pursue a course of energy-financed growth and
diversification. Their aim, perhaps the most focused of any oil and the gas-rich nation is to guarantee Qatar's prosperity for future generations, even if the oil and gas wells run dry (Khatib, 2014).

A substantial of Qatari’s economic growth and development is due to the major expansion of the natural gas industry - much of it is found offshore in Gulf waters shared with Iran. Qatar's high investment in gas from 2001 to 2003 is now increasing the country's export income. Between 2007-2011 period, Qatar earmarked $83 billion to boost oil, natural gas, refining, petrochemicals, fertilizer, and energy-based industries like aluminium and steel.

"On the whole, Sheik Hamad has done a good job," says a foreign banker in Doha who has also worked extensively in other countries in the region. "He has made progress in putting Qatar on the centre stage of the Middle East while distributing the country's wealth, reducing dependence on oil and gas, and keeping a pro-democracy attitude."

The foundation of economic success in Qatar is the government's shrewd administration (efficient organizational performance) of its energy resources which lead to high revenue generation. In the year 2007, both Standard & Poor and Moody upgraded Qatar's sovereign rating to AA− and Aa2 respectively, in recognition of the government's sound fiscal and economic programs. This is an indication of the good organizational performance management of the country’s energy sector.

"Oil and gas still dominate the economy, accounting for 60 per cent of GDP," says Roy Thomas, senior economist of Qatar National Bank, a state-controlled institution that has a 40 per cent market share and is the largest of the country's 16 banks. Thomas further asserted that "In 2007, Qatar exported 31 million tons of liquid natural gas transforming it into the world's largest supplier of Liquefied Natural Gas (LNG). By 2010, LNG exports should reach 77 million tons."
Oil reserves have been boosted sevenfold to 27 billion barrels since 1999, but it is Qatar's leadership in the LNG field that has attracted the attention of energy and financial groups alike. "Qatar has gas, and gas is a clean, non-cartel fuel that is the future of energy," says Farhan Mahmood, CEO of the newly established corporate and investment banking operations of Citi in Doha.

The same line of thinking has led to the establishment of a new energy exchange called International Mercantile Exchange (IMEX), currently with offices in Doha, London, Houston, New York, Singapore, and Tokyo. Steve McMillan, the former European CEO of GFI Group Ltd, has been CEO of IMEX since June 2007 mentioned that "We were attracted to Qatar because of the government's plans to create an extensive home here for the Persian Gulf's energy sector, and because of the world-class regulatory environment enhanced by the QFCRA."

Wright and Wright (2017) stated that Qatar’s real growth emerged since the year 2005 when foreign investors were allowed to own up to 25 per cent of listed Qatari companies. That ceiling should be raised to 49 per cent soon. "In November we did a roadshow in London with nine Qatari companies and had 142 one-on-one meetings with investors," says Almanor. "We were very pleased with the high level of interest."

Qatar Financial Centre Regulatory Authority (QFCRA) is responsible for developing strategies to attract more international players to invest in Qatar. Another entity, the Qatar Financial Centre Regulatory Authority, licenses and regulates activities of new firms. Since its inception in 2005, the QFCRA has attracted 67 foreign financial institutions and advisory firms to Doha. According to QFCRA Chairman and CEO, Phillip Thorpe, QFCRA has laid the groundwork for a world-class regulatory environment, and the government intends to convert it into a central regulatory agency for all areas of banking, insurance and securities trading.
"We are a one-stop platform that helps companies set up and continue their operations in the financial sector here." "Qatar is uniquely positioned to be a financial centre for the region. The only real bottlenecks we have are the shortage of human resources and the limited supply of good commercial and residential real estate," says QFCRA CEO Stuart Pearce, a former HSBC executive.

Therefore, it is clear that organizations in the Gulf region consider their reputation as a requisite for borrowing. With about 200,000 native Qatars, has close to 800,000 foreign workers, compared with its neighbours Iran and Saudi Arabia, Qatar is demographically challenged.

Angus’ (1997) observations focus on Qatar’s General Petroleum Corporation (QGPC) developmental plans for the state's oilfields. Gomes et al. (2014) states that an extensive upgrade of existing oilfield infrastructure has projects that have been carried out by an economically ambitious Qatari government. The government has undertaken enhanced oil recovery and reservoir management techniques, concentrated on QGPC-operated field of Dukhan and assured of the availability of oil, gas and natural gas liquids from its mature reservoir structures. INSET: Foreign investment and technology line up QGPC’s development plans for the country.

1.2 Organisational Performance in Qatar’s Oil and Gas Sector

As Truss et al. (2013) write on organization performance, with us considering the oil and gas industry posited that to create predominant work system, management should concentrate on strategies to enhance their employee’s abilities such as job training either extensive or computer-based. Truss (2013) was emphatic when he opined that, employees within an organization should consider both extrinsic and intrinsic rewards to boost their morale in achieving high levels of performance.
Truss et al. (2013) further argued that management should give power to their employees continuously by decentralizing authority, inclusive decision making, among others. Apart from this, the management should encourage a learning culture to enhance the knowledge management capability of their employees.

1.3 Risk Management in Qatar’s Oil and Gas Industry

Risk management makes a vital contribution to organizational excellence (Lam, 2014). Risk management is the anticipation of possible threats and hazards that generate ways of coping with them and also create reliable forms of business value (Crouhy, Galai and Mark, 2000). Due to the benefits attained by the enactment of risk management, organizations should adopt this strategy, the plus points of which include a potential rise in the level of success and a notable decrease in the chances of failure thus leading to easier accomplishment of objectives (Bitkowska and Bitkowska, 2018). Risk management has recently grasped a notable amount of interest. However, its implementation has still been at a comparatively lower rate (Stoneburner, Goguen and Feringa, 2002). With the onset of the economic crisis, it has become even more important for companies to put in efforts to manage risks. However, risk management is very similar to achieving the desired organizational goals (Rampini, Sufi and Viswanathan, 2014). A great responsibility rests on the shoulders of senior managers to ensure sustainability by offering value at reasonable risks (Stoneburner, Goguen and Feringa, 2002). Performance reports prepared for senior managers should focus on risk management. The overall organizational performance can be enhanced by getting a better insight into organizational risk (Power, 2008; Lam, 2014). This can be done by incorporating risk into performance management processes. Different departments and professions are involved in such cases. However, enterprise-wide risk management or environmental resource management framework is more often applied when discussing high-level risks for an
organization (Michalski, 2009). Through the environmental resource management framework, an insight into crucial business risks, integration of traditional and function specific risk management is gained (Eckles, Hoyt and Miller, 2014). These include labour safety and information security system. Various kinds of information can constitute this report (Lam, 2014), examples include qualitative information such as risk objectives, audit findings, incidence reports, key risk indicators and measures against financial risk including the value at risk. According to Stulz, (2006), innovative performance management frameworks can be applied to help senior managers gain a better understanding of the risks present.

The current competitive business environment has raised the level of risks for any business firm (Kerzner, 2013). Therefore, the responsibility for people managing human risk factors has become greater. All kinds of business organizations including financial services, energy and gas, manufacturing and other sectors, have to put in greater effort to compete in the market (Bouder, Slavin and Lfstedt, 2009). Moreover, new regulations have been introduced that must be followed, keeping in mind the risk factors and managing them efficiently. Board members and executive members are very interested in being informed of risks to the business and being briefed on the methods being adapted to manage these risks (Bouder, Slavin and Lfstedt, 2009). They are also interested in deriving methods to best cope with risks to achieve maximum profits for shareholders. Due to different organizational factors, the importance of risks is increasing. Some of these include failures in energy and communication industry, banks suffering from subprime mortgages, the new regulations for corporate governance and risk management which surfaced during the financial crisis of 2007/8. These have shifted the focus of organizations towards possible risks (Louisot and Ketcham, 2014).

To reduce losses, management must follow the new regulations (Kerzner, 2013). To do this, operational efficiency must be enhanced, risks and compliance must be adequately managed,
and the division of capital must be done considering all the benefits and risks (Rodrigues, Oliveira, and Leitão, 2014).

Generally, in the energy sector, safety refers to those practices that help eradicate any threats to the well-being of the human operators. Early societies regarded accidents as unavoidable events, and no provisions were made in public policies (Stoneburner, Goguen and Feringa, 2002). The global realization of health and safety started mainly in the 1800s (Stulz, 2006). A lot of human lives were lost as a result of a breakdown in industries, making companies realize the importance of taking preventive measures. In the present world, the safety factors are incorporated in nearly every governmental and private organization to reduce the loss of human capital and to achieve organizational excellence (Qinjin et al., 2014). Moreover, separate organizational teams work for the identification of risks and devise mitigatory policies to prevent unwanted risks from taking place (Kerzner, 2013).

The area dealing with risk is interconnected with numerous other sciences which include natural science, health, statistical studies, safety engineering, sociology, economics, and psychology. Each field employs a different field approach to handle the risks pertinent to their field. However, none of the fields can claim to have fully comprehended risks. As asserted by Freudenburg and Gramling (2011) a combined approach from all these connected fields can only offer efficacious risk mitigation services. Hoffman (2011) stated that it is very complex phenomena to sort all the risks involved due to its dependence on many parameters. The same concept was advocated by (Louisot and Ketcham, 2014) who believed that risks are correlated with many factors that make its analysis a challenging task.

Even the renowned companies over the world have faced serious safety challenges in their history. The O&G (oil and gas) sectors often considered as a benchmark industry concerning the field of risk management and safety. In spring 2010, the industry faced a major setback due to significant oil spill ever recorded in US history, thus leaving adverse long-term effects
Currently, deep-water drilling has posed some serious consequences. With the rising depth of seawater, the pressure rises manifold, and studies have revealed that O&G basin exists at even more pressures, with the great possibility of oil spills if the necessary precautions are not taken. These hazards were categorically stated in the researches. Freudenburg and Gramling (2011) showed their concerns on this underwater disaster, stating it to be not only a huge challenge for engineers but also causes a tremendous amount of costs to rectify it.

As risk management is still the undergrowth phase, a lot of potential in this field is yet to be explored. The research will focus on the major risks that companies’ face, identification of the people authorized to handle risks, expectation levels associated with risk management functions, the duration of risks, and the expertise and guidelines which companies can apply to achieve organizational excellence.

1.4 Scope of the Research

Employees working in the risk department are getting additional responsibilities in the shape of strengthened risk departments, risk committees, and improved governance structures. The role of risk managers has matured, along with exchanging of practical knowledge amongst colleagues and field mates (Lam, 2014).

This process of refining the risk management function is not just limited to any single particular sector. The attention of corporate management is being diverted toward the significance of ERM (Enterprise Risk Management) by a crisis, mishaps, and rise in business inconsistencies, increasing complications and growing business issues (Bromiley et al., 2015). The risk management function comes as a remedy to address all these various issues.

Although employees consider ERM as a vital component, its practical implementation is lacking. Scarce investments in this sector are evidence of this fact, the reason being budget...
limitations and company-wide budget freezes. Another proof is the lack of a prominent role of risk management in major business resolutions. According to Lam (2014), risk managers are being used for different purposes within the organization rather than the professional risk management tasks.

The effects and the impact of any change or new activity are assessed by researchers and managers these days depending on the result. The result could be similar to the company or firm’s efficiency. Power (2008) establishes that any company may have four indicators for its efficiency. These are Customers, Internal Process, Learning and Growth, and Financial. So, any activity will affect one or more of these indicators.

The company’s decisions are normally made in line with its objectives and goals (Bichou, Bell and Evans, 2013). The risk is a major factor in the financial decision and is likewise important in many other segments. Enterprise Risk Management (ERM) nowadays is a key factor affecting the management of risks and grasping the opportunity depending on the company’s goals and objectives (Rampini et al., 2014). The establishment of ERM in industries was with a managerial intention in the mid-1990s. According to Power (2008), 80 risk management frameworks are present including that of the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Lam (2014) states that COSO is an important accounting standard. An organization that tries to point out the board supervision manage and assess the main corporate risks using a combined framework.

Lam (2014) defines ERM as a structured method to manage the risk. Successful risk management can lead the companies and firms to achieve the goals and objectives set for the respective organization and also increase the shareholders’ value. According to Eckles, Hoyt and Miller, (2014) for successful risk management certain things are required they include: organizations’ perspective with dedication from the top-level management, philosophy for risk management, ethical and moral values and also the framework and direction for ERM.
ERM has developed into a widely known aspect all over the world. It is indeed a new area for the organizations to pay attention to. Currently, ERM is the last thing being used for Risk management. The ERM is specifically recognized to broaden the board and senior managers’ ability to examine the general risks involved in the corporate environment (Power, 2008). Furthermore, Enterprise Risk Management provides a special competitive source for those people having a high potential for ERM (Qinqin, 2014). It is supposed that the ERM system must not be listed in the set regulation based on the general concept of risk. Some risks like macroeconomic, industry-specific, country-specific and firm-specific can be countered with minor adjustments to the organization (Power, 2008).

Even though these risks would be different every time, but the risk management would still be accounted on the general issues. The ERM has made it possible for examining and assessing the risks in all the companies (Jeston and Nelis, 2014). The condition inside the organization can decide the ERM philosophy, and it also determines the risks resulting from the actions of workers and their decisions. The BOD and the top-level management designs the philosophy for managing the risks and ERM can assist them in identifying and controlling risks. Despite this, it is important to direct the organization towards risk culture and the value of ERM (Lam, 2014).

On the other hand, a few studies including the ones done by Rampini (2014), Stulz (2006), and Doherty (2000), suggest that there is a certain relationship between the board’s nature and the firm’s performance. This study aims at determining the effect of the board’s characteristics (size, number of non-executive directors, and the number of financial directors), the nature of risk management and the performance of the firm. The nature of risk management can comprise the presence of a risk management committee, the distinction between the risk management and the audit committee, and the size of the committee. Without a doubt, this is concerned with the corporate governance and particularly ERM, and evidently, the effect of a risk management
committee on the firm’s performance was not done in the earlier researches (Lam, 2014). This study focuses on the energy sector. They are furthermore, classified according to the industry for instance oil, gas, manufacturing, raw materials, and more than one industry. The implementation of risk management and practices in the oil and gas sector will be examined in this thesis.

1.5 Rationale for the Study

The rationale behind the research stems from the researcher’s association with the Oil and Gas Industry in Qatar from an infant age. The researcher has since an early age sought to find out ways and means of enhancing and improving the oil and gas industry in Qatar.

1.6 Aim of the Research

This research aims to critically investigate the operations of the Oil & Gas Industries in Qatar and assess the impact of ERM in the operations and performances of these oil and gas industries in Qatar.

1.7 Research Objectives

Risk management involves the identification of and preparation for unseen events. Insurance companies have the greatest responsibility in risk management because the cost incurred due to losses must be covered by them (Lam, 2014). Efficient and effective forms of risk management help in avoiding greater losses due to risks while increasing the payoff. Some of the reasons leading to failure of insurance business are low product prices, lack of financial management, weak corporate governance and poor underwriting (Qinqin and Jia, 2014). Therefore, according to Louisot and Ketcham (2014), energy companies should play a larger role in finding and managing risk factors. In the preliminary studies conducted by the
researcher, there were only a few examples of research in risk management with regards to the performance of the energy companies.

The research focuses on the prevailing risk assessment practices, management of risk and factors that affect ORYX GTL and Qatar Petroleum organizations. The implementation of Enterprise Risk Management begins with the assessment made through a survey of existing practices from the people working in the industry. At the end of the research, a clear understanding of risk practices is generated and appropriate measures to ensure the effective application of ERM is provided.

The objectives of the research, therefore, are:

i. To critically evaluate the levels of risk management implementation in Qatar’s oil and gas sector

ii. To critically evaluate the organizational contextual approaches to risk management in Qatar’s oil and gas industry

iii. To critically evaluate the critical success factors in Qatar’s effective risk management implementation and practices on the organizational performance of Qatar’s oil and gas industry

iv. To critically evaluate the impact of successful risk management implementation and practices on the organizational performance of Qatar’s oil and gas industry

v. To develop a framework linking together risk management, organizational performance and the success factors contributing to the successful operations of Qatar’s Oil and Gas Industry

1.8 Research Questions

1. What are the levels of risk management implementation in Qatar’s oil and gas industry?

2. What are the contextual approaches to risk management in Qatar’s oil and gas industry?
3. What are the critical success factors that contribute to the success of Qatar’s oil and gas industry?

4. What has been the impact of effective risk management implementation and practices on the organizational performance of Qatar’s oil and gas industry?

1.9 Research Methodology

To fulfil the objectives of the research, both qualitative and quantitative approaches were used in the methodology.

1.9.1 Research Approach

The researcher collected both primary and secondary data to achieve the aims and objectives of the research. Questionnaires and interviews were used to collect primary data. Secondary data was collected through academic journals, books, and other publications as well as the internet.

1.9.2 Data Collection

Questionnaires were distributed to respondents within the oil and gas communities within some areas of Qatar. This was done both via online and manually (physically visiting certain institutions related to the oil and gas industry in Qatar). In respect of secondary data, journal websites such as Emerald, Ebsco, etc. formed reservoirs from which secondary data were gathered.

1.9.3 Data Analysis

Data were analyzed using pie charts, graphs, tables, and other relevant models. Statistical data were analyzed with the use of SPSS, a statistical package. A regression model was used to
analyze the data used in the empirical work and the testing of the hypotheses that guided the study.

1.9.4 Research Philosophy
The research adopted a positivist philosophical approach (Tomkins and Tomkins, 1997). A link was established between Qatar’s oil and gas, and risk management, organizational performance and the success factors contributing to Qatar’s oil and gas industry.

1.10 Justification for the Research
Many organizations have employed the use of quality and risk management techniques. Some attempts in this direction have proved to be productive while various others have failed to produce results (Power, 2008; Lam, 2014). A large number of studies are now discussing the application of risk management in business operations. It is often argued in these researches that, risk management is linked to organizational aspects such as industry, size of the company and the geographical location of a firm (Eckles, Hoyt and Miller, 2014). Moreover, according to Kerzner (2013), organizational culture plays a very important role in addition to the features mentioned earlier. Bouder and Slavin (2013) also assert that, apart from the factors discussed above, the culture prevalent in an organization has a marked effect on the risk and quality management practices in use. There is a variety of different opinions existent on the determination of risk management practices is based on one culture or the possibility of applying multiple cultural dimensions (Kerzner, 2013). Risk and quality management is dependent on various cultural factors.

According to Taplay et al. (2014), risk and quality management cannot be confined to tools and techniques alone as quality management is based on a value system. The results of the
different methods applied in an organization are largely dependent on the cultural setting within a firm (Kerzner, 2013).

This research primary aim is to evaluate the impact of risk management on the performance of an organization. At the same time, it will also discuss the adaptation of the practices to be in line with the implementation where needed (Lam, 2014). There is a large number of organizational types with similar numbers of organizational cultures. However, many experts have attempted to define and organize the various kinds of organizational cultures available, such as risk management philosophy, and risk appetite.

One of the most efficient means of risk management is by reducing the volatility of earnings and gaining a reasonable return rate in an organization (Kerzner, 2013). Business units can be measured with a risk-adjusted rate of return and rewards can be placed for individuals, projects, and departments that produce maximum returns. Capital markets are good managers of risks, and higher valuation is awarded to those companies that can manage to maintain lower earnings volatility compared to other companies (Michalski, 2009). In the same way, firms capable of showing better control to creditors have lowered debts compared to other firms in the market (Stulz, 2006). A better understanding and ability to foresee risks gives organizations a better chance of achieving their aims and goals and therefore also increases the number of company shareholders. According to Qinquin and Jia (2014) qualitative measures, better management of risk results in enhanced performance, better efficiency and helps in corporate governance. This research enabled firms to be more capable of risk management by including the following characteristics:

- Fewer surprises. Unexpected risks can be avoided by early identification and management; more stable earnings and better stakeholder trust.
- Improved decision-making. Decisions can be improved if risk management is incorporated in strategizing.
• It has improved corporate governance.
• Stakeholders can be satisfied by following regulations and communicating the risks in time.

1.11 Structure for the Research

This thesis consists of six chapters, details of which have been given below:

Chapter 1

The introductory Chapter provides an overview of the research topic, thesis statement introduction, the research objectives, the background of the research and scope of the study are considered. The chapter also makes readers understand what the researcher wants to achieve in this study.

Chapter 2

This is the Literature Review Chapter. This Chapter avails evidence and answers to questions posed in the previous Chapter. Journals, periodicals, government publications, and other published literature are used for this Chapter. The Detailed Plan of Report (under Literature Review activity) defines the main subtopics that are covered in this part. A conceptual review will be developed based on detailed theories and models that have been discussed in the literature review.

Chapter 3

The Methodology and Research Design is our Chapter 3. This Chapter provides detailed stages taken in conducting the research together with the evidence and the reason behind adopting certain methods.

Chapter 4

Results and discussions. This chapter discusses the findings of the interviews conducted by the researcher into details. For the researcher make the results interpretation easy, pie-charts and tables were used.
Chapter 5

Critical analysis chapter examined the results of the whole research. Primary and secondary research data were examined against supporting proof from literature.

Chapter 6

The conclusion is the sixth and final chapter which provides the results and conclusions from the discussion. At the end of the research report, a list of references and Appendices were added to provide extra information.

1.12 Conclusion

This opening chapter for the research discussed the background as well as the rationale behind the research. The researcher has laid out the research objectives and aims. The methodology and design used for the research have been clearly stated. The chapter ended with a structure/outline for the thesis.
2 LITERATURE REVIEW

2.0 Introduction
This chapter reviews the relevant literature, theories, and models on Oil and Gas Industry, Risk Management, Performance Management Systems, Organisational Structure, and Trust. The chapter is divided into seven main sections.
Section 2.2 reviews the literature on knowledge management in the oil and Gas sector in both the developed and developing countries with special consideration to Qatar.
Section 2.3 reviews the literature on risk management with specific consideration to the oil and gas sector.
Section 2.4 outlines the types of risks in organizations as identified in the oil and gas industry.
Section 2.5 delineates the techniques for identifying organizational risks relevant to oil and gas companies.
Section 2.6 discusses some risk assessment tools for ensuring a Healthy and Safety Environment in Oil & Gas. Also, Key Risk Management Indicators such as ORYX GTL in Qatar.
Section 2.8 reviews the relevant literature on performance management systems and its relevance to the oil and gas industry
Section 2.9 discusses the structure of an organization detailing the structure of companies within the oil and gas industry.
Section 2.10 reviews the literature on Trust as it operates within organizations’ drilling, dealing in or having any relevance to oil and gas.
Section 2.11 looks at risk and their management in oil & gas sector, explaining the importance of stakeholder analysis in project management and some related issues.
2.1 Knowledge Management in the Oil and Gas Industry

In both developed and developing economies the oil and gas sectors face problems in their daily operations. Ochieng et al. (2016) attributed the existence of some of these problems to lack of knowledge management. Feblowitz (2012) observed that, although PM practitioners in the modern-day oil and gas sector were responsible for knowledge management as a means of creating value in projects up to this time they face several performance challenges. Feblowitz (2012) also posited that one common challenge in the oil and gas sector was lack of information although there exists much data. In other words, oil and gas practitioners and organizations wield far too much data which they fail to manage efficiently.

Knowledge management is defined as the ability to systematically manage an organization’s (such as those in the oil and gas sector) knowledge assets aimed at value creation and matching tactical and strategic needs. This encompasses the efficient utilization of the strategies, processes, and systems that sustain and enhance an organization’s storage, assessment, sharing, refinement, and knowledge creation.

KM, therefore, infer to the strong attachment to organizational goals and strategy, and it entails efficient handling of knowledge for the organization to create value within the oil and gas sector.

Feblowitz and Vesset (2013) in their evaluation of the challenges facing the oil and gas industry in modern times asserted that, digitalization of oilfields, price and improvements in performance using sensor technology, broadband networks have improved the quantity, diversity, and speed of data in the energy sector which has made it hard for other sectors to handle. Powell and Abel (2015) demonstrated that most of the data relevant to the geological interpretation of oil reservoirs entail visual data that have no formal denomination and are learned through an implicit process during training and field experience. Again, this has proved
to be a challenge to many of the oil and gas industries and their practitioners around the world in both the developed and developing countries.

Ochieng et al. (2016) think that the oil and gas companies view key business exploration, upstream and downstream production and refining as their key performance targets in their operations. This consequently makes them oblivious and unable to efficiently carry out the process of standardizing and implementing knowledge to disseminate and evaluate the huge data that they accumulate and referred to earlier in this chapter.

Given the aforesaid from researchers, Seechi and Camuffo (2016) and Siemieniuuch and Sinclair (2004) while acknowledging that the creation of a standardized knowledge model which entails people and technology approaches could be challenging. They argued that to implement a knowledge management-based system successfully, key stakeholders from the core areas of the industry (gas and oil in this instance) must come together and participate in designing a knowledge management system that is broad enough to capture all of the assets of an organization. For the oil and gas industries in general and the companies in particular, Ochieng et al. (2016) suggested that these companies establish well standardized knowledge-based systems linked to various businesses and projects functions that allows centralized knowledge and oversight while giving flexibility in implementation.

Wagner and Majchrzak (2006) posited that achieving knowledge efficiency in oil and gas management companies in both developed and developing countries requires cultural transformation within the strategic, operational and project levels. De Wit (1986), Lang (1990) and Oil and Gas UK (2015) were more emphatic when they confirmed that, the UK oil and gas sector was no exception when in terms of gaps and shortcomings experienced as a result of efficiency related challenges of knowledge management and project delivery.

Notwithstanding the above observation by Wagner and Majchrzak (2006), De Wit (1986), Lang (1990) and Oil and Gas UK (2015) and Oger (2015) noted that, it was worth emphasizing
that the oil and gas industry in the UK as a whole has shared best practices to ensure the advancement of the oil and gas sector had made significant strides in how they operate individual companies. Contrary to this, Iledare (2007) stated that the oil and gas industry in the developing countries such as Nigeria had been under constant pressure to evolve into a sector that is constantly changing to fit the needs of the broader context in which their operations are executed.

Ekemena (2011), Nwafor and Salau (2009) and Rabiu (2009) also posited that, as oil and gas organizations in Nigeria define more and more of their activities as projects, the demand for innovative solutions grows and there was increasing interest in reforming the project delivery process. Basing their conviction on these assertions, Ochieng et al. (2016) focused their discussions on examining the extent to which knowledge management people approach and technology approaches could contribute to adding value to the delivery of oil and gas projects in both the developed and the developing countries of the world.

Oyejide and Adfewuyi (2011), Rabiu (2009) and Chen and McQueen (2010) argued that the growing difficulties associated with accessing and leveraging technical knowledge have roots in the several on-going trends including demography. Nwafor and Saau (2009) were more specific when they cited the example of about half of the senior project management practitioners who were expected to retire over the next fifteen (15) years. This exodus Nwafor and Salau (2009) viewed as engendering recruitment and training challenges as well as incorporating a tacit knowledge management challenge.

The problem that this phenomenon poses for the oil and gas industries in developing countries such as Nigeria is that, ensuring that experienced project management practitioners and the newly recruited project management practitioners have access to the data they require to avoid the mistakes of their predecessors and avoid repeating lessons already learned in the industry.
Okunye and Karsten (2002), Oyejide and Adewuyi (2011) also stated that accessing that data was time-consuming and tedious, particularly for the newly recruited practitioners in the Nigeria oil and gas industry. Okunye and Karsten (2002), Oyejide and Adewuyi (2011) attributed to traditional knowledge management systems which are overly ill-suited to competently and efficiently run the oil and gas industries in the country. Okunye and Karsten (2002) and Oyejide and Adewuyi (2011) complemented this statement when they argued that, local oil and gas organizations in Nigeria were finding it impossible to capture the value of information residing inside and outside of their organizations.

Okunye and Karsten (2002) and Oyejide and Adewuyi (2011) concluded that ultimately without a solution to the knowledge management challenge, senior project management practitioners will continue to waste valuable time and resources will lead to low revenues and profits of companies. For a reason such as those discussed in the oil and gas industries of the developed and developing the world, Ochieng (2016) examined knowledge management challenges and proposed an integrated framework for managing knowledge repositories in oil and gas projects. The knowledge is built upon the previous works carried out in these areas of the oil and gas industry by Leavitt (2002) and Grant (2013) and contributed empirically to the development and advancement of project delivery in the oil and gas sector by proposing the application of knowledge management.

This section of the thesis depicts the importance of knowledge management in oil and gas industries in both developed and the developing countries. The section confirms that a very well managed knowledge would tremendously help practitioners in every country to efficiently manage all aspects of oil and gas in their countries.
Table 2.1: Some Theories Related to Oil and Gas

<table>
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<tr>
<th>Theories</th>
<th>Title of Article</th>
<th>Reference Author(s)</th>
</tr>
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<tbody>
<tr>
<td>Lack of information in the face of too much data in the Oil and Gas Industry</td>
<td>“Recognising the value of untapped data assets: Big data and analytics in oil and gas,” Paper and Presentation, IDC Energy Insights.</td>
<td>Feblowitz and Vesset (2013)</td>
</tr>
<tr>
<td>Standardized knowledge model</td>
<td>“Relationship between Organizational Characteristics and Information Security Knowledge Management Implementation”</td>
<td>Siemieniuuuch and Sinclair (2004)</td>
</tr>
</tbody>
</table>

2.2 Overview of the Oil and Gas Industry in Qatar

Qatar discovered its first oil around 1940 in the Duklan Field situated west coast of the peninsula. The daily production was estimated at 5000 barrels. Qatar was fourth in production after Bahrain, Saudi Arabia, and Kuwait. In the late 1940s, Qatar commenced exporting oil through the Mesaieed port located on the East coast. Their first export was approximately 80,000 tonnes retailing at 5.9 Million rupees (1951). Qatar developed its production rising to over 40,000 barrels per day. In 1952 Qatar was ranked 11\textsuperscript{th} among the oil exporting states, with a daily production of 67,700 barrels that was 0.5% of global production.

The second oil investment phase started in 1952 after an agreement with Shell (a Durch corporation) and then Qatar Shell Ltd. They started an exploration of oil in regional waters, and offshore production commenced in 1966 in Al-Idd Al-Sharqi field discovered in the early 1960s. The field aimed at generating over 700 million cubic feet of natural gas for domestic
use. This increased the daily production to 233k barrels in 1965. The products of these fields were shipped to Halul Island for export.

After 30 years of discovery, Qatar Shell and Qatar Oil Ltd abandoned most of their oil operations areas which forced the government to look for other plants. The government opens Qatar-Japan oil Company with the intentions of producing at least 800 million metric tonnes for domestic use and 50,000 barrels of condensate. This phase ended with a cost of $1300 million and in 1992 production commenced following the agreement for onshore exploration with Winter Shell Corporation for offshore exploration.

After redrawing of Qatar and Abu Dhabi Emirate borders, joint work between the two states began in the Al-Bunduq Field. It aimed at producing about 800 million cubic feet of natural gas for local use and 50,000 barrels of condensates. It was characterized by the establishment of factories for liquefying gas in RasLaffan Industrial City in the northeast of the peninsula. This stage started in 1984 when Qatar Gas Company was established to produce about 6 million tons of liquefied gas annually to be exported to Japan. Actual production, however, started in 1996. This was followed by the establishment of RasLaffan Company for Natural Gas in 1993 with a production capacity of 10 million tons of liquefied natural gas to be exported to Asian markets, specifically, to South Korea.

This stage marked the development of North Gas Field which resulted in the laying pipelines to pump gas to neighbouring countries like the Gulf States, Turkey, and Pakistan and others.

The Qatar government continues its activity in the domain of oil exploration by offering licenses for foreign corporations to survey the region for oil. In 1985, it issued licenses to Sohaio Company for offshore exploration within the area of 12,000 sq km and the American AMOCO for onshore exploration within the area of 8,000 sq km outside the work field of the Qatar General Petrol Corporation. The two companies terminated their contracts without any noteworthy discoveries.
ORYX GTL is a joint venture between Qatar Petroleum (51%) and SASOL of South Africa (49%) and the first of a series of planned GTL production facilities in the State of Qatar, representing an investment of around 1.2 billion USD. The plant was designed, built and commissioned under a Turkey contract. The plant was the world's first commercial-scale GTL plant to be commissioned and is based on a large scale-up of existing prototype technology at SASOL facilities in South Africa.

The ORYX GTL facility primarily manufactures high-quality, low sulphur grade diesel and naphtha from natural gas; other products include LPG by-products. The source of the natural gas is the north field gas site north-east of Qatar. Natural gas is formed in the presence of oxygen and steam to form Syngas which is reacted in a Fisher-Tropsch reactor to form long chain waxes. The waxes are then cracked and fractionated to form Naphtha and Diesel.

2.3 Risk Management

This chapter discusses risk management and the important factors that guarantee the success of risk management procedures to enhance organizational performance. The chapter is divided into several sections. The first section focuses on the basics of risk management, types of risk while the second highlights the critical success factors involved in the effective implementation of risk management processes in the energy sector. Risk management, over the last few years, has become an area of development in various organizations operating in the energy sector. In the business sector, industrial services are the area most associated with uncertain conditions. The energy sector has also proven to be highly volatile in the latest financial crisis. Activities within the energy sector are considered to be highly dangerous making a risk management a vital source of business value when compared to other sectors.
Figure 2.1: The Risk Management Plan

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<td>Very Likely</td>
<td>Low Med</td>
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<tr>
<td>D</td>
<td>Likely</td>
<td>Low</td>
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<td>Medium</td>
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<tr>
<td>C</td>
<td>Possible</td>
<td>Low</td>
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<tr>
<td>B</td>
<td>Unlikely</td>
<td>Low</td>
<td>Low Med</td>
<td>Low Med</td>
<td>Medium</td>
</tr>
<tr>
<td>A</td>
<td>Very Unlikely</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Source: Continuing Professional Development

Figure 2.1 above illustrates the risk management plan. It clearly shows negligible, minor, moderate, significant and severe levels of risk with their corresponding low, medium and high likely or unlikely levels.

A risk is defined as a function of the possibility of the occurrence of something and the extent of loss that can result from an activity or situation (Lam, 2014). ISO 31000 (2010) also defines risk as the effect of uncertainty on objectives, and can also be regarded as potential condition, element, event or factor arising during project execution which inhibits or negates the achievement of stated project objectives.

Losses are broadly divided into two categories namely direct and indirect (Hoyt and Liebenberg, 2011). An example of direct loss is the destruction of buildings that results from an earthquake or a bomb blast. Indirect losses include loss of status or loss of consumer confidence. In case of an earthquake, an indirect loss could be the capital that has to be invested...
in rehabilitation of a damaged building. The probability of the occurrence of an event affects the achievement of objectives. According to Eckles et al. (2014), the negative effect on profitability that can come from multiple and separate sources of uncertainty is used to define risks.

**Figure 2.2: The Risk Assessment Code.**

![Risk Assessment Code Matrix](image)

**Figure 2.2** defines risk management and provides a risk assessment code matrix for risk management. These include the hazard probability codes ranging from A-Frequent, B-Likely, C-Occasional, and D-Rarely.

The types and extent of risks an organization faces depend upon factors such as the size of the organization, the volume of work it handles and the intricacy of its activities (Rampini et al., 2014; Hoyt, 2011).

Lam (2014) and Brandimarte (2014) have stated that risk can be either systematic or unsystematic. Systematic risk (also known as market risk, systemic risk, and un-diversification...
risk) is a risk which is intrinsic to a system or market and cannot be evaded through diversification (Lam, 2014). A risk that is related to individual assets and can be evaded through diversification is called an unsystematic risk (Eckles et al., 2014) (also known as specific, diversification and residual risk).

Risk management has many definitions. Zwikaël (2008) Defined risk management as the procedure that aims to completely remove, reduce or control risks, increase profits and evade losses from speculative exposures. The main objective of risk management is to maximize potential successes and minimize potential losses (Lam, 2014). Risks that lead to problems can hurt the profitability and performance of a system among other things (Hoyt and Liebenberg, 2011).

The types and extent of risks an organization faces depend upon factors such as the size of the organization, the volume of work it handles and the intricacy of its activities (Rampini et al., 2014; Hoyt, 2011).
Figure 2.3: Risk Assessment Flow Chart

Figure 3-1. Risk Assessment Methodology Flowchart

Source: Continuing Professional Development
Figure 2.3 above illustrates a systematic flowchart of the risk assessment activities with their inputs and outputs. It shows a step-by-step method flow of risk identification, what to do and the processes to follow until the desired results are achieved.

Enterprise risk management is the process that is applied strategically throughout an entity to determine events that can affect the entity, reduce the associated risks within the risk appetite of the entity and provide sufficient guarantee concerning the attainment of company objectives (Hopkin, 2012). It is a process that is affected by the entity’s board of directors, administration and related personnel (Park, 2010). According to Hopkin (2012), risk management involves identification, measurement, monitoring and controlling of risks. Risk management needs to be completely understood by an individual and must allow him to act to fulfil business strategies and objectives.

Risk management is a process that helps identify, analyze and address potential risks. It helps in minimizing and eliminating negative impact and emerging prospects. Risk involves the probability of the occurrence of something and its result as it affects the attainment of objectives (Reeves et al., 2012).

2.3.1 Enterprise Risk Management

Enterprise risk management (ERM) is occasionally called "business risk management", "strategic risk management", "holistic risk management", "integrated risk management", "corporate risk management", and "enterprise-wide risk management", i.e. what conventional silo-based risk management (SBRM) is called instead (Lam, 2014). ERM and conventional SBRM differ in that companies can increase the worth of investors at the same time as alleviating instability if an ERM system is pursued (Brandimarte, 2014). Enterprise risk management is a process whereby the directors and management apply strategy across a company to identify potential events that may occur, identify risks that can affect its
operation and develop preventive measures to ensure that accidents can be prevented or minimized. The purpose of ERM is to determine existing issues, and risk within an organization whether within administration or operation and develop a solution that can treat the risks strategically and operationally to avoid business disruption. The oil and gas industry is a huge industry, and any disruption to its operation can lead to millions of losses for the company.

Enterprise risk management can be defined in various ways. According to Lam (2014), ERM is a procedure of resolution and examination of insecurity from a coherent point of view which keeps in mind the entire firm. As stated by Liebenberg and Hoyt (2011), ERM allows firms to use a wider and more coherent system of managing risk, which is combative and calculated as compared to SBRM, which was a defence-driven procedure of risk management. Ariff et al. (2014) suggested that ERM is one of the basic building blocks of new age enterprises. The emphasis of risk managing has morphed into a more calculated way of looking at chances and hazards. They further assert that ERM is a tough and forceful method of managing risk, and it increases the craving for positive instability.

Lastly, COSO, the architect of the ERM system, mentions that ERM is:

“A process, affected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite to provide reasonable assurance regarding the achievement of entity objectives (COSO, 2004)”.

Enterprise risk management encompasses methodologies and practices that companies’ use for risk management and to take advantage of any current prospects in attaining their objectives (Eckles et al., 2014). ERM takes care of many necessities of investors who want to know about the various insecurities faced by the company, all to make sure that the company runs well (Ariff et al., 2014).
ERM provides a framework for risk management which includes the identification of events or circumstances which has relevance to an organization’s goals, objectives and opportunities, assessment of the magnitude of its impact, determination, and development of a response strategy, and monitoring its progress. Through effective implementation of ERP, a business can create value for their stakeholders which includes the business owners, customers, employees, regulators, and the entire society. ERM can also be noted as a risk approach to internal control and strategic planning whereby it addresses the various needs of stakeholders. Stakeholders in organizations have different expectations, and it is important that the company is aware of each expectation and ensure that they deliver.

The main difference between ERM and conventional SBRM is that ERM analyses completely the insecurities that a company faces to take care of them, undertake an all-inclusive method (Lin et al., 2012). According to Lam (2014), ERM differs in four ways from conventional risk management (RM). First, it is necessary that ERM be a part of the general control system of the company. Second, ERM is not a substitute for conventional RM but a compliment. This means that conventional RM should be used specifically in areas about commerce while ERM can be used as a professional stage to help in the managing of the general insecurities being faced by a firm (Brandimarte, 2014; Bromliey et al., 2014).

Thirdly, another way that conventional RM and ERM differ is in how the existence of a hazard champion is required as the chief risk officer (CRO). Conventionally, chief financial officers (CFOs) have undertaken the responsibility of hazard management for businesses, but the fresh system of ERM insists that CFOs and CROs have differing duties, and CFOs are focused on increasing return and ignoring some of the hazards (Rampini et al., 2014). The existence of a CRO makes sure that any chances apart from the hazard will also be considered. Lastly, the implementing of ERM should follow a tactic that is top-down and modern and conventional
RM utilizes bottoms up tactic, which could lead to a company away from its planned goals (Ariff et al., 2014).

2.3.2 Process Hazard Analysis (Risk) at ORYX GTL Qatar

ORYX GTL has its own Process Hazard Evaluation Standard that outlines the PHA process within the company. This standard refers in part to already existing methodologies including qualitative and quantitative methods. These are vigorously used continuously as either part of the Management of Change MOC process, incident investigation RCAs, for revalidation of an existing design or operational risk management. These methods to date include the following:

2.3.2.1 Safety Review

Safety reviews are conducted as part of the MOC process for all Management of Change projects. The designated owner of a MOC is required to schedule and conduct a safety review for the MOC before it can proceed to Gate 3 approval, which includes a safety review checklist and supporting documentation. Issues raised in safety review are flagged on the checklist for action and requirements for HAZOPS, SILs, constructability reviews, etc. are stated where relevant.

2.3.2.2 HAZOPS (Hazard and Operability)

Hazard and operability for all units were conducted as part of the detailed design of the plant and are archived and well documented. HAZOPS are used by engineering through the MOC process so that an independent 3rd party also reviews new changes to the plant.
2.3.2.3 SIL *Safety Integrity Level

Safety integrity level is partially documented from the original design and is not as complete as the original design HAZOPs for all SIFs (Safety Instrumentation Function). However new projects through engineering and initiatives from maintenance have ensured that SILs for all critical systems are determined, maintained and well documented.

2.3.2.4 HAZIDs (Hazard Identification)

Hazard Identification has been conducted since 2011 and is relatively a new PHA method in a company. It is primarily used for projects and risk management of non-routine and high-risk activities.

2.3.2.5 Quantitative Risk Analysis

Quantitative risk analysis has been conducted for the entire plant operation recently. The basis of design Consequence Modelling of fire and explosion was conducted by Technip, and the recent update includes a more comprehensive review including calculation of worker exposure risks at each unit.

2.3.2.6 Risk Review in ORYX GTL and Qatar Petroleum

This plan has sought to review and validate the risk management process that was introduced across companies. Enterprise risk management (ERM) is a process whereby all types of risk which material to businesses is can be identified, assessed, prioritized and mitigated on a common basis. The different elements needed to achieve an effective process includes the risk matrix, risk registers, risk management standards, and business continuity plans, are integrated into an overall ERM framework. To provide the necessary assurance that risks are being
properly managed in the company, ORYX GTL required the researcher to review its corporate risk register and develop risk mitigation plans for its top risks to ensure:

- Significant risks to the company (that are both currently recognized and unforeseen) are identified
- Assessing and prioritizing the identified risks facing the company
- Developing plans to mitigate the impact of any identified risk exposures
- Create awareness of the key exposures.
- Provide advice relating to the design of the ERM framework

Furthermore, performance measurement must be reflected through a combination of KPIs and enterprise risk management. KPIs should be identified to clarify defined outcomes and reflect performance. Enterprise risk management is developed to close the GAP between current and expected results and achieve the desired performance.

2.4 Types of Risks in Organisations

A risk management policy reduces a company’s failure chances and increases their success likelihood (Risk Management Policy, 2015). To successfully integrate risks it is significant to understand the various types of risks. According to Bichou et al. (2013), there are two kinds of risk; internal and external risks. These two can be further subdivided into four subparts which are strategic, operational, financial and hazard risks. Internal risks are connected to factors within the organization while external risks are associated with factors outside the organization. Regardless of risk management becoming popular over the last years, it is puzzling that many scholars have not been attentive to the risks encountered in building a corporate image (Power, 2008). The most imminent risks are the financial risks while most of the other risks are ignored; this can impact the business negatively. There is a common belief that operational risks,
processes, and culture are the second important risks. We should first consider the five aspects of bearing risks capacity before ranking risks. The five aspects are: management capacity, financial strength, risk management systems, competitive dynamics, and operational flexibility.

Ernst and Young (2010, p. 18), have evaluated ten business risks within the global industry levels. The below matrix demonstrates how the impact of risk differs in various industries. The most critical risk factors were compliance and regulation as of 2010 due to the previous financial recession. The risks in this matrix can be grouped into the previously mentioned four risk categories and risks defined by IRM.

These are:

- **Strategic**: Legal changes, regulatory changes, customer changes, reputation, competition and availability of capital.
- **Operational**: Day-to-day issues
- **Financial**: Presence of creditors, investors, foreign exchange and interest rates
- **Compliance**: With the laws and regulations, health and safety issues, consumer protection and a safe environment.
Figure 2.4: The top 10 business risks

Figure 2.4 above illustrates the top ten (10) business risks associated with financial, compliance, strategic and the operational aspects of running an organization.

As Ernst and Young (2010) states the definition of risk can vary with industry, the purpose of the organization, the environment in which they operate among other factors. The unpredictability of the international market gives rise to financial threats. Strategic threats originate from competitors and investors, and operational threats emanate from processes of the business, participants and the value chain. The duo concludes that the significant risks to a business are the emerging markets, recessions, new entrants, access to creditors and investors, CSR, government regulations and compliance among others.
2.5 Techniques for Identifying Organisational Risks

These authors (Jeston and Nelis, 2014; Eckles, Hoyt and Miller, 2014) have devised the tools and mechanisms necessary to evaluate the risk management system of an organization. These tools produced by the institute are mentioned below:

2.5.1 Brainstorming

Although one might think of it as futile, brainstorming can help a lot through the process of identifying existing, and potential risks face by a business (Rodrigues et al., 2014). Sometimes very well concealed risks also meet the spotlight of these sessions. Identifying latent risks is a challenging, typical situation in many organizations. Identifying new and previously unknown risks, therefore, depends on the professional judgment and expertise of risk managers who are often achieved through brainstorming sessions. Firstly, these sessions require all the participants to grasp at least the gist of the ERM structure. Since this is an exercise which involves the employees and the members of an organization, their co-operation is very vital and useful (Power, 2008).

2.5.2 Event inventories

Event inventories are often used to form a basis for the brainstorming exercise. This gives a general idea of all the risks elements existing within an industry (Michalski, 2009). However, to keep the exercise relevant, it is very important only to discuss the risks affiliated with the organization in question.

2.5.3 Interview and self-assessment

In this exercise, each employee is interviewed separately, and they have to define their jobs and the objectives (Kerzner, 2013). Then they are asked to speculate all the risks that could
hinder those objectives from being completed. This exercise can be conducted either by a staff member of the ERM or a risk management employee as well.

2.5.4 Risk questionnaires and risk surveys

These risk questionnaires deal with both the internal and the external risks involved within an organization. There is a comprehensive version of these risk questionnaires, and it is known as risk surveys. Sometimes these surveys can be used as concise alternatives to the lengthy, tedious and time-consuming questionnaires designed to cover every aspect of an event and likely risk areas and impact on those events. One of the most frequently used exercise through these surveys or questionnaires is to rate the risk elements and organization faces (Jeston and Nelis, 2014). They are asked to assess how dangerous risk is considering its ability to hog the organization from completing its goals or how well prepared the organization is to deal with this risk.

2.5.5 Scenario analysis

Scenario analysis exercise is based on the universal truth that the future cannot be predicted, so there is not much one can do about it except for being prepared to determine how the situation is most likely to be in case a certain scenario occurs and also evaluating the probability of that scenario happening (Jeston and Nelis, 2014). Scenario analysis is best at determining strategic risks in situations which are not well defined. This exercise is also very helpful when there is a low probability that an event happens, but the impact is high (Taplay et al., 2014). For instance, what effects might an earthquake have on the operation of an organization? Any costs related to the event are also speculated within the process of this exercise.
2.6 Risk Assessment Tools

According to Lam (2014), there are tools for identifying risk elements within a business environment. There are also tools specially dedicated to assessing and managing those risks. The tools can be divided into three major categories. These are qualitative tools, quantitative tools and the mixed quantitative/qualitative tools (Stluz, 2006). A summary of these tools is shown below in Figure 2.5 below.

Figure 2.5: Categories of risk assessment tools

Source: Ariff et al. (2014)

2.6.1 Qualitative tools

The qualitative tools highlighted include risk rankings, risk maps and heat maps, and executive dashboards.
Risk rankings

After the identification of a risk, it can be placed on a scale defining its importance from low to moderate or even high (Lam, 2014). Cross-functional groups discuss every single risk element because the importance to every element may vary depending upon the person and how they see the environment and the role that risk element can play in that environment (Ariff et al., 2014). This leads to a broader, deeper and much detailed study of every risk element present in the industry.

Risk maps and Heat maps

Heat maps and risk maps are very important tools for assessing and managing risk elements. What this tool does is to visualize the significance of certain risks factors. Price Waterhouse Coopers (2014) in their practical guide emphasized the efficiency of this tool. Appendix one contains an example of a risk map used by Price Waterhouse Coopers. A risk map is considered a great tool because it can look at a risk factor individually and in comparison, to other elements as well. First, it considers the likelihood that an event is happening. This can range anywhere between high, medium or low. Then Price Waterhouse Coopers speculated the impact of the risk under assessment and chose to record this impact in monetary terms. Another advantage of using this tool is that when all the risks within an industry are considered together, better results can be produced since sometimes, risks that occur at the same time can cause more accumulated damage.

Once these risks have been identified and assessed, an organization can now plan according to its risk ability that how it chooses to deal with these risks. Different risks need to be treated differently; some must be avoided, and others should be reduced whereas a few need to be accepted as well (Taplay et al., 2014). Companies usually accept risks with lower likelihoods and lower impacts. Other risks with a mediocre level of likeliness and impact can be reduced
by insurance or other tools (Jeston and Nelis, 2014). Furthermore, risks with higher impacts must be avoided at all costs, for instance, engaging in fraudulent and illegal activities.

**Executive Risk Dashboard**

The next tool used to assess risk is the executive risk dashboard. PWC (2014) have stated that many businesses prefer to alter their policies to suit themselves since they face different risks, they perceive them differently, and they want to deal with them differently using a risk dashboard designed for it. For instance, a business might be in a different kind of environment, or it may be facing different legal and regulatory policies. Companies deal with this by creating policies which affect them at strategic and tactical levels. Due to the complex nature of tasks, organizations sometimes tend to create a very complicated model. As a solution to this, the executive risk dashboard is created. The executive risk dashboard allows the manager to view certain data and information. It provides a picture of an organization to the managers providing statistics and figures to support each claim (Jeston and Nelis, 2014). This provides managers quick access to all this information without having to go through the otherwise tedious and lengthy process. Executive risk dashboard serves as a means of assessing information about the risk elements involved in the industry (Gordon, 2009).

**2.6.2 Qualitative/Quantitative Tools**

**Gain/loss curves**

The gain/loss curves show how an organization is likely to be affected by a specific risk. If an organization knows about the impact and the likeliness of that risk occurring, it can be speculated as to how much money would be needed in order to manage that risk (Doherty, 2000) effectively.
2.6.2.1 Quantitative Tools

Quantitative data is the use of statistics and data to evaluate risks and to speculate their effects. They may seem very precise and accurate but predicting the future based on the data collected in the past does have its limitations such as being out of date and out of touch with realities and the inability to capture changes in the circumstances and conditions of events and other activities.

Effective Risk Management and Organizational Performance

Some scholars link the implementation of ERM with a better company operation. Recently, executives have been impressed by how ERM can benefit organizations. These include:

- Decreased rate of start-up money
• Decreased instability of wages which leads to an increase in investors
• Decreased volatility in the rates of stocks, leading to an improved worth of investors
• Getting an edge by recognizing which hazards can be used to own advantage
• Better capacity to make informed decisions
• Increased confidence of stakeholders (Liebenberg and Hoyt, 2011; Miccolis and Shah, 2000).

Woon et al. (2011) have managed to prove that, ERM if employed successfully, results in the creation of worth for investors via a decreased price of start-up (through decreased hazard premium) and better working of an enterprise (that is, the greater rate to wages ratio for the company’s shares). According to Pagach and Warr (2011), the reason why companies employ ERM is to benefit directly economically instead of just complying with stress form rules. A lot of companies are now employing ERM in their setups because they have now realized how beneficial it can be.

Different researchers show that implementing ERM has a large effect on organization functioning (Fong-Woon Lai, 2010; Gordon et al., 2009; Hoyt and Liebenberg, 2010; Segal, 2011). For instance, the Ernst and Young study from 2005 showed that 61% of all shareholders do not intend to spend in companies which have not yet recognized hazards (Oracle, 2009). By setting up a steady and regulated system of hazard managing which encompasses the entire business, companies can better their outcomes (Oracle, 2009). It can be stated that the implementation of ERM results in better working of organizations.

There are advantages of integrating risk management across organizations. It can help to reduce the shortcomings from TRM which may cause failure from considered risk management in each function or division (Collier, 2009), and disregarding the effect on each other (Hoyt and
Moreover, it is assumed that it will help reduce every risk of organizations which will lead to enhancing performance and value (Gordon et al., 2009).

Although there is literature that found a positive relationship between ERM and organizational benefit (i.e., organizational performance), there are other findings which do not establish a positive relationship. McShane et al. (2011) used a risk management rating developed by standard and poor (S&P) to measure risk management implementation of an insurer. The result from this study found that organizational value did not increase for firms which achieved a higher ERM rating. On the other hand, most of the studies found the opposite result.

The evidence from Pagach and Warr (2011) indicated clearly that, firms adopted economic benefits motivated ERM. Also, Gordon et al. (2009) found that the relationship between ERM and performance depended on ERM and its contextual factors. Moreover, the study by Gates, Nicolas, and Walker (2012) found significantly that the process of ERM implements resulted in organizational value, enhanced management, and improved organizational performance. Likewise, Hoyt and Liebenberg (2011) found a positive relationship between ERM adoption and performance which is reflected by organizational value.

2.6.2.2 Enterprise Risk Management and Organizational Culture

Organizational culture is one of the contextual factors which are associated with MCS (Chenhall, 2003). Definition of culture has been variously discussed. According to Daft (2010), culture refers to a group of values, norms, believes, and understanding which members of organizations think are of positive worth. Organizational culture may include observable artifacts such as symbol, story, behaviour, and ritual or underlying values which are difficult to observe such as belief, feeling, and attitude.

Moreover, other scholars defined culture variously. Phanphae (2011) mentioned that organizational culture is the practice approach of an organization which is collected and
developed for over a long period, through both formal and informal social process. Also, Schein (2010, p. 26) stated that culture is a pattern of basic assumptions shared for learning by a group which defines how they perceive, think, and feels. It can be passed on to new members for coordination within an organization and adapted to the external environment.

There are different cultures in each organization. The culture which people share learning and adapt to change are some important aspects of learning organization culture. Senge (1990) stated that a learning organization is an organization where people can continuously expand their ability to accomplish desired goals. New and wide ideas of people are fully supported, and people in organizations continuously desire to share learning. Furthermore, Chermack, Lynham, and van der Merwe (2006) and Yang, Watkins, and Marsick (2004) define the learning organization similarly. It is an organization which shows learning continuously and can adapt to the environment appropriately.

According to the above, learning organization culture can be referred to as an organization that has continuously shared learning culture, and has adapted to the environment changing to accomplish a goal. Organizational culture will affect the operation of employees due to the impact on their feelings, level of co-operation, and decisions of management (Cunliffe, 2008); therefore, patterns of culture in an organization are important to create the success or failure of management (Koompai, 2010). Prior researches showed that organizational culture is important to ERM.

Moreover, Kleffner, Lee, and McGannon (2003) found that 48 per cent of respondents indicated that, an organizational structure or corporate culture which is not provided to ERM is a major barrier to its implementation. Also, Kimbrough and Componation (2009) found that organic culture leads to the progress of ERM. An organizational culture that can encourage ERM should have characteristics of continuously learning, ability to adapt to a dynamic environment and communicate collaboratively to accomplish organizational goals because
ERM needs to collaborate cross-functional analysis and finding ways to manage uncertain events in the future within a dynamic environment that will help organizations achieve goals.

2.6.2.3 The Effective Risk Management Components

The procedures that makeup risk management have been highlighted recently through the publication of various scholars and researchers. It has been discovered in previous publications that there are slight differences in the descriptions of the processes of risk management given by different scholars and authors. According to Lam (2014), a risk management framework covers the scope and the procedures of risk management as well as the duties of an individual concerning risk management. A successful risk management structure includes procedures that cover identification, acknowledgment, measurement, monitoring, reporting and controlling of risks (Gordon, 2009).

COSO’s (2004) ERM framework argues that ERM in any organization will include among others the alignment of organization’s risk appetite with their strategies for good achievements of strategies, enhancement of quick and appropriate risk response decisions, the reduction of operational surprises and loses and the improved deployment of capital. This demonstrates the capabilities provided by the implementation of ERM and its important components that would enhance the achievement of an organization’s performance and profitability objectives while preventing loss of resources.

These capabilities which enable ERM to deal with risks and opportunities affecting value creation or preservation are however dependent on the components of ERM implemented in an organization. The components are however integrated with the management process and therefore derived from the way management runs an organization. This implies that the components may highlight the ERM implementation approach, the processes of ERM, and the factors that drive the successful operations of ERM in organizations. The components of ERM
according to COSO (2004) are the internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication, and monitoring.

The internal environment component of ERM concerns the organization’s structure, culture, management behaviour, integrity and ethics, the operating environment and nature of the business. This component could be regarded as the risk context which drives risk management or a platform for effective risk management. ISO 31000 refers to this component of a structure as the risk management context. It is also noted that a suitable organization structure is required for successful implementation of risk management, provision of adequate support and the sustenance of the risk management process (COSO, 2004; ISO 31000, 2010). The internal environment component may, therefore, be regarded as a critical success factor for ERM implementation and operation. It is thus a major requirement of risk management that should be in place to ensure good standards of risk governance. Shenkir and Walker (2006) also opined that an effective ERM implementation might require an organization context characterized with strong top management commitment, risk management philosophy with risk appetite, integrity, and ethical values, and also the scope and infrastructure for ERM.

The objective setting component of ERM concerns the processes used to set objectives that are consistent with its risk appetite that also align with an organization’s mission. This component becomes a major requirement for successful risk management as the entire ERM is based on risks due to the pursuit of organizational objectives. There must be organizational objectives before management can identify potential events affecting their achievement. In the same vein, ERM also provides the platform for organizational objectives to be validated which also may help in the testing of the assumptions underpinning those objectives (COSO, 2004; ISO 31000, 2010).
The event identification component of ERM is part of the risk protocols in an organization designed to identify the internal and external events required for the achievement of an organization’s objectives. The component highlights the processes and practices required in an organization to evaluate and analyze objectives to identify necessary events from which risks and opportunities associated to the identified events can be distinguished for necessary management action (Lam, 2014). This component is, therefore, a necessary component for a successful ERM implementation (COSO, 2004; ISO 31000, 2010).

The risk assessment component of the ERM is a follow up of the event identification component and is focused on the analysis of identified risks with a view of establishing the likelihood and impact of each risk which will determine the management of different risk. This component is also part of the risk protocols in an organization and is to ensure that, suitable and sufficient risk assessments are carried out and recorded in an appropriate manner (COSO, 2004; ISO 31000, 2010). This component is, therefore, a necessary component for a successful ERM implementation and practice in an organization.

The risk response component of ERM is also a major part of risk protocol necessary for a successful ERM implementation and practice (Gordon, 2009). It identifies various possible ways to respond to identified risks within an organization such as avoiding, accepting, reducing, or sharing risk and helps management in selecting appropriate risk responses with a set of actions aligned with an organization’s risk tolerance.

The control activities component of ERM is also a follow up on the risk response component designed to ensure that risk responses are effectively carried out with the establishment of appropriate policies and procedures (COSO, 2004). The component is therefore necessary for a successful ERM implementation and practice in an organization. The information and communication component of ERM highlights the importance of relevant information which needs to be identified with the sources, captured using different appropriate means, and
communicated in a form and timeframe that will effectively enhance the carrying out of required risk management responsibilities by required individuals (COSO, 2004). The information and communication component, therefore, is part of the risk architecture required to make ERM work efficiently. It is required both as a part of a structure or risk content and as part of risk protocol required to sustain the practice of ERM in an organization (Gordon, 2009).

The monitoring component of ERM is designed to ensure the sustainability of the ERM practice in an organization. It is therefore integrated into management activities to guarantee effective monitoring and evaluations of the risk management process and framework in an organization (COSO, 2004; Gordon, 2009).

2.7 Critical Success Factors for Effective Risk Management

ISO 31000 suggests that for a successful implementation, support and sustenance of risk management process in an organization, a structure is required. The appropriate organizational structure and other relevant infrastructure are thus usually referred to as risk management content that is critical to the success or survival of the risk management process.

The review of critical success factors below discusses the CSFs that are essential for effective risk management. Many research articles identify the importance of critical success factors for effective risk management. The problem of risk mitigation and a process established to aid the high-performance level of a company are evaluated by Gordon (2009). They have recognized the four main factors as shown in Figure 2.4 below:
Figure 2.7: Critical Success Factors for Effective Risk Management

Source: Gordon (2009)

Gordon (2009) has examined the significance of management of risk, the aspect of risk management and have analyzed the process for implementing risk management procedures. The four activities significant in risk management are the support of top management, the structure, and processes of management, the participation of affected individuals, and the measurement of the pattern.

2.7.1 Communication

Many companies generally accept that good communication is very important. Every employee has a different concept, and hence the discussion between them depends on various conclusions. The general purpose is to send a clear message, and so discussion might not be an appropriate way to disseminate messages. Some workers would desire that plans are discussed by senior management with the staff (Guest, 2011). The internal communication must aid business strategy and enhance business processes along with performance (Arena et al., 2010).
Communication is an essential skill for top management and leaders. Effective leaders or managers can through good communication achieve clear mutual expectations, goals, and objectives. According to Guest (2011), effective communication ensures that the members of a team do not only recognize and support the team in its current position but also future expectations.

The gathering, storage, delivery and the communication of information in the general sense is in itself, a growing business (Jeston and Nelis, 2014). The need for communication professionals to make sure that, workers are evaluated of the occurrences within and outside of their company is continuously growing. A good manager should be an effective communicator, and future managerial training should emphasize on communication training.

Communication is one crucial factor for effective risk management. According to Gordon (2009), communication is paramount for effective risk minimization. It offers opportunities for clarifying, understanding the progress of an organization, and for workers to discuss the improved methods and the effects of utilizing various risk minimization strategies. The process of communication enables employees to comprehend their roles and responsibilities within an organization when the structure is altered (Zwikael, 2008). Many different people are involved in the identification and assessment of risks within an organization. Financial departments must understand the idea of verifiability. If various people were deciding on the significance of risk, they would arrive at the same conclusion (Park, 2010).

2.7.2 Organizational Culture

There are different definitions of culture. Geert Hofstede defines culture as “the collective programming of the mind which differentiates the individuals of one group from another” (Hofstede, 2001). Concerning Hofstede’s definition, culture constitutes trends of values, ideas,
beliefs and feelings that are transferred by symbols as determinants in constructing a behaviour. The results of beliefs, attitudes, and skills have an impact on thoughts, emotions, and actions. Culture is an integration of common history, expectations, unwritten rules, and social customs that shape behaviours (Painter-Morland and Bos, 2011). It is the set of underlying beliefs that, when uncommonly joined together, always affect the understanding of the actions and communications of workers. In any place where the support is crucial to find a solution to a crisis, culture plays a vital role that determines the willingness to learn from their mistakes and to share the best practices within a company (Hopkin, 2012). However, the supply chain includes different companies and cultures and therefore establishing any one culture is challenging. This does not only motivate the employees to work more but also to work efficiently.

Mosadeghrad (2006) researched the effect of the culture of a company on the success of TQM management. The success of management greatly depends on the culture of the organization. An integrated and corporate organizational culture is established by long-term management, teamwork, collective efforts, clear communication, and taking risks. A strategic plan must be developed to serve as the framework for designing and combining the quality culture. Grabowski and Roberts (2006) state that the integration of various cultures to form the overall system is necessary for risk management that would make the system a combined complete entity where deep-rooted perceptions and values of every member of a firm integrated to form a reliable culture. In some situations, teamwork can establish certain behaviour by sharing the beliefs, holding staff meetings and achieving consensus to support management. Culture is required for effective risk management because the transfer of information requires individuals to meet each other to interact, exchange ideas and share information. Furthermore, culture develops individuals who continuously strive to come up with new ideas, knowledge, and solutions.
2.7.2.1 Safety Culture

An important aspect within the context of an organisation’s effort to identify, manage and mitigate risk is the development of a safety culture (Antonsen, 2017). A safety culture needs to be imbedded within the entire organisation. It’s essentially a subset of the overall organisational culture. The components of ERM have been identified by Standard & Poor (S&P) as risk management culture, risk controls, emerging risk management, risk models and strategic risk management (Baxter et al., 2013). An important component of ERM, thus, is the promotion of a risk management culture or in other words, a culture that is risk resilient. In manufacturing companies, in particular, promoting a culture attuned to risk management requires a ‘safety culture’ enhancement (Antonsen, 2017). A safety culture is basically “a combination of the attitudes, values and perceptions that influence how something is actually done in the workplace, rather than how it should be done” (Health and Safety Executive (HSE), 2020, p. 1). The HSE (1993) gave a formal definition of safety culture as:

the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation’s health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures.

The promotion of a safety culture demonstrates a direct commitment of an organisation to reduce inefficiencies, increase employee productivity, reduce accidents and injury rates and overall enhance the morale of the workforce (HSE, 2020; Ostrom et al., 1993). The important role of a safety culture is that it contributes significantly to the outcomes of an organisation’s safety management system (SMS).

In the oil and gas sector, particularly, a safety culture is necessary in order, not only to increase employee morale and productivity, but to reduce the chances or probability of accidents and injuries from happening (Ostrom et al., 1993). As a concept, safety culture developed in the
aftermath of the Chernobyl disaster (Pidgeon, 1991). As such, this shows the integral role of a safety culture to risk management in order to avoid accidents from happening. Importantly, a safety culture is highly influenced by the vision, values and belief of senior management (Antonsen, 2017). This places the importance of leadership in steering the culture of the organisation in the direction of risk resilience; promoting good safety practices where employees are alerted to unexpected changes and all foreseeable hazards are handled efficiently. In this respect, Ostrom et al. (1993, p. 164) argue that:

“good safety cultures have employees with particular patterns of attitudes toward safety practice …In a “good” safety culture employees might be alert for unexpected changes and ask for help when they encounter an unfamiliar hazard. They would seek and use available information that would improve safety performance. In a “good” safety culture, the organization rewards individuals who call attention to safety problems and who are innovative in finding ways to locate and assess workplace hazards.”

In a good safety culture, the overall result is a positive outlook and attitude towards safety where all employees participate in defining and addressing safety concerns, and no one group imposes safety on another in a punitive manner (Antonsen, 2017; Ostrom et al., 1993); instead, everyone is engaged in the safety process. Thus, active employee participation in the safety management process facilitated by good communication between all levels of employees form as important aspect to an effective culture. At an organisational level, a good safety culture contributes to improved organisational reputation and gaining greater competitive advantage (HSE, 2020).

The consequences of a poor safety culture in an organisation include a widespread occurrence of routine procedural violations which could be avoided (Cooper, 2000). In addition, despite having a safety management system, there is often a persistent failure to comply with the company’s own SMS when there is a poor safety culture (HSE, 2020). With a poor safety culture, there is usually lack of management commitment to promoting effective risk
management strategies; with management often making decisions that put production or cost first before safety (Ostrom et al., 1993). This is why its imperative that leadership that has a vision and commitment to safety and engages employees in the safety process is needed so that an organisation’s safety management system can work effectively and efficiently.

Further, within the context of promoting a safety culture within the organisation is the imperative of building trust among the key actors within the organisation. As highlighted by the HSC (1993), mutual trust is founded on good communication and the sharing of perceptions of the importance of health and safety and through generating confidence in the effectiveness of preventive measures instituted. This requires a management and leadership style that is effective participative and open in its approach on risk management (Yilmaz and Flouris, 2017).

2.8 Performance Measurement Systems (PMS)

Performance measurement is the method of enumerating the efficacy and competence of an act (Neely, Gregory, and Platts, 2005). According to Rouse and Putterill (2003), it is the juxtaposition of outcome and expectancy with the suggested purpose of absorbing to perform well. It is a method by which pre-set aims can be attained, with data about the efficacy with which means are changed into amenities and wares, the worth of these results, and the efficacy of organization systems according to their role in the organization goals (Amaratunga et al., 2002). The main aim of PMS is to analyze the development of attaining both monetary and non-monetary goals. In the meantime, the results of PMS will determine the efficacy and competence of how resources have been allocated in a company (Acharyya and Johnson, 2007). According to Beamon (1999), a well working PMS has four major features, which are inclusiveness, measurability, consistency, and universality. Also, a successful PMS ought to
have no trouble evaluating the environs of a company from both the inside and outside. The results of PMS must be used by upper managing tiers of a company to help with deciding upon new aims for the company. PMS are essential as they help companies in translating their plans in terms of preferred conduct and outcomes. Also, PMS assists companies in communicating hopes, monitoring the commercial methods, giving feedback, and encouraging workers to rewards according to how they perform.

There are various methods and manoeuvres which can be used to measure performance in a company. Amongst those employed regularly are Economic Value Added (EVA), Balance ScoreCard (BSC), Benchmarking, and Total Quality Management (TQM). BSC is a complete method of PMS which is used the world over by various companies.

2.8.1 Performance Management at a Gas Company

The review of literature in this section centres more on practical experiences of the gas company, Conglom, and its numerous subsidiaries which were responsible for distribution gas supplies in many parts of the country of Malaysia. The then Chief Executive Officer (CEO) of the company in the pursuit of a workable and efficient performance management system said, “…..I don’t want to hear from the accountant; I want to hear from the division head,” (Siti-Nabiha (2010 pp1) What this implies that in other to get the real performance of the gas company, the CEO needed to hear from every divisional head, not only from one central figure within the company such as the accountant. Nabiha (2010) further explains that it means that, the division heads of the gas company, whether they liked it or not, had to understand the numbers for all subsidiaries and divisions of the gas company. This the CEO said, “because you are reporting your business performance.”

This performance management reporting implies that those who do not understand accounting will struggle during management committee meetings, not only for the main gas company but
for all subsidiaries. This approach to performance management within an oil and gas company would prove useful for efficient monitoring of all the divisions and subsidiaries of the main oil and gas company, for example, those established in Qatar. The many engineers in the oil and gas companies of Qatar are known to have a technical mindset. However, with the implementation of this performance management system within the company, sooner or later, when they reach senior management positions, they would have to stand at committee management meetings and explain the numbers of the subsidiaries and divisions that they head.

In 2005, the Malaysian gas company, Conglom introduced a new performance management system (PMS) for all its subsidiaries one of which was called ALPHA. The performance management system at ALPHA was implemented in stages, starting from the middle of the year 2007, and by the year 2009, the whole performance management system at the gas company was to be fully implemented.

The essence of this PMS within the oil and gas company of ALPHA was that everybody within the oil and gas industry had to understand that they (all employees) had to add value to ALPHA, the oil and gas company. What this meant was that performance management within the gas company would be measured in terms of how employees translate their activities into “dollar signs.” In other words, every action undertaken during the operations of the gas company would be measured by the amount of monetary income that it generates for the company or organization. This type of performance measurement in the oil and gas industry means that every activity by every division and subsidiary should add monetary value to the company.

Siti-Nabiha (2010) noted that the essence of PMS used at the gas company of ALPHA, and indeed in the whole Conglon gas company was to ensure that workers in a division of the company translates have their tasks measured. Commenting on this PMS, Siti-Nabiha (2010) quoted the one in charge of implementation at ALPHA as saying, “…..before; you were not under the measuring tape; it was just kind of abstract. Not quantifiable; you don’t go by a
certain ratio whereby you have to meet a certain target as defined by a number. Now, in a way, it’s...quantifiable, and you would have to report on how you achieved it. So, it becomes more measurable. And when that happens, I mean, being human, you need to get used to new ideas and the way your work is affected. Now you are more conscious of how you contribute to the whole thing.

What this implies in performance management within the oil and gas industry such as that of Qatar is that by this method, each activity or operation within the company or organization would be measured. In this regard, the PMS would produce a reliable, quantifiable measure of every movement of operation of every division or subsidiary of the oil and gas company.

2.8.1.1 New Corporate Performance Management System in Oil and Gas Companies

To achieve a more strategic placement aimed at maximizing economic value the new corporate performance management systems should facilitate this (Siti-Nabiha, 2010). The new corporate performance management system is conceived as a management style that visualizes on the whole oil and gas company or organization on one purpose - value creation. Through an understanding of the new corporate performance, organizations are facilitated in consistently delivering robust returns.
The new corporate PMS will ensure all branches of oil and gas companies employ similar measurements when reporting. For instance, before utilizing the new PMS, some companies had different degrees used in measuring performance. They, for example, used ROE while others used ROA. With the presence of new PMS, all companies employ economic earnings in reporting their performance. Financial gains are earnings after deducting capital.

The new corporate PMS has demonstrated in Figure 2.8 above. The new PMS needs KPI, linked with performance targets for each process that is in strategic planning, resource allocation, PA and portfolio management.

Siti-Nabiha (2010) was emphatic when he stated that, the critical performance indicators formulated should have characteristics which should include actionable, measurable, and assignable and have a high impact value. Siti-Nabiha (2010) stressed that the metrics used should reflect and support the company’s strategic goals, and strategic performance and monitored through key performance indicators, which are reported periodically (say monthly) and should be available on lime.

Source: Siti-Nabiha (2010)
These key performance indicators, which mainly relate to the economic value for the oil and gas company are supposed to be monitored and reported by the subsidiaries and sent to the parent company. Siti-Nabiha (2010), as a result, asserted that all the executives in the oil and gas company or organization are expected to receive a set of the key performance indicators, and staff compensation, in some cases based on achieving the set performance for each of the KPIs. This translates to mean a connection of the daily activities and decisions to the total financial performance of the oil and gas company. Siti-Nabiha (2010) sums it up in one short phrase: “what gets measured gets done.”

2.8.2 Value Performance-Based Planning and Strategies

The new PMS adopted by the parent oil and gas company explains the process of value performance-based planning strategies and the performance monitoring system which oil and gas companies such as those of Qatar could adopt. Siti-Nabiha (2010) states these value-based planning approach processes as below:

1. Embrace a balanced scorecard (See section 2.6.7 below) to place the target and focus strategic development in connection to high impact areas at corporate, business and subsidiary level.

2. Long-term corporate objectives drive the setting of an annual group, business areas, and targets for the oil and gas company.

3. A balanced top down and bottom up approach aligns corporate, business area and subsidiary strategies

4. Strategy development entails the formulation of multiple strategic options to achieve targets.

5. The best plans are selected based on a value maximization test.

6. The budget is applied as a tool to allocate resources for value maximization strategies
7. The implementation of strategies is tracked over time by key performance indicators.

8. Portfolio reviews are undertaken periodically to rationalize non-performing business lines.

Siti-Nabiha (2010) emphasizes that these initiatives should have defined targets. The strategies are given to particular individuals or team responsible for attaining the set targets. The objectives follow the SMART approach (Specific, Measurable, Achievable, Realistic and Timely). An illustration of the process is shown in Figure 2.9 below:

**Figure 2.9: The Value-Based Strategic Process**

Source Siti-Nabiha 2010

### 2.8.3 Concerns with the Key Performance Indicators

Siti-Nabiha (2010) believed that, in-as-much as the KPIs having the potential to measure values adequately, there could be a resistance of this performance measurement system as was the case with the oil and gas company of ALPHA in Malaysia. Siti-Nabiha (2010) stated that there was high resistance to the PMS in all the divisions and subsidiaries of ALPHA, especially in the plant division of the oil and gas company. Almost all the employees were uncomfortable
with the introduction of KPI and complained that the management perceived them as machines as everything had some set standards.

Furthermore, Siti-Nabiha (2010) stated that the philosophy and terms of an application associated with the new corporate PMS were relatively new to some of the staff, especially those from a non-accounting background as one senior project manager explained. Siti-Nabiha (2010) cited another manager at ALPHA oil and gas company who said, “…..previously, we have performance based on our objectives. We will have our objectives every year. Now the objectives are supposed to tie in with KPIs, and on top of that, we should have targets. That’s a new concept. Now, they have strategies…..all different terms; it gives me a headache. Last time they called it planning objectives; now; now they change the word to initiatives; we get headaches.”

It was evident from the observations of these senior managers at the ALPHA gas company that the PMS implementation was not plain sailing. Despite its perceived advantages in measuring performance in the oil and gas industries such as those in Qatar, its application was causing some problems to the staff.

Another ALPHA senior manager noticed that before the PMS strategies they had KPI. At the plant, some of the initiatives were to build KPI for all departments as part of quality initiatives. This initiative, however, were not related to value a large percentage was based on functional KPIs. The KPI was aimed at creating economic value.

Employees on the ground feared that the system would be used to discipline them. There was uncertainty implementing the new PMS and anxiety among the employees. It was believed that the new PMS would make individual, group and departmental performance visible and transparent. The departmental managers commented that “…..the perception is very vague at the moment since we don’t have seen the real impact of the new system. This has never been implemented before. It is still at the early stage. So, people have a very vague idea of the impact
of KPIs on them….Furthermore, the thing has not been clearly defined….we don’t have a clear picture at the time. To what extent will the KPIs effect our performance evaluation?”

In spite of all these concerns by both managers and staff on the implementation of the new corporate PMS in the oil and gas company of ALPHA, the KPIs based on functional activities (informal KPIs) were used by the superiors in evaluating their managers. Even the manager at the oil and gas company, used these informal KPIs formulated from the evaluation system with a certain amount of subjectivity.

Siti-Nabiha (2010) noted that managers employed preference when evaluating their employees. The KPI results were not used to discipline their subordinates as many employees dreaded. Reasons for not attaining KPI targets were explored. The author concluded that KPI is employed to boost their employee's performance, productivity, and work processes.

During the implementation stage of the KPI Siti-Nabiha (2010) concluded that there was no clear connection between performance achievements vis-à-vis the set KPI targets to employees PA systems. In evaluating the subordinates, the rationale for not meeting the targets will be evaluated together with actions taken to boost their performance.

Conglom, the parent company of the oil and gas company, ALPHA provided training on the new corporate PMS to all its business analysts in their branches and divisions. Subsequently, the business analysts gave information to the heads of departments on the new PMS, the concept of the value drivers about the ways of designing their KPIs. Department heads are tasked with explaining the PMS system to their juniors. This resulted in minimum grievances of the KPI data, and the employees are more responsive to the new PMS appraisal system.

**2.8.4 The Balanced Scorecard (BSC)**

Kaplan and Norton mentioned BSC in 1996. They say that BSC is a PMS which gives those in major managerial positions a fast but comprehensive look at how a firm is running. The
addition of “balance” to the name suggests that it is inclusive of both monetary and operation related aspects. The usual BSC will translate a company’s aims and goals into specific and quantifiable areas which include monetary accomplishment, client approval, inside methods and (IV) development and learning (Kaplan and Norton, 2012).

Figure 2.10: The Balanced Scorecard (BSC) Model

![Balanced Scorecard Diagram](image)

Source: Kaplan and Norton (2012)

According to Figure 2.10, above, development and learning are focused on the competence of workers to increase the function of the internal operations of the enterprise. Lastly, monetary rewards would increase via these happy clients. In this way, the four areas as mentioned by Kaplan and Norton's BSC are linked (Beasley, Chen, Nunez, and Wright, 2006).
2.8.5 Organisational Responsibilities

Risk management is a task that can be performed by either an audit group, an executive group within an organization, a non-executive group or another department within an organization. Risk management is different for each company, and thus its implementation varies as well. However the following four tasks are very important and used in almost every case: (1) Defining a risk management strategy; (2) Starting a risk management culture, creating risk management awareness within the organization; (3) Deducing ways to minimize and avoid risks; and (4) Companies which are more concerned about risk management can be spotted easily by their increased number of resources dedicated towards this task and their number of officers as CRO (Chief Risk Officers).

Some companies do not hire any CRO. This does not mean that they are not investing in risk management. They might just have centralized their risk management and given the responsibility to their executive members. The Institute of Risk Management defines the role of inter audit in ERM which includes auditing of the managerial processes set up to control risks; converging the focus of inter audits towards the significant risks; provision of support in management risk processes; and education of employees to assist in the identification process and the internal controls.

Organizations should be reluctant to use the conventional audit processes in order to manage risks because studies have revealed that the audit setups are not equipped to deal with the risks of today’s market. Also, it can overburden the audit committees. The business can construct a new sub-committee within the audit department to deal with the ERM, or this job could be contracted out to an external specialist contractor. This way, the audit committee could stay focused on what its really its job.
2.9 Organizational Structure

The structure of an organization includes its inside order of control, communication, and relationships (Stank et al., 1994). The chain of control and communication along with the data associated with this chain is what constitutes the structure. Therefore, the chain of control, communication, assigning duties and resources is explained by the organizational structure. The thought that the structure of an organization gives the control to tell in advance the way workers will function is supported by Hunter (2002). To ensure that the structure and operations of an organization are efficient, the planned purposes need to be in congruence with the surroundings and have a productive effect on the policies of the organization. So, the structure of an organization is among the principal characteristics for successful risk management. The structure of an organization gives the idea, assistance, orientation, and advice to the workers and is managed by the guiding panel. Their task is to develop and impart education in the workers regarding the usage of a common vocabulary. To enhance information sharing and make hesitant workers a part of the operations, the staff work in the form of a team (Hasanali, 2002). According to Guest (2011), it is important to establish clear goals and outline for risk management.

The world of finance and business is in a continuous state of change. New businesses will expand slowly with time with a change in the business environment whereas other business might expand quickly and grab a larger market share. To accommodate the changing financial situations, a regular assessment of the structure of an organization must be carried out (Arena, 2010). The suggestion of strategies for risk management is the task of an organization’s management. The assessing and giving approval to those strategies is the committee’s task, and then the management is responsible for enforcing those strategies and reporting back on their functioning (Carey, 2001).
Risk management is mainly related to the smoothness in operation of organizational structures (Grabowski and Roberts, 2006). The adjustable attitude is to acknowledge the changing environments that react swiftly. The enterprise-wide management process (EWRM) method to handle risks is emphasized by DeLoach (2004). The basis of EWRM is a straightforward organizational structure. Relevant employees are given tasks related to risk management. Their job is to create and evaluate alternatives for risk management along with the selection of a structural procedure to assess risk management alternatives.

2.9.1 Organizational Structure in Oil and Gas Companies

This section of the thesis discusses how a typical organizational structure for an oil and gas company would like the look. Again, the thesis uses Siti-Nabiha’s (2010) examples from the oil and gas company, Conglom and all its subsidiaries to illustrate how the organizational structure looks within the oil and gas company.

Conglom’s subsidiary of ALPHA, the oil and gas company, has five main divisions within its organizational structure. These are the Plant, Commercial services, transmission, finance, and technical facilities, divisions. ALPHA also has four units of public affairs, centralized facilities unit, health, safety and quality, and human resources.
Figure 2.11 above illustrates the organization chart of a typical oil and gas company as the one that operates within the ALPHA oil and gas company in Malaysia. It is clear from Figure 2.8 that, the plant and the transmission divisions are not located at ALPHA’s headquarters. The head of the division at the oil and gas company of ALPHA is known as the general manager, while the management committee consists of its managing director as illustrated in Figure 2.11. Typically, in an oil and gas company or organization such as those of Qatar, for example, there is divisionalisation on functional lines, with functional managers; but the divisions, as is in the case of the oil and gas company of ALPHA are not evaluated as business units. The purpose of divisionalisation within the set-up of an oil and gas company or organization is to give more authority to the general managers.
The plant has the largest number of employees in a typical oil and gas industry. ALPHA has approximately 900 employees in the plant division, around 400 in the transmission unit, and around 190 in the head office (Siti-Nabiha, 2010).

2.9.2 The Plant Division in the Oil and Gas Company

The plant and transmission divisions are the most significant in an oil and gas industry. These units are self-sustaining, and none is evaluated as a business unit. The plant unit has all the department heads where the middle managers make-up the entire departmental heads. Sectional managers are ranked second, and they lead different sections. The last group is the executive and non-executive members. The non-executives are employees like secretaries, clerks, technicians among others. An overview of the accounting department in a plant division has a chief accountant with two section managers, one for the fund and the other for accounting and budget management purpose. The management accountant has two plant accountants at the executive level. This is illustrated in Figure 2.12 below:
Nabiha (2010) observed in Figure 2.12 above and stated that in the plant division of a typical oil and gas company, the plant management is made up of all departmental heads. As stated by Nabiha (2010) some oil and gas companies such as those in Qatar practice a job rotation system. By this practice, the executives in the oil and gas company are moved to different jobs after a period. This type of movement of the employees periodically is coordinated by the parent oil and gas company or organization.

Source: Nabiha (2010)
2.10 Trust in Oil and Gas Industry

2.10.1 Trust

Trust is defined as the readiness of someone to be exposed to the activities of someone else based on the assumption that the other person will carry out a certain act necessary for the person who is trusting, regardless of the capability to track or administer that person (Simpson, 2012). This explanation of trust applies to a partnership with another known person who is considered to carry out an action willingly for the person who is trusting (Mayer, Davis and Schoorman, 2011). The trust within a company is explored by the authors, and they create a version of team trust considering an organizational background. The act of trust includes two groups: a trustor and a trustee.

Trust has been a topic of main research in organizations during the last several years. To know how to develop constructive teamwork inside a company, it is necessary to study trust (Guest, 2011). Trust is important due to the reason that it allows and motivates collaboration and teams to work together effectively. The capability to govern efficient teamwork relates to the success of a company (Tyler, 2003). The thought that trust is necessary for the execution of projects is endorsed by Pinto, Slevin, and English (2008). According to them, trust makes working relationships strong and enhances the desire for collaboration with different project shareholders. According to Erden (2003), trust is the outcome of behaviour related to sharing of information, resources and materials and showing good purpose.

Collaboration is required for risk management, and it promotes success. According to McAllister (1995), trust is an important factor in minimizing risk because organizations do not use association-like organizational structures that promote susceptibility to changes in the surroundings.
Trust allows employees to put emphasis on their objectives, regardless of other employees’ tasks and resources (Grabowski and Roberts, 2006). The dedication to sharing is promoted and enhanced by the activities of risk management. So, trust is one of the factors that influence effective risk management.

The critical success factors for the methods of risk management are known on the basis of literature review. Various studies in the past have proposed these critical success factors (Lam, 2014). Most of the researches carried out related to risk management are mainly for projects. This research studies risk management on a broad scale encompassing all factors of financial industries. The significance of each factor needs to be evaluated. Evaluation is the next step after defining the seven critical success factors. The importance of these seven factors needs to be examined. These seven factors act as a hypothesis which will later be examined in the experimental research. So, the hypothesized critical success factors are vital for successful risk management methods in various organizations.

2.10.1.1 Using Science to Engender Trust in Oil and Gas Countries

Managing the oceans from which oil and gas are drilled have proved over the years to be a rather difficult task. There are management disputes, land disputes as well as maritime border disputes. One phenomenon that stands to alleviate and mitigate against these difficulties is trust; where there is trust between organization employees, landowners and oil and gas companies and even countries that have disputes over their maritime boundaries.

Petri et al. (2011) explore the use of science and policy to promote effective management of maritime resources (including oil and gas). Petri et al. (2011) cited the operations of the California Ocean Science Trust (OST), a non-profit organization in California, the USA who support management decisions for companies and organizations engaged in maritime operations and activities including the drilling of oil and gas using scientific methods.
Petri et al. (2011) posit that OST functions as a “boundary organization” bridging the gap and ironing out the differences between oil and gas organizations and countries who have maritime disputes. The actions of the OST do a lot to engender trust among all stakeholders in the oil and gas industry. The OST’s operations in building and keeping the trust among all stakeholders in the oil and gas companies and organizations are executed through the framework of boundary organizations and salience, credibility and legitimacy.

Lubechenco (1998), Joint Ocean Commission Initiative (2009); Doremus and Tarlock (2005) and Lubechenco and Sutley (2010) regard the OST's scientific information and expertise used in promoting TRUST among stakeholders within the oil and gas companies as that which could help decision-makers understand and balance the various potential impacts, trade-offs and conflicting goals of various regulatory decisions, and expand the alternative policy and regulatory choices available to decision-makers.

Petri et al. (2011) observe that ocean resources, from where most of the oil and gas drilling takes place, face increasing threats, ranging from sea-level rise to ocean acidification to the depletion of valuable fishery sources. Thus, Petri et al. (2011) posit that in the marine world many have called for the use of best available scientific information and expertise to inform and innovative forward-thinking and comprehensive approaches to addressing these complex challenges. Two other non-profit organizations support the OST in these efforts: The United States Commission on Ocean Policy (USCOP) and the Pew Oceans Commission (Pew Oceans Commission,2003; USCOP, 2004). According to the Pew Commission, “improving how existing (scientific) information and knowledge is used is the first and most important step to improve the scientific foundation for the ocean and coastal management.” (2003, p. 90).

More recently, a final report with presidential mandate engaged the United States Interagency Ocean Policy Task Force called for “use of the best available science and knowledge to inform decisions affecting the ocean, our coasts, and the great lakes.” (2010, p. 3).
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<tr>
<th>Legislation/Action</th>
<th>Description of Legislation</th>
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<tr>
<td>Assembly Bill (AB)1241-Marine Life Management Act</td>
<td>Manage marine Living resources based on best available scientific information. Establish a programme for external peer review of the scientific basis of marine living resources management documents</td>
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<td>AB 2387-California Ocean Resource Stewardship Act (CORSA) (2000)</td>
<td>Authorizes Secretary of the Secretary of the California Natural Resources Agency to “enter into an agreement with an existing non-profit corporation…to be known as the California Ocean (Science) TRUST…to seek and provide funding for ocean resource science projects and …to encourage coordinated, multiagency, multi-institution approaches to ocean resource science.”</td>
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<td>California Ocean Action Strategy (2004)</td>
<td>To identify and support the science necessary to inform decisions regarding coastal and ocean resources and called on the state to continue its role as a leader in ocean and coastal science research and monitoring. “The fact is that protection and management measures, when based on sound science, can yield significant results. (Ocean Strategy (2004, P8).</td>
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<td>Senate Bill (SB) 1319-California Ocean Protection Act (COPA) (2004)</td>
<td>COPA established the California Ocean Protection Council (OPC) and called for science to inform decision-making: “The governance of ocean resources should be guided by principles of sustainability, ecosystem health, precaution, recognition of interconnectedness between land and ocean, decisions informed by good science and improved understanding of the coastal and ocean ecosystems, and public participation in decision making.” A goal of all state actions shall be to improve monitoring and data gathering and advance scientific understanding to continually improve efforts to protect, conserve, restore, and manage the coastal waters and ocean ecosystems.”</td>
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<tr>
<td>AB 1056-Amendment to COPA (2007)</td>
<td>The bill to amend COPA calls for the establishment of the Ocean Protection Science Advisory Team: The bill would require the council to “Establish a science advisory team of distinguished scientists to assist it in meeting the purposes of this division.</td>
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Source: Petri et al. (2011)
Table 2.2 above illustrates the extent to which the State of California in the United States of America is prepared to go into protecting its oceans and coastal lines where some oil and gas operating companies and organizations drill oil and gas from the sea.

It can be argued that this level of protection of the ocean and the coastline given by the State of California goes a long way to put some strong level of trust between all stakeholders who take part in maritime operations such as fishing and oil and gas drilling in the sea. The various legislations that protect the ocean and the coast of the State of California serve to guarantee the trust that enables peace and tranquillity to prevail through all commercial maritime activities in the sea of California including the drilling of oil and gas. This thesis envisages similar legions in other oil and gas operations around the world including those of Nigeria and Qatar, for example.

2.10.1.2 The Ocean Science TRUST as a Boundary Organisation

It was noted the difficulties that the use of science in policy and boundary decision making entails (Coastal Society. and Lowell, 1987; Association for Education in Journalism and Mass Communication and Glynn, 1995; Lowell et al., 2012; Timotijevic et al., 2013; Castella et al., 2014; Ecological Society of America., Resilience Alliance. and Carleton University., 2016; Posner, McKenzie and Ricketts, 2016; Chong, 2017).

Boundary organization sometimes use co-operation- the incorporation of representatives of external groups into their decision-making structure, as a spanning strategy but they attempt to balance it between scientific and political principals. This, sometimes, brings about conflicts where decisions must be taken, for example, on maritime or oil and gas drilling borders/fields in the oceans. The dilemma that usually faces the authorities and the oil and gas companies is usually whether decisions should be scientifically or politically backed. This can easily degenerate into a conflict between two oil and gas companies or even countries. A recent
example is the boundary conflict between the oil and gas drilling fields of the West African countries of Ghana and Cote d’Ivoire (Ivory Coast).

Cash and Buizer (2005); Miller, Strang, and Miller (2010); Agrawala, Broad and Guston (2001) all pointed out that, one mechanism that has emerged to address this conflict is the notion of the so-called boundary organizations working at the border between science and political policy. This thesis believes that oil and gas drilling can be and is in most cases done from deep sea, and the management of the oceans that are drilled must be protected. For this reason, these should be a certain level of trust between the stakeholders of all maritime commercial activists, e.g. oil and gas drilling, fisheries, etc., and these boundary organizations.

2.10.1.3 The Ocean Science Trust: Risks at the Boundary: Balancing Salience, Credibility, and Legitimacy

Cash et al. (2002) observed that, although boundary organizations fulfil an integral niche in science. policy interface, boundary work also involves essential challenges. Cash et al. (2002) propose a useful structure for evaluating these risks and relate boundary work as embodying three key features: salience, credibility, and legitimacy. In this case, salience is the relevance of information for decision-makers; for instance, is the scientific information timely, credibility is concerned with the reliability of the information source and technical and scientific probability. Last, legitimacy, comprises of how actors conform with the laws and policies that produced the scientific knowledge that is was the process fair, appropriate, or unbiased (Cash et al., 2002).

As mentioned earlier in the chapter, recent examples of the oil and gas field boundaries dispute/conflict between the West African countries of Ghana and Cote d’Ivoire (Ivory Coast) caused a lot of tension between the two countries. Ivory Coast claimed Ghana had encroached upon it soils and gas borders and entered Ivorian territory. Ghana rejected this claim and stated
that the oil and gas fields in questions belonged to Ghana. The dispute/conflict was eventually resolved at the International Maritime Courts in The Hague-Netherlands in favour of the country, Ghana.

2.10.1.4 Organizational Performance and Benefits of ERM

Risk management is focused on practical and timely assessment of significant risks in the light of an organization’s objectives and events needed to achieve the objectives. It is also focused on the formulation and implementation of suitable risk responses to achieve maximum sustainable value from the events and all the activities of an organization to achieve desired objectives and set targets. Risk management is therefore designed to increase the probability of successful performance while reducing both the chances of failure and the level of uncertainty surrounding an organization’s objectives and its feasibility.

It is noted that the main essence and purpose of risk management initiative is not simply to identify risk, but to evaluate every event associated with an organization’s objectives for easy, better and profitable achievements (Nickmanesh et al., 2013). It is therefore expected that organizations with risk management initiatives will have some noticeable benefits associated with the outputs delivered by the risk management framework implemented in the organization. Generally, risk management may not just create value for an organization but may also enhance the general economic growth as it attempts to decrease capital cost and activities related to uncertainty (Nickmanesh et al., 2013). The benefits may include more measurable and sustainable efficient operations, effective tactics and efficacious strategy. These benefits are made possible by values enhanced by risk management such as improved decision making, increased understanding of the potential upside and downside of the factors that may affect an organization, strong shareholders’ trust, and confidence, and compliance with applicable governance requirements.
2.11 Gap in Literature

Risk management includes all those endeavours that control or plan to mitigate risk associated threats in an organization (Lam, 2014). Generally, in most corporate institutions, the risk management process involves the formulation of framework structure, risk assessment, and risk mitigation measures. The structure of the built framework indicates the type of environment it is exposed to, the need for risk management and its criteria (Eckles et al., 2014).

Risk mitigation refers to all those measures that involve the treatment of the risks identified. It may involve preventing or retaining measures. Two prime essentials that the risk management activity caters for is the true risk depiction and incorporation of this input into the decision-making process (Moran, 2010). Here, the most important parameter is the identification of the relevant risk also termed as ‘Risk Influencing Factors’ (RIF) which is most closely associated with the occurrences (Lam, 2014).

The issue is determined by the high-level management and the board of directors, and it can be different for every organization depending on the desired outcome. For instance, the organizations focusing on venture capital are more inclined towards the risk culture to prevent losses and exploit opportunities (Stulz, 2006). Researches in these organizations are performed with some information about specific risks, but they consider if these risks would be able to pay back in the future. However, the majority of mature, developed organizations would focus more on risk opposition. Other organizations might make a handsome profit by making small amendments to the products over a long period of time like the restaurants, paper producers and soap product companies (Woodward, Kapelan and Gouldby, 2014).

Many of the researchers (Stulz, 2006; Lam, 2014; Hoyt and Liebenberg, 2011) have a common assertion which is, the ERM system, which if implemented would improve a firm’s performance. Gordon, Loeb, and Tseng (2009) state that data is useful for answering the question of the insurance company and Tobins’ Q measurement has been used to evaluate the
firm’s performance. Razali and Tahir (2011) have described different facts that aid the ERM system and improve the firm’s performance. The general evidence, however, establishes that the relationship between ERM and performance is narrow and is not a factor for ERM. Jeston and Nelis (2014), stated that examining the relationship between ERM and performance must not be restricted to a particular year.

A lot of research studies have earlier been conducted that concentrate on assessing the effect of risk management mechanism; which means that, the impact of the board’s nature on the firm’s performance. Only limited evidence was found by Lam (2014), Razali and Tahir (2011) and Hoyt and Liebenberg (2011) to imply that the board’s involvement in risk management has a positive effect on firm’s performance.

2.12 Risk and Project Management in Oil and Gas

Based on the dynamism of the world today, project management has become an integral part of every business. The nature of doing business has become complex and more engaging. Therefore, it is apposite for every organization to chart effective, innovative management approaches. Current organizations operate in an entirely different environment compared to the traditional environment (divided and hierarchical) systems. The conventional environment has been replaced by innovative, competitive, and skills driven environment. This presents risks for most institutions and project management; modern management techniques should be flexible and focus on efficiency. The primary elements (knowledge areas) of managing a project are:

- Management Scope
- Management of costs and time
- Stakeholder and quality management
- And risk management (Nguyen, Chih, and García de Soto, 2017)
For a project to be successful, it should comprehensively look into the most critical aspects such as management and alleviation of risks. This is more or less a SWOT analysis which facilitates in preparation and plan execution accordingly. This helps project members to be proactive instead of reactive, thereby, controlling future events in the project (Iemsomboon and Tangtham, 2014).

2.12.1 Project Risk Management

Different authors have defined the term ‘risk management’ differently. For instance, (Blokdijk, 2007) described the term as a process by which an institution/s seeks predicting potential risks that they may encounter and then devise strategies that would help in alleviating these risks. Organizations are composed of many diverse people it is, therefore, prudent to inform all their members when devising a risk management strategy. Notifying the member facilitates them in preparing for future changes and adopt the initiatives on their level. The management and employees are encouraged to communicate at the same level to reduce resistance and enhance arriving at a common level of understanding in relation to the expected project outcomes (Zulch, 2014). In a nutshell, communication is a prerequisite for effective project risk management.

In the present day, the term ‘risk communication’ has been formulated to persuade organizations to inspire communication as a vital requirement in their operations. Communication is a fundamental element of the risk management process as it allows all members of the organization to participate in making decisions regarding management of risks that a project may encounter (Valoyi, Lessing and Schepers, 2000). All members with interests in the project are consulted; they may include the community, customers, employees, directors shareholders, investors etc. As observed new strategies affect the operational process, it is
important for the managers to maintain effective communication with the stakeholders. The communication initiative should be formulated to identify the key stakeholders and then an engagement formula and then concentrate on maintaining a positive relationship with the stakeholders. This is illustrated in Figure 2.13 below:

**Figure 2.13: A Model of Communication strategy for effective risk management**

![Communication strategy model](image)

Source: Researcher

### 2.12.1.1 Understanding the Significance of stakeholder Evaluation in project management

In risk project management specific stakeholders are involved in the process. Like if a city administration finds it necessary to bulldoze one area of the town, the most relevant stakeholders to inform are the residents dwelling in the town. The initial step of a communication strategy is, therefore, to identify the relevant stakeholders and classify them according to their significance and influence, understand their motives and develop a strategic plan with their primary duties and responsibilities defined. This is what we call a stakeholder analysis which is a popular risk management tool in organizations today (Eskerod and Larsen, 2018).

All the phases of project management are vital, but it is vital to examine each decision and their outcomes. Stakeholder analysis can be conducted at any stage of project management. At the early stages, stakeholder analysis assists in identifying the primary stakeholders and defining
their roles and responsibilities. In the design stage, it assists in framing calculated actions and apprise risk analysis. In the implementation stage, it facilitates understanding which stakeholder should take part at which time and level. Finally, in the adaptation stage, it acts as a reminder of the goals of the project and compares the achieved goals while stakeholder analysis serves as a reminder of the project goals and compares it to the realized outcomes.

The process of project management must keep a record of risks identified, their association, recommended action all in a register called the risk register (Singhal, 2008). A risk register is a tool which assists in the management and efficient risks alleviation. There is no defined risk register format, but it should have dates, risk description, type of risk, the probability of occurrence, and countermeasures.

2.13 Further Research

A number of elements are rendering the business environment difficult. These factors are:

- Advanced technology
- Dynamic customer demands
- Risky economic conditions
- A decline in skilled manpower

After the 2007/2008 global recession, the business environment has become uncertain. This has strained organizations to discover ways to counter the complexity and dynamism in the business environment. As the researcher has stated above communication is a vital tool in managing risks. Organizations are compelled to have a robust management tool that ensures the free flow of information and participation is vital to projects. Evaluation of stakeholders has been quoted as the most common tool for this purpose.
Nevertheless, there have been conflicts regarding the appropriate stage in which the tool should be executed. Some researchers argue that it is advisable to conduct stakeholder analysis at the beginning of the project; others opine the process can be conducted at any phase of the project for various reasons. There is also a lack of agreement at which stage it should be implemented. The question posed is “Should a project be broken down into multiple sub-parts and the evaluation conducted on each sub-part or on the entire project?” Further research is required to answer this with the following objectives:

- Build the significance of stakeholder evaluation to projects and decide the level and stage in which the evaluation should be conducted
- Interpretation of which part of stakeholder analysis data should be in the risk register
- Understand the aims of a project to devise a communication plan and initiatives and how stakeholder risks should be governed using a communication plan and strategy.

2.13.1 Oil and Gas Operations: Establishment of QGPC

As a result of these positive developments in Qatar's oil industry, Qatar General Petroleum Corporations (QGPC) was established in 1974 as a national oil company responsible for ownership and management of oil and gas operations and the state's interests both in Qatar and abroad. The state's shares in oil operations and oil and gas related ventures in Qatar and abroad reverted to QGPC.

Qatar Petroleum Producing Authority (QPPA) which was established in 1976 to overtake all operations previously run by QPC and SCQ was merged with QGPC in July 1980. Since then and until 1991, responsibility for operations came under two QGPC Divisions: Onshore
Operations and Offshore Operations. Both divisions are now being amalgamated and renamed Oil & Gas Operations reporting to QGPC Headquarters.

2.13.2 QGPC Objectives
Decree-Law No.10 of 1974 concerning the establishment of QGPC defines the corporation’s objectives as follows: ‘The Corporation may undertake all activities that would lead to the achievement objectives. The Corporation may undertake all actions that would lead to the achievement of its aforementioned objectives.

Oil & Gas Resources Producing Fields - Onshore
QGPC produces Onshore oil from Dukhan Field which is a single large field consisting of 4 major hydrocarbon reservoirs, three oil bearing and one containing non-associated gas. It takes the form of a long narrow anticline structure. At the southern end of Dukhan structure lies Diab Oil Field which is under development at present.

Quality
The oil exported from the Umm Said Terminal is of high quality, with an average gravity of 40.9 API and a 1.1% sulphur content.

Offshore
QGPC produces oil from Offshore fields within the territorial waters of Qatar. There are 3 fields: Idd El- Sharqi, Maydan Mahzam and Bui Hanine, located some 85-115 km. from the capital Doha. Halul Island is the operations' storage and export facility for Offshore oil. Al-Bunduq is another Offshore oil field, located on the marine boundary between Qatar and the United Arab Emirates; it is jointly exploited by the two states.
Quality

The oil exported from Halul terminal is in the high-quality Arabian crude range and is a blend of the three crudes from the Idd El-Shargi, Maydan Mahzam and Bui Hanine fields, whose combined average gravity is 36.3 API. It is salt-free and exported clean of basic sediment and water with a low sulphur content of 1.4% wt. Al-Bunduq crude is similar to that of Maydan Mahzam. It has an average API gravity of approximately 36.37." and contains 1.4 per cent sulphur.

Exploration

QGPC has continued to optimize its oil operations and to intensify exploration activities in search for more oil. QGPC shall continue to implement works and procedures for proper reservoir management and optimum hydrocarbon recovery from existing operations as well as the development of known oil accumulations in those areas. For the longer term, QGPC is going ahead with the 1985 plan for exploration of all Qatari lands and waters.

2.13.3 Oil Exports

QGPC shall export onshore and offshore crude according to the national policies and in line with OPEC decisions. Over the past period, QGPC has developed its export and storage facilities at Umm Said terminal and Halul Island.

Natural Gas

From being solely, an oil QGPC has become a key producer of gas. The corporation now plays a key role in the supply and distribution of gas as fuel or feedstock to the main gas-based industries and to the state's power generation and water desalination plants. Associated gas is produced from onshore and offshore oil fields and non-associated gas from the Khuff gas
reservoir in Dukhan Field area from 1978 until 1991, mainly to meet the country's ever-growing requirements for electricity and desalinated water, for electricity and desalinated water.

2.13.4 Major Events and Developments in the Oil and Gas Sectors

Chronology

1949: First oil production and exports from Qatar's Dukhan field.
1961: Qatar joins OPEC.
1963: First utilization of Qatar's associated gas in gas-driven electricity generating plant commissioned at Ras Abu Abboud.
1971: North Field Gas deposits discovered.
1973: Qatar Fertilizer Plant (QAFCO 1) came on stream; (QAFCO 2) was commissioned in 1979. Each unit produces ammonia and urea.
1974: Qatar General Petroleum Corporation established.
1976: All remaining rights of the Qatar Petroleum Company Ltd., reverted to QGPC by the Emiri Decree No.99 of 1976. The takeover agreement was signed on 16.9.1976.
1977: All remaining rights of the Shell Company of Qatar reverted to QGPC by the Emiri Decree No. 10 of 1977. The Takeover Agreement was signed on 9.2.1977.
1981: The NGL plant and the Petrochemical Complex at Umm Said inaugurated.
1984: Qatar Liquefied Gas Company established with 70% QGPC participation.
1984: The Umm Said 50,000 BPSD Refinery inaugurated.
1987: The implementation of Phase 1 of the North Field Development project began.
1991: The inauguration of the North Field Project, Phase 1 on 3rd September.
1991: A Sale and Purchase Agreement for the sale of 4 million tons per year of Liquefied Natural Gas (LNG) by Qatar Liquefied Gas Co. (QATARGAS) to Chubu Electric Power Company starting 1997, was signed in Doha, on May 13.

2.14 QATAR: From Strategy to Implementation

Supreme leaders in Qatar are unshaken by the rise of Canada and US shale and their dominance in global LNG markets. In the year 2014, the then Minister of Energy of Qatar Mohamed Saleh told the UK’s Telegraph that the US shale gas revolution will not be a game changer but instead an authentication of the Qatari strategy. The demand for gas has been consistently growing, and Qatar had the flexibility to restructure their LNG marketing strategies to meet the growing demand in other parts of the world. Almost 85% of Qatar gas is converted into LNG and exported via Qatargas and RasGas with the two Qatar companies which have a capacity of 79 MMTPA. It is reported that Qatar exports to Asia are at 73.5% as of 2013; this was a jump of over 20% compared to 49.6% in 2012 (Gilbert and Sovacool, 2018). The increase is driven by an increase in oil and gas production in fewer countries like Iraq, the US, and Canada which have served to reduce the demand for LNG in Europe. Another factor that has triggered the rise in demand is the retreat from nuclear plant following the Russia and Japan incidents.

The CEO of Qatar gas has forecasted an increase in demand in the Asian countries from over 200 million metric tonnes to over 430 by the year 2025. The growing appetite for LNG should be matched with production. Supply should exceed demand for LNG, which will be facilitated by projects under construction in the US and Canada. Based on Qatar projections there is a need for another over 100 Mmtpa of additional not fixed LNG supply to meet world demand by 2025.

"Even if an optimistic view is taken on the number of LNG projects that will go to completion, the LNG market will continue to be tight in the short and medium term as demand growth
outpaces supply," says Al-Thani of Qatargas. This sentiment is echoed by Hamad Rashid Al-Mohannadi, CEO of RasGas: "The greatest risks to ensuring timely supply of new LNG to meet growing global demand are the delay in development of new supply and the associated LNG value chain; escalating development costs and indecision or inability of customers and suppliers to agree mutually on acceptable contract terms."

It seems as if the biggest issue for Qatar to remain the world's largest exporter of LNG will be tight supply, rather than a challenge from North America.

**Figure 2.14 Graph Showing Global Liquid Natural Gas Capacity and Demand**

Figure 2.14 above shows the global capacity as well as the demand for liquid natural gas. It includes the existing, construction, possible, speculative and demand options for the product.
The Compass Points on North Field

Qatar is facing challenges of remaining the world’s leading LNG exporter; this is made difficult due to the moratorium in place since 2005. There is a prohibition on new exploration and development projects in the Qatar North fields. The North is largest globally non-associated gas fields with an estimation of over 900 Tcf. The prohibition was enacted by the primary shareholder Qatar Petroleum, to give them time to study reservoir performance of the Northern Fields. This would allow them to build a world-class gas field that is long-term and efficient.

Notwithstanding the prohibition, production at the North Fields has increased recently (USD 10.4 billion) thanks to RasGas long-term projects, once complete there will be an increase in 1.4 Bcf/d to the overall gas production in Qatar. This gas has been reserved for export outside LNG.

Beside the North Fields, there are explorations going on elsewhere. In 2013, a new gas discovery was reported by Wintershall in Block 4 North directly opposite to the North Fields. The area was named Al Radeer field and had a capability of 2.5 Tcf gas reserve. The main setbacks are developing the gas field. A development plan is required, have it approved, and finally have all done on time. The project is still in development; its production location is unknown.

LNG has been the main source of revenue for Qatar for over 2 decades. Qatar government is planning to reduce financial dependence on LNG to improve sustainability. One way to do this is by developing a globally competitive downstream industry. However, there are other decisions that need to be made considering the increase in global demand for LNG, and the country is well positioned to compete for contracts given their low costs of production and Qatar is almost meeting the capacity-limits on gas production and ought to increase the total allocated domestic consumption, for instance in power generation.
Figure 2.15 above shows all top countries which import oil and gas from Qatar. They include Singapore, South Korea, Japan, India, and North Korea. The Qatar economic advisor and architect of Qatar vision 2030 explain the importance of gas in Qatar context and the importance of being competitive. Doing this simultaneously while diversifying the Qatar economy would be difficult.

2.14.1 More Growth, More Consumption

There are looming problems with the increasing LNG demand and the moratorium on new exploration projects. The prohibitions are causing delays in the increasing volume of gas supply. This will lead to problems related to growing domestic consumption. A major section of the new gas discovery will be used by power and water generation sectors as explained by CEO of RasGas. As Qatar develops the competitive downstream, the RasGAs will be playing a supportive role in operating their plants to meet the increasing demands. The RasGas projects are already servicing the growing downstream sector which has GTL projects.
Once the Barzan project is commissioned, RasGas will provide downstream projects with butane and propane.

**Figure 2.16: Graph showing Qatar’s Natural Gas Production and Consumption between the years 2003-2012**

Figure 2.16 above shows Qatar’s Natural Gas Production and Consumption between the years 2003-2012.

Some sectors of Qatar downstream industry are already flourishing. For instance, Qafco is an established fertilizer company with more than 3 decades in the market. They are currently supplying more than 12% of fertilizer to the US each year. Fertilizers and petrochemicals will play a pivotal role in the Qatar development strategy especially with the budgeted $25 billion investment in the sector. Qatar projects boosting the production to over 20 Mmtpa from 10 Mmtpa by 2020.

The downstream projects create hopes for the future. Extensive marketing, sales, and distribution are required for the new downstream projects to meet the financial obligations of every project. The pre-marketing strategy will be the initial step to bring awareness to the
people, training and communicating with the customers will follow. Global marketing infrastructure is already in place. The growth of the downstream sector will benefit the government, local companies, investors. Discussions on future growth strategies are essential to meet the demand for more growth and consumption.

2.14.2 Taking Qatar Abroad
International growth is the only possible future growth for Qatar gas and oil sector. The Qatar gas and oil sector has reached the potential for globalization. Qatar has consolidated the domestic supply expanding internationally is inevitable as Qatar Petroleum has grown to be the largest LNG supplier globally. To penetrate the international markets, Qatar Petroleum should consider partnerships and seek new markets as they review the value chains and address gaps where they appear. Investment in international projects may change for QP in the coming years. There is no moratorium beyond the Qatar borders. Therefore, the country must look outside domestic markets to maintain global market share and grow as a global force in the LNG market.

Qatar has a global legacy in LNG supply success. Qatar is willing to move forward and internationalize with our primary goal of becoming top in overseas investments. Qatar is looking to expand the downstream segment projects the same as upstream projects. The QIA is focused on both upstream and downstream projects to build greater relationships for the future.

2.14.3 The Birth of a New Regional Hub
Compared to Dubai, Qatar is considering becoming the regional hub headquarters as they diversify their services. Trade and services created Dubai into a trade regional hub. Multinational companies have built their headquarters in Dubai.
Qatar will consider differentiated value proposition to attract large companies in specific industries which will act as a catalyst to sufficient growth of the region. As of now, the incentives are not in place to entice large companies to move their operations to Doha. Over time this will change following the discovery of large gas and oil deposits and successive rapid growth in the sector. In my observation, the overall development in Qatar is still lingering in contrast to the gas and oil sectors.

Qatar is considering R&D as the main focus to surpass Dubai. There are more than 5 global research centres distributed in Qatar and working in areas connected to energy and environment in line with QDG. Another option is building a robust financial sector that will generate revenue for diversification purpose. There has been significant growth in this sector with developed financial institutions and markets. This has been possible through regular issuance of government securities and treasury bills. This will lead to a free-risk yield curve that will assist in the systematic pricing of financial tools. This would help in mobilizing investment resources (Fleming and Minyard, 2005).

Qatar is considering developing a new set of SMEs to avoid overreliance on gas and oil economy. The Qatar Development Bank (QDB) is financing small enterprises and providing non-financial support that will nurture promising investments. Once the SMEs mature and ready to start exporting QDB provide credit, financial and advisory services to enhance their export capabilities.

**2.14.4 Fact box: Qatar's LNG Giants**

QATARGAS

**Shareholders:** Qatar Petroleum, Total, ExxonMobil, Mitsui, Marubeni, ConocoPhillips, Shell, Idemitsu Kosan, Cosmo Oil

**Established:** 1984
Production capacity: 42 Mmtpa

**Leadership:** Khalid Bin Khalifa Al-Thani, CEO

**RASGAS**

**Shareholders:** Qatar Petroleum (70%), ExxonMobil (30%)

Established: 2001

Production capacity: 37 Mmtpa

**Leadership:** Hamad Rashid Al Mohannadi, CEO

### 2.14.5 Oil, Technology, and Implementation in Qatar

Despite the daily gas production, there is a solid level of crude oil in Qatar, with an overall production of 1.55 Million b/d in 2013. Qatar is ranked 16th globally crude oil producer (Slesser, 2015). Al Shaheen is the largest field in Qatar producing over 300k b/d. Al Shaheen has advanced technology to overcome major challenges. For instance, they have been able to drill the deepest wells, implementing the world’s offshore waterfloods that supply over 700k b/d of water in the reservoirs facilitating EOR techniques. Al Shaheen has over 250 wells with over 30 offshore platforms. The company is implementing technology such as swell packers and ICDs that will provide value for the operators through compartmentalization within the reservoir. As reservoirs are either gas or water drive the ICD technology can control what they are producing by controlling either the flow of gas or water. International companies in Qatar provides innovation technologies tested and implemented quickly.

### 2.14.6 Qatar's Oil and Gas

The relationship between leading Qatar and International oil and gas companies is shown in Table 2.3. The comparison considers the downstream, upstream and investments established internationally and in Qatar.
2.14.6.1 SHELL

Shell gas has a stake in Qatar gas. QIA has invested 5% in Royal Dutch Shell.

Research & Technology Centre in Qatar

Pearl GTL - run as a production sharing agreement between QP and Shell

Parque das Conchas, offshore Brazil: Shell, 50%, QPI, 23%

Petrochemical JV with Shell and QPI in Singapore

Shell/QPI/PetroChina JV for a Chinese refining complex in central China

2.14.6.2 TOTAL

Qatar Investment Agency has a 3% stake in Total

The total has a stake in Qatargas

25% equity in Qatar Block BC

40% interest in Al Khaliq oil field in Qatar

Total Science & Technology Park based in Doha

20% interest in Mesaieed LDPE plant with Industries Qatar

10% in Qatargas-operated Ras Laffan condensate refinery

49% in Qatofin venture with QAPCO and QP: includes ethane cracker in Ras Laffan, the

128km pipeline from Ras Laffan to Mesaieed, and downstream LLDPE unit

Mauritania - 2 exploration blocks: QPI has a 20% stake, Total a 60% stake

QPI has a share subscription of 15% to Total E&P Congo: 9 producing assets and 3 exploration

licenses

2.14.6.3 ExxonMobil

30% stake in RasGas

ExxonMobil has a stake in Qatargas
7% stake in Barzan gas project with QP

10% in Qatargas-operated Ras Laffan condensate refinery

ExxonMobil Research Qatar

Condensate refinery project - 10% interest, another partner Qatargas

3 LNG receiving terminals in Europe & the US with QP: Adriatic (Italy), South Hook (UK), Golden Pass (Texas, US)

2.14.6.4 WINTERSHALL

80% of exploration Block 4 North in a PSA with QP

The operator at exploration Block 3

2.14.6.5 MAERSK

PSA with QP since 1992 at the Al Shaheen oil field

Maersk Oil & Technology Research Centre in Qatar

2.14.6.6 GDF SUEZ

60% stake in Qatar Block 4 with QP and PetroChina

The operator of Ras Laffan B and C, integrated power and water plants

2.14.6.7 ORYX GTL plant, a joint venture between Sasol & QP

2.14.7 Qatarization - benefits, and challenges

The vision 2030, has a strong emphasis on Qatarization. Qatarization is increasing the national content in their departments and partnerships. These are some of the opinions of the key players:
"The QNV2030 is clear about the need to increase the effective participation of Qatars in the labour force. Presently, the available skills of nationals do not always match those demanded by potential employers. Qatarization is best interpreted in terms of building the nationals' skillsets, empowering citizens to participate and contribute effectively to the economy and society." - Saleh Al-Nabit, minister of development planning and statistics of Qatar. Another trend affecting the energy industry in the Gulf is the structural weakness of its labour force.” Qatar may be surprised by the economic challenges as they have observed high rates of growth due to the oil and gas prices and higher costs of production. The private sector is on the front line in creating employment, but the citizens are reluctant to participate.

According to - Hilda Mulock Houwer, partner & global head of advisory, energy & natural resources, KPMG, "We are very pleased with the quality of the people we are getting in, but a simple challenge is an availability, given the size of the Qatari population. A number of years ago it was much the quantity the number of people, employed-but I think everyone recognized that there simply aren't enough people to go around. Recently, the focus has been much more on recruiting, developing and retaining high-quality performers and getting them into leadership positions." - Lewis Affleck, managing director, Maersk Oil Qatar

"There is always a danger in employing expatriates, as they never stay forever, and this is a business that thrives on continuity. We have people who need to understand the asset, operate it well, and grow their career taking care of that asset and taking care of the people involved. For that, the best is without any doubts the Qatars: they are the ones that want to live here permanently. They have family equity. When I have Qatari leaders who are able to take this company forward, that makes my business better." - Wael Sawan, managing director and chairman, Qatar Shell Companies.
2.15 Health Safety Environment (HSE) in the Middle East

Joseph Brincat is Vice president of ABS in the Middle East region. He was transferred from Europe to Dubai in 1997. ABS has opened engineering offices to offer centralized services in the Middle East. Another office was opened in 2012 in Fujairah to enhance regional expansion. ABS clients have recorded a positive response. ABS is well-equipped with the largest team of surveyors and engineers in the region and over 10 offices in 6 countries.

In UAE, all the offshore drilling are built under the specifications of ABS as it has gained international recognition. The company was named as the best in 2013 at the International Marine awards and Lloyd's List Middle East and Indian Subcontinent Awards. ABS was also awarded the Safety and Quality awards in Indian subcontinent awards. All these awards have recognized the contributions of ABS in the UAE region. The company has expanded its training capabilities and workforce to direct challenges facing the oil and gas industry.

"Safety is the bylaw and driving force behind every interaction we are involved in, from our own headquarters to our far-flung research centres to every touch point where ABS and its global clients meet," says Brincat.

2.15.1 Optimizing operational efficiency

There has been observable fluctuation in the price of oil per barrel from $120 which has led to an increased struggle in some companies who are striving to adjust the drop in oil prices. Some companies have been forced to reduce drilling and production rendering them bankrupt. The oil industry in the past has been characterized by booms and busts. The drop in oil prices surprised everyone. Companies that are used to higher margins have the tendency to overlook operational efficiency. The drop should be a wake-up call for oil and gas industries to apply technology to enhance operational efficiency. The companies with the lowest cost of production are always the winners and companies should not overlook technologies that create
operational efficiency. It is a key requirement for organizations to improve efficiency both onshore and offshore.

2.16 Recent History

From the 1950’s most of the oil and gas industry innovations were focused on offshore drilling. However, things took a twist a decade ago when companies developed technologies to drill oil from shale. This was considered uneconomical but turned to be cost-efficient through exploration processes. In 2013-2014 the shale reached its peak and so did the infrastructure investment to maximize this new source of production. This approach made North America successful, and for the first time in 5 decades, the US turned into a net exporter.

Intricate geopolitical factors made the prices to drop through increased competition by Middle East oil who decided to drop the price of the oil. The results were so serious even with the advanced technology it turned prohibitive. In the modern day, oil has dropped below $50 per barrel due to the devaluation of Yuan, uplifting sanctions on Iran among other factors leading people to worry how far will the prices drop. Numerous companies in the US that had invested in the shale are now struggling to sustain their operations at lower production costs.

All this has triggered the urgency to use the available tools to get much from the industry. The questions being how and where to cut costs, increase output and improve efficiency. Companies are obliged to look into their business operations efficiency.

2.16.1 The Opportunity

As provided by data Gartner (DOF) survey 2014, Upstream companies continuously invest in digital field technologies for the purpose of:

- Of the respondents 37% top priority was to increase production optimization
- 29% of the respondents had their priorities on improving operational efficiency
• 20% of the participants top priority was reducing costs

The rewards if the priorities are well implemented are high; for instance, the bottom-line benefits can accrue from reduced production costs and increased production. With the latest technology innovations applying software to monitor workflow is the greatest decisions a company can make to turn-around their performance.

2.16.2 Analytics for Downtime Reduction and Production Optimization

Managing, tracking and reporting are the primary challenges oil and gas industries encounter, this later affects their ability to optimize their performance. This leads to higher maintenance costs and lower revenue.

Downtime reduction

This has been a long-term goal for every oil and gas manufacturing company. Downtime has been captured through continuous analysis to identify the main causes and sources of downtime. This enables companies to identify and prioritize the wells with the highest impact to get more attention to minimize loss and get activities running quickly (Jennions, Esperon-Miguez, and John, 2013). Better tracking and reporting companies with downtime have saved some individual companies as much as $100 million yearly.

Production optimization

This involves the various activities of measuring, analyzing and prioritizing actions to help boost production in a field. Low production fields are discovered easily and the root cause of the production anomalies. Reviews on each well are normally conducted 2-3 times a year due to their expansiveness and time consumption.
Product optimization is a necessity to recover from developed fields and to maximize returns. This may involve production debottling, preventing organic and inorganic deposition near the oil well, among others. Production optimization can be enhanced through technologies, by producing real-time production data, well productivity through well inflow performance using the Nodal analysis. This has been accredited with improving performance by close to 20%.

2.16.3 Process Efficiencies and Drilling Program, Well Delivery Acceleration

Adoption of software has enabled automation and streamlining of drilling tasks and various activities such as project development, Study of soil and rocks, production and regulations. This has facilitated the management of activities in one platform. This software help minimize the average time associated with drilling by 5% enabling companies to reach their targets within short periods of time. Adoption of technology has enabled reduction of expenses from $120,000/rig to $30,000/rig to generate millions of annual savings.

2.16.4 Analytics Modules for Optimizing Project and Vendor Spend

Mismanagement leads to huge losses given the amount and number of transactions. In most cases, organizations with huge spending fail to monitor transactions properly. This places them at risk of overspending. For instance, a known company in upstream exploration had a market capital of more than $20 Billion and was increasing through acquisitions and activities. They began losing focus into how they manage their vendor spending; this led to inefficient procurement processes, continuous delays in vendor, material delivery time and lack of focus on vendor performance measurements. The company, however, re-engineered their processes and automation facilitated in a 20% reduction in eccentric expenditure.
2.16.5 Summary
The world today focusses on reducing production costs and increase productivity. For oil and gas companies to succeed in this environment they must:

- Facilitate the transformation of their companies to be driven by data-analytics to adapt to the evolving business and technology landscape
- Appraise the achievable projects, the easy to implement with low disruptions
- Employ traditional technology solutions specifically designed for oil and gas so as to achieve ROI on time

If utilized properly, technologies that channel data to the decision makers will push for better and faster decisions by proper use of assets, reducing costs while increasing production, and improving efficiency. With the improved technology if prices go to $120/barrel, the companies would hit higher profit margins.

2.17 Health & Safety Environment in Oil & Gas: Key Risk Management Indicators:

ORYX GTL

2.17.1 Introduction
As the economy of Qatar is growing so are the HSE regulations. The need for a strong HSE is becoming evident ensuring compliance with the required provisions of different laws and regulations. HSE has to ensure the environment is conserved, health and safety and oil spill emergency preparedness as well as quality assurance.

HSE contribute to the development of centralized HSE legislation. ORYX GTL has a unique method to safety and ensuring a world class-performance that meet the employees, stakeholders, and other interested entities expectations. High safety culture was initiated by the CEO in 2009. The programme was called “Road to Zero HarmCampaign”. The main goal of the programme is to implant the company shared value of “Safety is our Way of Life.”
The programme over the last four years has recorded a steady improvement in achieving the company shared value. In simple words, more than 90% of employees believe that the company never compromises on safety, while another over 90% specify that management always responded on time on safety matters.

As illustrated in Fig. 2.17 in 2010 staff believed in safety accountability, and for the safety of those around them, this was the second top-scoring question.

**Figure 2.17: ORYX GTL Company Engagement Survey 2010**

Source: ORYX GTL (2012)

The programme strategy contributed to keeping the company injury-free driving the TRIR to zero. This achievement made the company a third-ever in Qatar to achieve this milestone. In addition to this achievement, the company has worked over 10 Million hours to-date without any recordable incidents.

**2.17.2 Performance Enhancement**

Fig. 2.18 below is the summary of the 2011 Company Engagement Survey clearly showing
company safety culture as being the top scoring subject, which is an improvement on the previous year and further demonstrating human behaviour changes in progress.

Fig. 2.19 below is the summary of the 2012 Company Engagement Survey clearly showing the company safety culture stronger than the previous year with staff reporting they continue to perceive ORYX GTL as a safe and responsible place to work. Social, environmental and financial benefits are realized through enhanced employee awareness and belief, zero financial impact through accident loss and zero harm to the environment. This has bred a more socially aware employee who is willing to take safety on as a way of life and in doing so, transfer their knowledge to their peers and reports in a professional and confident manner.
Figure 2.19: ORYX GTL Company Engagement Survey 2012

**Dimension Summary**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Rating</th>
<th>Diff to 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Culture</td>
<td>90</td>
<td>+2</td>
</tr>
<tr>
<td>Responsible Business Practices</td>
<td>84</td>
<td>+1</td>
</tr>
<tr>
<td>Teamwork</td>
<td>78</td>
<td>+2</td>
</tr>
<tr>
<td>Leadership and Vision</td>
<td>78</td>
<td>-2</td>
</tr>
<tr>
<td>Job Challenge</td>
<td>78</td>
<td>+1</td>
</tr>
<tr>
<td>Quality</td>
<td>75</td>
<td>-2</td>
</tr>
<tr>
<td>Tools &amp; Resources</td>
<td>74</td>
<td>+4</td>
</tr>
<tr>
<td>Immediate Manager</td>
<td>71</td>
<td>+1</td>
</tr>
<tr>
<td>Fair Treatment</td>
<td>70</td>
<td>-4</td>
</tr>
<tr>
<td>Communication</td>
<td>98</td>
<td>-4</td>
</tr>
<tr>
<td>Efficiency</td>
<td>66</td>
<td>+2</td>
</tr>
<tr>
<td>Managing Performance</td>
<td>85</td>
<td>+1</td>
</tr>
<tr>
<td>Employee Development</td>
<td>63</td>
<td>+1</td>
</tr>
<tr>
<td>Alignment</td>
<td>58</td>
<td>-1</td>
</tr>
</tbody>
</table>

**Good News**
- Staff continue to perceive ORYX GTL as a safe and responsible place to work
- The majority of dimensions have seen an improvement since 2011

**Bad News**
- Managing performance is still one of the least positively scored dimensions
- New dimensions on Staff Development and Alignment score relatively low

Source: ORYX GTL (2012)

Figure 2.20: Safety-Related Questions Answered by ORYX GTL Employees,

**Key Strengths are maintained**

<table>
<thead>
<tr>
<th>Safety Culture</th>
<th>Ethical Business Dealings</th>
<th>Effective Leadership</th>
<th>Confidence in the Survey Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q034 Management responds quickly when safety problems are discovered where I work.</td>
<td>Q033 ORYX GTL acts responsibly in relation to the environment.</td>
<td>Q022 I have a good understanding of ORYX GTL’s business goals and strategy.</td>
<td>Q032 Do you believe the results of this survey will be used constructively by Management?</td>
</tr>
<tr>
<td>93</td>
<td>93</td>
<td>89</td>
<td>91</td>
</tr>
<tr>
<td>93</td>
<td>93</td>
<td>93</td>
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<td>93</td>
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<td>91</td>
</tr>
<tr>
<td>93</td>
<td>93</td>
<td>93</td>
<td>91</td>
</tr>
</tbody>
</table>

*items ranked by % favourable responses

Source: ORYX GTL (2012)
Figure 2.20 above shown above are the top scoring safety-related questions answered by employees, which clearly shows the strength, depth and sustained safety culture in ORYX GTL for the last three years.

2.17.3 Transferability

The programme “The road to Zero Harm Campaign” initiated during November to December 2009 was created with the purpose of putting safety into focus employing a number of easy strategies, an individual and executive charter were in place. This raised the focus of executive management commitment and demonstrated to their staff and contractors that safety is the first priority. The programme was aimed to lower the company’s TRIR to zero, which clearly indicated that the management and employees were fully committed to employee safety to improve the safety culture.

The “Road to Zero Harm Campaign” brought new challenges both of system, cultural and human resources natures. With nearly forty different nationalities in the company, the challenges identified varied considerably. These had to be addressed on a constant and daily basis, many of them by the small team of Health Safety Environment (HSE) professionals who were present in all required site meetings either to answer questions on the spot. They also provided and presented information and technical support on the ground transferring information continuously throughout the varying cultures. None of this is new, however, it was there, it was visible, and it was successful.

Safety interactions mediums such as Root Cause Analysis (RCA), Behavioral Based Safety (BBS), Department Heads Safety meetings, HSE Control, and Risk meetings, and Safety Awareness monthly campaigns directly linked to BBS, one on one coaching provided by the HSE Team were all provided and reached the whole company using many communications.
mediums. From the offset of the “Road to Zero Harm Campaign” at all times all management and employees were strongly encouraged to take all safety challenges seriously with no compromises, and further was required to raise safety concerns as they arose, and take action to mitigate or report them for action.

From December 2009 a thorough HSE documentation review was also undertaken, apart from updating, the aim was to make HSE standards and procedures more user-friendly. This work had to be combined with incorporating new decrees, legislation, standards, and procedures from government bodies in Qatar. The sheer volume of work and effort required to complete this took over two years and is still ongoing. The demands upon the HSE team were higher than those normally expected of any team at that time and particularly when normal work activities still had to be completed in the extremes of weather conditions that only Qatar can produce.

There were no secret recipes used to meet the challenges ORYX GTL faced, but by applying first-class leadership, ensuring transparency at all times and really putting safety first encouraged and inspired our employees to react positively and responsibly. The systems and methods used have all been used elsewhere in the O&G industry and are therefore by default transferable. ORYX GTL had the courage to take elements of those systems, piece applicable and relevant items together, formulate a strategic plan and roll it out using strong and capable leadership at all levels, whilst never missing an opportunity to build upon a rapidly improving safety culture.

Fig: 2.21 below shows the Health Safety Environment Strategy 5-year plan showing year-by-year priority elements identified as key to improving safety culture, build confidence through employee and contractor training and improve safety systems.
The one-year plan which is also developed for environmental, health and security departments as well shows the planned campaigns to be undertaken and initiatives and strategic elements to be monitored and measured through the year. Successful implementation (or not) of these elements is reflected in management tracking meetings and directly in HSE employees annual personal assessments as Key Performance Indicators (KPIs). The idea was to help the employee understand that their job is directly related to safety and building in KPI’s into their Annual Assessment plans it was possible to encourage, measure, and improve individual performances.

Fig: 2.22 below shows part of the 71 planned, implemented and measured initiatives and campaigns selected for the 2012 plan showing progress against the planned activity.
2.17.4 Improvement Plan Tracking by Leadership

The HSE Manager and direct reports meet every week to measure the progress of initiatives against the plan. When a specific action is found to be lagging, a recovery plan is agreed upon and put into place by the responsible HSE team member.

The Chief Operations Officer and HSE Manager meet every month to review the progress of initiatives against the plan and to review resource requirements. Specific results are cascaded up to the Chiefs weekly Meeting and were applicable to the Exco meeting each quarter.

Source: ORYX GTL (2012)
2.17.5 Reputation

As a company, ORYX GTL has embraced the challenge of turning around its own safety culture and has visibly driven it towards excellence. This is a clear and visible statement of total commitment. Employees are now willing to take on HSE issues and work them as individuals or as a team because the new-found knowledge has given them the confidence and tools to succeed and be recognized by the company in doing so. Through strong leadership, transparent well-communicated information and management instilling the desire to continuously improve, employees now in their role in HSE.

The results of the Road To Zero Harm campaign has brought ORYX GTL local, national, international and self-recognition and has proven its self as a company leading the way to a safer more sustainable future.

Self-recognition this year was celebrated with our contractors twice this year with well-received 650-person Gala Dinners during which ORYX GTL recognized both its employees and contractors dedicated contribution toward safety excellence. Recognition Awards were presented to contractors and employees by the CEO during both events in top hotels in Doha.

OTX GTL has certified its reputation as the safest and production company in the world by winning two coveted Sasol awards. The first award the company was honoured as the safest team (Sasol safety Badger) and the second award as the Sasol Badger production team. There are six Sasol Badger awarded yearly to the teams, partnerships and companies competing globally for honours in services, innovations, safety, best project, among others. The journey to becoming a safety team in ORY GTL began when the programme to zero harm was initiated.

The company is the second in history to achieve a zero TRIR. This success was hailed by the Minister of Energy and Industry. This played a role in establishing the company as a world-class.
International recognition gained on the world O&G stage is currently enhancing the reputations of those connected with ORYX GTL whether in Qatar or outside it. Clearly, this is demonstrable proof that ORYX GTL’s Safety performance is recognized internationally and is playing a key role in enhancing the HSE reputation of the O&G industry in Qatar.

2.17.6 Innovation
The company soon realized they had a winning solution when their leading indicators started to positively affect lagging indicators. Improvements month upon month and year upon year had an exciting snowball effect throughout the company who soon realized that success was not only attainable but imminent if they persevered and delivered the targets and objectives they had planned.

Through careful selection of proven and previously tried and tested campaigns, initiatives and ideas that were identified as being ideal to help create the changes needed within the company, ORYX GTL developed a strategy, support plans, milestones and the right leading indicators that would help to identify, track and monitor other challenges they were faced with. These combined with their 71 objectives and targets became the measurement needed to “see” visible improvement and communicate positive results across the company.

The company safety leading indicators were chosen for their ability to provide an overview of the current status and improve safety in helping to steer the company toward a safer working environment. They also provide management with a “safety status health check” and provide an early warning of any trends potentially affecting business.

HSE Leading Indicators are reviewed and agreed on every year by the Operations Management Team to ensure that any significant changes in the management of safety brought on by governmental decrees or agencies, shareholders or other legal entities which may affect KPI
calculations during the following year are considered for effect, and adjustments made to keep them specific, measurable, attainable, realistic and timely (SMART).

Two levels of HSE Leading Indicators are developed annually. The first higher level of Leading Indicators supports the Chief Operations Officer Quarterly Monthly Operating Reports, which in turn supports the company Score Card. The second level of Leading Indicators contained in the HSE Department Quarterly Monthly Operating Reports cascades results up to the Chief Operating Officers QMOR.

2.17.7 Management Tracking Leading Indicators

Leading KPI’s in the COO’s QMOR are tracked and reviewed both monthly and quarterly by all Operations Managers, trends are discussed, and actions to get back on track are assigned where required. Actions are reviewed during the same meeting which allows progress to be monitored and also encourages closure.

Figure 2.23 below shows a selection of leading and lagging indicators from the COO QMOR and good evidence of tracking in place.

**Figure 2.23: KPI, UOM, and Targets – Jan-Jul 2010**

<table>
<thead>
<tr>
<th>KPI</th>
<th>UOM</th>
<th>Target</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>TRIR (inclusive of contractors)</td>
<td>rate</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>12</td>
<td>Environmental Index</td>
<td>%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>13</td>
<td>Percentage Closure of listed safety defects for month</td>
<td>%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>14</td>
<td>Number of overdue audit findings (all audits included)</td>
<td>no</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: ORYX GTL (2012)
Fig. 2.24 below shows an early selection of the HSE leading and lagging indicators from the HSE QMOR and evidence of tracking in place.

**Figure 2.24: HSE Leading and Lagging Indicators**

<table>
<thead>
<tr>
<th>Source: ORYX GTL (2012)</th>
</tr>
</thead>
</table>

### 2.17.8 Supporting Documentation

#### 2.17.7.1 Incident Investigation and Sharing of Learning

The DNV Root Cause Analysis process is used as part of the Incident Management Cycle (see fig. 3) to investigate and analyze incidents with a severity level of 3-1 for process incidents and for severity a level of 4-1 for HSE incidents similar to the Sasol system.

Root Cause Analysis (RCA), qualified team leaders from the operations group, are assigned to lead the RCA team throughout the incident investigation process, they comprise of company SME’s, key personnel involved in the incident and contractor supervisors responsible for the work area to ensure that root causes are determined correctly. The process not only identifies root causes, but it also guides the team to reach the correct mitigation actions and potential learning points for further communication.

The ORYX GTL standard is designed to describe the interface between Incident Management, Emergency Preparedness, Crisis Management, and Business Continuity.
By following the Incident Management Cycle and by including third-party contractors in incident investigations and RCA’s, the process to ensure that everyone involved participate, understand and work toward a safer workplace is reinforced.

**Figure 2.25: The Incident Management Cycle**

Source: ORYX GTL (2012)

Figure 2.25 above illustrates the Incident Management Cycle showing the chain of events initiated upon an incident occurring within ORYX GTL operations.
Figure 2.26: Incident Notification, Investigation, Emergency Response, and Business Continuity

Source: ORYX GTL (2012)
Figure 2.26 above shows a diagram illustrating the Interface relationship between Incident Notification, Investigation, Emergency Response, and Business Continuity.

During an incident in 2010, a contractor suffered a thumb injury whilst loading a catalyst crushing machine. The subsequent incident investigation and Root Cause Analysis (RCA) revealed several areas highlighted for improvement actions. In housework carried out by the Operations Team ensured that the correct modifications were successfully carried out and the machine made safer as a result. Secondly, the type of catalyst used was investigated with the objective of introducing catalyst that did not need crushing at all. After an exhaustive investigation, consultation and trials “catalyst candles” were approved by management as being a safer and cleaner alternative. ORYX GTL now only uses 50% of rock catalyst that needs crushing and is in the process of using the remaining “drummed catalyst” until the stock is consumed.
Figure 2.27: Results of another successful Root Cause Analysis

Source: ORYX GTL (2012)

2.17.9 Process Hazard Analysis

ORYX GTL has its own Process Hazard Evaluation Standard that outlines the PHA process within the company. This standard refers in part to already existing methodologies including
qualitative and quantitative methods. These are vigorously used on a continuous basis as either part of the Management of Change MOC process, incident investigation RCAs, for revalidation of the existing design or for operational risk management. These methods to date include:

**SR (Safety Reviews)** which are conducted as part of the MOC process for all Management of Change projects. The designated owner of a MOC is required to schedule and conduct a Safety Review for the MOC before it can proceed to Gate 3 approval, which includes a Safety Review Checklist and supporting documentation. Issues raised in the Safety Review are flagged on the checklist for action and requirements for HAZOPS, SILs, constructability reviews, etc. are stated where relevant.

**HAZOPS (Hazard and Operability)** for all units were conducted as part of the detailed design of the plant and are archived and well documented since 2007. HAZOPS are used by engineering through the MOC process so that new changes to the plant are also reviewed by an independent 3rd party. Revalidation of the entire plant HAZOPs is due, and reviews are to be scheduled for 2013.

**SIL (Safety Integrity Level)** are partially documented from the original design and are not as complete as the original design HAZOPs for all SIFs (Safety Instrumentation Function). However new projects through Engineering and initiatives from Maintenance have ensured that SILs for all critical systems are determined and maintained and well documented.
HAZIDs (Hazard Identification) has been conducted since 2011 and are relatively a new PHA method in the company. They are primarily used for projects and for risk management of non-routine and high-risk activities.

QRA (Quantitative Risk Analysis) has been conducted for the entire plant operation recently in early 2012. The basis of design Consequence Modelling of fire and explosion was conducted by Technip, and the recent update includes a more comprehensive review including calculation of worker exposure risks at each Unit.

FMEAs (Failure Mode Effects Analysis) – This method is used extensively by the Technical and Maintenance Departments when conducting RCAs of process incidents, and also assessing identified Bad Actors from the number of SAP notifications on some equipment for improvement initiatives. These are archived in various places and are not conducted according to one procedure; however, plans are in place to rectify this.

2.17.10 Examples of Recent Preliminary Hazard Analysis Processes (PHA) Conducted

HAZOP and SIL assessment rating of new ESD valve on GOX supply line separating GASAL plant (Air Liquide) with ORYX GTL. Assessments conducted by a 3rd party on behalf of the design company Ramboll for ORYX GTL and GASAL. Original SIL Assessment identified the need for isolation of oxygen from GASAL to avoid Production trips when oxygen cutback is required. An existing control valve on the GASAL side was used as a shutdown valve, which does not meet the requirements of SIL 3 and is also not considered a good practice to use for emergency shutdown. The HAZOP helped identify the requirements, including specific GASAL requested Gaebler valve for oxygen service, ensuring both a Safe design and minimization of Production losses.
Comprehensive Quantitative Risk Analyses for ORYX GTL completed early in 2012 for the plant based on calculated leak frequencies generated from P&ID parts counts and generic leak database. The risk analyses helped identify Major Accident Hazard risks of all Units, including toxic gas releases, explosions, BLEVEs and fires. These risks have been flagged, and actions and findings from the QRA reports have been escalated to Senior Management. An example is buildings within Overpressure contours above 70 Mbar which now must undergo a review of their structural integrity and siting of temporary buildings between 30 Mbar and 70 Mbar which now must come with mitigative controls in place. These findings and actions for improvement ensure a safer work environment for all Personnel at the plant by minimizing the catastrophic effects of a major explosion.

Figure 2.28 in the chart below shows a graph illustrating the cumulative leak frequencies for all plant units and showing frequency and unit type.

![Chart Showing Graph Illustrating the Cumulative Leak](image)

Source: ORYX GTL (2012)

### 2.18 Process Safety Information Sharing

Sharing of Process Safety Information in the company is done through a number of forums. The HSE Department spearheads some of the main forums including:
**Monthly RLIC Risk Forum** meetings discuss risk management throughout Ras Laffan City with End-users. This monthly Forum also feeds back to ORYX GTL and encourages access of process safety information internally as well as externally to our facility neighbours.

**Monthly PRC (Production Risk and Control)** meetings between Safety and Operations departments are used to raise concerns on Process Safety issues, amongst others, and ensures openness and awareness and timely responses.

**Quarterly Operational Risk Register Committee** meetings have recently been started to review actions from all risk assessments logged in the Operational Risk Register including Environmental Risk Assessment, Safety Risk Assessment, QRA reports, and QRA HAZID, and will eventually include outstanding actions from all HAZOPs and other PHA risk assessments conducted in the future. A Task Force has been established to review actions, risk rank them and escalate critical risks to the responsible Department’s Objectives and Targets and Business Planning’s ERM (Enterprise Risk Management) project.

Process Safety sharing is also evident through the Incident Investigation procedure of Process Safety Incidents. This is often dependent upon licensor openness to disseminate licensor confidentiality and failure analyses conducted which unfortunately does not always occur. Licensor representation from Sasol does allow, however, for requests to be made directly.

Process Safety sharing and awareness through Training is limited to Orientation for new employees and Contractors on site, for Production staff training and indirectly through HSE training requirements (e.g. Permit to Work, JHA). Improvements in sharing Process Safety Awareness are planned for 2013 through the HSE department.
2.18.1 Safety Performance Results

Figure 2.29 above shows a diagram illustrating the process of safety managed elements. Some of the examples of the managed safety elements have been underlined in the diagram.

In the last financial year, the Recordable Case Rate (RCR) of ORYX GTL has improved from 0.18 (end June 2011) to 0.05 (end June 2012). This is an improvement of 72% from the end of June 2012 and 94% from the end of June 2007. The Sasol Group target was 0.34 for the end of June 2011 to end June 2012. See Figure 2.30, below.

Figure 2.30 below shows the current financial year (2012), already, from July 2012 to November 2012, Figure 22 shows that the RCR has improved from 0.05 (end June 2012) to 0.00 (end August 2012). The current TRIR as of November 2012 remains at Zero, and ORYX GTL aim to continue the trend.
The oil and gas industries in Qatar, the whole of the Middle East, and indeed, the whole world take Risk management and Health and Safety very seriously. ORYX GTL is no exception as this gas and oil organization has put in place many risk management and health and safety projects throughout the industry. This has prompted the ORYX GTL oil and gas company to manage risk better and offer the best health and safety practices in what they do.

ORYX GTL has a proven record oil and gas producing rate of 31,972 barrels per day. In the year 2009, there were no planned shutdowns within the industry. That year, ORYX GTL’s average oil and gas production was 22,400 barrels per day. The company reckons that, with the current level of excellence they display with their project operations, they are set to achieve a delivery target of 88% overall equipment effectiveness (OEE). The company, however,
reckons that this leaves a gap of 5,700 barrels a day to close. The company is determined to achieve this because the gap has a value of approximately US$100 million to the company.

The company has a major objective of implementing a sustainable culture of continuous improvement. See Figure 2.31 below which illustrates ORYX GTL’s determination to continue implementing a sustainable culture of realistic improvement of HSE within its operations.

**Figure 2.31: Sustainable Culture of Continuous H&S Performance**

Source: ORYX GTL (2012)

Figure 2.31 above shows ORYX GTL’s step-by-step approaches to achieving operational health and safety excellence focusing on performance, maintenance of standards, production optimization, value engineering and self-learning organization all emanating from short-term focus, production focus, process stability, continuous improvement, and operational excellence respectively.
The element of the ORYX GTL immediate project objectives includes following operating procedures to the letter. This is to engender consistent and effective risk management and health and safety operation throughout the industry. This includes the use of short interval controls to stabilize the production process. It also includes the clarification of major roles and responsibilities in the risk management and health and safety operations within the industry, measure which in themselves enhance the alignment of operations, maintenance, and reliability among others.

The immediate project objectives include the implementation of a production loss accounting system and problem-solving; improvement and maintenance’s work management system. These include Planning and scheduling, Work prioritization, Work order close out, Supervising work execution, Always doing the “right work”, Implementation of a contractor management system and the Use SAP to drive operations.
Figure 2.32: The ORYX GTL Strategy Map 2014-2020

Figure 2.32 above shows the enhanced overall ORYX GTL strategy map for the 6-year starting from the year 2014 and ending in the year 2020.
Figure 2.33: Achievement Standings/Rates of Objectives at ORYX GTL

<table>
<thead>
<tr>
<th>Code</th>
<th>Statement</th>
<th>Admin</th>
<th>Qor</th>
<th>Pro</th>
<th>Ref</th>
<th>Dme</th>
<th>ERC</th>
<th>MRC</th>
<th>BMD</th>
<th>DET</th>
<th>Omg</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Maximize Margin</td>
<td></td>
<td></td>
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<tr>
<td>C1</td>
<td>Satisfy the Customers with Our Valuable Products</td>
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<tr>
<td>F1</td>
<td>Match Product applications with Demand</td>
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<tr>
<td>F2</td>
<td>Discover Opportunities in Target Markets</td>
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<tr>
<td>F3</td>
<td>Optimize Volume &amp; Cost</td>
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<tr>
<td>F4</td>
<td>Be a Reliable Supplier of Quality Product</td>
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<tr>
<td>F5</td>
<td>Increase Efficiency</td>
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<td>F6</td>
<td>Commericalize byproducts</td>
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<tr>
<td>F7</td>
<td>Embedded HSE as Our Way of Life</td>
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<tr>
<td>F8</td>
<td>Upgrade Production Technology to Meet Strategic Needs</td>
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<tr>
<td>F9</td>
<td>Become the Selected Company for Expansion (CEO)</td>
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<tr>
<td>C3</td>
<td>Become a Recognized Contributor to Qatar</td>
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<tr>
<td>P10</td>
<td>Strengthen Engagement with Shareholders</td>
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<td>P3</td>
<td>Partner with the Key Stakeholders including CSR</td>
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<td>P4</td>
<td>Be Internally Ready for Expansion</td>
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<td>P5</td>
<td>Enhance IT Infrastructure</td>
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<td>P6</td>
<td>Evolve Customer Focused Support Functions</td>
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<td>P8</td>
<td>Be the Employer of Choice</td>
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<td>P9</td>
<td>Nurture Qatari Talent</td>
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</table>

Source: ORYX GTL (2012)

Figure 2.33 above shows the achievement standings/rates of objectives of the various functional operations with the overall risk and management projects.
Figure 2.34: Achievement Theme Market Standings/Rates of Objectives at ORYX GTL

Figure 2.34 above shows strategic market theme encapsulating the main strategic objectives description and key performance indicators.

Source: ORYX GTL (2012)
Figure 2.35: ORYX GTL’s Theme Excellence Strategic Objectives and Key Performance Indicators

Figure 2.35 above shows strategic theme excellence encapsulating the main strategic objectives description and key performance indicators.

Source: ORYX GTL (2012)
Figure 2.36: ORYX GTL’s Strategic Theme Expansion Objectives and Key Performance Indicators

Source: ORYX GTL (2012)

Figure 2.36 above shows strategic theme excellence encapsulating the main strategic objectives description and key performance indicators.
Figure 2.37: ORYX GTL’s Organisation Strategic Theme Expansion Objectives and Key Performance Indicators

Source: ORYX GTL (2012)

Figure 2.37 above shows strategic theme excellence encapsulating the main strategic objectives description and key performance indicators.

2.19 ORYX GTL Specific Risk and Hazard Analysis

2.19.1 Profile of Oil & Gas in Qatar

ORYX GTL is a joint venture between Qatar Petroleum (51%) and SASOL of South Africa (49%) and the first of a series of planned GTL production facilities in the State of Qatar, representing an investment of around 1.2 billion USD. The plant was designed, built and commissioned under a turnkey contract with Technip Italy. The plant was the world's first commercial-scale GTL plant to be commissioned and is based on a large scale-up of existing prototype technology at SASOL facilities in South Africa.
The ORYX GTL facility primarily manufactures high-quality low Sulphur grade diesel and naphtha from natural gas; other products include LPG by-products. The source of the natural gas is the north field gas site north-east of Qatar. Natural gas is reformed in the presence of oxygen and steam to form Syngas which is reacted in a Fisher-Tropsch reactor to form long chain waxes. The waxes are then cracked and fractionated to form Naphtha and Diesel. Total production volume is estimated to be 34441 barrels per day.

2.19.2 Process Hazard Analysis

ORYX GTL has its own Process Hazard Evaluation Standard that outlines the PHA process within the company. This standard refers in part to already existing methodologies including qualitative and quantitative methods. These are vigorously used on a continuous basis as either part of the Management of Change MOC process, incident investigation RCAs, for revalidation of the existing design or for operational risk management. These methods to date include:

1. Safety Reviews which are conducted as part of the MOC process for all Management of Change projects. The designated owner of a MOC is required to schedule and conduct a Safety Review for the MOC before it can proceed to Gate 3 approval, which includes a Safety Review Checklist and supporting documentation. Issues raised in the Safety Review are flagged on the checklist for action and requirements for HAZOPS, SILs, constructability reviews, etc. are stated where relevant.

2. HAZOPS (Hazard and Operability) for all units were conducted as part of the detailed design of the plant and are archived and well documented since 2007. HAZOPS are used by engineering through the MOC process so that new changes to the plant are also reviewed by an independent 3rd party. Revalidation of the entire plant HAZOPs is due, and reviews are to be scheduled for 2013.
3. **SIL (Safety Integrity Level)** are partially documented from the original design and are not as complete as the original design HAZOPs for all SIFs (Safety Instrumentation Function). However, new projects through Engineering and initiatives from Maintenance have ensured that SILs for all critical systems are determined and maintained and well documented.

4. **HAZIDs (Hazard Identification)** has been conducted since 2011 and are relatively a new PHA method in the company. They are primarily used for projects and for risk management of non-routine and high-risk activities.

5. **QRA (Quantitative Risk Analysis)** has been conducted for the entire plant operation recently in early 2012. The basis of design Consequence Modelling of fire and explosion was conducted by Technip, and the recent update includes a more comprehensive review including calculation of worker exposure risks at each Unit.

6. **FMEAs (Failure Mode Effects Analysis)** – This method is used extensively by the Technical and Maintenance Departments when conducting RCAs of process incidents and assessing identified Bad Actors from the number of SAP notifications on some equipment for improvement initiatives. These are archived in various places and are not conducted according to one procedure; however, plans are in place to rectify this.

**2.19.3 Impact of the Review Risk Use on the Organisation**

This plan has sought to review and validate the risk management process that was introduced across the company. Enterprise Risk Management (ERM) is a process whereby all types of risk which material to the business are can be identified, assessed, prioritized and mitigated on a common basis. The different elements needed to achieve an effective process; including the risk matrix, risk registers, risk management standards, and business continuity plans are integrated into an overall ERM framework. In order to provide the necessary assurance that
risks are being properly managed in the company, ORYX GTL required the researcher to review its corporate risk register and develop risk mitigation plans for its top risks with a view to ensuring:

a) Significant risks to the company (that are both currently recognized and unforeseen) are identified
b) Assessing and prioritizing the identified risks facing the company
c) Developing plans to mitigate the impact of any identified risk exposures
d) Create awareness of the key exposures.
e) Provide advice relating to the design of the ERM framework and the optimum means of integrating the various elements.

2.19.4 Objectives:
The project has sought to address the “Enterprise Risks” which are those risks which can prevent the Company from achieving its strategic objectives, threaten its survival during its planned lifetime or damage its international reputation.

The objectives of this process can be summarized as follows:

- Identify, assess and prioritize the key risks inherent in the Company’s activities.
- Develop tools to support the ongoing enterprise risk management process.
- Develop mitigation plans for the top 10 risks.
- Assign ownership for the risk mitigation plans.

2.19.5 Methodology used for ORYX GTL Specific Risk and Hazard Analysis
The methodology used to design the specific risk and Hazard analysis mainly consisted of structured interviews with the Senior Management Team in which to review and reach a consensus of the top risks together with the development of High-Level Risk Mitigation Plans.
2.19.6 Key Findings - Top 10 Corporate Risks

The revised top 10 risks developed from the workshops are shown below. Some of the risks have been renumbered since the workshop and also a new risk has been added.

Figure 2.38: Top 10 Corporate Risks

<table>
<thead>
<tr>
<th>Risk Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of Feedstock - upstream AKG</td>
</tr>
<tr>
<td>Loss of Feedstock - downstream pipeline</td>
</tr>
<tr>
<td>Geopolitical event</td>
</tr>
<tr>
<td>Release of hydrocarbon</td>
</tr>
<tr>
<td>Catastrophic equipment failure</td>
</tr>
<tr>
<td>Failure of supply chain</td>
</tr>
<tr>
<td>Loss of critical utilities</td>
</tr>
<tr>
<td>Inability to dispatch the product</td>
</tr>
<tr>
<td>Failure of DCS</td>
</tr>
<tr>
<td>Project execution</td>
</tr>
<tr>
<td>Pandemic</td>
</tr>
</tbody>
</table>

2.19.6.1 Semi-Structured Interviews

In order to refresh the population of risks to be used as the input to the ORYX GTL Specific Risk and Hazard Analysis workshop, it was decided to undertake some semi-structured interviews which were held in Qatar with some key stakeholders.

The interviews took place on time and represented an opportunity to provide input and direction that would help shape how the Company deals with risk and risk management in the future. Each interview lasted between 45 minutes to one hour and was undertaken by the researcher.
The interviews were not limited to the risks relating to the stakeholder’s respective area of responsibility but also raised issues of general relevance to the business as a whole. Each interview explored the following:

- Which are the key risks of the business in general and your specialist area in particular?
- Which are the factors that could cause these risks to materialize?
- What are the underlying vulnerabilities relating to these risks?
- What is the likelihood of these risks materializing?
- What are the possible consequences if these risks did materialize?
- What are the current controls to manage these risks and are they likely to be effective?

In preparation for these interviews we asked each interviewee to set aside some time in advance of the meeting to consider the above issues and address the following questions:

1. Which do you think are the 5 most serious risks within your areas of responsibility?
2. Which do you think are the 5 most serious risks facing the company as a whole?
3. Are there any specific risks or types of risk that you think may have been overlooked or which may not have been given sufficient attention? This might include new and emerging risks. The researcher meets with the following ORYX GTL staff as part of this study:
**Figure 2.39: List of Interviewees**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdulrahman Mohamed F. Al-Suwaidi</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>Ettienne Rademeyer</td>
<td>Chief Operations Officer</td>
</tr>
<tr>
<td>Alan Catchpool</td>
<td>Chief Finance Officer</td>
</tr>
<tr>
<td>Mohamed Sharif Ibrahim Al-Mushiri</td>
<td>Chief Commercial Officer</td>
</tr>
<tr>
<td>Ahmed Ali Al-Muhannadi</td>
<td>Chief Administration Officer</td>
</tr>
<tr>
<td>Marcel Juergen Krause</td>
<td>Technical Manager</td>
</tr>
<tr>
<td>Paul Dennis Vardanega</td>
<td>Production Manager</td>
</tr>
<tr>
<td>Gary Frank Von Berg</td>
<td>Marketing Manager</td>
</tr>
</tbody>
</table>

The oil and gas company of ORYX GTL in Qatar and most of the oil and gas industry within the Middle East region take health and safety very seriously, Figures 2.32 and 2.33 below show two examples of the ORYX GTL in Qatar’s Safety Scorecard: one of Recordable Incidents and the other on Environmental issues and spills.
Figure 2.40: ORYX GTL’S Oil & Gas Recordable Incidents’ Record Sheet

<table>
<thead>
<tr>
<th>KPI Name:</th>
<th>Recordable Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Business Driver:</td>
<td>Safety Scorecard</td>
</tr>
<tr>
<td>Accountable:</td>
<td>Head of Safety</td>
</tr>
<tr>
<td>Responsible:</td>
<td>All Departments</td>
</tr>
<tr>
<td>Frequency:</td>
<td>Daily / Weekly</td>
</tr>
</tbody>
</table>

| Objective: | To measure the number of Recordable Incidents |
| Definition: | The number of recordable incidents reported into HSE |
| Calculation: | Number of Recordable Incidents |
| Unit of Measure: | Each |
| Target: | 0 |

| Reporting Documents: | Incident Reports |
| Review Meeting: | Daily HSE Manager Review Mtg |

Source: ORYX GTL (2012)
2.20 Conclusion

This chapter has extensively discussed the main and relevant literature on the Oil and Gas industry, the risks associated with the industry and how performance is managed within the industry. The organizational structure and how Trust is managed within the oil and gas industry have also been discussed in the chapter. The chapter also extensively discussed the Health and Safety Environment in the Oil & Gas company of ORYX GTL in Qatar clearly discussing and modelling some of the Key Risk Management Indicators at the company.

The literature review presents the secondary data gathered from various secondary sources which include books, journals, and other relevant websites. The aspect of risk management, techniques in identifying risks, risk assessment tools, and performance management systems were critically analyzed. The literature gathered served as the main source of knowledge for the researcher to fully understand the topic and the study. The organizational structure and
performance management within the oil and gas sectors were discussed in detail. The chapter also discussed the importance and validity of trust in the oil and gas industry. The conceptual framework used for the thesis/research is discussed in the following chapter, chapter 3.
THE CONCEPTUAL FRAMEWORK

3.0 Introduction

This chapter discusses the total concept of the research topic, “A Critical Analysis of How Enterprise Risk Management Impacts Organisational Performance” A Study of the Oil and Gas Industry In Qatar.” The research process is represented diagrammatically in the research process flowchart and the conceptual framework underlying this research aim depicted in Figure 3.1 and Figure 3.2 respectively.

The theoretical framework is based on the concepts and principles of the Enterprise Risk Management Integrated Framework towards the enhancement of organizational performance within the oil and gas industries in Qatar (See Figure 3.3. below).

In their studies, Miles and Huberman (1994) referred to the conceptual framework as a visual or written product that “explains, either graphically or in narrative form the main things to be studied – the key factors, concepts, or variables – and the presumed relationships among them”.

In developing the conceptual framework of this study, the key consideration is conceptualising the influence of Enterprise Risk Management (ERM) on organisational performance. This is done through recognising the different aspects of ERM and how these integrate with each other to become an influence on the efficiency and productivity of a company’s operations. Thus, the overall conception is that having an ERM strategy in place should contribute to an organisation’s likelihood of achieving its objectives. Positive organisational performance is the ultimate organisational objective. Miles and Huberman (1994) condensed the conceptual framework as a connection of concepts, assumptions, expectations, beliefs, and theories that support and inform the research. Therefore, the conceptual framework developed helps to show the underlying connection of ERM’s concepts to aspects related to organisational performance.
Before delving into discussing the conceptual framework, the research process that feeds into the conceptual framework development is discussed first. The research process flowchart shown in Figure 3.1 depicts the interrelation between the various phases of this research, from the research objectives to research findings that should empirically demonstrate the effect of implementing ERM strategies and practices in the oil and gas industries in Qatar.

The flowchart encapsulates all the research objectives and the associated research questions that help to identify different kinds of risks in order to review, monitor and implement new policies that are developed after consultation. The implementation and communication of established risk management policies is what should result in improved organisational performance.

The research process flowchart highlights that the four research objectives formulated are addressing by answering the associated research questions. The focus is on four main aspects: the establishment of context; the identification of risk, the analysis of risk; the evaluation of risk; and the mitigation of risk. In answering the research questions, a methodological approach that employs both qualitative and quantitative methods is utilised. The aim is to examine the approach adopted by the case study company (ORYX GTL) in its ERM strategies and practices that involves communication, consultation, monitoring, review, implementation and action taken to address the identified risks that could hinder the accomplishment of organisational objectives. Through exploring the different ERM strategies and practices of the company, the interconnection with aspects of organisational performance is established. The organisational performance relates to aspect such as improved productivity, less operational disruption and increased process efficiencies.
Figure 3.1: Research Process Flowchart

**Research Objectives**

- To critically evaluate the levels of risk management implementation in Qatar’s Oil and Gas industry.
- To critically evaluate the organizational contextual approaches to risk management in Qatar’s Oil and Gas industry.
- To critically evaluate the critical success factors in Qatar’s Oil and Gas industry.
- To critically evaluate the impact of effective risk management implementation in Qatar’s Oil and Gas industry.
- To develop a framework linking together risk management, organizational performance and the success factors contributing to Qatar’s Oil and Gas industry.

**Research Questions**

- What are the levels of risk management implementation in Qatar’s oil and gas industry?
- What are the contextual approaches to risk management in Qatar’s oil and gas industry?
- What are the critical success factors that contribute the success of Qatar’s oil and gas industry?
- What has been the impact of effective risk management implementation and practices on the organizational performance of Qatar’s oil and gas industry?

**Step 1**

- Use ROs & RQs to establish the RISK Context.

**Step**

- Identify the RISK

**Step**

- Analyse the RISKS

**Step**

- Evaluate the RISKS

**Step**

- Treat the RISKS

**Result**

- Enhanced Organisational Performance
The conception of the relationship between an organisation’s ERM strategies and practices and the resultant organisational performance is depicted in the developed conceptual framework shown in Figure 3-2 below. The conceptual framework starts with the recognition that ERM involves several aspects which are all interrelated.

Central to the ERM is the organisation’s internal environment which essentially forms the risk context. The aspects involved include the organization’s structure, culture, management behaviour, integrity and ethics, the operating environment and nature of the business (COSO, 2004). This component integral, forming the risk context which drives risk management or provide a platform for effective risk management. In order for ERM to be effective in any organisation, there must be an appropriate organization structure which accords sufficient responsibility and authority to the risk management processes. The organisation should be able to provide adequate support and the sustenance of the risk management process (COSO, 2004; ISO 31000, 2010). In this respect, Shenkir and Walker (2006) argue that an effective ERM implementation requires an organization context characterized by strong top management commitment, risk management philosophy with risk appetite, integrity, and ethical values, and provides the scope and infrastructure for implementation. Thus, the internal environment forms a critical success factor for ERM implementation and operation. The internal environment provides the framework or backbone for risk governance of an organisation.

With a supportive internal environment, the risk management strategies and practices implemented should be effective. As highlighted in section 2.4, an organisation is exposed to different types of risk which could be categorised as financial, operational, compliance and strategic (Ernst and Young, 2010). Some risks are therefore, from external sources and others from internal operations. The implementation of ERM strategies and practices which include: objective setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring; become a process for managing, mitigating
and controlling this risks. This process gives a more systematic and integrated approach to managing holistically all of the risks that an organisation faces in order to achieve its objectives (Dickinson, 2001). Thus, the result is an enhanced strategic perspective of the organisation’s operations which then improves its decision making, increases its understanding of the potential upside and downside of the factors that may affect the organization, builds strong shareholders’ trust and confidence, and enhances the organisation’s compliance with applicable governance requirements. These aspects, complemented by other factors (such as customer demands, satisfaction) contribute to improved organisational performance.
Figure 3.2: Conceptual Framework
3.1 The Theoretical Framework

Theories are developed to explain, formulate, speculate and understand a phenomenon. In most cases, theories are used to further existing knowledge with the boundaries of critical assumption. The theoretical structure is a framework that supports the theory guiding the study. The theoretical framework explains the theory that explains the research problem under which the study exists (Gentner, 1983; Simon and Goes, 2011; Geluykens, 2013).

Figure 3.3: The Theoretical Framework Risk Management of Oil & Gas in Qatar (ONYX GTL)

In Figure 3.2 above, the theoretical framework risk management of oil & gas in Qatar begins with the problem identification (where risk(s) are identified where it is the case) to how the
problems are tackled using research objectives to action some of these risks and then, once solves or eradicated, the oil and gas industry in Qatar benefits hugely from how theory has been utilized in action.

This theoretical framework consists of concepts and, together with their definitions and reference to relevant scholarly literature, the existing theory that is used for your particular study. The theoretical framework must demonstrate an understanding of theories and concepts that are relevant to the topic of your research paper and that relate to the broader areas of knowledge being considered.

The theoretical framework is most often not something readily found within the literature. The researcher has to review course readings and pertinent research studies for theories and analytic models that are relevant to the research problem being investigated. The selection of theory also depends on its appropriateness, ease of application, and explanatory power.

The theoretical framework strengthens the study in the following ways:

- Straightforward assumptions by the theory allow the researcher and reader to analyze them critically
- Theoretical framework acts as a bridge between the researcher and available knowledge. Theories guide the researcher in adopting the most appropriate research methods
- Expressing the theoretical assumptions of the study forces the researcher to address the questions of how and why. It allows the researcher to intellectually transform from simply describing an occurrence to the generalization of the various occurrence aspects
- A theory assists the researcher in identifying the limits to those generalizations. A theoretical framework identifies which primary variables affects the phenomenon
and underlines the need to explore how the primary variables may change under different circumstances (Geluykens, 2013; Willumsen, 2017).

Due to the applicability nature of the theoretical framework, social sciences describe a good theory as one that meets the primary purpose of explaining the meaning, nature, and obstacles associated with an occurrence. These are regularly experienced but not accounted for in the real world, to enable readers and researchers to use knowledge in understanding an occurrence in a deeper manner and informed ways.

3.2 Enterprise Risk Management (ERM)

The research also focuses on evaluating the impact of ERM as a risk management framework in ORYX GTL and Qatar Petroleum on their performance. The implementation of ERM in ORYX GTL and QP was examined. The organizational context which is described as a critical success factor in the implementation of ERM is examined.

Finally, the performance of the organization based on the implementation and the values derived from the ERM are also examined in the thesis.

Based on risk management literature reviewed in chapter 2 of the thesis, and the ERM framework/components as suggested by COSO (2004), ERM implementation activities and processes include event identification; risk assessment; risk response; control activities; and monitoring, just as discussed in the earlier section above.

The Organisation’s context or risk context and critical success factors for effective ERM implementation include the internal environment - strong top management commitment, Risk Management philosophy with risk appetite, integrity, and ethical values, and also the scope and infrastructure for ERM; objective setting; and information and communication. The organizational performance will include improved decision making, increased understanding
of the potential upside and downside of the factors that may affect the organization, strong shareholders’ trust, and confidence, and compliance with applicable governance requirements.

**Figure 3.4: Theoretical Framework of the ERM approach.**

Figure 3.3 above illustrates the ERM theoretical model approach to risk management, and it follows an IPO format. The theoretical model is based on the research title and serves as the fulcrum of the study. The input of is the Enterprise Risk Management which Enterprise risk management (ERM) is the process of planning, organizing, leading, and controlling the activities of an organization in order to minimize the effects of risk on an organization's capital and earnings. ERP application in business can be assessed through its internal environment, objective setting, event identification, risk assessment, information and communication, and control activities.

The process in the study is the assessment of the following: ERP implementation in ORYX GTL and QP; Degree of Importance in ORYX GTL; and Degree of importance and significance of factors affecting organizational performance. The implementation of ERP starts with assessment and whatever data and information gathered; it can serve as a basis in its implementation in the organization. The output of the study is categorized into two areas: The
first is the generalization on the impact of Enterprise Risk Management implementation on organizational performance. The second is the recommendations on how to effectively implement Enterprise Risk Management to improve the performance of the organization as demonstrated in Figure 3.1 earlier in the chapter.

### 3.3 Conclusion

This chapter has discussed the concept of the research which is illustrated through a conceptual framework which is modelled in the chapter. The main elements of the model have been discussed. The risk-minimizing plan, processes, procedures, evaluation, and implementation of the various stages of the conceptual model has been discussed. The ERM theoretical framework illustrated in Figure 3.3 serves as a guide for the researcher in order to achieve the set aim and objectives of the study. There are three major tasks in the study which includes examining the ERM implementation in the oil companies such as those in Qatar, the examination of the organizational context that is a critical driving force and platform for successful ERM implementation in the oil companies in particular, and the industry in general. This also includes the examination of the impact of risk management on the performances of the oil and gas companies within the industry.

The next chapter discusses the research methodology and design used for the thesis.
4 RESEARCH METHODOLOGY AND DESIGN

4.0 Introduction

This chapter discusses in detail the research methodology and design used for the research. The chapter reviews the different methods and techniques usually used in order to fulfil the research objectives and research questions for large scale research studies. The methodology used is also geared towards applying the appropriate and reliable statistical method that augurs well for the testing of the hypotheses guiding the study.

In this particular instance, the methodology used seeks to focus on how the problem identified is best researched with a detailed justification for every part of the research design. The research focus/problem seeks to utilize enterprise risk management to engender good, efficient and risk-free organizational performance within the oil and gas industry of Qatar.

Choosing the appropriate and relevant method for the research helps this research to understand the background of the research topic and carry out effective and relevant analyses. The researcher ensures that all relevant steps are taken to ensure that the research is conducted within WUS’s ethical framework based on the university’s ethical code of conduct.

The research method and methodology are similar terms used alternatively by many researchers (Kwok-bun and Wai-wan, 2011). Other researchers have disputed this claims with the assertion that the term ‘Methodology’ is deeper compared to the word ‘method’ they believe that methodology is made-up of different methods of data collection, it has the detailed thematic data analysis and the research rationale (Atkinson and Delamont, 2010). Other researchers hold the notion that the term ‘method’ is only about the data collecting in any study (Tomkins and Tomkins, 1997). In this research, the researcher will use the term ‘methodology’ to cover all the relevant aspects of the term as explained earlier.
4.1 The Research Approach

Duignan and Duignan (2016) define a research approach as a plan or procedure which has a timeline and steps of conducting a specific task in the research. The research plan has the data collection, the data analysis, write-up plans among other elements. The nature of the research determines the research approach adopted, and it as well considers the research objectives. The research approach is divided into data collection and data analysis.

The research approach also makes it clear whether the research assumes a quantitative or qualitative approach. Based on this conception, either primary data, secondary data or both are used for the research. Both qualitative and quantitative data analysis are considered in the selection of the research approach.

The researcher, in this case, adopted both primary and secondary data to meet the research objectives. The primary data collection took the form of face-to-face unstructured interviews conducted with selected managers and other staff in the oil and Gas companies in Qatar. These interviews, which represent the qualitative dimension of the research are geared toward finding out the various steps and procedures that oil and gas managers employ to minimize risk within the oil and gas industry of Qatar.

Secondary data collection took the form of the collection of information and data from empirical sources as well as journal articles, books, periodicals, and other published materials. Also, this research assumes both qualitative and quantitative approaches. A qualitative approach is adopted for the research to facilitate better and wider literature search for the research. The quantitative approach which is also used in the research enables the research to collect quantifiable data which enables statistical proving of the hypotheses guiding the study.

The research process also considers inductive and deductive approaches. The inductive approach begins with observations, where the researcher proposes theories when the research approaches the end of the research process. The approach searches for trends/patterns from the
observations and strives to explain the theory using the observed patterns using hypotheses. The theories and hypotheses emerge later towards the end of the research process; if they occur at the beginning of the study, it would be difficult for the researcher to alter the direction of the study (Eisenhardt, 2011; Maxwell and Reybold, 2015).

It is imperative to note that inductive strategies do not overlook theories when formulating the research objectives and questions. The inductive approach aim is to create meaning from the data collected to identify the trends and connections and build a theory. The inductive approach, nevertheless, does not limit the researcher from applying existing theory to develop research questions to be examined. The approach is based on learning from experience. Trends and relationships inexperience are used so as to reach conclusions (generate theories).

A deep observation of the world is the initial step to the inductive approach; this leads to more ideas and generalization. A researcher who uses an inductive approach, starting with a topic, develops more empirical generalizations and discovers exploratory connections as the research progresses.

On the other hand, a deductive is focused on developing hypotheses from the existing theory and then develop the research framework to test the hypothesis. Authors state that deductive is a means of reasoning from the specific to the general. If there exists a connection between a particular case study, it might be common in other similar cases. A deductive method may test to see if this connection did obtain on other general circumstances (Monsen et al., 2009). A deductive approach is interested in deducing conclusions from propositions. The deductions are from a projected trend, tested against observations, in contrast with induction which begins with observations and seeks to find a relationship within the observations.

Deductive approach examines a known theory or occurrence and probes if that theory is applicable in the given situation. The approach starts with a theory which leads it to new
hypotheses. The hypothesis is tested using observations which may lead to either rejection or confirmation of the hypothesis.

Deductive reasoning can be described as reasoning from the extensive to the specific in contrast to an inductive approach. In a nutshell, the deductive approach involves the creation of a hypothesis testing the hypothesis during the research, while there are no hypotheses in the inductive approach.

In the study, the inductive approach was adopted. Risk Management is one of the main focuses of businesses today, especially in the Oil and Gas sector. The Oil and Gas industry’s operations are so huge, and any disruption in the operations could lead to great losses to the companies. The purpose of this study is to determine the impact of Enterprise Risk Management on the performance of ORYX GTL and Qatar Petroleum and help avert any risk(s) within the oil and gas industry of Qatar.

The application of ERM starts with the assessment of risk, analysis, and application of the ERM. To get a general view of the risk management and its implementation in ORYX GTL and Qatar Petroleum, survey questionnaires were distributed to employees. The result of the survey has provided a clear understanding of the extent of risk assessment in the Oil and Gas companies and their views on how risk could be minimized within the organization.

From the data collected and processed through SPSS analysis, a generalization has been created which led to the effective implementation of Enterprise Risk Management in the companies.

There are two types of research; quantitative and qualitative as suggested by (Saunders, Lewis and Thornhill, 2009; Miller, Strang and Miller, 2010; Mora, 2010; Kwok-bun and Wai-wan, 2011). The two types of research have its pros and cons. The nature of data collected determines the type of research adopted.

Researchers who adopt qualitative approach do not make use of numerics or statistical data to make conclusions: instead, interactive methods such as surveys, focus groups or direct
interviews (structured or semi-structured) sessions with the participants are conducted to collect the required data. Flick (2014) and Silverman (2013) further added to this by stating that the secondary data is collected through a literature review using existing information (empirical data) on the subject matter.

Miller and Miller (2010) believed that this method of collecting the data is far better than other methods as it eliminates most of the ambiguities during the data collection process. Contrary to this, the quantitative method of collecting the data makes use of elaborate numerical or statistical analysis, using quantifiable techniques to reach a conclusion.

4.1.1 Qualitative Approach

This research employs a qualitative approach as part of its research methodology. The qualitative approach took the form of researching and analyzing imperial data/information from books, some quality journals, periodicals and other publication relevant to the chosen research topic. Quality qualitative data and information used for the research were also collected for the ONYX GTL oil and gas corporation in Qatar.

Bryman and Bell (2011) were emphatic when they stated that qualitative research involved a research strategy that usually emphasizes words rather than the quantification in the collection and analysis of data. This approach could assume an inductivist, constructionist not interpretivism approaches; however, it is not imperative that a qualitative approach to research methodology should always subscribe to these sorts of methodologies. Consequently, this research in adopting the qualitative approach as part of its research methodology strives to:

i. Clearly, delineate the sequence of stages in qualitative research to make it less controversial and addresses the relevant points the research wants to make much more clearly
ii. Firmly establish the relationship between theory and research

iii. Explore the nature of concepts in qualitative research and their differences from concepts in quantitative research—even though both are used side-by-side in this research.

iv. Ascertain how far reliability and validity are appropriate criteria for the qualitative part of this research, and whether there are any other alternative criteria or area that this research could explore further.

v. Ensure the main preoccupation of the qualitative part of this research concentrating on the five areas of seeing through the eyes and minds of research participants; description and context process of the qualitative part of this research; process, flexibility and lack of structure (avoid at all costs) and the concepts and theory as outcomes of the research process.

vi. Be aware and effectively deal with some common criticisms of the qualitative approach to research methodology.

vii. Clearly iron out the main contrasts between qualitative and quantitative research, and finally,

viii. Assume the stance of feminist researchers on qualitative research.

Most of the scholars such as Miller and Miller (2010) and Tomkins and Tomkins, (1997) are of the view that the qualitative research allows the researchers to get a deeper understanding of the issue being studied. Furthermore, Crowther and Lancaster (2012) state that the qualitative data helps to strengthen the collected data by taking in to account the actual scenarios which result in reaching a thorough and validated conclusion. According to Smith (2002) and Bryman and Bell (2001), there are six steps to conduct qualitative research.
The first step is to gather all the relevant data which is followed by studying and extracting the most relevant one for further study which is the second step. The third step is where all the data gathered is analyzed, followed by the fourth step where a detailed investigation of the same is conducted. The fifth step involves further probing of the topic under investigation to see if any additional data is required to derive sound and possible conclusions. The sixth step is the last one where all the analyzed data is used to form a theory which would help the researcher to find the required answers to the research question. Nel (2008) and Maxwell (2012) have helped in explaining ways to make use of the qualitative research methods to get the answers to the questions in the research, specifically in a study where the relationship between the employees deployed at different levels of hierarchy is studied in a single organization.

According to Flick (2014) and Silverman (2013), one of the main features that distinguish qualitative research from the quantitative one is the ability of qualitative research to form theories. Further to this, Bryman and Bell (2007) suggested that the researcher should use the positivist approach for testing the theory and avoid the generalization of the results as this type of research usually consists mainly of statistical or numerical data for a large number of populations. On the contrary, as explained by Silverman (2013), the same principle is not viable for qualitative researches. However, there are many ways which can be used to test the results of the qualitative research. The same notion is also supported by experts such as Maxwell (2012) who are of the view that the qualitative research is a great source of getting the required information, which can be verified, using numerous strategies. This research will make use of the following main steps of the qualitative part of this research:
Figure 4.1 above shows the structural process of the qualitative approach part of the methodology used in this research. Utilizing Prasad’s (1993) theory of “thinking deeply” the research developed research questions in chapter one which is used in the research. This research in line with step two of Figure 4.1 above selected a relevant site and size of oil and gas companies in the Middle East (and sample oil and gas companies, e.g. ONYX GTL of Qatar) and used in all major risk management, work practices interactions of staff and all Health and Safety, risk and Health Environmental administrative operations carried out in the oil and gas industries.

In step three, and as part of the qualitative approach part of this research, again as theorized by Prasad (1993), since every organizational situation is likely to be filled with multiple and
frequently conflicting interpretations and meanings (Prasad, 1993), this research adopted the use of multiple research methods in order to capture any complexity or contradictions in the data. This research uses both the interview and observation methods to collect qualitative data for this research.

In step four, the research approach to the interpretation of data is grounded in theory (Glazer and Straus, 1967) to provide guidelines for the classification and organization of the data of the various risks and risk factors associated with the oil and gas industries of the Middle East. Once this is done, and the patterns of data have been identified, the researcher places them in in the context of relevant literature about various relevant issues including health and safety and risk technological changes in the oil and gas industries.

In step five, the research applies the interactionist perspective of deep meanings of the oil and gas industries’ meanings to help the research develop propositions about how risks are minimized within the oil and gas industries and how these are associated with technological changes that go with them. This step in the qualitative research method stands to provide the relevant data that are associated with the findings.

Steps 5a ‘tighter specification of the research question(s)’ and 5b ‘collection of further data’ provide room for the collection of further data for the research which may or may not help to refine the research questions asked in the opening chapter of this study. Prasad (1993) presumed that his approach concurs with the grounded theory framework and highlights the interconnection between interpretation and theorizing, on the one hand, and data collection, on the other.

Finally, in step 6, the last of the six steps of the outline of qualitative research, this research recognizes that there is no real difference between the significance of writing up quantitative and qualitative research. What is important for this research is to articulate the particularly distinctive aspects of the sequence of steps in the qualitative research that are highly related
issues to the research topic and focus, and of the links between theory and concepts of the oil and Gas industries, the risks associated with them and how these risks are minimized, or totally eradicated.

Also, according to scholars such as Silverman (2013), one of the most vital parts of research work is its subjectivity. Yin (2014) and Flick (2014) are of the unanimous view that for social sciences or conventional researches, the qualitative method is the most suited way. Furthermore, Crowther and Lancaster (2012) are of the view that qualitative research can assist in understanding the research participants in a better way. Additionally, this phenomenon, as explained by Miller and Miller (2010) and Maxwell (2012), can be explained better by understanding the reasons behind the occurrence of the same, which can be studied using the qualitative techniques.

Hence, this study employs a qualitative approach as part of the methodology used in collecting data for the research. There are many reasons for the occurrence of operational issues such as lack of implementation of risk management strategies, weak strategies related to risk management, lack of efficiency in monitoring the policy adopted in the operation department and lack of communication in the organization.

4.1.2 Semi-Structured Interviews

The research also employed the use of semi-structured interviews as part of its qualitative approach. Selected managers and other officials from selected oil and gas companies were interviewed in order to collect primary data for the research.

According to Tomkins and Tomkins (1997) there are numerous kinds of interviews available. Some interviews are structured while others are not. For this research, the researcher used questionnaires and semi-structured interviews. The application of the semi-structured interview format is very productive as it allows the researcher flexibility to shape up the question
according to the responses of the participant (Yin, 2014; Jackson, 2014; Flick, 2014). It is mutually agreed that the most beneficial method of conducting interviews is through one on one interview. However, this method is not always feasible due to various limitations of time and personnel; therefore, the researcher often applies technological means such as telephonic interviews to cope with this problem (Miller and Miller, 2010). Maxwell (2012) further adds that respondents should be provided with a relaxed and comfortable environment for maximum productivity. A relaxed environment puts the respondent at ease, therefore, allowing them to speak more freely, openly and honestly. In the study, the researcher collects data primarily through semi-structured interviews.

4.1.3 Quantitative Approach

This research also employs a quantitative approach as part of its research methodology. The quantitative approach took the form of sending questionnaires out to relevant respondents in order to collect primary data. A great deal of quantitative data and information used for the research was also collected for the ONYX GTL oil and gas corporation in Qatar. Quantitative research is also used to form different theories, as stated by Tomkins and Tomkins (1997) and Smith (2002). On the contrary, that method should be selected for conducting the research which would help the research reach the aimed conclusions. However, as believed by Myers (2009), predominantly qualitative research could be biased given the fact that it is descriptive in nature and the interpretation of the same is made as per the understanding of the researcher.

Bryman and Bell (2011) again, were emphatic when they stated that quantitative research involved a research strategy that has been the dominant strategy in the conducting of business research and continues to be powerful in many quarters. This approach predominantly assumes the collection of numerical data and exhibiting a view of the relationship between theory, and
research as deductive, an inclination towards a natural science approach (and/or positivism in particular). Furthermore, the quantitative approach to research methodology has an objectivist conception of social reality (Prasad, 1993). Consequently, this research in adopting the quantitative approach as part of its research methodology strives to:

(a) Clearly identify the main steps of quantitative research, which are presented as a linear succession of stages
(b) Apply the importance of concepts in quantitative research to this research including the measures that could be devised for concepts
(c) Critically follow the procedures for checking the reliability and validity of the measurement process
(d) Apply to the research the main pre-occupation the main tenets of quantitative research which as described in terms of four features: measurement, causality, generalization, and replication.
(e) Identify and follow through some of the criticisms that are levelled against the quantitative research approach.
This research will make use of the following main steps of the qualitative part of this research:

Figure 4.2: An Outline of the Main Steps of Quantitative Research

1. Elaborate Theory
2. Device Hypothesis
3. Select Research
4. Device Measures of
7. Administer Research Instruments/Collect
5. Select Research
6. Select Research
8. Process Data
9. Analyse Data
10. Develop
11. Write up

Source: Bryman and Bell (2011)

Figure 4.2 above shows the structural process of the quantitative approach part of the methodology used in this research. Utilizing Prasad’s (1993) theory of “thinking deeply” the
research developed research questions in chapter one which is used in the research. This research in line with step five of Figure 4.2 above selected a relevant site and size of oil and gas companies in the Middle East (and sample oil and gas companies, e.g. ONYX GTL of Qatar) and used in all major risk management, work practices interactions of staff and all Health and Safety, risk and Health Environmental administrative operations carried out in the oil and gas industries.

The difference between qualitative research to quantitative is that quantitative explore an occurrence statistically, using numerics and computations (Singh, 2015). The purpose of quantitative research is to employ mathematical models, theories and hypothesis in regard to an occurrence. The process of measurement is key as it provides the primary relationship between the mathematical expressions and the empirical observation. Percentages, statistics, mean, central tendency are some of the numerical forms. In our case, the researcher will use statistics to analyze data. The researcher aspires that the results will be unbiased for the generalization of a larger population.

The primary purpose of quantitative research is to direct the connection between variables (dependent and independent variables) in a group. The design of qualitative research is either experimental or descriptive (Hopkins, 2000). According to Bryman and Bell (2011), the quantitative approach involves gathering numerical data and displaying the relationships between the theory and the study as deductive. The most common methods of quantitative data collection are questionnaires (close-ended) or surveys.

4.1.4 The Mixed Methods Approach

This approach combines both quantitative and qualitative research methods. In simple terms, the use of quantitative and qualitative data (collection methods and analysis). The researcher adopted both methods in collection and data analysis.
The researcher when adopting a quantitative approach seeks to:

i. Present various arguments for and against the mixed research approach. These arguments would assume the two kinds that are differentiated and are referred to as embedded methods and paradigm arguments.

ii. Explore the suggestion that there are two versions of the debate about the possibility of combining quantitative and qualitative research. This would concentrate on methods of research, and another is concerned with epistemological issues.

iii. Re-visit the various ways in which mixed methods have been carried out in the past, and

iv. To examine the belief that the mixed research approach is not essentially superior to a study that employs either the two approaches.

4.1.4.1 The Embedded Approach

As would be seen later in the research philosophies chapter of this research, the method used for the research is inescapably guided by epistemological and ontological commitments. And as such, the research is greatly committed to particular versions of the world and determined to know what happens in that world; e.g. the ‘world’ of oil and gas drilling and engineering in Qatar, and for that matter, the Middle East. In doing so, the research uses questionnaires to choose a random sample of respondents in the oil and gas industries to measure the various risks and health and safety concerns associated with the oil and gas and how these risks and health and safety concerns are managed in order to minimize them, if not totally eradicate them.

It has to be pointed out, however, that some writers have had mixed views on this approach of using the mixed method. The main difficulty expressed by some writers is that this approach to the mixed method of research carries with it fixed (rather than flexible) epistemological and ontological implications that could prove very difficult to sustain. Nevertheless, it could also
be argued that, once the researcher manages to achieve the research’s objective(s) using this approach, it should be appropriate to employ in research such as this one.

4.1.5 The Paradigm Approach

The paradigm argument of a mixed method approach research conceives of the quantitative and qualitative research as paradigms in which epistemological assumptions, values, and methods are intertwined. The argument, therefore, as put forward by writers such as Guba (1985) and Morgan (1998b) is that these intertwined positions may not be compatible with each other. Guba (1985) and Morgan (1998b) were of the opinion that when researchers combine participant observations with a questionnaire, they are not really combining quantitative and qualitative research since paradigms are incommensurable.

4.1.6 The Logic of Triangulation

This being said, combining the two methods (mixed methods; quantitative and qualitative approach) increases the results and findings effectiveness, which through the triangulation approach are easily validated (Creswell, 2002; Creswell, 2009; Harwell, 2011). As defined by (Olsen, 2004) triangulation in social science is a process used to indicate that two or more research approaches are employed in research with the intentions of validating the results. Triangulation, therefore, helps in getting to reliable and valid recommendations and conclusions. Researchers should apply mixed methods in their research as argued by (Johnson and Onwuegbuzie, 2004), they further state that combining the two approaches will give dependable and richer research findings and results.

With this study, for instance, one method is employed in measuring and assessing risks and health and safety issues associated with oil and gas in Qatar’s oil industry could be cross-
checked with other methods to enhance confidence and reliability in the findings or assessments.

4.1.7 Qualitative Research Facilitates Quantitative Research
Bryan and Bell (2011) were of the opinion that there were several ways in which qualitative research could be used as a guide to quantitative research.

4.1.7.1 Providing Hypotheses
Bryan and Bell (2011) argued that, because of its tendency towards an unstructured, open-ended approach to data collection, qualitative research is often very helpful as a source of hypotheses or ideas that could be subsequently tested using quantitative research strategy. This research finds this very useful as some information/data gathered for the research came from a qualitative approach, and these were statically progressed through quantitative approaches.

4.1.7.2 Aiding Measurement
Bryan and Bell (2011) posited that the in-depth knowledge of social contexts acquired through qualitative research could be used to inform the design of survey questions for structured interviewing and self-questionnaires.

4.1.8 Quantitative Research Facilitates Qualitative Research
Bryan and Bell (2011) stated that one of the ways in which quantitative research can prepare the ground for qualitative research was through the selection of people to be interviewed. Or companies to be selected as case studies.
4.1.9 Filling in the Gaps

This approach to mixed method research occurs when the researcher cannot rely on either a quantitative or a qualitative method alone and must buttress the research findings with a method drawn from the other research strategy. What this means is that it is not everything that the researcher needs to know about is accessible through participant observation. For example, for several reasons, there could be a need for information that is not available or accessible to observation or to qualitative interviewing.

4.1.10 Justification of the chosen research method used for the research

Two approaches are used in data collection and reporting; they are quantitative and qualitative approaches or a combination of both. Qualitative approach focusses on understanding an occurrence while qualitative approach focuses on estimating an occurrence using numerics. In simple terms, qualitative research is basically exploratory used to gain better insights into the underlying reasons, beliefs, and motivations. It provides understanding into the problem and assists in developing ideas or a hypothesis for probable quantitative research. Qualitative research is employed to unearth patterns in beliefs and opinions and immerse deeper into the problem. In qualitative research data can be collected using in-depth interviews, focus groups discussions, and participants observations. The sample in qualitative research is generally small. Describing a phenomenon deeper occurs during interviews, focus groups or open-ended questions. This approach is resource and time consuming; hence a small population is preferred. Due to the sample size, the research findings cannot be generalized to the entire population. However, such studies create a deeper understanding of future research and can inform theory and practice in particular scenarios. Open-ended questions and interviews enhance a deeper understanding of participants experiences and their interests in the research. Qualitative research can be viewed as anecdotal
when employed too many participants, however, it provides understanding and evidence of the existence of certain phenomenon (Ozanne, Strauss and Corbin, 2006; Jackson, Drummond, and Camara, 2007; Reeves, Kuper and Hodges, 2008; Leal Filho and Kovaleva, 2015; Maxwell and Reybold, 2015; Williamson, Given and Scifleet, 2017).

Qualitative research type is necessary for the research because it allows the researcher to gather deeper and more information from the employees of ORYX GTL and Qatar Petroleum. One thing about the qualitative research type is that the researcher is not limited to the set questions only. The researcher can always ask unlimited questions from the supervisors and managers of ORYX GTL and Qatar Petroleum.

The quantitative research approach is used to quantify data by generating data numerically and data usable statistically. The approach is utilized to quantify attitudes, behaviours and other variables. The approach generalizes data from a larger sample. Measurable data is used to formulate facts and reveal trends in research. This method is more structured compared to the qualitative approach. Surveys, such as mobile, paper systematic operations etc. are used to collect data. The quantitative method focusses on describing a phenomenon from a large sample of participants, presenting a likelihood of summarizing characteristics across relationships. Quantitative approach examines a large population and employs statistical techniques to determine the total trends in relations of processes (Amaratunga et al., 2002; Celo, Braakmann and Benetka, 2008; Frels and Onwuegbuzie, 2013; Creswell, 2014; Leal Filho and Kovaleva, 2015; Singh, 2015).

The researcher adopted a mixed approach whereby the quantitative method was used through a five-point scale rating questionnaire. A questionnaire is a research tool with a series of questions and is meant to collect primary data from participants (Bulmer, De Vaus and Fielding, 2004). Questionnaires are cheap, easy to analyze, and do not require much effort as compared to other methods of data collection. However, questionnaires have their own
shortcomings, the researcher, for instance, may not know whether the participants comprehend the questions, as opposed to interviews. Information gathered can be minimal since the questions are too specific to the researcher’s questions. The researcher, therefore, had to apply mixed approaches in data collection.

The researcher adopted the quantitative approach which was supplemented by a few interviews from the respondents to get an overall opinion and assist in the discussion of the results and analysis. The main focus of the study is to address the 3 objectives and to generate information that can lead to the determination of the impact of Enterprise Risk Management on the Organisation Performance of ORYX GTL and Qatar Petroleum in relation to reducing or eliminating risk within the oil and gas industry in Qatar. And this approach best suits the researcher in the quest of achieving the research objectives.

Consequently, the research formulated questionnaires with reference to the research objectives which were then tested with validity and reliability before it was given to the 300 employees divided between ORYX GTL and Qatar Petroleum. The result of the survey was tabulated and processed with the aid of SPSS, and each aspect was interpreted and analyzed.

4.2 Data Collection

Data collection becomes more effective if it is collected using a variety of different methods rather than a single methodology. This form of data collection is called triangulation (Denzin, 2005; Flick, 2014). The main concept behind the use of triangulation is to support the results gathered from a single source and apply multiple sources to ensure the accuracy and reliability of conclusions (Yin, 2014; Jackson, 2014). The triangulation method is explained in more detail by Smith (2002). According to him, the triangulation method may be formulated based on methodological or diverse collection procedure or on the temporal or spatial variation in
data. It may involve more than one investigator or data collectors. Moreover, various ideas may be incorporated from literature to endorse the findings.

To make this study more successful at achieving reliable conclusions, the researcher aims at applying a variety of sources for data collection. These multiple sources will give a better understanding of the research problem and will help in reaching more accurate conclusions.

4.2.1 Sampling

Bryan and Bell (2011) describe sampling as that aspect of research very much connected with principles and practices associated with social survey research. In-as-much as sampling principles are not exclusively concerned with survey research; the methodology is relevant to the selection of documents for content analysis. However, in this research, the emphasis of sampling is on sampling in connection with the selection of oil and gas companies and employees whose views and data would prove useful to the thesis focus of risk analysis and prevention (i.e. minimizing risk or completely eradicating risk), as well as health and safety issues in the oil and gas industries of Qatar in the Middle East.

This research, therefore, explores:

i. The related ideas of generalization (also known as external validity) and of a representative sample, the latter which allows and enables the researcher not generalize findings from a sample to the respondents used in the surveys

ii. The idea of a probability sample that is, one in which a random selection process has been employed

iii. The main types of a probability sample

iv. Factors to consider when deciding the sample size

v. The different types of the non-probability sample including quota sampling, which is widely used in market research and opinion polls, and finally
vi. The likely sources of errors in research

Thus, this research approach applied to sample in relation to social survey research involving data collection by unstructured interviews and questionnaires of and to respondents from the oil and gas companies of the Middle East.

4.2.1.1 Basic Terms and Concepts of Sampling

The research strives to apply the following universal concepts in sampling in its search of respondents who the research would interview and survey:

**Population**: This is mainly the collection of items or individuals from which the sample will be selected. In our case scenario, the oil and gas industries in the Middle East with our focus Qatar are our population.

**Sample**: This is the sample set of units of the population that is appointed for investigation. The method of selecting a sample is based on the probability and non-probability method. Our sample is certain oil and gas companies.

**Sampling Frame**: This is a list of the set units of the population from which the population will be selected for investigation. This will include all the gas and oil companies in the Middle East.

**Representative Sample**: This is a small population that reflects the characteristics of the entire population accurately. For instance, the gas and oil industries in Qatar representing the larger UAE.

**Probability Sample**: To keep the error of sampling low the researcher used this approach. A sample was selected randomly to provide equal chances to the entire population for selection.

**Sampling Error**: This research did not detect any sampling error. This error arises from the unrepresentative of samples.
Non-Sampling Error: The disparities between the population and the sample that emanate from insufficiencies in the sampling method. A deficiency in the sampling frame or poor wording in questionnaires, poor interviewing lead to this error. The researcher did not encounter any non-sampling error.

Non-Response: This occurs during the sampling process when some of the participants fail to cooperate, or for certain reasons they cannot be contacted or provide the required data can be caused by mental instability.

Census: This is an official survey of the entire population. For instance, data collected from the entire population instead of a sample unit of the specific population. The term census refers to the whole population. Vis-à-vis this research the census approach was not used since the sample was the participants from Qatar oil and gas industries.

4.2.1.2 Population and Sampling Techniques

It is essential to mark the appropriate population for conducting any study. So, in order to conduct a complete study, it is very important that the population sample is taken from the selected population. According to Smith (2002), the group of people on which the study is conducted in the population. Flick (2014) further adds that the people, places, and events that contribute to the provision of data for the study constitute the population. The criterion on which the population sample is to be selected from the total population is described by Creswell (2009).

As it is not possible that the entire population is questioned by the researcher, so he/she selects a representative sample of that population called the population sample. Collis and Hussy (2003), and Fisherman (2003) state that the population sample is a proportion of the larger total population. Fisherman (2003) further adds that it is the choice of the researcher to determine
the number of individuals to be included in the population sample. There are different approaches for sampling; systematic or random in nature.

Miller and Miller (2010) state that for qualitative research, the findings of the research are not affected by the size of the population. Hence the size of the sample population is insignificant. Many researchers agree that the number of individuals included in the sample population can be changed if deemed necessary by the researcher during the study period.

According to Maxwell (2012) further adds that the sampling process continues on until the research is finally completed. As a matter of fact, the researcher might have to repeat the sampling process to gain some other information.

According to Collis and Hussy (2003), sampling is a process which aids in the selection of small population size from a larger initial population for the research. Furthermore, Maxwell (2012), and Gao and Low (2014) defined sampling as a process which selects a smaller number of individuals from a larger total population in order to gather data and generalize the findings on the entire population. Flick (2014), and Yin (2014) are also of the view that the selection of the population size must be made by the researcher according to the requirement of the research and if the research is non-probable in nature. Interviews will be conducted to the workers at different levels within the operations department of the ORYX GTL Company which will be administered by the researcher.
The selection of samples in this method as illustrated in Figure 4.3 is not done in a random way (Gao and Low, 2014). Rather a thoughtful selection is done keeping the aims of the research in view. This is known as purposive or judgment sampling. This study is related to certain issues faced by the operations department and to analyze the risk management strategies in place. Figure 4.3 above shows a few of the methods used for non-probability sampling. The researcher needs to make decisions about different participants in the sample for successfully carrying out non-probability sampling. According to Yin (2014), this is carried out by recognizing the knowledge and information available or the willingness of the individual to be a segment of the research. There are many different types of research, and the researcher must have the knowledge to determine which individuals to include in the research. The decisions are based on recognizing what types of data everyone may contribute to the research.
For instance, when research is being done on life history, even though, many individuals would be eager to participate, but they would not have the type of data that is required for the research. For the questionnaire, there were three hundred respondents, 158 of whom were from ORYX GTL and 142 from Qatar Petroleum. The respondents were distributed across nine departments within the company.

4.3 Primary Data

Primary data are fresh information collected from experimentation, survey, case study and exploratory research (Saunders et al., 2007). Primary data may be collected by various methods including one-on-one interviews, group questioning techniques, and query collections and through survey forms (Bryman and Bell, 2007).

The primary data in this research is the information that will be collected from the employees of ORYX GTL and Qatar Petroleum via questionnaire and interview. The research questionnaires were framed from the research objectives to ensure that there is sufficient information gathered to address the objectives set in the research.

4.4 Secondary Data

Secondary data differs from primary data in the fact that it is not collected directly from the source and is not in its original form. Secondary data is gathered from pre-existing sources such as the findings of earlier researchers (Smith, 2002). This research extracts secondary data from pre-existing Archives sources such as annual reports of these two company, researches to develop risk and the previous incident occurs. In addition to that Myers (2009) also suggests the use of online sources for gathering subject related information. However, the rights of original publishers must be respected, and such kind of data must be used with citation of the
rightful owner of the information and proper referencing. Inability to do so may render the research invalid due to plagiarism reports.

4.5 Sample Size of the Research

Sample size refers to the portion of the population considered in the study. ORYX GTL and Qatar Petroleum are huge Oil and Gas Companies in Qatar and employees the numbers of employees range from thousands where much is concentrated on operation and administration. The table below presents the breakdown of respondents from ORYX GTL and Qatar Petroleum.

Table 4.1: Number and Breakdown of Departments in the Survey

<table>
<thead>
<tr>
<th>Total Respondents</th>
<th>Department</th>
<th>ORYX GTL</th>
<th>Qatar Petroleum</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>DOT</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Engineering</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Learning and Develop</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>65</td>
<td>Maintenance</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>Warehouse</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Health and Safety</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Information Technology</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>145</td>
<td>Production</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>35</td>
<td>Technical</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>158</td>
<td>142</td>
</tr>
</tbody>
</table>

Source: The Researcher

Overall, there were 300 respondents in the survey. One hundred fifty-eight were from ORYX GTL and 142 from the Qatar Petroleum. The departments for both companies were identical, and it mainly consists of 9 departments which include the DOT, Engineering, Learning and Development, Maintenance, Warehouse, Health and Safety, Information Technology, Production, and Technical. In the DOT, there were 15 respondents where 8 came from ORYX GTL and 7 from Qatar Petroleum.
In the Engineering department, there were 5 respondents where 2 came from ORYX GTL and 3 from Qatar Petroleum. In Learning and Development, there were 5 respondents where 3 came from ORYX GTL and 2 from Qatar Petroleum. In the Maintenance Department, there were 65 respondents where 40 came from ORYX GTL and 25 from Qatar Petroleum. In the Warehouse department, there were 10 respondents where 5 came from ORYX GTL and 5 from Qatar Petroleum. In the Health and Safety department, there were 10 respondents where 5 came from ORYX GTL, and 5 came from Qatar Petroleum. In the Information Technology department, there were 10 respondents where 6 came from ORYX GTL, and 4 came from Qatar Petroleum. In the production department, there were 145 respondents where 65 came from ORYX GTL and 80 from Qatar Petroleum. Lastly, from the Technical department, there were 35 respondents where 24 came from ORYX GTL and 11 from Qatar Petroleum.

The researcher opted for a great number of respondents, but because of scheduling and shifting issues, only 300 respondents were considered. Prior to the distribution of questionnaires, the respondents have given approval, and they were given a week to complete the questionnaires.

4.6 Data Analysis

Once the data is collected, the crucial part is its treatment and analysis. According to Rennie (2014), data analysis is the actual process for obtaining raw data and converting it into information useful for decision-making by users. The data collected can be used to answer the questions, test hypotheses or disprove theories. The method for collecting information in the study is an interview where the researcher will be formulating questions thematic to the aim and objectives set in the study. Once the interviews are finished, immediately the data and information collected will be processed using the exploratory data analysis technique. The analysis starts with an understanding of the messages contained in the data. In the exploration process, it may result in data cleaning or an additional request for data that might be needed in
the study. Descriptive statistics such as the average, percentages or median may be generated to help understand the data. The responses of the respondents are thoroughly processed and evaluated to come up with appropriate answers and conclusion to the study. Data visualization may also be used to examine the data in graphical format, to obtain additional insight regarding the messages within the data.

4.7 Research Philosophies

Many contemporary marketing experts such as Flick (2014) and Yin (2014) have emphasized the difference between research methodologies. As defined by Merriam (2014), when research makes use of scientific methods to define, explore and examine a specific subject that is social in nature, it is known as positivism. A philosophe or paradigm is “a set of beliefs, values, and techniques which is shared by members of a scientific community, and which acts as a guide or map, dictating the kinds of problems scientists should address and the types of explanations that are acceptable to them” (Kuhn, 1970, p. 175). In simple terms, a paradigm or worldview is defined as “a basic set of beliefs that guide action” (Guba, 1990, p. 17). Every research work is predisposed by their theoretical framework also known as research paradigm; positivism and post-positivism, constructivism, Interpretative, transformative, emancipatory, critical pragmatism and deconstructivity (Johnson et al., 2000; Mertens, 2005; Gill et al., 2010. Others include such research philosophies such as ontology, interpretivism, and epistemology.

4.7.1 Epistemological and Ontological Issues

The epistemological issues in research philosophy deal with what is regarded as appropriate knowledge about the social word; one of the most crucial aspects is the question of whether or not a natural science model of the research process is suitable for the study of social the social world. With ontological issues in research, it deals with whether the social world is regarded
as something external to social actors or as something that people are in the process of fashioning.

Bryan and Bell (2011) posited that an epistemological issue concerns the question of what is (or should be) regarded as acceptable knowledge in a discipline. For example, Bryan and Bell (2011) in explaining epistemology further considered the question whether or not the social world can and be studied according to the same principles, procedures, and echoes as the rational sciences.

Bryan and Bell again describe the position that affirms the importance of imitating the natural sciences is invariably associated with an epistemological position know as positivism.

4.7.2 Positivism

According to the Bryan and Bell (2011), the doctrine of Positivism is extremely difficult to pin down and, therefore, to outline in a precise manner, because it is used in a number of ways by authors. For example, for some writers, it is a descriptive category-one that describes a philosophical position that can be discerned in research-though there are still disagreements about what it comprises; and for others, it is a disapproved term used to describe crude and often superficial data collection.

Positivism is also classified as an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond.

This research philosophy, upon which this research is hugely dependent upon, is also taken to entail the following philosophies:

1. The only phenomena and hence knowledge confirmed by the senses that can genuinely be warranted as knowledge (the principle of phenomenalism).
2. The purpose of theory is to generate hypotheses that can be tested and that will thereby allow explanation of laws to be assessed (the principle of reductivism).

3. Knowledge is derived through the gathering of the facts that provide the basis for laws (the principle of inductivism).

4. Science must (and presumably can) be conducted in a way that is value free (that, objective).

5. There is a clear distinction between scientific statements and normative statements and a belief that the former is the true domain of the scientist.

It is important to mention that, principle (e) is implied by the first because the truth, or otherwise of the normative statements cannot be confirmed by the senses.
Figure 4.4: The Research Onion

Source: Saunders et al. (2012)

Figure 4.4 above shows the research onion as theorized by Saunders et al., (2012). The research onion consists of all the major research philosophies including realism, interpretivism, positivism, and pragmatism.

4.7.3 Four Main Approaches to Management Research

The key contribution of Johnson, Buehring, Cassell, and Symon (2006) is the way it has attempted to demonstrate how qualitative research methods have embraced the diversity and the confusion to promulgate a specific evaluation criterion. Besides evaluation is a critical and significant concern for everyone involved in the academic world as the growing acceptance of qualitative management research seems to have conveyed an increased divergence in the form that it takes (Prasad and Prasad, 2002).
Figure 4.5: The Four Main Approaches to Philosophical Management Research

<table>
<thead>
<tr>
<th>Modes of engagement in management research</th>
<th>Ontological status of human behaviour/ action</th>
<th>Epistemology</th>
<th>Ontological status of social reality</th>
<th>Methodological commitments</th>
<th>Examples of research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positivism</td>
<td>Determined</td>
<td>Objectivist</td>
<td>Realist</td>
<td>Quantitative methods to enable erklären</td>
<td>What are the causes of variable x?</td>
</tr>
<tr>
<td>2. Neo-empiricism</td>
<td>Meaningful – inter-subjective</td>
<td>Objectivist</td>
<td>Realist</td>
<td>Qualitative methods to enable verstehen</td>
<td>How do people intersubjectively experience their worlds?</td>
</tr>
<tr>
<td>3. Critical theory</td>
<td>Meaningful – inter-subjective</td>
<td>Subjectivist</td>
<td>Realist</td>
<td>Qualitative methods to enable a structural phenomenology or critical ethnography</td>
<td>How do people intersubjectively experience the world in a particular socio-historical period and how can they free themselves from this domination?</td>
</tr>
<tr>
<td>4. Affirmative postmodernism</td>
<td>Discursive–inter-subjective</td>
<td>Subjectivist</td>
<td>Subjectivist</td>
<td>Qualitative methods to enable deconstruction</td>
<td>How and why are particular intersubjectively derived discourses being voiced while others are silenced?</td>
</tr>
</tbody>
</table>

Source: Johnson, Johnson, and Duberley (2000)

Figure 4.5 above illustrates the criteriology started with positivism which is the main quantitative research philosophy and it continues to dominate management research, hence used as a foil against which criteriological comparison is made.

Further to this, as highlighted by Flick (2014) and Miller and Miller (2010), the positivist approach is not similar to the interpretivism approach. Yin (2014) and Silverman (2013) explains this difference by stating that, the interpretivism approach does not study one aspect, rather, it takes in to account a variety of subjects simultaneously such as natural sciences and social sciences aspects including societies and people respectively. Resultantly, as pointed out rightly by Bryman and Bell (2007), researches which make use of the interpretivist approach encompasses more than one research method to carry out the study. And to do so, Creswell
is of the viewpoint that the researcher should make use of the inductive theory for gaining enhanced insight into the topic of study, which helps the researcher to study all related aspects of the research and reach conclusions which are sounder and applicable. Hence, under this study, the research has made use of the inductive theory along with the interpretivism approach to understand the topic of risk management in detail.

4.7.4 Interpretivism

Xinping, (2002) specified that interpretivists researchers commonly start with the presumption that researchers understand reality designed socially through the meaning given to them by people. They argue that simple basic laws, features of positivism are inadequate to comprehend the entire difficulty of social occurrence.

A neutral observation of the social world is difficult; this is because the world has importance to people and is designed by human beings behaviour and actions (Walsham, 1995). Interpretivist maintains that awareness is developed and theory is built by growing ideas generated from the observed and explicated social actions (Walsham, 1995). Unforeseen findings beyond contemporary scientific understanding are prompted during the research process; the research should make sense of such findings. Interpretivists try to comprehend personal realities and to present interpretations which have meaning to the research participants (Walsham, 2006).

The interpretivism approach enables a deeper investigation to gain in-depth insight and understanding. It also allows for the research to learn from the experiences of the participants and get the insiders’ views of how risk management is implemented and how the organizational context has enhanced or constrained the impact of risk management on the performance of an organization. As explained in detail by (Tomkins and Tomkins, 1997) and Bryan and Bell (2011) posit that the research philosophy of interpretivism denotes an alternative to the
positivist orthodoxy, and this has been the case for tens of years. It is premised on a view that a strategy is required that respects the differences between people and the objects of the natural sciences, and therefore, requires the social scientist to grasp the subjective meaning of social action.

Bryan and Bell (2011) stated that taking the interpretative stance can mean that the researcher may come up with surprising findings, or at least findings that appear surprising if a largely external stance is taken—that is, a position from outside the particular social context being studied. It is important to note, however, that with the interpretivist approach, a social scientist will almost certainly be aiming to place the interpretations that have been elicited into a social scientific frame.

4.7.5 Realism

Bryan and Bell (2011) are of the opinion that realism shows two features with positivism; they are a) the belief that the natural and the social sciences can and should apply the same kinds of approach to the collection of data and to explanation, and b) a commitment to the view that there is an external reality which scientists direct their attention (in other words, there is a reality that is separate from our descriptions of it). Realism “concerns multiple perceptions about a single, mind-independent reality” (Fisher, 2010). Thus, realism recognizes that “perceptions have certain plasticity” (Churchland, 1979) and that there are “differences between reality and people’s perceptions of reality” (Bisman, 2002). Bryan and Bell (2011) identify two major forms of realism: empirical realism and critical realism.

4.7.5.1 Empirical Realism

This is the research philosophy which simply asserts that, through the use of appropriate methods, reality can be understood. As such, this approach is regarded as ‘failing to recognize
that there are enduring structures and generative mechanisms underlying and producing observable phenomena and events ‘and are, therefore’ superficial. This is perhaps the most common meaning of the term. Thus, when writers employ the term ‘realism’ in a general way, it is invariably this meaning to which they are referring.

4.7.5.2 Critical Realism

The philosophy of this research is a particular form of realism whose declaration is to identify the reality of natural order of events in the real world and believes that if we identify them and understand structures that generate those events, we would have a better world. This structure, however, as stated by Bhaskar (1989) can be identified through theoretical and social sciences. Therefore, “critical realism seeks to expose the reality of social phenomena and examine and explain the events and discourses that exist within them” (Fisher, 2010).

4.7.6 Ontological Considerations

Ontology social questions are concerned with the characteristics of social enterprises. The important point here is: should social entities be regarded as objective entities that have extrinsic reality to their actors and should social entities be considered as social constructions designed from the views and activities of social actors? Bryman and Bell (2015) stated that these two positions are commonly referred to as objectivism and constructionism respectively. The variations between these two can be demonstrated by reference to two of the popular central terms in social science-organization and culture.
4.7.7 Objectivism

However, as explained by Bryman and Bell (2007), one common mistake that many researchers make during the course research is to use positivism, which is a scientific way of understanding a social research topic.

Based on Bryman and Bell (2007), the researcher is undertaking this study using a qualitative approach. With the use of a qualitative approach, the researcher adopts the interpretivist research paradigm.

The ways to make use of the reached conclusions through positivist approach is explained in detail by many renowned scholars such as Silverman (2013), Flick (2014) and Creswell (2013). The researchers apply different methods to study a certain subject matter and reach a constructive conclusion which is then tested using different empirical processes. Further to this, as identified by Tomkins and Tomkins (1997) and Smith (2002), that research which makes use of the positivist approach during the study has to have a huge amount of data collected to conduct a detailed analysis using different qualitative techniques. Also, it is imperative for research to study and incorporate relevant social patterns and behaviours objectively and separately for improved understanding of the subject matter.

There are different types of philosophies which can be adopted in research but is important to determine the best suited for it. Positivism, interpretivism, and pragmatism common philosophies used in business and social research. The researcher always believes in Objectivism, and the real scenario or situation can be determined only from those people who are in that position or operation. The researcher works in the Oil and Gas sector but distances himself from the possible result of the study. The researcher has knowledge of the current situation of the Oil and Gas sector but has been very objective on the outcome of the study. The discussions were purely based on the outcome of the survey and the additional conversation to a few employees working in ORYX GTL and Qatar Petroleum.
4.8 Research Strategy and Justification

Collis and Hussy (2003) explain how targeted research makes the understanding of a problem easier. Moreover, when studying a particular problem, the help of an example helps to clarify the subject (Silverman, 2013; Yin, 2014). Other experts such as Creswell (2013) and Jackson (2014) are also of the opinion that the use of examples to clarify a problem is helpful in addition to the use of a subjective methodology.

To effectively study a problem and gain a deep insight by analyzing the various angles, Yin (2010) suggests the case study method. A case study involves the creation of theories and collecting the proof of these by various methodologies (Smith, 2002; Jackson, 2014). Moreover, the research of Miller and Miller (2012) also suggests the same concept with the addition of considering the case study as specific to a research problem. In addition to these facts, Jackson (2014) also adds that the case study methodology can be very useful for institutions as a thorough analysis of the results can be conducted.

Yin (2010) lists the positivity in the application of the case study methodology while conducting institutional researches. Primarily, a case study provides an insight into the operations and management of an institution. According to the findings of the research by Silverman (2013), having a thorough understanding of the background of a research problem helps to apply the case study methodology more meaningfully. This work aims at finding the reasons behind the decision taken by any firm to end a certain organizational movement or process (Jackson, 2014). When applying the case study methodology, it is important for a researcher to calculate the number of cases required to reach meaningful results.

For this research, the researcher also used a Case Study of the operation and situation in ORYX GTL and Qatar Petroleum companies. The researcher only focused on the scenario and condition within these two petroleum companies. Also, in-depth interviews were used as a
means of collecting data and information from the selected participants; furthermore, the choice of these two companies is based on the privileged access of the researcher to both companies.

4.9 Generalisation, Validity and Reliability of the Research

Researchers have developed specific tests to verify the reliability and validity of the acquired data which signifies the great importance of these qualities in any research that is being conducted (Rennie, 2014; Yin, 2014). For this study, apart from performing the statistical tests, the researcher also focused on the behaviour and the characteristics of the population sample. The statistical tests of hypothesis were employed in order to further provide an understanding of the characteristics of the sample.

4.9.1 Generalisation

According to Yin (2014), the findings of the sample population are generalized for the entire population in quantitative research, but this cannot be done for qualitative research. This assertion presents both an advantage and a disadvantage for the researchers conducting the study. The analysis of the collected data can be a tedious, time consuming and costly task. However, the generalization of the data is a simpler and quicker task (Rennie, 2014; Gao and Low, 2014). The findings of the research on the population sample would be recognized as the overall response of the entire population, implicating that the responses from a certain proportion of the population reflect the generalized concept of the whole population (Jackson, 2014; Rennie, 2014).

4.9.2 Validity

In every research, validity is one of the main concerns since “any research can be affected by different kinds of factors which, while extraneous to the concerns of the research, can invalidate
the findings” (Seliger and Shohamy 1989, p. 95). Therefore, “conclusions drawn from analyzing survey data are only acceptable to the degree to which they are determined valid”. As a result, “validity is used to determine whether research measures what it intended to measure and to approximate the truthfulness of the results”. Gao and Low (2014) state that validation is necessary to make sure and ensure that the research is being carried out in accordance with the objectives and aims of the study. This process is very important for any research work. According to Smith (2002), careful attention must be given to the behaviour of the respondent to identify if the responses are genuine and original. The sample population which can easily be accessed and is pertinent to the research is selected so if necessary, it may again be accessed at a later stage. Bell and Bryman (2007) state that these steps are necessary to verify that the study conducted is valid.

4.9.3 Reliability

Reliability in simple terms refers to the consistency of a measure be employed. Therefore reliability, like validity, is a way of assessing the quality of the measurement procedure used to collect data in a research study. Past studies have shown that in order for the results from a study to be considered valid, the measurement procedure must first be reliable (Hair et al., 2016; Yin, 2014). Silverman (2013) states, that, reliability is an important way of verifying the consistency and the constancy of the research. In this study, the researcher suitably recognizes the relevant entities of secondary information, which ensures that the data collected, and the findings made are transparent, authentic and reliable. The population selected was not selected in a random way and the questions asked were also related to the topic of the study.
4.10 Document Analysis

Although this research is conducted for study purposes, it may also be used as the material for writings, articles, journals, and reports (Tomkins and Tomkins, 1997). These sources of literature assist in qualitative study related to the research problem. The use of such sources also forms the basis of the triangulation approach (Yin, 2010).

The document analysis involves a comprehensive analysis of the data and information. A document is a systematically put together readable piece that gives information about a subject (Yin, 2014). Documents exist in a variety of different forms. They may be in the form of factual information regarding a subject or formal interpretative conclusion. The analysis for the information is carried out using the same methods as surveys and questionnaires.

Yin (2014) explains the role of documents as a means of endorsing the subject matter and ensuring that it is reliable as it is gathered from other sources. The documentation method is less time consuming compared to one on one interview. Moreover, the documentation process is, even more, cost-effective compared to other means. However, one drawback of this method may be the collection of inaccurate information due to the lack of reliable information (Yin, 2014).

4.11 Statistical Treatment of Data

Cronbach’s alpha coefficient of reliability was used to determine the reliability of the research instrument. The computed value of 0.909 would indicate that the questionnaire is highly reliable.

Cronbach’s alpha is a measure of internal dependability; in other words, how connected are items in a set of groups. Therefore, it is considered as a scale to measure reliability. High Alpha values do not translate to unidimensional measures. Additional analysis can be conducted in providing evidence that it is unidimensional in the scale of the question. Researchers have
proposed exploratory factor in measuring dimensionality. In technicality, Cronbach Alpha is a coefficient of dependability and not a technical test (Bonett and Wright, 2015; Vaske, Beaman and Sponarski, 2017).

The Cronbach’s Alpha can be expressed as a function of the total test items and the mean inter-dependence between the items. Below is the formula for the standard Cronbach’s Alpha:

\[ \alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N - 1) \cdot \bar{c}} \]

N is the number of items
\( \bar{c} \) is the mean inter items covariance and \( \bar{v} \) is the mean of variance.

From the formula, we can see that if we increase the items the Cronbach’s Alpha will increase, similarly, if the mean inter-item correlation is low the Alpha is low. We can say as the inter-item increases the Alpha increases with the number of items constant.

The researcher utilized the mean to calculate the level of ERM implementation, the significance degree of various elements affecting the performance of organizations and the extent to which risk management implementation and practices affect the performance of the organization.

Independent-samples t-test was utilized to compare and determine if there is a significant difference in the level of implementation of ERM between ORYX GTL and Qatar Petroleum while, on the other hand, the analysis of variance (or F-test) was used to compare and determine if there is a significant difference in the level of implementation of ERM among the different departments.

Evaluation of variance (ANOVA) can be employed to confirm whether the averages of at least three groups are different. ANOVA employs \( f \)-Test to test the equality of averages statistically. The F-Test is a ratio of two variances. Variance measure how far the data is distributed from the mean. Larger values translate to greater distribution. F-statistics are grounded on the mean
squares ratios. Mean square is an estimation of population variance that interprets for the degree of freedom (DF) used in calculating the estimate.

F-Tests can be utilized broadly; they as well estimate the variance equality. However, we can enhance the flexibility of the F-test by changing the variances included in the ratio.

The various interdependent groups are defined by specific participants characteristics such as BMI (Body Mass Index) or by the researcher (through randomization of participants into one or more competing groups, say A, B, C). Sample data are organized as shown in Table 4.2, assuming the outcome is systolic blood pressure, and the researcher wishes to measure whether there is a statistical difference in the average of systolic blood pressure between the three groups (A, B, C).

**Table 4.2: Data Organisation**

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of Sample</td>
<td>N_A</td>
<td>N_B</td>
<td>N_C</td>
</tr>
<tr>
<td>Mean of Sample</td>
<td>( \bar{X}_1 )</td>
<td>( \bar{X}_2 )</td>
<td>( \bar{X}_3 )</td>
</tr>
<tr>
<td>Standard Deviation of Sample</td>
<td>S_A</td>
<td>S_B</td>
<td>S_C</td>
</tr>
</tbody>
</table>

The researcher hypothesis interest in ANOVA, therefore, are:

\[ H_0: \mu_1 = \mu_2 = \mu_3 \ldots = \mu_k \]

\[ H_1: \text{Means are not all equal}. \]

where \( k \) = the number of independent comparison groups.

In our example, the hypothesis is:

\[ H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 \]

\[ H_1: \text{The means are not all equal}. \]
In ANOVA the null hypothesis states there is no difference in the averages. The alternative hypothesis is that the averages are usually not equal and instead of writing it mathematically it is written in words. In research, the hypothesis expresses any variation in means. They include, for instance, a condition where all the three averages are unequal, the means are different from each other, and so on. As shown above, the alternative hypothesis represents all the likely situations instead of equality in all averages as the null hypothesis states.

4.11.1 Test Statistic for ANOVA

The test statistic for testing $H_0: \mu_1 = \mu_2 = \ldots = \mu_k$ is:

$$F = \frac{\sum n_j (\bar{x}_j - \bar{x})^2 / (k-1)}{\sum (x - \bar{x})^2 / (N-k)}$$

Using the probability table of values the critical value can be found for the F distribution using the degrees of freedom df$_1 = k-1$, df$_2 = N-k$.

In the test statistic, $n_j =$ the sample size in the $j^{th}$ group (e.g., $j = 1, 2, \ldots$ and $n$ when there exist $n$ groups to compare), $\bar{x}_j$ is the sample mean in the $j^{th}$ group, and $\bar{x}$ is the overall mean. $k$ is the number of independent groups (in this case, $k=n$), and $N$ is the number of observations in the analysis. In this case, $N$ is not equivalent to the size of the population but the analysis sample size.

Using all the sample data complicates the test statistic, making it difficult to see the extension. The above F statistics is a generalization of the test statistic utilized in examining the equality of precisely two means.

A conventional guideline, we reject the null hypothesis stating there is no observable difference when the $p$-value is less than 0.05 significant level. The post hoc evaluation for multi-comparisons is carried out to ascertain which populations differ notably from another.
4.12 Ethical Considerations

Certain norms are to be followed while conducting the study; therefore, the analyst framed some ethical limitations which were accepted by the manager of the operation’s department working for ORYX GTL.

According to (Munhall, 1988), the privacy and safety of the selected sample are essential, and analysts need to ensure that no member of the population is affected adversely whilst the study is being conducted; thus analysts need to devise certain risk combating strategies. The mental state of the respondent's matters for the study which should be undisturbed based entirely on the comfort of the interviewees without external interferences. According to Silverman (2013) no forces should be exerted by the analyst to obtain the desired responses, and all information collected should be discreet and usually anonymous to ensure their safety in situations of mishandling of the data. So, based on these ethical considerations, the analyst destroyed all the collected data on any media after finalizing the evaluation process, to make the interviewees safe and relaxed about their responses.

4.12.1 Right to Self Determination

According to the study of Tomkins and Tomkins (1997), the researcher cannot use the respondent's samples without their approval. It is, therefore, unethical to force them to form part of the study. According to Yin (2011) to avoid this the aims and objectives of the research should be clearly discussed with the respondents. The researcher actively discussed with their respondents and no financial benefits were mentioned, and the respondents were free to quit when they wished. A binding written and verbal agreement were made with the researcher and participants to avoid misunderstandings later in the research.
4.12.2 Right to Full Disclosure

The researcher as mentioned in the consent form has fully explained to the participants their rights, and they have full knowledge of the research. The respondents in our case are free to quit at any time. The researcher shared the research aims and questions with the participants to boost their trust and interest.

4.12.3 Principle of Justice

Using unbiased attitude and respective conduct towards the respondents is mandatory for the smooth analysis of the subject.

4.12.4 Right to Fair Treatment

According to Yin (2010), the participants should be selected based on the targets of the study and not on the choice of the analysts.

- Judgment and conclusions should not be carried out against those who quitted or shifted away from the scope of the study at any time.
- The concerns of the respondents and their queries regarding the study should be cleared by the analysts at every stage of the study.
- The analyst needs to consider the values and norms of every society and religion; therefore, the beliefs and the cultural views of every respondent should hold a dignified position.
- Gracious attitude towards the participants is important.
- Choosing the people for the study should be dependent on their respective knowledge and experiences.
4.12.5 Right to Privacy

According to McLaren (2001), this right deals with the discretion of the acquired data and the preservation of their viewpoints without exploitation. As stated, before the privacy was ensured, and the respondents answered the questions in a comfortable and relaxed atmosphere without any pressure or forces, and furthermore, the discretion and enclosure of their responses were considered. The interviews although were taped but their privacy was promised and to ensure full loyalty anonymous responses were collected so the respondent’s personal details should not interfere with the analysis.

To further enhance the credibility and discretion following steps were undertaken by the analyst:

- Under protection, all the information was kept, and sharing was not permitted.
- The recorded responses and the data were placed not in contact with the personal information of the respondents to assist anonymity.
- Furthermore, the identity was kept discreet, and thus no recordings were labelled with the respondents.

4.12.6 Academic Integrity

Different learning institutions are concerned with issues of copyright and material duplication. The institutions ensure that students properly reference and cite their work by recognizing authors or specific studies. This study has conducted vast citations and referencing in acknowledgment of other authors who have contributed to the success of this research. The researcher employed other researchers work for analysis and identifying gaps.
4.12.7 Limitations of the Study

This study investigated the risk management and ERM implementation of oil and gas companies using two oil companies as case study organizations. In particular, it evaluated the risk management implementation approaches in the oil and gas industry. Moreover, it evaluated the organizational context of risk management and the critical success factors and also, the impact of risk management implementation and practices on organizational performance.

This research has some limitations, however. First, it investigated only two firms as the sample representing the oil and gas sector in Qatar. Each of these firms has an organizational culture which could have an impact on the perceptions of the respondents. Secondly, the sample size for the interview is relatively limited because members of senior management were not available most of the time. Thirdly, the research might not be able to generalize its findings in the entire Middle East or of the globe, because of the difference in regulatory reforms, rules, and practices in other countries. So, it is limited to the risk management practices of the oil and gas sector in Qatar. The fourth limitation is that this research has used very limited secondary data which might contain risk-related information.

4.13 Conclusion

In this chapter, the research philosophy, type, strategy, data collection, sample size and sampling, data analysis, generalization, validity, reliability, and ethical consideration have all been discussed in detail. The research methodology was developed to collect the appropriate data that leads to meeting the aim and objectives of the study. The justification for choosing such a research method is also provided in the chapter.

In the next chapter, the findings and analysis made in the research are discussed.
5 PRESENTATION OF RESULTS AND ANALYSIS

5.0 Introduction

This chapter presents the results of the statistical analysis in relation to risk management implementation within the oil and gas industry in Qatar. The chapter also presents a demographic analysis of the various respondents from which information was derived during the fieldwork.

5.1 Demographic Descriptive Statistics

5.1.1 Gender of Interviewees/Respondents

In total, the researcher spoke to twenty-five officials of the ORYX GTL Qatar oil and gas industry. Of the twenty-five officers, 18 were male, and 7 were female officers. These are represented in Table 5.1 and Figure 5.1 below.

Table 5.1: Table Showing Gender of Interviewees/Respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18</td>
<td>18</td>
<td>72%</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>7</td>
<td>28%</td>
</tr>
</tbody>
</table>
Table 5.1 and Figure 5.1 above illustrates the gender representation of the officials spoken to by the researcher at the ORYX GTL oils and gas industry in Qatar in the Middle East. The 18 male respondents represent 72% and 7 female respondents represent 28% of the officials at the ORYX GTL oil and gas industry that were spoken to.

5.1.2 Age of Interviewees/Respondents

Table 5.2: Table Showing the Age Categories of Interviewees/Respondents

<table>
<thead>
<tr>
<th>Age Category</th>
<th>18-25</th>
<th>25-35</th>
<th>36-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Tables 5.2 and Figure 5.2 above shows the age categories of the interviewees/respondents spoken to at ORYX GTL oil and gas industry during the researcher’s fieldwork. Four male and 4 females with the age category of between 18 and 25 years, eight male and just one female with the age category between 26 and 35 years and six male and 2 females with the age category of between 36 and 60 years were all spoken to by the researcher. As the pie chart shows, the first age category represents 22% of the respondents, the second category represents 45% of respondents, and the last category represents 33% of all respondents spoken to.
Table 5.3: Table showing General Department of Official/Respondents at ORYX GTL

<table>
<thead>
<tr>
<th>Position</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Executive Officer</td>
<td>Overall In Charger</td>
</tr>
<tr>
<td>Chief Operations Officer</td>
<td>All Operations</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Health and Safety Environment</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Key Point Indicator</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Root Cause Analysis</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Behavioral Based Safety</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Oil and Gas</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Specific, Measurable, Attainable</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Realistic and Timely</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Quarterly Monthly Operating Report</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Process Hazard Analysis</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Management of Change</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Hazard and Operability</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Safety Integrity Level</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Quantitative Risk Analysis</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Failure Mode Effects Analysis</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Emergency Shutdown</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Enterprise Risk Management</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Permit To Work</td>
</tr>
<tr>
<td>Officer responsible for</td>
<td>Job Hazard Analysis</td>
</tr>
<tr>
<td>Other Officers responsible for</td>
<td>Risk management</td>
</tr>
</tbody>
</table>

Source: ORYX GTL Oil and Gas, Qatar
5.2 Risk management approaches implementation in the oil and gas industry

Table 5.4 below is used to interpret the mean ratings pertaining to the level of implementation of ERM approaches in the oil and gas industry. The results are presented in Table 5.5 through to Table 5.12.

**Table 5.4: Scale of Interpretation Used to Describe The Level of Implementation of ERM**

<table>
<thead>
<tr>
<th>Mean Rating</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00 – 1.79</td>
<td>Not at all implemented</td>
</tr>
<tr>
<td>1.80 – 2.59</td>
<td>Partially implemented</td>
</tr>
<tr>
<td>2.60 – 3.39</td>
<td>Moderately implemented</td>
</tr>
<tr>
<td>3.40 – 4.19</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>4.20 – 5.00</td>
<td>Fully/completely implemented</td>
</tr>
</tbody>
</table>
Table 5.5: Level of ERM Implementation in the Oil and Gas Industry in Terms of Internal Environment

<table>
<thead>
<tr>
<th>Internal Environment</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>The organization demonstrates a commitment to integrity and ethical values.</td>
<td>3.77</td>
</tr>
<tr>
<td>The organization’s board of directors demonstrates independence from management.</td>
<td>3.36</td>
</tr>
<tr>
<td>The organization’s board of directors exercises oversight of the development and performance of internal control.</td>
<td>4.12</td>
</tr>
<tr>
<td>The organization’s management establishes, with board oversight, structures, reporting lines and appropriate authorities and responsibilities in the pursuit of objectives.</td>
<td>3.50</td>
</tr>
<tr>
<td>The organization demonstrates a commitment to attract, develop and retain competent individuals in alignment with objectives.</td>
<td>3.79</td>
</tr>
<tr>
<td>The organization holds individuals accountable for their internal control responsibilities in the pursuit of objectives.</td>
<td>4.17</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.78</td>
</tr>
</tbody>
</table>

Tables 5.4 and 5.5 presents the scale of Interpretation Used to Describe The Level of Implementation of ERM and the data on the level of ERM implementation in the oil and gas industry in terms of internal environment respectively. In general, the risk management approaches in terms of the internal environment in the oil and gas industry in Qatar are highly implemented with an overall mean rating of 3.78. The standard deviations are all low, all below 1, which means that the ratings of the respondents do not deviate much from one another.

Among the six indicators, the highest mean (4.17) is obtained by the last one which states that the company holds individuals accountable for their internal control responsibilities in the pursuit of objectives. This implies that the company holds the individuals liable for those under their respective jurisdiction as they attain the objectives. This is supported by Hopkin (2012)
who contended that risk management needs to be completely understood by an individual and must allow him to act to fulfil business strategies and objectives.

Next is the indicator stating that the company’s board of directors’ exercises oversight of the development and performance of internal control (mean = 4.12). This finding is sustained by Park (2010) who posits that risk management is a process that is affected by the entity’s board of directors, administration and related personnel. Hopkin (2010) also explained that risk management involves identification, measurement, monitoring and controlling of risks; these form part of overseeing. Risk management is an important aspect of corporate governance (Alwi et al., 2019) and thus, an oversight of this strategic activity has to be undertaken by the board of directors. This is a proactivity approach of any organisation to show the commitment to long term growth and sustainability. The process of risk identification in the risk management process also involves the identification of opportunities which are “the actions or potential actions that create or alter goals or approaches for creating, preserving and realizing value” (COSO, 2017). In this respect, the board of directors’ key role in risk identification in ORYX GTL is also meant to identify opportunities for creating value.

The third highest rating is obtained by the fifth indicator stating that the company demonstrates a commitment to attract, develop and retain competent individuals in alignment with objectives. This implies that an employee performance appraisal is in place which could be used to determine the competency of applicants and employees as well. This will ascertain a high level of attainment of the company’s objectives and consequently lessen risk. This is supported by Reeves et al. (2012) who affirm that risk involves the probability of the occurrence of something and its result as it affects the attainment of objectives.

On the other hand, the lowest mean rating of 3.36 described as moderately implemented, is obtained by the second indicator which states that the company’s board of directors demonstrates independence from management. This means that the company’s board of
directors depend or rely on management most of the time since their independence is in moderation. This is a good indication that the board of directors does not entirely dissociate itself from the management; in fact, there should be a strong relationship and open communication between management and Board of Directors. This is suggested by Stank et al. (1994) who contend that the structure of any organization includes its inside order of control, communication, and relationships.
Table 5.6: Level of ERM Implementation in the Oil and Gas Industry in Terms of Objective Setting

<table>
<thead>
<tr>
<th>Objective Setting</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td><strong>Standard</strong></td>
</tr>
<tr>
<td>The organization specifies objectives with sufficient clarity to enable the <em>identification</em> of risks relating to objectives.</td>
<td>3.40</td>
</tr>
<tr>
<td>The organization specifies objectives with sufficient clarity to enable the <em>assessment</em> of risks relating to objectives.</td>
<td>3.58</td>
</tr>
<tr>
<td>The organization identifies risks to the achievement of its objectives across the entity.</td>
<td>3.73</td>
</tr>
<tr>
<td>The organization protects value for example by ensuring a certain target rating, avoiding large losses or default, and avoiding volatility in the P/L.</td>
<td>3.73</td>
</tr>
<tr>
<td>The organization drives profitability and growth by using risk management techniques to generate value, as reflected in a rising P/E multiple, as well as increased profit and return on equity.</td>
<td>3.54</td>
</tr>
<tr>
<td>The organization drives profitability and growth by encouraging controlled risk-taking in innovation or R&amp;D and investments.</td>
<td>3.05</td>
</tr>
<tr>
<td>The organization ensures regulatory compliance.</td>
<td>4.04</td>
</tr>
<tr>
<td>The organization protects the enterprise from negative regulatory intervention.</td>
<td>4.34</td>
</tr>
<tr>
<td>The organization avoids penalties such as product liability or safety claims.</td>
<td>4.43</td>
</tr>
<tr>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>avoiding unpleasant surprises for shareholders</em>.</td>
<td>3.47</td>
</tr>
<tr>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>providing a sustainable workplace for employees</em>.</td>
<td>3.35</td>
</tr>
<tr>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>minimizing negative externalities for society at large</em>.</td>
<td>3.49</td>
</tr>
<tr>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>maintaining the confidence of business partners</em>.</td>
<td>4.13</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.71</strong></td>
</tr>
</tbody>
</table>
5.3 Interpretation and Analysis:

Table 5.3 provides the data for the level of ERM implementation in the oil and gas industry in terms of objective setting. In general, there is an indication that the characteristics of objective setting were highly implemented with an overall mean rating of 3.71. The standard deviations are all low, below 1, which means that the ratings of the respondents do not deviate much from one another. According to Nickmanesh et al. (2013), the main essence and purpose of risk management initiative is not simply to identify risk, but to evaluate every event associated with organization’s objectives for easy, better and profitable achievements. Thus, objective setting plays a significant role in the company.

Based on the gathered data, the highest mean rating is 4.43 described as highly implemented which is obtained by the ninth indicator which states that the company avoids penalties such as product liability or safety claims. This implies that the company is maintaining high standards in their quality control, thus avoiding the occurrence of product liability or safety claims. This is considered a good culture or practice of the company.

The second highest in mean rating is 4.34 described as highly implemented which provides that the company protects the enterprise from negative regulatory intervention. This is an indication that the company does not allow the inference of regulations which are not in accordance with the company’s objectives. This is closely related to the next indicator obtaining the third spot which states that the company provides stability and continuity, ensuring the independence of the enterprise by maintaining the confidence of business partners obtaining a mean rating of 4.13. This finding implies that the oil and gas companies maintain a code of professionalism respecting the confidentiality of each other, breeding trust. Pinto, Slevin and English (2008) endorse the thought that trust is necessary for the execution of projects. According to them, trust makes the working relationships strong and enhances the desire for collaboration with different project shareholders. According to Erden (2003), trust is
the outcome of behaviour related to sharing of information, resources and materials and showing good purpose.

On the opposite end, the lowest mean rating is 3.05 described as moderately implemented, which is obtained by the 6th factor which states that the company drives profitability and growth by encouraging controlled risk-taking in innovation or R&D and investments. The finding implies that the profitability and growth of the oil and gas companies in Qatar do not depend much on research and development projects neither on risky investments. The oil and gas companies in Qatar may need to improve in this area.

In a survey conducted by Perrons (2014) to show how innovation and R&D happen in the upstream oil & gas industry, he found out that the USA plays a dominant role in the industry’s overall technology-related activities. Furthermore, service companies file considerably more patents per innovation than other organizations. Moreover, in a study conducted by Liu and Zeng (2016), they found out that policy risk was the main factor affecting the investment in the early development stage; while policy risk and technology risk decline gradually, market risk has gradually become the main uncertainty affecting the investment in the mature development stage.

Another moderately implemented factor is that the company provides stability and continuity, ensuring the independence of the enterprise by providing a sustainable workplace for employees. This finding implies that providing a sustainable workplace for employees may not be the priority of the companies. This is supported by Net Impact’s report that satisfaction is relatively low with having a comfortable working environment, compensation, working for a place that values their employees’ opinions, but rather the staff who claim to have an immediate relationship with their social and environment contact through their roles report higher levels of job satisfaction than those who do not in a ratio of 2:1. This contradicts the contention of
Samani, Rasid and Sofian (2015) who maintain that the environment will support a collaborative culture, that will assist in attracting and retaining talent.

**Table 5.7: Level of ERM Implementation in the Oil and Gas Industry in Terms of Event Identification**

<table>
<thead>
<tr>
<th>Event Identification</th>
<th>Level of Implementation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization determines the internal and external environment for achieving organizational goals.</td>
<td>Mean 3.05  Standard Deviation 0.56</td>
<td>Moderately implemented</td>
</tr>
<tr>
<td>The organization frequently conducts surveys (quarterly, annually) and polls of the risk-champion framework to certify the various departments identify the most significant existing and emerging risks</td>
<td>Mean 3.40  Standard Deviation 0.72</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization has in place internal and external quality standards to tackle quality risks that can lead to failure or obstruct operations</td>
<td>Mean 4.13  Standard Deviation 0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization has a religious centralized operational risk management that enables identifying and defining the guidelines of best practice and roll them out via the enterprise and past contractors</td>
<td>Mean 3.49  Standard Deviation 0.53</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The operational risks are managed and controlled within the organization given the diversification of the risks and the expertise required to deal with them.</td>
<td>Mean 4.13  Standard Deviation 0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization has a specialized department that handles the political and regulatory risks, and it operates closely with the BOD and the management (to understand business needs).</td>
<td>Mean 3.40  Standard Deviation 0.72</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization oversees regulations of risks by the government, for instance, passing of energy laws</td>
<td>Mean 4.04  Standard Deviation 0.52</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>Mean 3.66  Standard Deviation 0.31</td>
<td>Highly implemented</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:**

Table 5.7 presents the data on the level of ERM implementation in the oil and gas industry in terms of event identification. In general, event identification is highly implemented with an overall mean of 3.66. The standard deviations are all low which is below 1, which indicates that the ratings of the respondents do not deviate much from one another.
Among the event identification processes, the highest mean rating is obtained by the third and fifth indicators, both with a mean rating of 4.13, which are as follows: The organization has internal and external quality standard in place to address quality risk that may lead to failure and hamper sales; The organization’s technical and operational risks are controlled and managed within businesses given the diversity of these risks and the expert knowledge needed to deal with them. Next in rank is the factor which states that the company monitors regulatory risk, for example, the passage of renewable energy laws.

The finding along this aspect supports the finding of Lemak (1997) who found out that Total Quality Management is associated with superior stock-market performance (on the market- and risk-adjusted basis) and improved profit margins. In a study which was conducted by Bayo-Moriones and Merino-Díaz de Cerio (2001) they conclude that high work performance practices, both at the organization and employment levels are facilitated by the enforcement of quality assurance systems and various instruments.

The third highest mean is 4.04, described as highly implemented, is obtained by the seventh indicator stating that the company monitors regulatory risk, for example, the passage of renewable energy laws. This is a good indication that the companies are careful and closely monitoring whatever possible risk in the passage of renewable energy laws. It is noted that renewable energies such as solar and wind sources, nuclear power, or hydrogen fuel cells may become viable alternatives to conventional fuel in the future. On the other hand, the study conducted by Al-Mammary, Kazem, and Chaichan (2016) clarifies the share of renewable energies today and how it will continue to increase steadily. It further demonstrates that the increase in oil and shale gas production will affect the Gulf Cooperation Council (GCC) countries, especially kingdom of Saudi Arabia (KSA), the largest oil exporter in the GCC.

The lowest rating among the indicators is the first one about the company identifying the internal and external events required for the achievement of the organization’s objectives, with
a mean of 3.05 described as moderately implemented. This finding implies that the company may have had fallen short of identifying these factors.

**Table 5.8: Level of ERM Implementation in the Oil and Gas Industry in Terms of Risk Assessment**

<table>
<thead>
<tr>
<th>Risk Assessment</th>
<th>Level of Implementation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization evaluates risks based on how the risks can be managed</td>
<td>3.05</td>
<td>0.56</td>
</tr>
<tr>
<td>The organization contemplates the likelihood for fraud in determining risks in achieving organization objectives</td>
<td>3.50</td>
<td>0.53</td>
</tr>
<tr>
<td>The organization recognizes changes that could especially affect the system of internal control</td>
<td>3.40</td>
<td>0.71</td>
</tr>
<tr>
<td>The organization evaluates changes that could importantly affect the internal control system.</td>
<td>3.48</td>
<td>0.54</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.36</td>
<td>0.34</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:**

Table 5.8 shows the data on the level of ERM implementation in the oil and gas industry in terms of risk assessment. Based on the results, the respondents perceive that the risk assessment strategies are moderately implemented as validated by the overall mean of 3.36. It should be noted that this area obtained the lowest over-all mean rating among the eight areas considered in the study. This implies that the oil and gas industry in Qatar may not yet have a fully efficient risk assessment system in place.

There are three indicators which qualify to be highly implemented, but it has to be noted that two of them are quite low, near the borderline. The highest mean rating is 3.50 described as highly implemented, obtained by the second indicator about the company considering the potential for fraud in assessing risks to the achievement of objectives. This implies that the company is being careful that there should be no fraud in assessing risks.
An example wherein a company is exposed to levels of fraud is when a drop in the price of oil severely affect the industry. The companies in the oil & gas industry encounter reduced spending and sustained pressure to continue producing the wanted production levels. This situation is spilled down to service providers in the oil fields, and the extra pressures lead to disequilibrium between agreement and business operations and probably influences activities that may not be in line with organization policies. Authors maintain that oil and gas institutions frequently hire third parties, like engineers, constructors and procurement firms to coordinate them in their country activities. This leads the companies vulnerable to fraud, bribery, and corruption (Silvestre, Gimenes and Silva Neto, 2017).

Closely following next is the fourth indicator “The organization evaluates changes that could significantly impact the internal control system” with a mean of 3.48, which is also closely related to the third in rank “The organization recognizes changes that could importantly affect the internal control system” with a mean of 3.40. These findings support the contention of Osabutey et al. (2009) that the initial step in operationalizing risk management is establishing the vulnerable risks the company is exposed to, the management is then tasked with finding or assessing a dependable way in measuring the organization’s subjection to these risks and identify and quantify a firm’s significant exposure.

The lowest in rank is obtained by the indicator “The organization evaluates risks based on determining how to manage the risks” with a mean of 3.05. This finding implies that there may be a shortage of expert resources in the highly technical areas such as geophysics and petroleum engineering, or IT personnel with expertise in some of the more complicated IT, like high-performance computing (HPC). HPC is employed to reinforce large volumes of data in scientific and engineering exploration and production.

Evaluating the risks is not enough; Osabutey et al. (2009) recommend identifying the contributing factors and classifying the factors is crucial. They further recommend ways in
which the risks can be divided, evaluated and quantifies, they maintain that the approach adopted, and method(s) used should be specific in meeting the business, customer and project needs. The findings of the present study also corroborate the finding of Fazlali, Ebrahimi and Hosseini (2013) in their study conclude that absence of strategic risk assessment and risk evaluation introductory plan for the preferred alternative are the most considerable issues.

Table 5.9: Level of ERM Implementation in the Oil and Gas Industry in Terms of Risk Response

<table>
<thead>
<tr>
<th>Risk Response</th>
<th>Level of Implementation</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization’s effective procedures when treating risks empower people to decide within their respective areas of responsibility.</td>
<td></td>
<td>4.11</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization has effective procedures that lay out specifically what people should do—and what they should not do—in a given situation.</td>
<td></td>
<td>4.02</td>
<td>0.53</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization has efficient and effective internal controls when to eliminate or reduce any kinds of risks through these proposed control measures.</td>
<td></td>
<td>3.42</td>
<td>0.69</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization selects and implements appropriate control measures to modify the risk, for example, risk control (or mitigation), risk avoidance, risk transfer, and risk financing.</td>
<td></td>
<td>4.10</td>
<td>0.58</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization’s risk management system tracks the value at risk arising from risk exposure to ensure that these remained below the respective limits.</td>
<td></td>
<td>3.49</td>
<td>0.53</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization assesses its risk &quot;appetite,&quot; in measuring the amount of risk it is bearing, and determine which risks should be maintained and which to transfer (e.g. environmental or quality compromises, new product lines, (e.g. gross profit vs. market share?).</td>
<td></td>
<td>3.07</td>
<td>0.56</td>
<td>Moderately implemented</td>
</tr>
<tr>
<td>The organization assigns decision responsibility to a single person—possibly with the help or approval of others so that personal accountability is at stake.</td>
<td></td>
<td>4.12</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>Overall Mean</td>
<td></td>
<td>3.76</td>
<td>0.30</td>
<td>Highly implemented</td>
</tr>
</tbody>
</table>
Interpretation and Analysis:

Table 5.9 presents the data on the level of ERM implementation in the oil and gas industry in terms of risk response. In general, the risk response strategies are highly implemented with an overall mean rating of 3.76.

The highest mean rating, 4.12 (highly implemented), is obtained by “The organization assigns decision responsibility to a single person — possibly with the help or approval of others so that personal accountability is at stake. This implies that decisions are centralized, but in consultation with others, that is, fora, consultation meetings, and deliberations are conducted to solicit ideas and suggestions regarding risk response system.

The indicator “The organization’s effective procedures when treating risks empower people to decide within their respective areas of responsibility” was rated the highest (4.11). Closely following and related is the indicator stating that the company selects and implements appropriate control measures to modify the risk, for example, risk control (or mitigation), risk avoidance, risk transfer, and risk financing (mean = 4.10). Nava and Rivolta, (2013) champion corporate activities should empower project teams by hiring and retaining the best employees, clearly defining processes, and certifying control of management and technical activities.

Sequentially, the project teams should be able to make decisions for projects deliverables.

The moderately implemented indicator is the assessing of the company’s risk "appetite," in measuring the amount of risk it is bearing and determine which risks to maintain and which to transfer to others. This implies that the companies are somewhat encountering difficulty in assessing some risks such as, but not limited to, environmental or quality compromises, on new product lines - gross profit or market share.
Table 5.10: Level of ERM Implementation in the Oil and Gas Industry in Terms of Information and Communication

<table>
<thead>
<tr>
<th>Information and Communication</th>
<th>Level of Implementation</th>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization obtains or generates relevant, quality information to support the functioning of internal controls.</td>
<td>3.51</td>
<td>0.53</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization uses relevant, quality information to support the functioning of internal controls.</td>
<td>3.50</td>
<td>0.54</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization internally communicates information, including objectives and responsibilities for internal control, necessary to support the functioning of internal control.</td>
<td>4.12</td>
<td>0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization communicates with external parties regarding matters affecting the functioning of internal control.</td>
<td>4.03</td>
<td>0.52</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.79</td>
<td>0.29</td>
<td>Highly implemented</td>
</tr>
</tbody>
</table>

Interpretation and Analysis:

Table 5.10 shows that the ERM in terms of information and communication in the oil and gas industry in Qatar is highly implemented, in general, with an overall mean of 3.79. The two highest in mean rating are a) The organization internally communicates information, including objectives and responsibilities for internal control, necessary to support the functioning of internal control (4.12), and b) The organization communicates with external parties regarding matters affecting the functioning of internal control (4.03). These findings imply that the company maintains effective communication lines internally and externally.

This corroborates Guest (2011) who posits that effective communication ensures that the members of the team not only recognize and support the team in its current position but also in the future expectations. Gordon, Loeb, and Tseng (2009) also contend that communication is one crucial factor for effective risk management. According to him, communication is paramount for effective risk minimization as it offers the opportunities for clarifying,
understanding the progress of the organization, and for workers to discuss the improved methods for the organization and the effects of utilizing various risk minimization strategies. Also, according to Zwikael and Ahn (2011), the process of communication enables the employees to clearly comprehend their role and responsibility within the organization when the organizational structure is altered.

The indicator “The organization uses relevant, quality information to support the functioning of internal controls” obtained the lowest mean rating, 3.50, nonetheless described as highly implemented. This is supported by Bigliani (2013) who maintain that to lower risk in oil and gas operations, there should be consistency in information stored by various companies, and the information should be secure and synchronized on mobile devices.
Table 5.11: Level of ERM Implementation in the Oil and Gas Industry in Terms of Control Activities

<table>
<thead>
<tr>
<th>Control Activities</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>The organization selects control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels.</td>
<td>3.42</td>
</tr>
<tr>
<td>The organization develops control activities that contribute to the alleviation of risks to enhance acceptable achievement of organizational goals.</td>
<td>4.12</td>
</tr>
<tr>
<td>The organization selects extensive control activities over technology to support the achievement of objectives.</td>
<td>3.49</td>
</tr>
<tr>
<td>The organization develops general control activities over technology to support the achievement of objectives.</td>
<td>3.51</td>
</tr>
<tr>
<td>The organization employs control activities through policies that establish what is expected.</td>
<td>3.06</td>
</tr>
<tr>
<td>The organization employs control activities through procedures that put policies into action.</td>
<td>4.11</td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.62</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:**

Based on the results in Table 5.11 above, the ERM in the oil and gas industry in Qatar in terms of control activities is highly implemented with an overall mean of 3.62. The following control activities obtained the highest mean ratings: a) The organization develops control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels (4.12), b) The organization deploys control activities through procedures that put policies into action (4.11), and c) The organization develops general control activities over technology to support the achievement of objectives (3.51).

The indicator “The organization employs control activities through policies that establish what is expected” was given the lowest rating (3.06) which is interpreted as moderately
implemented. This implies that the companies need to enhance or improve their policies along this line.

Table 5.12: Level of ERM Implementation in the Oil and Gas Industry in Terms of Monitoring

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Level of Implementation</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization selects process and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td></td>
<td>3.06</td>
<td>0.55</td>
<td>Moderately implemented</td>
</tr>
<tr>
<td>The organization develops process and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td></td>
<td>4.12</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization performs the process and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td></td>
<td>4.10</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization evaluates internal control insufficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td></td>
<td>4.12</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>The organization communicates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td></td>
<td>4.12</td>
<td>0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>Overall Mean</td>
<td></td>
<td>3.91</td>
<td>0.48</td>
<td>Highly implemented</td>
</tr>
</tbody>
</table>
Interpretation and Analysis:

Table 5.12 shows the results on the level of ERM implementation in the oil and gas industry in terms of monitoring. Based on the results, the oil and gas companies highly implement the indicated monitoring activities, in general, with an overall mean of 3.91.

With regard to the specific indicators, the following obtained the highest mean rating of 4.12 described as highly implemented: a) The organization develops ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning; b) The organization communicates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate, and c) The organization evaluates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.

These findings imply that the company implements an effective monitoring and evaluation system. This corroborates Moeller and Robert (2007) and Gordon, Loeb, and Tseng (2009) who posit that the Monitoring component of ERM is designed to ensure the sustainability of the ERM practice in the organization. They further infer that monitoring is therefore integrated into management activities to guarantee effective monitoring and evaluations of the risk management process and framework in the organization.

The present finding also supports Verma, Johnson, and McLean (2000) who undertook research on the benzene and total hydrogen exposures in the upstream petroleum oil and gas industry and formed several safety concerns. Their findings assist in establishing a precaution to the global oil and gas industry that certain operations such as glycol dehydrators should be carefully monitored and there should also be based-monitoring program along with the traditional long-and short-term personal exposure sampling.
Meanwhile, Nava and Rivolta (2013) also contend that successful organizations assess projects continually, not only at formal checkpoints and stage gates, to ensure they are on track to add value.

However, the companies under investigation in this study fell short of selecting ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning. This indicator obtained a mean of 3.06 described as moderately implemented. The finding is parallel to that of Fazlali et al. (2011) who found out from their study that there is lack of risk evaluation preliminary plan for the preferred alternative in the implementation of oil, gas, and petrochemical projects in Iran.

### 5.4 Summary of Results

Seven out of eight aspects were perceived to have been highly implemented in. However, they are not also fully or completely implemented. Monitoring obtained the highest overall mean rating among them. Looking at the mean 3.91 out of 5 indicates that the level of implementation is not maximized; the companies still need improvement in the implementation of the identified activities/events.

Only one aspect, risk assessment, is moderately implemented with an overall mean rating of 3.36.
Table 5.13: Level of ERM Implementation According to Company

<table>
<thead>
<tr>
<th>Facet</th>
<th>ORYX GTL</th>
<th>Description</th>
<th>Qatar Petroleum</th>
<th>Description</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Internal Environment</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.79</td>
<td>Highly implemented</td>
<td>0.602</td>
</tr>
<tr>
<td>b. Objective Setting</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>0.806</td>
</tr>
<tr>
<td>c. Event Identification</td>
<td>3.70</td>
<td>Highly implemented</td>
<td>3.63</td>
<td>Highly implemented</td>
<td>0.051**</td>
</tr>
<tr>
<td>d. Risk Assessment</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.34</td>
<td>Moderately implemented</td>
<td>0.373</td>
</tr>
<tr>
<td>e. Risk Response</td>
<td>3.80</td>
<td>Highly implemented</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>0.036*</td>
</tr>
<tr>
<td>f. Control Activities</td>
<td>3.64</td>
<td>Highly implemented</td>
<td>3.60</td>
<td>Highly implemented</td>
<td>0.271</td>
</tr>
<tr>
<td>g. Information &amp;</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.79</td>
<td>Highly implemented</td>
<td>0.747</td>
</tr>
<tr>
<td>h. Monitoring</td>
<td>3.96</td>
<td>Highly implemented</td>
<td>3.85</td>
<td>Highly implemented</td>
<td>0.052**</td>
</tr>
</tbody>
</table>

*Significant at 5% level

** Significant at 10% level (or even at 6% level)

Interpretation and Analysis

Table 5.13 shows the level of ERM implementation according to the company. In this study, there are two companies considered namely, the ORYX GTL and Qatar Petroleum. Both companies obtained the highest mean rating in Monitoring. However, they differ in the lowest mean rating. For ORYX GTL, the lowest is in Control activities while for Qatar Petroleum, the lowest mean rating is in Risk assessment.

Meanwhile, there is no significant difference in the level of ERM implementation between ORYX GTL and Qatar Petroleum in terms of five facets namely; Internal Environment, Objective Setting, Risk Assessment, Control Activities, and Information and Communication. This is because the associated p-values are less than the level of significance of 0.05 or 0.10. This means that the level of ERM implementation of ORYX GTL and Qatar Petroleum are...
statistically the same in terms of these five aspects. This implies that the management of the two companies has the same views in terms of these aspects.

In terms of Risk Response, ORYX GTL has a significantly higher level of implementation than Qatar Petroleum, at 5 per cent level of significance. At 10 per cent level of significance, ORYX GTL also has a significantly higher level of implementation than Qatar Petroleum in terms of Event Identification and Monitoring.

These may be attributed to the differences in the companies’ manpower and resources.
Table 5.14: Level of ERM Implementation according to the Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Internal Environment</th>
<th>Objective Setting</th>
<th>Event Identification</th>
<th>Risk Assessment</th>
<th>Risk Response</th>
<th>Control Activities</th>
<th>Information &amp; Communication</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>3.54</td>
<td>3.61</td>
<td>3.58</td>
<td>3.30</td>
<td>3.62</td>
<td>3.54</td>
<td>3.68</td>
<td>3.64</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>3.83</td>
<td>3.69</td>
<td>3.77</td>
<td>3.50</td>
<td>3.83</td>
<td>3.57</td>
<td>3.70</td>
<td>3.80</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>3.87</td>
<td>3.75</td>
<td>3.80</td>
<td>3.30</td>
<td>4.03</td>
<td>3.70</td>
<td>4.00</td>
<td>4.36</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>3.73</td>
<td>3.67</td>
<td>3.58</td>
<td>3.31</td>
<td>3.71</td>
<td>3.56</td>
<td>3.76</td>
<td>3.86</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>3.88</td>
<td>3.74</td>
<td>3.63</td>
<td>3.33</td>
<td>3.74</td>
<td>3.60</td>
<td>3.80</td>
<td>3.92</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>3.77</td>
<td>3.75</td>
<td>3.52</td>
<td>3.30</td>
<td>3.59</td>
<td>3.50</td>
<td>3.78</td>
<td>3.58</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>3.72</td>
<td>3.80</td>
<td>3.89</td>
<td>3.35</td>
<td>4.00</td>
<td>3.78</td>
<td>3.90</td>
<td>4.30</td>
</tr>
<tr>
<td>h. Production</td>
<td>3.80</td>
<td>3.73</td>
<td>3.65</td>
<td>3.35</td>
<td>3.77</td>
<td>3.61</td>
<td>3.79</td>
<td>3.93</td>
</tr>
<tr>
<td>i. Technical</td>
<td>3.89</td>
<td>3.74</td>
<td>3.84</td>
<td>3.51</td>
<td>3.84</td>
<td>3.76</td>
<td>3.82</td>
<td>3.94</td>
</tr>
<tr>
<td>p-value</td>
<td>0.003*</td>
<td>0.039**</td>
<td>0.001*</td>
<td>0.225</td>
<td>0.004*</td>
<td>0.026**</td>
<td>0.442</td>
<td>0.004*</td>
</tr>
</tbody>
</table>

*Significant at 1% level

**Significant at 5% level
Interpretation and Analysis:

Based on the analysis results presented in Table 5.14, it can be gleaned that there is no significant difference in the level of Enterprise Risk Management (ERM) implementation among the departments in terms of two facets namely, risk assessment and information and communication \((p > 0.05)\). The results would imply that ERM implementation along risk assessment, on the average, is the same among the departments of the organization. It can be said that the level of implementation of enterprise risk management is at the same level among the different departments. The same result can be said considering enterprise risk management implementation along information and communication – the different departments, on the average, implement the same level of enterprise risk management.

Analysis results also showed that a significant difference in the level of implementation of Enterprise Risk Management (ERM) exists among the departments in terms of Internal Environment, Objective Setting, Event Identification, Risk Response, Control Activities, and Monitoring. The results imply that regardless of the department, the level of implementation of ERM along the mentioned areas or aspects is the same.

Taking into consideration Risk Response, it turns out that the Technical, Warehouse, and Learning and Development departments are the top three departments with the highest level of implementation of ERM. On the other hand, DOT, IT, and Maintenance are the department with the lowest level of implementation of ERM.

When it comes to Objective Setting, the IT department was seen to have the highest level of implementation. The Learning and development and Health and safety departments provided the second highest level of implementation of ERM. The departments with the lowest level of implementation are Engineering, Maintenance, and DOT, respectively.

The IT department has the highest level of implementation of ERM when it comes to Event Identification. This is followed by the Technical and the Learning and development
departments. On the other hand, the Health and safety department had the lowest level of implementation of ERM, after the DOT and Maintenance departments.

When it comes to Risk response, it was seen that the Learning and development department provided the highest level of implementation followed by the IT department. The Health and safety department had the lowest level of implementation after the DOT and Maintenance departments.

The IT and Technical departments have the highest level of implementation when it comes to Control activities. Along the same aspect, it was seen that the Health and safety department and the DOT department had the lowest level of implementation of ERM.

Along the aspect of Monitoring, it can be seen that Learning and development had the highest level of implementation of ERM followed by the IT department. On the other hand, the Health and safety and the DOT department have the lowest level of implementation.
### Table 5.15: Multiple Comparison Test Among Departments for Level of ERM

<table>
<thead>
<tr>
<th>Factors</th>
<th>Pair</th>
<th>The difference in Mean Ratings</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Environment</td>
<td>DOT vs Warehouse</td>
<td>- 0.3389</td>
<td>0.044**</td>
</tr>
<tr>
<td></td>
<td>DOT vs Production</td>
<td>- 0.259</td>
<td>0.010*</td>
</tr>
<tr>
<td></td>
<td>DOT vs Technical</td>
<td>- 0.3413</td>
<td>0.001*</td>
</tr>
<tr>
<td>Event Identification</td>
<td>Maintenance vs Technical</td>
<td>- 0.2584</td>
<td>0.002*</td>
</tr>
<tr>
<td></td>
<td>Production vs Technical</td>
<td>- 0.1876</td>
<td>0.026**</td>
</tr>
<tr>
<td>Risk Response</td>
<td>DOT vs Information Technology</td>
<td>- 0.381</td>
<td>0.044**</td>
</tr>
<tr>
<td></td>
<td>Health &amp; Safety vs Information Technology</td>
<td>- 0.4143</td>
<td>0.047**</td>
</tr>
<tr>
<td>Control Activities</td>
<td>Maintenance vs Technical</td>
<td>- 0.1956</td>
<td>0.030**</td>
</tr>
<tr>
<td>Monitoring</td>
<td>DOT vs Information Technology</td>
<td>- 0.6600</td>
<td>0.017**</td>
</tr>
<tr>
<td></td>
<td>Health &amp; Safety vs Information Technology</td>
<td>- 0.7200</td>
<td>0.018**</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:**

The post hoc analysis using Tukey’s Honest Significant Difference test, a follow-up to the significant result of the Analysis of variance, presented in Table 5.15 shows which particular departments differed significantly on the perceived level of ERM implementation considering some important factors. With regards to the aspect of Internal Environment, a significant difference in the level of implementation of ERM exists between the DOT department with the following departments: Warehouse, Production, and Technical with these three departments having a significantly higher mean rating for the level of ERM compared to that of the DOT department.

In the Analysis of Variance, it turned out that at least two of the departments differed significantly on the level of ERM implementation. However, in the post hoc analysis performed, it turns out that none of the possible pairs of comparisons of departments turned out to be significant.
Considering the aspect of Event Identification, a significant difference in the level of ERM is observed between Maintenance and Technical department as well as between the Production and Technical departments. Along Risk Response, it is seen that a significant difference exists between the DOT and Information Technology department as well as between Health and Safety and Information Technology departments. Only one pair of comparisons turned out to be significant considering control activities – Maintenance and Technical department. For the Monitoring aspect, a significant difference in the perceived level of ERM implementation exists between DOT and Information Technology as well as between the Health and Safety and Information Technology departments.

5.5 Organisational context of risk management and the critical success factors

The computed mean ratings pertaining to the degree of significance and extent of the effect of some factors would be interpreted based on Table 5.13. The degree of importance of some critical factors is presented in Table 5.14.

Table 5.16: Scale of Interpretation Used to Describe the Degree of Significance and Extent of Effect of Some Factors

<table>
<thead>
<tr>
<th>Mean Rating</th>
<th>The degree of Importance/Significance</th>
<th>Extent of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.20 – 10.00</td>
<td>Very Highly significant</td>
<td>Very Great Extent</td>
</tr>
<tr>
<td>6.40 – 8.19</td>
<td>Highly significant</td>
<td>Great Extent</td>
</tr>
<tr>
<td>4.60 – 6.39</td>
<td>Moderately significant</td>
<td>Moderate Extent</td>
</tr>
<tr>
<td>2.80 – 3.59</td>
<td>Partially significant</td>
<td>Low Extent</td>
</tr>
<tr>
<td>1.00 – 2.79</td>
<td>Not significant</td>
<td>No Effect</td>
</tr>
<tr>
<td>Critical Factors</td>
<td>Degree of Significance</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>a. Culture</td>
<td>7.23</td>
<td>0.851</td>
</tr>
<tr>
<td>b. Risk Management philosophy</td>
<td>8.14</td>
<td>0.789</td>
</tr>
<tr>
<td>c. Risk Appetite</td>
<td>5.92</td>
<td>0.791</td>
</tr>
<tr>
<td>d. Top Management Commitment</td>
<td>8.63</td>
<td>0.830</td>
</tr>
<tr>
<td>e. Organizational and work environment</td>
<td>8.54</td>
<td>0.091</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:**

Table 5.17 presents the data on the degree of importance/significance of some critical success factors as these are essential for effective risk management and in turn affects the organizational performance of oil and gas companies. In general, top management commitment, organizational and work environment are both perceived to be of very high significance ineffective ERM implementation; also, risk management philosophy and culture are perceived to be highly significant. The standard deviations for these selected critical factors are all low, below 1, which means that the ratings of the respondents do not deviate much from each other. Top management commitment obtained the highest mean rating of 8.63 among the five selected critical factors involved in the success of ERM implementation. This is supported by Eckles and Hoyt (2014) who asserted that the dedication of top management is required for a successful ERM implementation. This is also consistent with the arguments of Shenkir and Walker (2006) who opined that an effective ERM implementation requires an organization context characterized with strong top management commitment where top management formulates and incorporates risk management policies in their strategic plan. Furthermore, this finding implies that effective communication is maintained by the top management as it is one
of the crucial skills for management for effective risk management as endorsed by Gordon, Loeb and Tseng (2009).

The second highest factor is organizational and works environment (mean=8.54) ineffective ERM implementation. This shows an alignment between implementation and the COSO framework concerning overall attitude, awareness, and culture of the organization regarding risk management. This is sustained by Collier (2009) when he considered the work environment as the tone of the organization, which sets the basis of how risk is viewed, including risk management philosophy and risk appetite.

Risk management philosophy ranked third (mean=8.14) described as highly significant. This means that the essence and the very notion of risk management implementation are to integrate risk with organizational objectives and to align risk management initiatives with the overall organizational strategy in order to improve performance. This is supported by Lai (2010) that philosophy of risk management is an element deemed to be relevant and important to define the intensity, maturity, and penetration level of ERM practices.

Organizational risk culture ranked fourth with mean 7.23; nevertheless, its extent of effect to effective ERM implementation is perceived to be highly significant. This implies that the existence of risk within the organization is recognized and that the organization makes active use of risk information to improve organizational performance, business processes and gain a competitive advantage and learns from its experience. This finding is sustained by Kerzner (2013) who claimed that organizational risk culture plays a very important role in risk management; also supported by the findings of Kleffner, Lee, and McGannon (2003) and Kimbrough and Componation (2009). Moreover, this is in concordance with the arguments of Bouder and Slavin (2013) that the risk culture prevalent in an organization has a marked effect on the risk management practices in use.
On the other hand, risk appetite obtained the lowest mean rating of 5.92 described as moderately significant ineffective ERM implementation. This signifies that management of risk is still in line with organizational objectives and risk appetite which in turn develops as risk culture that is consistent with the organization’s strategy for managing risk. Hillson (2009) conjectured that decision over implementation level may be driven by organizational risk appetite as part of its necessary infrastructure but provided no solid evidence.

**Table 5.18: Degree of Importance/Significance of Some Factors According to Company**

<table>
<thead>
<tr>
<th>ORYX GTL</th>
<th>Qatar Petroleum</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.20</td>
<td>Highly significant</td>
<td>7.25</td>
</tr>
<tr>
<td>8.12</td>
<td>Highly significant</td>
<td>8.16</td>
</tr>
<tr>
<td>6.00</td>
<td>Moderately significant</td>
<td>5.84</td>
</tr>
<tr>
<td>8.61</td>
<td>Very significant</td>
<td>8.65</td>
</tr>
<tr>
<td>8.75</td>
<td>Very significant</td>
<td>8.30</td>
</tr>
</tbody>
</table>

**Interpretation and Analysis:** Qatar Petroleum rated top management commitment, risk management philosophy, and risk culture as slightly more significant than that of ORYX GTL. On the other hand, ORYX GTL rated organizational and work environment and risk appetite as slightly more significant than that of Qatar Petroleum at the 10% significance level. However, the differences are not statistically significant except for their perception of risk appetite as a critical success factor in ERM implementation.
Table 5.19: Degree of Importance/Significance of Some Factors According to the Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Culture</th>
<th>Risk Management Philosophy</th>
<th>Risk Appetite</th>
<th>Top Management Commitment</th>
<th>Organizational and Work Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>7.13</td>
<td>8.20</td>
<td>5.93</td>
<td>8.40</td>
<td>8.60</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>8.40</td>
<td>7.20</td>
<td>6.20</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>7.20</td>
<td>7.80</td>
<td>7.40</td>
<td>9.40</td>
<td>8.40</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>6.95</td>
<td>8.05</td>
<td>6.17</td>
<td>8.60</td>
<td>8.54</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>7.30</td>
<td>7.50</td>
<td>5.90</td>
<td>9.10</td>
<td>8.30</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>7.20</td>
<td>8.30</td>
<td>6.40</td>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>6.90</td>
<td>7.70</td>
<td>5.70</td>
<td>8.50</td>
<td>8.80</td>
</tr>
<tr>
<td>h. Production</td>
<td>7.31</td>
<td>8.26</td>
<td>5.90</td>
<td>8.70</td>
<td>8.68</td>
</tr>
<tr>
<td>i. Technical</td>
<td>7.34</td>
<td>8.23</td>
<td>5.23</td>
<td>8.37</td>
<td>8.14</td>
</tr>
<tr>
<td>p-value</td>
<td>0.009</td>
<td>0.003</td>
<td>&lt;0.0001</td>
<td>0.005</td>
<td>0.999</td>
</tr>
</tbody>
</table>

Interpretation and Analysis:

The analysis results presented in the preceding table indicates that there is no significant difference in the perception of the respondents on the degree of significance of Organizational and work environment when they are grouped according to the department. This result implies that Organizational and work environment is perceived to be of the same degree of significance regardless of the department to which a person or worker belong to. On the other hand, a significant difference is observed among the departments with regard to the degree of significance of Culture, Risk Management Philosophy, Risk Appetite, and Top Management Commitment. The perception as to the degree of significance of these four factors is dependent or influenced by the department to which a worker belongs to.

Along Culture, the engineering department provided a relatively higher mean score of 8.40 indicating the highest degree of significance relative to the other departments. This shows that the Engineering department perceived culture as a very highly significant factor with regards to the implementation of risk management in the organization or company. The IT and
Maintenance departments, on the other hand, provided the lowest ratings of 6.90 and 6.95, respectively, for their perception on the degree of significance of Culture; however, these values still indicate that the two departments perceived culture to be highly significant. Overall, Culture is a factor that is at least highly important in relation to the implementation of risk management.

As stated by Cunliffe (2008), organizational culture will affect the operation of employees about their feeling, cooperation, and the decision of management. Koompai (2010) further states that patterns of culture in an organization are important determinants or they serve to create success or failure or the organization’s management. Results of the present study further validate prior researches where it was shown that the organizational culture is important to Enterprise Risk Management. Kimbrough and Componation (2009) found that organic culture trend to progress of ERM while Kleffner, Lee, and McGannon (2003) somehow found in their study that organizational structure or corporate culture which is not provided to ERM, is an important barrier to its implementation which is the perception of 48 per cent of respondents to their study.

With regard to Risk Management Philosophy, the highest degree of significance for was observed in the Health and Safety department with a corresponding mean rating of 8.30, followed by the Production and Technical departments with mean ratings of 8.26 and 8.23, respectively. These mean ratings show that the three departments perceived Risk Management Philosophy, on the average, to be very highly significant with regard to the implementation of risk management. The least rating for the degree of significance of Risk Management Philosophy was observed from the Engineering department after the Warehouse and IT departments which still indicate that these three departments perceived Risk Management Philosophy to be of high significance. These results generally indicate that Risk Management
Philosophy is at least a highly significant factor that needs to be considered when it comes to the implementation of risk management in the company.

In regard to the degree of significance of Risk Appetite, the Learning and Development department had the highest rating indicating the highest perceived degree of significance of Risk Appetite relative to the other departments and is followed by the Engineering department. The obtained mean ratings for these two departments indicate that they perceive Risk Appetite to be highly significant. The Technical and IT departments provided the least degree of significance of Risk Appetite with corresponding mean ratings of 5.23 and 5.70, respectively which indicates that these two departments only perceived Risk Appetite to be of moderate significance when it comes to risk management implementation.

When it comes to Top Management Commitment, the Learning and Development department gave the highest mean rating of 9.40 for the perceived degree of significance of this factor, followed by the Engineering department with a mean rating of 9.20. The Health and safety department gave the least mean rating of 8.00 indicating the least perceived degree of significance of Top Management Commitment among the departments. All of the departments except the Health and safety department perceived Top Management Commitment as a very highly significant factor with regards to risk management implementation.
Table 5.20: Multiple Comparison Test Among Departments for Degree of Importance/Significance of Some Factors on ERM Implementation

<table>
<thead>
<tr>
<th>Factors</th>
<th>Pair</th>
<th>The difference in Mean Ratings</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>Engineering and Maintenance</td>
<td>1.4462</td>
<td>0.007*</td>
</tr>
<tr>
<td></td>
<td>Engineering and Information Technology</td>
<td>1.50</td>
<td>0.031**</td>
</tr>
<tr>
<td>Risk Appetite</td>
<td>DOT and Learning &amp; Development</td>
<td>-1.4667</td>
<td>0.003*</td>
</tr>
<tr>
<td></td>
<td>DOT and Technical</td>
<td>0.7048</td>
<td>0.046**</td>
</tr>
<tr>
<td></td>
<td>Learning &amp; Development and</td>
<td>1.2308</td>
<td>0.009*</td>
</tr>
<tr>
<td></td>
<td>Maintenance and Warehouse</td>
<td>1.50</td>
<td>0.006*</td>
</tr>
<tr>
<td></td>
<td>Learning &amp; Development and</td>
<td>1.70</td>
<td>0.001*</td>
</tr>
<tr>
<td></td>
<td>Information Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning &amp; Development and</td>
<td>1.4966</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning &amp; Development and Technical</td>
<td>2.1714</td>
<td>&lt; 0.001*</td>
</tr>
</tbody>
</table>

* Significant at 1% level

** Significant at 5% level

** Interpretation and Analysis:**

The analysis of variance indicated significant differences among the departments in terms of the degree of Importance/Significance of Some Factors on ERM implementation, thus requiring multiple comparisons among the departments. The post hoc analysis results using Tukey’s Honest Significant Difference test which is presented in Table 17 shows that considering the degree of importance or significance of culture on the implementation of risk management, a significant difference exists between the Engineering and Maintenance departments as well as between the Engineering and Information Technology departments.

Along Risk Appetite, a significant difference in the perceived degree of importance or significance is observed between DOT and Learning and Development departments, DOT and
Technical department, between Learning and Development with the following departments – Maintenance, Warehouse, Information Technology, Production, and Technical. As for the factor Top Management Commitment, a significant difference in the degree of importance or significance of said factor exists only between the Learning and Development and Health and Safety departments.

5.5.1 Impact of risk management implementation and practices on organizational performance

Table 5.18 reveals that risk management implementation has a very great extent of the effect on organizational performance along strong stakeholders' confidence, compliance with government requirements, and profitability. Also, improved decision making has a great extent of the effect.

Table 5.21: Extent of Effect of Risk Management Implementation and Practices on Organisational Performance of Oil and Gas Companies

<table>
<thead>
<tr>
<th>Organizational Performance</th>
<th>Degree of Significance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>a. Profitability</td>
<td>8.60</td>
<td>0.699</td>
</tr>
<tr>
<td>b. Improved Decision Making</td>
<td>8.11</td>
<td>0.591</td>
</tr>
<tr>
<td>c. Strong Stakeholders' Confidence</td>
<td>8.72</td>
<td>0.646</td>
</tr>
<tr>
<td>d. Compliance with Government</td>
<td>8.66</td>
<td>0.652</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interpretation and Analysis:

Table 5.21 above presents the data on the perceived extent of the effect of risk management implementation and practices on organizational performance of the oil and gas companies.
Among the four aspects of organizational performance, risk management implementation and practice were perceived to have a very great extent of effect along strong stakeholder’s confidence, compliance with government requirements, and profitability. The implementation of risk management having a very great extent of the effect on strong stakeholder’s confidence is supported by the results of the study by Manab and Ghazali (2015) where they stated that failure to improve the risk management practice could cause severe financial loss and damage to reputation. This will be reflected in the stakeholder’s confidence and trust. Also, according to Beasley et al. (2005), the adoption of enterprise risk management enhances a firm’s shareholder value by supporting senior management and the board to attain adequate monitoring system and manage the company’s risk portfolio. Furthermore, the Ernst and Young study from 2005 showed that 61% of all shareholders do not intend to spend in companies which have not yet recognized hazards (Oracle, 2009).

Compliance with government requirements was also perceived to be affected by risk management implementation and practice to a very great extent where the overall mean score or rating for the said item was 8.66. Lipworth (1997) stated that effective risk control is a key element of sound business performance. According to Mobius (2002), good corporate governance is an environment where the boards and the top management provide quality management to enhance the company’s performance in the interest of shareholders. Compliance of the company with government requirements can be seen as a consequence of these.

Risk management implementation and practice having a very great extent of the effect on profitability is seen to be supported by Nocco and Stulz (2006) and Ai Ping and Muthuveloo (2015) where their studies found out that a key advantage of enterprise risk management is that it enables a highly significant increase in firm value. Moreover, Lai and Shad (2017) posit that enterprise risk management (ERM) implementation is an important factor in enhancing the
firm’s value through increasing the Net Operating Profit After Tax, reducing the Weighted Average Cost of Capital, and increasing the Return on Invested Capital.

On the aspect of decision making, however, it is gleaned from Table 16 that risk management implementation and practice affects this aspect to a great extent. According to Bichou and Bell (2013), the company’s decisions are normally made in line with its objectives and goals. The risk is a major factor in the financial decision and is likewise important in many other segments. Rampini et al. (2014) contended that Enterprise Risk Management (ERM) nowadays is a key factor affecting the management of risks and grasping the opportunity depending on the company’s goals and objectives and Power (2008) states that the risk management activity has two prime essentials: true risk depiction and incorporation of this input into the decision-making process.

Table 5.22: Extent of Effect of Risk Management Implementation and Practices According to Company

<table>
<thead>
<tr>
<th>Organizational Performance</th>
<th>ORYX GTL</th>
<th>Description</th>
<th>Qatar Petroleum</th>
<th>Description</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Profitability</td>
<td>8.64</td>
<td>Very Great Extent</td>
<td>8.56</td>
<td>Very Great Extent</td>
<td>0.306</td>
</tr>
<tr>
<td>b. Improved Decision Making</td>
<td>8.09</td>
<td>Great Extent</td>
<td>8.12</td>
<td>Great Extent</td>
<td>0.718</td>
</tr>
<tr>
<td>c. Strong Stakeholders' Confidence</td>
<td>8.65</td>
<td>Very Great Extent</td>
<td>8.80</td>
<td>Very Great Extent</td>
<td>0.044*</td>
</tr>
<tr>
<td>d. Compliance with Government Requirements</td>
<td>8.71</td>
<td>Very Great Extent</td>
<td>8.61</td>
<td>Very Great Extent</td>
<td>0.201</td>
</tr>
</tbody>
</table>

*Significant at 5% level

Interpretation and Analysis:

It can be gleaned from Table 5.22 that there is no significant difference in the perceived extent of the effect of risk management implementation and practice along profitability, improved decision making, and compliance with government requirements. However, along with strong
stakeholders’ confidence, it is seen that Qatar Petroleum has a significantly higher rating on the perception of the extent of the effect of risk management implementation and practice compared to that of ORYX GTL (p < 0.05).

Observed differences could be attributed to the nature of the industry and other aspects like what was found by Eckles et al. (2014) where organizational aspects like the company size and the geographical location of the firm are linked to risk management. Aside from the abovementioned aspects, organizational culture also has to be considered in risk management where Kerzner (2013) asserted that organizational culture also plays a very important role. The culture which is prevalent in an organization is seen to have a significant or marked effect on the risk and quality management practices which are in use (Bouder and Slavin, 2013).

Kerzner (2013) further states that based on one culture or the possibility of applying multiple cultural dimensions, a variety of different opinions are existent on the determination of risk management practices in the company or organization. Moreover, the cultural setting inside the firm determines the results of the different methods applied in an organization. Furthermore, according to Arnesen and Foster, (2016), different organizations possess varying risk cultures, and to enhance their performance, they should incorporate both risk appetite and risk tolerance both horizontally and vertically throughout the institution. The preceding findings indicate that risk and quality management is dependent on various cultural factors and according to Taplay et al. (2014) risk and quality management cannot be confined to tools and techniques alone as quality management is based on a value system.
Table 5.23: Extent of Effect of Risk Management Implementation and Practices to Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Profitability</th>
<th>Improved Decision Making</th>
<th>Strong Stakeholders' Confidence</th>
<th>Compliance with Government Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>8.87</td>
<td>8.00</td>
<td>8.93</td>
<td>8.80</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>8.20</td>
<td>8.40</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>7.40</td>
<td>8.00</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>8.69</td>
<td>8.38</td>
<td>8.74</td>
<td>8.65</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>8.30</td>
<td>8.50</td>
<td>8.10</td>
<td>8.50</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>8.60</td>
<td>8.30</td>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>8.40</td>
<td>8.00</td>
<td>8.90</td>
<td>8.40</td>
</tr>
<tr>
<td>h. Production</td>
<td>8.66</td>
<td>8.03</td>
<td>8.71</td>
<td>8.68</td>
</tr>
<tr>
<td>i. Technical</td>
<td>8.46</td>
<td>7.80</td>
<td>8.51</td>
<td>8.71</td>
</tr>
<tr>
<td>p-value</td>
<td>0.001</td>
<td>&lt;0.0001</td>
<td>0.003</td>
<td>0.199</td>
</tr>
</tbody>
</table>

Interpretation and Analysis:

When the respondents were classified according to their department, the analysis results indicate that the perceived extent of the effect of Risk Management Implementation does not significantly differ on the aspect of Compliance with Government Requirements (p > 0.05). This implies that the extent of the effect of the implementation of risk management among the departments is the same, on the average, when it comes to complying with government requirements.

On the aspect of profitability as an indicator of organizational performance, the DOT and Maintenance departments gave the highest mean ratings of 8.87 and 8.69, respectively, indicating the greatest perceived extent of the effect of risk management implementation relative to the perception of the other departments. These figures indicate that risk management implementation was perceived by these departments to have a very great extent of the effect on organizational performance, particularly along profitability. On the other hand, the Learning and Development department gave the lowest mean rating of 7.40. Overall, the implementation
of risk management was perceived to have at least a great extent of the effect on organizational performance in terms of profitability.

With regard to the perceived extent of effect of risk management implementation considering the aspect of improved decision making, results show that the highest mean rating of 8.50 was obtained by the Warehouse department indicating that, on the average, personnel in the Warehouse department perceived the extent of effect of risk management implementation on organizational performance along improved decision making to be of very great extent. The Technical department, on the other hand, gave the lowest mean rating of 7.80 which indicates their perceived extent of the effect of risk management implementation to be of great extent.

Along the aspect of Strong stakeholder’s confidence, the Engineering and the Learning and Development departments gave the highest mean rating of 9.20 for their perceived extent of the effect of implementation of risk management. This figure shows that the two departments perceived the implementation of risk management to have a very great extent of the effect on the organizational performance along the aspect of Strong Stakeholder’s Confidence. The lowest mean of 8.10 was obtained for the Warehouse department where this value corresponds to the perception of risk management implementation having a great extent of effect along Strong Stakeholder’s Confidence as an indicator of organizational performance.
5.6 Conclusion

This chapter has presented and discussed the results of the statistical analysis in relation to risk management implementation within the oil and gas industry in Qatar. The mean ratings pertaining to the levels of successful implementation of ERM within the oil and gas industry have all been discussed in the chapter. These were done in relation to the internal environment, objective setting, event identification, risk assessment, risk response, information and communication, and control activities.

The analysis was conducted on companies and departments in the oil and gas industry in Qatar. The degree of significance of the results and the extent to which some factors were affected have all been discussed in the chapter. The next chapter discusses the main results of these analyses.
6 DISCUSSION OF THE RESULTS AND FINDINGS

6.0 Introduction

The preceding Chapter presented and discussed the results of the statistical analysis in relation to risk management. The mean ratings pertaining to the levels of successful implementation of ERM within the oil and gas industry have all been discussed in the Chapter. These were done in relation to the internal environment, objective setting, event identification, risk assessment, risk response, information and communication, and control activities.

6.1 Discussion of the mean ratings pertaining to the levels of successful implementation of ERM within the oil and gas industry

6.1.1 Internal Environment

In terms of the internal environment, the risk management approaches in the Qatar oil and gas sector are highly implemented, and the highest mean rating (highly implemented) indicated that individuals are held accountable for their internal control roles while pursuing the company objectives, while the lowest mean rating (moderately implemented) indicates that the company’s BOD exhibit independence from management, thereby enabling organizational performance. The upshot of this result/finding proves that enterprise risk management can be successfully used to enhance organizational performance in Qatari oil and gas sector.

6.1.2 Objective Setting

In terms of objective setting, the characteristics of objective setting were highly implemented and the highest mean rating (highly implemented) indicates that the company avoids penalties such as product liability or safety claims, while the lowest mean rating is (moderately
implemented) states that the company drives profitability and growth by encouraging controlled risk-taking in innovation or R&D and investments. Also, a moderately implemented factor is that the company provides stability and continuity, ensuring the independence of the enterprise by providing a sustainable workplace for employees. Again, the upshot of this result=finding proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.

6.1.3 Event Identification
Meanwhile, event identification is highly implemented with the highest mean rating (highly implemented) indicating that the company has internal and external quality standard in place to address quality risk that may lead to failure and hamper sales; the company’s technical and operational risks are controlled and managed within businesses given the diversity of these risks and the expert knowledge needed to deal with them. On the other hand, the lowest rating (moderately implemented) indicates that the company identifies the internal and external events required for the achievement of the organization’s objectives. The upshot of this result=finding again proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.

6.1.4 Risk Assessment
With regard to terms of risk assessment, the strategies are generally moderately implemented; this area obtained the lowest overall mean rating among the eight areas considered in the study. The highest mean rating is (highly implemented), indicates that the company considers the likelihood for fraud in evaluating risks to the attainment of objectives, and is on the alert to avert any type of such risk. The lowest in rank (moderately implemented) states that the company analyses risks as a basis for determining how the risks should be managed. And this
augurs very well for enhanced organizational performance within the oil and gas company. Thus, the upshot of this result/finding again proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.

### 6.1.5 Risk Response Strategies

With regard to the risk response strategies, they are highly implemented, in general. The highest mean rating (highly implemented) indicates that the company assigns decision responsibility to a single person possibly with the help or approval of others. Thus, personal accountability is at stake. The lowest mean rating (moderately implemented) is in the assessing of the company’s risk "appetite," to measure how much risk it is bearing and decide which risks to retain and which to transfer to others. The upshot of this result/finding again proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.

### 6.1.6 Information and Communication

Information and communication in the oil and gas industry in Qatar are highly implemented, in general. Specifically, the highest in mean rating (highly implemented) indicates that the company communicates information internally, together with intentions and responsibilities for internal control, required to support the functioning of internal control while the lowest mean rating states that the company uses relevant, quality information to support the functioning of internal controls. And this enhances greatly the organizational performance within the company. The upshot of this result/finding again proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.
6.1.7 Control Activities

In terms of control activities, they are generally highly implemented, and the highest mean rating confirms that the company reinforces control activities that present to the alleviation of risks to the achievement of objectives to acceptable levels. The indicator “The organization deploys control activities through policies that establish what is expected” obtained the lowest mean rating (moderately implemented). Good organization performance using control activities within the organization. Again, this result/finding proves that enterprise risk management can be successfully used to enhance organizational performance in the oil and gas industry in Qatar.

6.1.8 Monitoring

In regard to monitoring the companies in oil and gas hugely implement the specified monitoring activities. The highest mean rating (highly implemented) shows that the company develops ongoing and/or separate analysis to confirm whether the elements of internal control are available and operational. Internal control insufficiencies are communicated to the relevant members, senior management and BOD in a timely manner for corrective action. The internal deficiencies are analyzed as the corrective action is ongoing to ascertain whether the elements of internal control are functioning.

Nevertheless, our companies under scrutiny were deficient of selecting the process or separate analysis to establish whether the elements of internal control are available and working.

Although this may be regarded as a setback which, could potentially not augur well for enhanced organizational performance, improved monitoring with well-functioning internal communications, taking corrective action, including senior management and the board of directors, enterprise risk management could eventually positively impact organizational performance within the organization.
6.1.9 Summary

A summary of the findings with regard to the first research objective revealed that seven out of eight aspects of ERM were perceived to have been highly implemented, but they were not also fully or completely implemented. Monitoring obtained the highest overall mean rating among them. On the other hand, risk assessment is moderately implemented. These findings indicate that the level of implementation is not maximized; the companies still need improvement in the implementation of the identified practices in order to further enhance organizational performance within the companies.

Although employees consider ERM as a vital component, its practical implementation is sometimes lacking. There is a scarce investment in this sector because of budget limitations and company-wide budget freezes. Another proof is the lack of a prominent role of risk management in major business resolutions.

Comparing the two companies under investigation, both companies obtained the highest mean rating in the area of monitoring. However, they differ in the lowest mean rating. For ORYX GTL, the lowest was control activities while for Qatar Petroleum, the lowest mean rating was a risk assessment.

Furthermore, in terms of comparative analysis of departments, the top three departments in terms of risk response are (1) technical, (2) warehouse, and (3) learning and development. The departments with the lowest level of implementation are the DOT, IT, and maintenance departments. In terms of Objective Setting, the IT department has the highest level of implementation while DOT has the lowest level of implementation. With regard to Event Identification, the IT department has the highest level of implementation while health and safety departments have the lowest level of implementation. As for Risk Response, learning and development department has the highest level of implementation while Health and safety department has the lowest level of implementation. With respect to Control Activities, IT and
Technical departments have the highest level of implementation while health and safety and the DOT departments have the lowest level of implementation. With regard to Monitoring, learning and development department has the highest level of implementation while health and safety and the DOT departments have the lowest level of implementation.

The performance of the companies in these different aspects of ERM contribute to an overall organisational culture that promotes safety. As indicated in section 2.17.2, a programme that was directed specifically at promoting a high safety culture was initiated in 2009 by ORXY GTL called the “Road to Zero Harm Campaign”. This fostered a culture of ‘Safety is our Way of Life’ and the results from staff engagement surveys in 2010, 2011 and 2012 showed significant progress. Thus, the safety culture of the company has been consolidated by a proactive ERM strategy that transfers responsibility for safety to everyone within the company, not only top management. With a high safety culture, the result has been zero recorded incidences as reported in the cases below:

<table>
<thead>
<tr>
<th>Table 6.1: ORXY GTL Safety Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>------</td>
</tr>
</tbody>
</table>
| 01 April 2012 | **Safety Is Not A Priority – It Is A Way Of Life at ORXY GTL**
ORYX GTL is committed to instil a zero-compromise culture of health and safety practices both in the workplace. It has taken this to another even higher level recently with the announcement of an impressive, new milestone reached which exceeds previous safety records.
The Company recorded a Total Recordable Incidence Rate (TRIR) of just 0.05, the lowest figure achieved since the plant commenced operations, whilst simultaneously achieving over 200 days without a recordable injury on 12 March 2012. TRIR is a key safety metric which measures the rate of recordable workplace injuries per 200,000 man-hours. This means, for example, that on personal level, a TRIR of 0.5 is equivalent to having a single incident in forty five years. (Source: ORXYgtl.com.qa) |
| 05 September 2013 | **ORYX GTL Achieves New Safety Benchmark**
In line with its Commitment to Safety Standards and Environmental Responsibility, ORXY GTL Achieves New Safety Benchmark…Company celebrated achieving a Zero Total Recordable Incident Rate (TRIR) for two consecutive years. |
With the realization of its new benchmark, ORYX GTL – a pioneering gas-to-liquids fuel company – confirms its leading position as one of the world’s safest energy companies committed to safety, high sustainability standards and environmental responsibility… ORYX GTL invests extensive hours in training, coaching and working with both employees and contractors to ensure safer working practices and working environments to help embed its safety culture and philosophy, which states that ‘Safety is our way of life.’

This is part of an organisation-wide, zero-compromise approach to safety. The Road to Zero Harm is a formal system integrated into every aspect of the business, helping define and use best practices to manage safety and health issues… (Source: ORYXgtl.com.qa)

18 September 2014

ORYX GTL Achieves Landmark Safety Benchmark

ORYX GTL celebrated achieving a world-class safety milestone... ORYX GTL's exceptional achievement of a Zero Total Recordable Incident Rate (TRIR) for the third consecutive year. The company, which takes an organisation-wide, zero-compromise approach to safety, is one of very few energy companies in the world to have ever reached this remarkable benchmark (Source: https://www.marhaba.qa)

Reflecting on this achievement of ORYX GTL, the company’s board chairperson highlighted that:

This exemplary effort and admirable achievement is a result of dedicated efforts that started in 2009 when the Road to Zero Harm was launched as an ambitious campaign for best-in-class safety practices... In fact, when it comes to safety, the job is never done... its important to continue to set world-class safety benchmarks to safeguard the wellbeing of our people, and the communities within which we work and operate, Safety will always remain an important challenge to the oil and gas industry. But the biggest challenge of all is to sustain our successes and to elevate our achievements to new heights (Dr Mohammed bin Saleh Al Sada, Board Chairman of ORYX GTL)

Thus, the challenge of maintain a safety culture is key. As a way of sustaining the safety culture, the company launched a ‘Beyond Zero Harm’ campaign. In this respect, the company’s CEO indicated that:
Having achieved the Zero Harm benchmark more than once, ORYX GTL is proving its commitment to going beyond that and to establish a culture of safety and security as an integral part of our way of life. This requires us to do our best to create such a culture in the minds of our employees, and to make them spread this culture outside work, in order to enjoy an accident-free society. (Mr Abdulrahman Al Suwaidi, CEO of ORYX GTL)

The achievement of the company becomes an example for other companies around the world.

On board director commented that

We are proud of the remarkable production achievements and safety record of our joint venture ORYX GTL, a world class company, which serves as a model for modern GTL projects around the world. The future looks bright. (Lean Strauss, Board Director).

These sentiments were also captured in the interviews with the company’s officials (see section 2.19.6). One of the managers highlighted that:

Our prioritisation of risk management across the company has produced the good results of zero incidents. This is a consented effort of all employees of the company that have embedded the culture of safety. It’s become our way of life. We are all proud of the achievement. (Paul Dennis Vardanega, Production Manager)

Whilst ORYX GTL has achieved remarkable progress of recording Zero Total Recordable Incident Rate (TRIR), the situation is different for Qatar Petroleum. A number of incidences have been recorded as shown in cases below:
Table 6.2: Qatar Petroleum Safety Cases

<table>
<thead>
<tr>
<th>Year</th>
<th>Report</th>
</tr>
</thead>
</table>
| 07 July 2015 | **Rig incident at Maersk Oil-run Al Shaheen field (Qatar)**  
Qatari offshore services contractor Gulf International Services has informed that there has been an incident at the Maersk Oil-operated Al Shaheen field, offshore Qatar.  
(Source: offshore-energy.biz) |
| 18 March 2020 | **One person dies as crane boom collapses at jack-up barge off Qatar**  
One person is believed to have died on board the jack-up barge Seafox Deema when one of the vessel’s cranes collapsed into the water off Qatar this week. (Source: upstreamonline.com) |
| 21 March 2020 | **Qatar oil rig fire injures six – company**  
Six people were injured in a “fire incident” on an onshore oil rig. The fire broke out while the rig was being readied to be moved. (Source: gulfnews.com) |

However, the company has one of its values that “we care for our people and see safety as a priority for everyone. We are committed to an incident-free, secure, safe and healthy environment for our employees, stakeholders, partners and communities where we operate” (Qatar Petroleum, 2020, p. 1). The need to have a safety culture has to be embedded in the long term strategic objectives of any company, with appropriate leadership. Commitment, for it to be successful.

The next section discusses the departmental comparison of the level of ERM implementation.

### 6.2 Discussion of the Multiple Comparison Test Among Departments of the Level of ERM implementation

Tukey’s Honest Significant Difference test used to achieve the results. In terms of Internal Environment, a significant difference in the level of implementation of ERM exists between the DOT department, the Warehouse, Production, and Technical departments. These three
departments were having a significantly higher mean rating for the level of ERM compared to that of the DOT department.

Considering the aspect of Event Identification, a significant difference in the level of ERM is observed between Maintenance and Technical department as well as between the Production and Technical departments. The presence of Risk Response revealed a significant difference between DOT and Information Technology department as well as between Health and Safety and Information Technology departments. Only one pair of comparisons turned out to be significant considering control activities – Maintenance and Technical department. For the Monitoring aspect, a significant difference in the perceived level of ERM implementation exists between DOT and Information Technology as well as between The Health and Safety and Information Technology departments.

6.3 Discussion of Degree of Importance and Extent of Effect of the Critical Success Factors in Qatar’s Oil and Gas Industry

Some critical success factors are essential for effective risk management and in turn, affect the organizational performance of oil and gas companies. In general, top management commitment, organizational and work environment are both perceived to be of very high significance ineffective ERM implementation. On the other hand, risk appetite obtained the lowest mean rating (moderately significant). Meanwhile, when compared according to companies, Qatar Petroleum rated top management commitment, risk management philosophy, and risk culture as slightly more significant than that of ORYX GTL. On the other hand, ORYX GTL rated organizational and work environment and risk appetite as slightly more significant than that of Qatar Petroleum. However, the differences are not statistically significant except for their perception of risk appetite as a critical success factor in ERM implementation.
With respect to the degree of importance/significance of the identified factors according to a department, there is no significant difference in the perception of the respondents regarding the degree of significance of organizational and work environment when grouped according to departments. However, with the other four factors, significant differences are present.

Culture has its highest degree of significance at the engineering department while the departments which have the lowest ratings on culture are the IT and maintenance departments. The significance of risk management philosophy has its highest degree of significance at the health and safety department, while the engineering department has the lowest rating, followed by the warehouse and IT departments.

On Risk Appetite, learning and development have the highest rating while the lowest ratings the Technical and IT departments had the lowest ratings. Top management commitment, learning, and development department received the highest rating while the health and safety department obtained the lowest mean rating.

6.4 Discussion of the Results of the Multiple Comparison Test among Departments for the Degree of Importance/Significance of Some Factors on ERM Implementation

Based on the post hoc analysis using Tukey’s Honest Significant Difference test, considering the degree of importance or significance of culture on the implementation of risk management, a significant difference exists between the engineering and maintenance departments as well as between the engineering and information technology departments. In terms of Risk Appetite, a significant difference in the perceived degree of importance or significance is observed between DOT and learning and development departments, DOT and technical department, between learning and development with the following departments – maintenance, warehouse, information technology, production, and technology. Top management commitment showed
6.5 Summary on the Impact of Risk Management Implementation and Practices on the Organisational Performance of Qatar’s Oil and Gas Industry

Risk management implementation along with strong stakeholders' confidence, compliance with government requirements to a very great extent has an effect on organizational performance. On the aspect of decision making, however, risk management implementation and practice affect this aspect to a great extent. The two companies under investigation do not differ significantly in the perceived extent of the effect of risk management implementation and practice along profitability, improved decision making, and compliance with government requirements.

However, along with strong stakeholders’ confidence, it is seen that Qatar Petroleum has a significantly higher rating on the perception of the extent of the effect of risk management implementation and practice than that of ORYX GTL. Furthermore, The DOT and maintenance departments perceived the greatest extent of the effect of profitability on organizational performance while the lowest was the learning and development department.

Regarding the extent of the effect of improved decision making, learning and development department received the highest rating while the lowest rating was the technical department. With regard to the effect of strong stakeholders' confidence, the engineering and learning and development departments had the highest rating. On the other hand, the warehouse department was the lowest ranked.
6.6 Conclusion
This chapter has discussed the mean ratings pertaining to the levels of successful implementation of ERM within the oil and gas industry. These were done in relation to the internal environment, objective setting, event identification, risk assessment, risk response, information and communication, and control activities. The results/analysis of each factor has been discussed in this. The next chapter presents the conclusion, contributions and the recommendations made by the research.
7 SUMMARY, CONTRIBUTION AND RECOMMENDATIONS

7.0 Introduction

This research aimed to investigate the impact of enterprise risk management on the organizational performance of oil companies, using two oil companies (ORYX GTL and Qatar Petroleum) as case studies. Organisational performance is measured in relation to profitability, improved decision-making, strong shareholder’s confidence, and compliance with the government requirements. These variables enhance organizational performance within companies.

The research also determined the level of ERM implementation approaches in the oil and gas companies in Qatar in terms of the following: (1) internal environment, (2) objective setting, (3) event identification, (4) risk assessment, (5) risk performance, (6) information and communication, (7) control activities, and (8) monitoring.

The research further discussed the advanced understandings of the qualitative aspects of risk management and performance enhancement in the Qatar oil and gas engineering sector. The method of investigation employed included a descriptive quantitative method based on the ratings from the questionnaire on the management and operational activities of the oil and gas sector under investigation.

7.1 Research Conclusions

7.1.1 Objective 1

Objective 1 of the research set out to critically evaluate the levels of risk management implementation in Qatar’s Oil and Gas Industry. The discussion and presentation of results in Chapter 5 addressed this research objective. A scale was used to help in interpreting the mean ratings obtained from the quantitative data on the different aspects of ERM (see section 5.2).
The summary of the results obtained are highlighted in section 5.4 which showed the ranking of internal environment, objective setting, event identification, risk response, control activities, information and communication, and monitoring as highly implemented in both ORYX GTL and Qatar Petroleum whilst risk assessment aspect was found as moderately implemented in respect of Qatar Petroleum. There were no significant differences observed in the companies at either 5% or 10% significance level in 5 aspects (internal environment, objective setting, risk assessment, control activities, and information and communication). However, significance differences were found at 5% significance level with respect to risk response and at 10% significance level with respect to event identification and monitoring. In all these 3 aspects, ORYX GTL had better performance than Qatar Petroleum.

7.1.2 Objective 2

Objective 2 of the research set out to critically evaluate the organizational contextual approaches to risk management in Qatar’s Oil and Gas Industry. This objective was achieved through the level of ERM implementation in the oil and gas industry in terms of the internal environment and other variables. In general, the risk management approaches in terms of the internal environment in the oil and gas industry in Qatar are highly implemented with an overall mean rating of 3.78 representing a critical evaluation of the organizational contextual approaches to risk management in Qatar’s Oil and Gas Industry.

Significant to the organisational contextual approaches to risk management is the role of board of director which identified a high score for organisations’ board of directors exercising oversight of the development and performance of internal controls and also the holding of individuals accountable for internal control responsibilities in the pursuit of organisational objectives. This aspect shows the importance of risk management being an integral aspect of corporate governance (Alwi et al., 2019; Mobius, 2002).
7.1.3 Objective 3

Objective 3 set out to critically evaluate the critical success factors in Qatar’s effective risk management implementation and practices on the organizational performance of Qatar’s Oil and Gas Industry. This was achieved with the research finding that with respect to the degree of importance/significance of the identified factors based on the various departments, there is generally no significant difference in the perception of the respondents regarding the degree of significance of organizational environment when grouped according to departments. However, significant differences at departmental levels were observed at 1% significant level for internal environment, event identification, risk response and monitoring whilst at 5% significant level, objective setting and control activities were identified as significantly different.

Culture has its highest degree of significance at the engineering department while the departments which have the lowest ratings on culture are the IT and maintenance. Thus, a culture that promotes risk management including safety seems to be more prevalent in the engineering department than others. This is particularly significant given the nature of engineering department as compared to other department, for instance, in terms of susceptibility to safety issues. The significance of risk management philosophy has its highest degree of significance at the health and safety department, while the engineering department has the lowest rating, followed by the warehouse and IT departments. In terms of Risk Appetite, learning and development have the highest rating while the lowest ratings were the technical and IT departments. In addition, top management commitment, learning, and development department received the highest rating while the health and safety department obtained the lowest mean rating.
7.1.4 Objective 4

Objective 4 set out to critically evaluate the impact of effective risk management implementation and practices on the organizational performance (captured with respect to profitability, improved decision making, stakeholders’ confidence and compliance with government requirements) of Qatar’s Oil and Gas Industry. This objective was achieved when the research established that risk management implementation together with strong stakeholders' confidence, compliance with government requirements to a very great extent affect organizational performance.

On decision making, the research found out that risk management implementation and practice affects this aspect to a great extent. The two companies under investigation do not differ significantly in the perceived extent of the effect of risk management implementation and practice along profitability, improved decision making, and compliance with government requirements. However, strong stakeholders’ confidence had a significantly higher rating on the perception of the extent of the effect of risk management implementation and practice in Qatar Petroleum than that of ORYX GTL. Furthermore, the DOT and maintenance departments perceived the greatest extent of the effect of profitability on organizational performance while the lowest is the learning and development department. With regards to the extent of the effect of improved decision making, learning and development department provided the highest rating while the lowest rating was the technical department. In terms of the effect of strong stakeholders' confidence, the engineering and learning and development departments had the highest rating. On the other hand, the warehouse department had the lowest.

7.1.5 Objective 5

Objective 5 set out to develop a framework linking together risk management, organizational performance and the success factors contributing to Qatar’s Oil and Gas Industry. This
objective was achieved through developing the conceptual framework elaborated in chapter 3. The conceptual framework highlighted that ERP helps to develop a strategic perspective on organisational operations that results in favourable effect on organisational performance. A holistic perspective is developed in the identification and management of risks arising from both internal and external sources. The positive influence on organisational performance are financial (e.g. profitability), operational (e.g. efficiency of operations) and strategic (e.g. strategic growth).

7.1.6 General Conclusion on Objectives

The answers to the research objectives were arrived at by means of survey questionnaires which served as the primary data gathering tool administered to 300 respondents, 158 of whom were ORYX GTL and 142 from Qatar Petroleum. The respondents were found in the nine departments in the company. Primary and secondary research data were examined with reference made to prior studies. Literature review presented the secondary data gathered from various secondary sources which include books, journals, and other relevant websites. The aspect of risk management, techniques in identifying risks, risk assessment tools, and performance management systems were critically analyzed. The literature gathered served as the main source of knowledge for the researcher to fully understand the topic, developing the context for data collection, analysis and interpretation.

The critical factors for the successful implementation of ERM were found to be culture, risk appetite and top management commitment. With respect to culture, the promotion of an organisational culture that is attuned to risk mitigation is significant. This implies an organisation that promotes a high safety culture (whose attitudes, values and perceptions that are attuned to risk management). A high safety culture, was observed in both ORYX GTL and Qatar Petroleum, with a relatively better performance in ORYX GTL. A high safety culture
requires top management commitment. Top management’s commitment transcends to all levels of the organisation through effective communication and engagement will all employees. The risk culture of an organisation is reflected in the attitude and appetite towards risk (Hillson, 2009; Shenkir and Walker, 2006). Thus, an organisational context attuned to risk management portrays a high safety culture, an important aspect in the oil and gas industry. This high safety culture is reflected in its risk appetite. ORYX GTL’s high safety culture has resulted in its attainment of consistently zero total recordable incident rate.

7.2 Reliability of Research Data

The Cronbach’s alpha coefficient of reliability was employed to determine the reliability of the research instrument which resulted to a computed value of 0.909 indicating that the questionnaires were reliable. The mean rating was used to determine the average level of ERM implementation in the oil and gas industry, the degree of importance/significance of some factors affecting the organizational performance of oil and gas companies, and the extent of the effect of risk management implementation and practices on organizational performance of oil and gas companies. Independent-samples’ t-test was used to compare ORYX GTL and Qatar Petroleum while analysis of variance using F-test was used to compare the different departments. As a general rule, the null hypothesis stating that there is no significant difference is rejected if the associated p-value is less than the 0.05 significance level.

7.3 General Conclusion to the Research

Risk management is an inevitable process in the daily activities of the Qatar oil and gas sector. There are many risks ranging from unstable market prices, increased health, safety, and environmental pressures. Nonetheless, risks connected to damage of assets, workplace injuries, pollution, interruption of business are external to the oil and gas companies. Another technical
threat is the Stuxnet virus and Cybersecurity targeting the Qatari oil companies. These are just examples of risks that can face an oil and gas company in Qatar.

Based on the salient findings, this research enables the firms to be more capable of risk management by including the following characteristics: (a) Unexpected risks can be avoided by early identification and management, more stable earnings, and better stakeholder trust; (b) Improved decision-making. Decisions can be improved if the risk management is incorporated in strategizing; (c) Improved corporate governance wherein stakeholders can be satisfied by following regulations and communicating the risks in time; (d) Better capacity to make informed decisions; and (e) Getting an edge by recognizing which hazards can be used to own advantage.

Based on the hypotheses of this research, the following conclusions were arrived at:

At the 5% level of significance, there is no significant difference in the level of ERM implementation between ORYX GTL and Qatar Petroleum in terms of five facets namely; Internal Environment, Objective Setting, Risk Assessment, Control Activities, and Information and Communication. In terms of Risk Response, ORYX GTL has a significantly higher level of implementation than Qatar Petroleum, at the 5% level of significance. At the 10% level of significance, ORYX GTL also has a significantly higher level of implementation than Qatar Petroleum in terms of Event Identification and Monitoring. Furthermore, there is no significant difference in the level of ERM implementation along two facets namely, Risk Assessment and Information and Communication. In terms of Internal Environment, Objective Setting, Event Identification, Risk Response, Control Activities, and Monitoring, there are significant differences in the level of ERM implementation.

At the 5% level of significance, there is no significant difference in the extent of the effect of compliance with government requirements on organizational performance. Qatar Petroleum rated top management commitment, risk management philosophy, and risk culture as slightly
more significant than that of ORYX GTL. On the other hand, ORYX GTL rated organizational and work environment and risk appetite as slightly more significant than that of Qatar Petroleum at 10% significance level. However, the differences are not statistically significant except for their perception of risk appetite as a critical success factor in ERM implementation. At the 5% significance level, there are significant differences among the departments along the degree of importance/significance of some factors on ERM implementation. When the respondents were classified according to their departments, the analysis results indicate that the perceived extent of the effect of Risk Management Implementation does not significantly differ from the aspect of Compliance with Government Requirements.

7.4 Contributions of the Research

7.4.1 Contribution to Industry

The main aim of this research was to evaluate the impact of enterprise risk management on organizational performance. It also determined the adaptation of ERM practices to different organisational context. Thus, one of the key practical contributions of this research to the oil and gas industry is showing how risk could be managed in order to enhance the performance of organizations. The research has shown that organisations need to focus on the key critical success factors that should enhance ERM implementation. Based on the results from the study, its highlighted that companies in the oil and gas industry have to focus on improving their organisational and work environment and top management commitment which then influence the culture, risk management philosophy and risk appetite. These critical success factors have an important role in enhancing ERM implementation that helps foster a strategic perspective of the organisation which then contributes to organisational performance. A better understanding and ability to foresee risks gives organizations a better chance at achieving their aims and goals and, therefore, also increases organisational value.
This research has also contributed to the context of benchmarking. It determined the strengths and weaknesses of the two companies in particular (ORYX GTL and the Qatar Petroleum), and in the oil and gas sector in general, as far as the implementation of ERM approaches is concerned. Furthermore, it is confirmed from the findings of this study that, firms have their individual strengths and weaknesses and different degrees of implementing ERM practices. In this respect, the understanding advanced is that there could be differences in the level of risk management within an organisation’s department. Differences in departmental risk management performance might be a reflection of the risk attitude, and thus culture, attributed to difference department. The contribution of this research to the oil and gas sector is that organisational effort, spearheaded by top management’s commitment, should be directed at ensuring a risk management attitude that is appropriate at the different levels of the company. The overall outcome should be the promotion of a high safety culture throughout the company. The comparison of the performance of the different departments also has practical implication; each department performs differently from the others. In this research, each department can know which area to address or give more attention to in order to improve its performance. It’s the combined efforts of all departments in an organisation that contributes to an effective risk management culture.

The results and findings of this research can be used as a tool for the managers of oil and gas companies to design and construct their plan of actions for a better risk management intervention programs within their organizations. These can also be used as a reference by researchers in the future.

7.4.2 Contribution to Methodology

This research makes a methodological contribution through empirically highlighting the connection between ERM practices and policies to organisational performance. The study has
shown that aspects of ERM related to internal environment, event identification, risk response, control activities and monitoring can be captured through different attributes. For instance, the internal environment of ERM could be proxied through evaluated the organisations commitment to integrity and ethical values, independence of board of directors, the oversight exercised by the board of directors, the existence of leadership and authority, the competence of personnel and the promotion of accountability for internal controls, among others. Thus, future studies could develop their methodological framework using this approach. The contribution of this research to methodology is evident, therefore, in the research framework and the analysis units adopted. With regards to the framework, this research resorted to the use of diagrams to better conceptualise and demonstrate concepts and ideas. The diagrams help stitch together arguments emanating from the combination of concepts employed in this research.

These contents are mainly in Chapter 2, Chapter 3, and Chapter 4 where they are clearly presented in diagrams. This was used to organize the concepts better and show the interconnection of one concept with another. The diagrams that were instrumental in achieving the research objectives include Types of Risks (Figure 2.1), Risk Assessment Tools (Figure 2.2), Tornado Charts (Figure 2.3), Balanced Scorecard (BSC) Model (Figure 2.4), Critical Success Factors Figure 3.1), Proposed Theoretical Framework of the Research (Figure 3.2), Onion Research Model (Figure 4.1), Proposed Research Methods Techniques (Figure 4.2), and the Sampling Methods in the Study( Figure 4.3).

The clarity to both the researcher and the reader is enhanced by representing the research concepts in diagrams without omitting the research objectives as per the literature review. Another contribution to research structure is the tabular presentation of the outputs of the data analysis. The rationale behind this method is to have an organized presentation and pictorial impression of the finding. The quantitative rating and the qualitative descriptive equivalent are
presented for each indicator; thus, there is a clearer understanding of the results. From Table 1 through Table 20 enhance the quality of the discussions.

With regard to the analysis of the collected data, not only the mean ratings were compared but also across companies using the t-test for independent samples, and across and departments using the analysis of variance. Significant differences were further determined with the use of post hoc analysis via Tukey’s Honest Significant Difference. These statistical tools were necessary to achieve a reliable and accurate analysis of the data leading to significant conclusions for the population under investigation.

7.5 Recommendations of the Research

Based on the foregoing findings and conclusions, the researcher recommends the following:

i. The oil and gas industry should practice consistency in the implementation of the risk management approaches and also revisit some of their policies that may need to be enhanced in order to adapt to changing times.

ii. The top management and the board of directors need to strengthen their collaboration by enhanced working relationship; the oil and gas industry should strengthen their research and development programs and capabilities to keep abreast with innovations especially in risk management.

iii. There is a need to adopt better strategies to analyze risks and consequently determine how the risks should be managed. Effective information dissemination and communication among the stakeholders must be maintained at all times. Effective communication and engagement is needed for promoting a safety culture within the organisations.
iv. There is a need for reliable and effective monitoring and evaluation scheme, which must also be in place to ascertain whether the components of internal control are present and functioning well.

v. Results showed that among the eight areas, the implementation of Risk Assessment is the weakest. So, there is a need to heighten the ERM implementation in terms of Risk Assessment for the two companies. For an effective ERM implementation, it’s important that capacity is built within the internal environment and all aspects that contribute to the risk management strategy.

vi. Among the other departments, the health and safety and the DOT departments need to develop better strategies to improve their implementation of ERM approaches.

vii. It is recommended that the two companies benchmark with the best ERM practices of other top performing gas and oil companies. The health and safety and the DOT departments may also benchmark with better performing departments.

viii. Decision-making is a fundamental part of the daily activities of the top management of companies as they are obligated in making calculated decisions on which projects should be executed first to maintain a company’s best performance, as well as, decisions about equipment resources, and which projects to prioritize much more so managing risk. Thus, there is a need to highly implement effective and functional risk management strategies to enhance organizational performance.

ix. The shifting market conditions and price volatility significantly and systematically influence oil and gas firms’ efficiency in a predictable manner depending on their financial strength and other specific contextual conditions. Market analysts and expert resources, and IT personnel with expertise in some of the more complex information technologies are needed. Seminars, training, and workshops may enhance the skill and capability of employees on effective risk management. Furthermore, in order to reduce
company losses, operational efficiency must be enhanced, risks and compliance must be managed.

x. The oil and gas companies are required to provide information on the risk management process, risk appetite, risk governance and risk culture in their yearly reports for the consumption of the stakeholders and the potential investors.

xi. There is also the need to recognize that, the implementation of the comprehensive, effective risk management practices requires strong commitment, involvement, and cooperation of the board of directors and the front-line officers.

The importance of these recommendations is that they are applicable to the oil and gas sector as a whole. The importance of promoting a safety culture through implementing a robust ERM strategy is integral to all companies in the industry. Imperative in this endeavour is need for good corporate governance that foster effective risk management.

7.6 Need for Further Research

In Chapter 2, the types of risks are generally categorized into strategic, operational, financial, and compliance. Future researchers may conduct a comprehensive analysis of each of the risks for a better and detailed understanding of the aspects of the procedure for risk management which are risk identification, assessment, analysis, measurement, monitoring, reporting, and mitigating. Further research was unearthed by the literature review gap which facilitated in the formation of a conceptual framework in Chapter 3.

The current study was conducted on the risk management practices of the oil and gas sector in Qatar, and this kind of research study could be conducted in different localities/countries individually using the same research model. Other research methods may be employed such as focus group discussion or panel study in addition to the survey method. These will be of interest
to compare and contrast the risk management practices of different countries, vis-à-vis their organizational performances.

As risk management practices are an ever-evolving issue in the oil and gas industry all over the globe, there is a need to conduct a detailed research study from time to time as innovations are taking place in terms of rules and regulations. Comparative studies can also be conducted which will relate to the specific risks and their management practices. Furthermore, future studies can also be extended to other types of firms or institutions such as hydroelectric power plants, cement industry, banks, insurance companies, and others.
REFERENCES


Taplay, K. *et al.* (2014) ‘Organizational culture shapes the adoption and incorporation of simulation into nursing curricula: A grounded theory Study’, *Nursing Research and Practice*.


APPENDIX 1

QUESTIONNAIRE

Block 1. Profile of the Company

1. Company Name (optional): ___________________________
2. Number of years in operation: _________________________
3. Number of employees: ________________________________
4. Asset capitalization: _________________________________
5. Products (goods and or services): _______________________

Block 2. Enterprise Risk Management Implementation

Please rate each of the following indicators by putting a check mark (✓) in the corresponding box of your choice of answer guided by the legend below, describing the level of implementation of the indicated enterprise risk management implementation approaches in the oil and gas company.

Legend:

1  Not at all implemented
2  Partially implemented (up to 25% of the time)
3  Moderately implemented (26% to 50%)
4  Highly implemented (51% to 75%)
5  Fully/completely implemented (76% to 100%)

<table>
<thead>
<tr>
<th>A. INTERNAL ENVIRONMENT</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The organization demonstrates a commitment to integrity and ethical values.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2. The organization’s board of directors demonstrates independence from management.</td>
<td></td>
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<tr>
<td>3. The organization’s board of directors exercises oversight of the development and performance of internal control.</td>
<td></td>
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<tr>
<td>4. The organization’s management establishes, with board oversight, structures, reporting lines and appropriate authorities and responsibilities in the pursuit of objectives.</td>
<td></td>
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</tbody>
</table>

297
6. The organization demonstrates a commitment to attract, develop and retain competent individuals in alignment with objectives.

7. The organization holds individuals accountable for their internal control responsibilities in the pursuit of objectives.

### B. OBJECTIVE SETTING

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>8.</td>
<td>The organization specifies objectives with sufficient clarity to enable the <em>identification</em> of risks relating to objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>The organization specifies objectives with sufficient clarity to enable the <em>assessment</em> of risks relating to objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>The organization identifies risks to the achievement of its objectives across the entity.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11.</td>
<td>The organization protects value for example by ensuring a certain target rating, avoiding large losses or default, and avoiding volatility in the P/L.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>The organization drives profitability and growth by using risk management techniques to generate value, as reflected in a rising P/E multiple, as well as increased profit and return on equity.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>13.</td>
<td>The organization drives profitability and growth by encouraging controlled risk taking in innovation or R&amp;D and investments.</td>
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<td>14.</td>
<td>The organization ensures regulatory compliance.</td>
<td></td>
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<td>15.</td>
<td>The organization protects the enterprise from negative regulatory intervention.</td>
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<tr>
<td>16.</td>
<td>The organization avoids penalties such as product liability or safety claims.</td>
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<tr>
<td>17.</td>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>avoiding unpleasant surprises for shareholders</em>.</td>
<td></td>
<td></td>
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<tr>
<td>18.</td>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>providing a sustainable workplace for employees</em>.</td>
<td></td>
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<tr>
<td>19.</td>
<td>The organization provides stability and continuity, ensuring the independence of the enterprise by <em>minimizing negative externalities for society at large</em>.</td>
<td></td>
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</tr>
</tbody>
</table>
20. The organization provides stability and continuity, ensuring the independence of the enterprise by maintaining the confidence of business partners.

<table>
<thead>
<tr>
<th>C. EVENT IDENTIFICATION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. The organization identifies the internal and external events required for the achievement of the organization’s objectives.</td>
<td></td>
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<tr>
<td>22. The organization conducts regular surveys (for example quarterly) and brief polls of the risk-champion framework to ensure that business departments think through and identify the most important existing and emerging risks.</td>
<td></td>
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<tr>
<td>23. The organization has an internal and external quality standard in place to address the quality risk that may lead to failure and hamper sales.</td>
<td></td>
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<tr>
<td>24. The organization has a rigorous centralization of operational-risk management that allows to identify and define standards of good practice and roll them out throughout the enterprise and beyond to contractors.</td>
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<tr>
<td>25. The organization’s technical and operational risks are controlled and managed within businesses given the diversity of these risks and the expert knowledge needed to deal with them.</td>
<td></td>
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<tr>
<td>26. The organization’s management of political and regulatory risks is handled by a specialized department that operates in close contact with the management board and other departments (such as the business to understand their needs) and by the compliance function.</td>
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<tr>
<td>27. The organization monitors regulatory risk for example the passage of renewable energy laws.</td>
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</table>

<table>
<thead>
<tr>
<th>D. RISK ASSESSMENT</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
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</thead>
<tbody>
<tr>
<td>28. The organization analyzes risks as a basis for determining how the risks should be managed.</td>
<td></td>
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<tr>
<td>29. The organization considers the potential for fraud in assessing risks to the achievement of objectives.</td>
<td></td>
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<tr>
<td>30. The organization identifies changes that could significantly impact the system of internal control.</td>
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<tr>
<td>31. The organization assesses changes that could significantly impact the system of internal control.</td>
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</table>
### E. RISK RESPONSE

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>32. The organization’s effective procedures when treating risks empower people to decide within their respective areas of responsibility.</td>
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<tr>
<td>33. The organization has effective procedures that lay out specifically what people should do—and what they should not do—in a given situation.</td>
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<tr>
<td>34. The organization has efficient and effective internal controls when to eliminate or reduce any kinds of risks through these proposed control measures.</td>
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<tr>
<td>35. The organization selects and implements appropriate control measures to modify the risk, for example, risk control (or mitigation), risk avoidance, risk transfer and risk financing.</td>
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<tr>
<td>36. The organization’s risk management system tracks the value at risk arising from risk exposure to ensure that these remained below the respective limits.</td>
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<tr>
<td>37. The organization assesses its risk &quot;appetite,&quot; to measure how much risk it is bearing, and decide which risks to retain and which to transfer to others (e.g. environmental or quality compromises, new product lines, (e.g. gross profit vs. market share?).</td>
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<tr>
<td>38. The organization assigns decision responsibility to a single person—possibly with the help or approval of others, so that personal accountability is at stake.</td>
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</table>

### F. CONTROL ACTIVITIES

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<tr>
<th></th>
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<tbody>
<tr>
<td>39. The organization selects control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels.</td>
<td></td>
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<tr>
<td>40. The organization develops control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels.</td>
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<tr>
<td>41. The organization selects general control activities over technology to support the achievement of objectives.</td>
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<tr>
<td>42. The organization develops general control activities over technology to support the achievement of objectives.</td>
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<tr>
<td>43. The organization deploys control activities through policies that establish what is expected.</td>
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</table>
44. The organization deploys control activities through procedures that put policies into action.

**G. INFORMATION AND COMMUNICATION**

<p>| | | | | |</p>
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<tbody>
<tr>
<td>45.</td>
<td>The organization obtains or generates relevant, quality information to support the functioning of internal controls.</td>
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<tr>
<td>46.</td>
<td>The organization uses relevant, quality information to support the functioning of internal controls.</td>
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<td></td>
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<tr>
<td>47.</td>
<td>The organization internally communicates information, including objectives and responsibilities for internal control, necessary to support the functioning of internal control.</td>
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<tr>
<td>48.</td>
<td>The organization communicates with external parties regarding matters affecting the functioning of internal control.</td>
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**H. MONITORING**

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<tbody>
<tr>
<td>49.</td>
<td>The organization selects ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
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<tr>
<td>50.</td>
<td>The organization develops ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td></td>
<td></td>
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<tr>
<td>51.</td>
<td>The organization performs ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
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<tr>
<td>52.</td>
<td>The organization evaluates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td></td>
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<tr>
<td>53.</td>
<td>The organization communicates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td></td>
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</tr>
</tbody>
</table>
Block 3. Significance of Some Critical Factors

Please rate each of the following critical factors affecting the organizational performance of oil and gas companies on a scale of 1 to 10 according to **Degree of Significance** where 1 is the lowest (Not Significant) and 10 is the highest (Very Highly Significant).

<table>
<thead>
<tr>
<th>Critical Factors</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Culture</td>
<td></td>
</tr>
<tr>
<td>b. Risk Management philosophy</td>
<td></td>
</tr>
<tr>
<td>c. Risk Appetite</td>
<td></td>
</tr>
<tr>
<td>d. Top Management Commitment</td>
<td></td>
</tr>
<tr>
<td>e. Organizational and work environment</td>
<td></td>
</tr>
</tbody>
</table>

Block 4. Impact of Risk Management Implementation on Organisational Performance

Please rate the impact of risk management implementation and practices on Organisational Performance of oil and gas companies along each of the following facets on a scale of 1 to 10 according to **Extent of Effect** where 1 is the lowest (No Effect) and 10 is the highest (Very Great Extent).

<table>
<thead>
<tr>
<th>Organisational Performance</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Profitability</td>
<td></td>
</tr>
<tr>
<td>b. Improved Decision Making</td>
<td></td>
</tr>
<tr>
<td>c. Strong Shareholders’ Confidence</td>
<td></td>
</tr>
<tr>
<td>d. Compliance with Government requirements</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2

Data Analysis:

**Risk management approaches implementation in the oil and gas industry**

Table 1 was used to interpret the mean ratings pertaining to the level of implementation of ERM approaches in the oil and gas industry. The results are presented in Table 2 through Table 9.

**Table 1**

Scale of Interpretation Used to Describe The Level of Implementation of ERM

<table>
<thead>
<tr>
<th>Mean Rating</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00 – 1.79</td>
<td>Not at all implemented</td>
</tr>
<tr>
<td>1.80 – 2.59</td>
<td>Partially implemented</td>
</tr>
<tr>
<td>2.60 – 3.39</td>
<td>Moderately implemented</td>
</tr>
<tr>
<td>3.40 – 4.19</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>4.20 – 5.00</td>
<td>Fully/completely implemented</td>
</tr>
</tbody>
</table>

**Table 2**

Level of ERM Implementation in the Oil and Gas Industry in Terms of Internal Environment

<table>
<thead>
<tr>
<th>Internal Environment</th>
<th>Level of Implementation</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>54. The organization demonstrates a commitment to integrity and ethical values.</td>
<td>3.77</td>
<td>0.75</td>
<td>Highly implemented</td>
<td></td>
</tr>
<tr>
<td>55. The organization’s board of directors demonstrates independence from management.</td>
<td>3.36</td>
<td>0.76</td>
<td>Highly implemented</td>
<td></td>
</tr>
<tr>
<td>56. The organization’s board of directors exercises oversight of the development and performance of internal control.</td>
<td>4.12</td>
<td>0.66</td>
<td>Highly implemented</td>
<td></td>
</tr>
<tr>
<td>57. The organization’s management establishes, with board oversight, structures, reporting lines and appropriate authorities and responsibilities in the pursuit of objectives.</td>
<td>3.50</td>
<td>0.59</td>
<td>Highly implemented</td>
<td></td>
</tr>
<tr>
<td>58. The organization demonstrates a commitment to attract, develop and retain competent individuals in alignment with objectives.</td>
<td>3.79</td>
<td>0.62</td>
<td>Highly implemented</td>
<td></td>
</tr>
<tr>
<td>59. The organization holds individuals accountable for their internal control responsibilities in the pursuit of objectives.</td>
<td>4.17</td>
<td>0.54</td>
<td>Highly implemented</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Mean**

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.78</td>
<td>0.27</td>
<td>Highly implemented</td>
</tr>
</tbody>
</table>
Table 3
Level of ERM Implementation in the Oil and Gas Industry in Terms of Objective Setting

<table>
<thead>
<tr>
<th>Objective Setting</th>
<th>Level of Implementation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The organization specifies objectives with sufficient clarity to enable the identification of risks relating to objectives.</td>
<td>3.40 0.72</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>2. The organization specifies objectives with sufficient clarity to enable the assessment of risks relating to objectives.</td>
<td>3.58 0.68</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>3. The organization identifies risks to the achievement of its objectives across the entity.</td>
<td>3.73 0.57</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>4. The organization protects value for example by ensuring a certain target rating, avoiding large losses or default, and avoiding volatility in the P/L.</td>
<td>3.73 0.60</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>5. The organization drives profitability and growth by using risk management techniques to generate value, as reflected in a rising P/E multiple, as well as increased profit and return on equity.</td>
<td>3.54 0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>6. The organization drives profitability and growth by encouraging controlled risk taking in innovation or R&amp;D and investments.</td>
<td>3.05 0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>7. The organization ensures regulatory compliance.</td>
<td>4.04 0.52</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>8. The organization protects the enterprise from negative regulatory intervention.</td>
<td>4.34 0.48</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>9. The organization avoids penalties such as product liability or safety claims.</td>
<td>4.43 0.50</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>10. The organization provides stability and continuity, ensuring the independence of the enterprise by avoiding unpleasant surprises for shareholders.</td>
<td>3.47 0.59</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>11. The organization provides stability and continuity, ensuring the independence of the enterprise by providing a sustainable workplace for employees.</td>
<td>3.35 0.64</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>12. The organization provides stability and continuity, ensuring the independence of the enterprise by minimizing negative externalities for society at large.</td>
<td>3.49 0.53</td>
<td>Highly implemented</td>
</tr>
<tr>
<td>13. The organization provides stability and continuity, ensuring the independence of the enterprise by maintaining the confidence of business partners.</td>
<td>4.13 0.56</td>
<td>Highly implemented</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.71 0.17</strong></td>
<td><strong>Highly implemented</strong></td>
</tr>
</tbody>
</table>
Table 4
Level of ERM Implementation in the Oil and Gas Industry in Terms of Event Identification

<table>
<thead>
<tr>
<th>Event Identification</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization identifies the internal and external events required for the achievement of the organization’s objectives.</td>
<td>3.05</td>
</tr>
<tr>
<td>2. The organization conducts regular surveys (for example quarterly) and brief polls of the risk-champion framework to ensure that business departments think through and identify the most important existing and emerging risks.</td>
<td>3.40</td>
</tr>
<tr>
<td>3. The organization has an internal and external quality standard in place to address the quality risk that may lead to failure and hamper sales.</td>
<td>4.13</td>
</tr>
<tr>
<td>4. The organization has a rigorous centralization of operational-risk management that allows to identify and define standards of good practice and roll them out throughout the enterprise- and beyond to contractors.</td>
<td>3.49</td>
</tr>
<tr>
<td>5. The organization’s technical and operational risks are controlled and managed within businesses given the diversity of these risks and the expert knowledge needed to deal with them.</td>
<td>4.13</td>
</tr>
<tr>
<td>6. The organization’s management of political and regulatory risks is handled by a specialized department that operates in close contact with the management board and other departments (such as the business to understand their needs) and by the compliance function.</td>
<td>3.40</td>
</tr>
<tr>
<td>7. The organization monitors regulatory risk for example the passage of renewable energy laws.</td>
<td>4.04</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.66</strong></td>
</tr>
</tbody>
</table>
Table 5
Level of ERM Implementation in the Oil and Gas Industry in Terms of Risk Assessment

<table>
<thead>
<tr>
<th>Risk Assessment</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization analyzes risks as a basis for determining how the risks should be managed.</td>
<td>3.05</td>
</tr>
<tr>
<td>2. The organization considers the potential for fraud in assessing risks to the achievement of objectives.</td>
<td>3.50</td>
</tr>
<tr>
<td>3. The organization <em>identifies</em> changes that could significantly impact the system of internal control.</td>
<td>3.40</td>
</tr>
<tr>
<td>4. The organization <em>assesses</em> changes that could significantly impact the system of internal control.</td>
<td>3.48</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.36</strong></td>
</tr>
</tbody>
</table>
Table 6
Level of ERM Implementation in the Oil and Gas Industry in Terms of Risk Response

<table>
<thead>
<tr>
<th>Risk Response</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization’s effective procedures when treating risks empower people</td>
<td>4.11</td>
</tr>
<tr>
<td>to decide within their respective areas of responsibility.</td>
<td></td>
</tr>
<tr>
<td>2. The organization has effective procedures that lay out specifically</td>
<td>4.02</td>
</tr>
<tr>
<td>what people should do—and what they should not do—in a given situation.</td>
<td></td>
</tr>
<tr>
<td>3. The organization has efficient and effective internal controls when</td>
<td>3.42</td>
</tr>
<tr>
<td>to eliminate or reduce any kinds of risks through these proposed control</td>
<td></td>
</tr>
<tr>
<td>measures.</td>
<td></td>
</tr>
<tr>
<td>4. The organization selects and implements appropriate control measures to</td>
<td>4.10</td>
</tr>
<tr>
<td>modify the risk, for example, risk control (or mitigation), risk avoidance,</td>
<td></td>
</tr>
<tr>
<td>risk transfer and risk financing.</td>
<td></td>
</tr>
<tr>
<td>5. The organization’s risk management system tracks the value at risk arising</td>
<td>3.49</td>
</tr>
<tr>
<td>from risk exposure to ensure that these remained below the respective limits.</td>
<td></td>
</tr>
<tr>
<td>6. The organization assesses its risk “appetite,” to measure how much risk</td>
<td>3.07</td>
</tr>
<tr>
<td>it is bearing, and decide which risks to retain and which to transfer to</td>
<td></td>
</tr>
<tr>
<td>others (e.g. environmental or quality compromises, new product lines, (e.g.</td>
<td></td>
</tr>
<tr>
<td>gross profit vs. market share?).</td>
<td></td>
</tr>
<tr>
<td>7. The organization assigns decision responsibility to a single person —</td>
<td>4.12</td>
</tr>
<tr>
<td>possibly with the help or approval of others, so that personal accountability</td>
<td></td>
</tr>
<tr>
<td>is at stake.</td>
<td></td>
</tr>
<tr>
<td>Overall Mean</td>
<td>3.76</td>
</tr>
</tbody>
</table>
### Table 7
Level of ERM Implementation in the Oil and Gas Industry in Terms of Information and Communication

<table>
<thead>
<tr>
<th>Information and Communication</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization obtains or generates relevant, quality information to support the functioning of internal controls.</td>
<td>3.51</td>
</tr>
<tr>
<td>2. The organization uses relevant, quality information to support the functioning of internal controls.</td>
<td>3.50</td>
</tr>
<tr>
<td>3. The organization internally communicates information, including objectives and responsibilities for internal control, necessary to support the functioning of internal control.</td>
<td>4.12</td>
</tr>
<tr>
<td>4. The organization communicates with external parties regarding matters affecting the functioning of internal control.</td>
<td>4.03</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td>3.79</td>
</tr>
</tbody>
</table>

### Table 8
Level of ERM Implementation in the Oil and Gas Industry in Terms of Control Activities

<table>
<thead>
<tr>
<th>Control Activities</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization selects control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels.</td>
<td>3.42</td>
</tr>
<tr>
<td>2. The organization develops control activities that contribute to the mitigation of risks to the achievement of objectives to acceptable levels.</td>
<td>4.12</td>
</tr>
<tr>
<td>3. The organization selects general control activities over technology to support the achievement of objectives.</td>
<td>3.49</td>
</tr>
<tr>
<td>4. The organization develops general control activities over technology to support the achievement of objectives.</td>
<td>3.51</td>
</tr>
<tr>
<td>5. The organization deploys control activities through policies that establish what is expected.</td>
<td>3.06</td>
</tr>
<tr>
<td>6. The organization deploys control activities through procedures that put policies into action.</td>
<td>4.11</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td>3.62</td>
</tr>
</tbody>
</table>
Table 9
Level of ERM Implementation in the Oil and Gas Industry in Terms of Monitoring

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. The organization selects ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td>3.06</td>
</tr>
<tr>
<td>2. The organization develops ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td>4.12</td>
</tr>
<tr>
<td>3. The organization performs ongoing and/or separate evaluations to ascertain whether the components of internal control are present and functioning.</td>
<td>4.10</td>
</tr>
<tr>
<td>4. The organization evaluates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td>4.12</td>
</tr>
<tr>
<td>5. The organization communicates internal control deficiencies in a timely manner to those parties responsible for taking corrective action, including senior management and the board of directors, as appropriate.</td>
<td>4.12</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td>3.91</td>
</tr>
</tbody>
</table>

Note:
Each of the indicators presented in Table 2 through Table 9 may be discussed. Below is the summary:

Seven out of eight aspects were perceived to have been highly implemented in. Only in one aspect which is the Risk assessment is moderately implemented. (You may explain each of these aspects…by pointing out reasons why there’s a high level of implementation. You can also take note that the level of implementation is not also maximized, meaning, there’s NO full/complete implementation yet.)
Table 10
Level of ERM Implementation According to Company

<table>
<thead>
<tr>
<th>Facet</th>
<th>ORYX GTL</th>
<th>Description</th>
<th>Qatar Petroleum</th>
<th>Description</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Internal Environment</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.79</td>
<td>Highly implemented</td>
<td>0.602</td>
</tr>
<tr>
<td>b. Objective Setting</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>0.806</td>
</tr>
<tr>
<td>c. Event Identification</td>
<td>3.70</td>
<td>Highly implemented</td>
<td>3.63</td>
<td>Highly implemented</td>
<td>0.051**</td>
</tr>
<tr>
<td>d. Risk Assessment</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.34</td>
<td>Highly implemented</td>
<td>0.373</td>
</tr>
<tr>
<td>e. Risk Response</td>
<td>3.80</td>
<td>Highly implemented</td>
<td>3.72</td>
<td>Highly implemented</td>
<td>0.036*</td>
</tr>
<tr>
<td>f. Control Activities</td>
<td>3.64</td>
<td>Highly implemented</td>
<td>3.60</td>
<td>Highly implemented</td>
<td>0.271</td>
</tr>
<tr>
<td>g. Information &amp;</td>
<td>3.78</td>
<td>Highly implemented</td>
<td>3.79</td>
<td>Highly implemented</td>
<td>0.747</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Monitoring</td>
<td>3.96</td>
<td>Highly implemented</td>
<td>3.85</td>
<td>Highly implemented</td>
<td>0.052**</td>
</tr>
</tbody>
</table>

*Significant at 5% level
** Significant at 10% level (or even at 6% level)

Results:

- There’s no significant difference in the level of ERM implementation between ORYX GTL and Qatar Petroleum in terms of five facets namely; Internal Environment, Objective Setting, risk Assessment, Control Activities, and Information and Communication. This is because the associated p-values are less than the level of significance of 0.05 or 0.10. This means that the level of ERM implementation of ORYX GTL and Qatar Petroleum are statistically the same in terms of these 5 aspects.
- In terms of Risk Response, ORYX GTL has a significantly higher level of implementation than Qatar Petroleum, at 5 percent level of significance.
- At 10 percent level of significance, ORYX GTL also has a significantly higher level of implementation than Qatar Petroleum in terms of Event Identification and Monitoring.
Organizational context of risk management and the critical success factors

The computed mean ratings pertaining to the degree of significance and extent of the effect of some factors would be interpreted based on Table 12. The degree of importance of some critical factors is presented in Table 13.

Table 12
Scale of Interpretation Used to Describe the Degree of Significance And Extent of Effect of Some Factors

<table>
<thead>
<tr>
<th>Mean Rating</th>
<th>Degree of Importance/Significance</th>
<th>Extent of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.20 – 10.00</td>
<td>Very Highly significant</td>
<td>Very Great Extent</td>
</tr>
<tr>
<td>6.40 – 8.19</td>
<td>Highly significant</td>
<td>Great Extent</td>
</tr>
<tr>
<td>4.60 – 6.39</td>
<td>Moderately significant</td>
<td>Moderate Extent</td>
</tr>
<tr>
<td>2.80 – 3.59</td>
<td>Partially significant</td>
<td>Low Extent</td>
</tr>
<tr>
<td>1.00 – 2.79</td>
<td>Not significant</td>
<td>No Effect</td>
</tr>
</tbody>
</table>

Table 13
Degree of Importance/Significance of Some Factors Affecting the Organizational Performance of Oil and Gas Companies

<table>
<thead>
<tr>
<th>Critical Factors</th>
<th>Degree of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>a. Culture</td>
<td>7.23</td>
</tr>
<tr>
<td>b. Risk Management philosophy</td>
<td>8.14</td>
</tr>
<tr>
<td>c. Risk Appetite</td>
<td>5.92</td>
</tr>
<tr>
<td>d. Top Management Commitment</td>
<td>8.63</td>
</tr>
<tr>
<td>e. Organizational and work environment</td>
<td>8.54</td>
</tr>
</tbody>
</table>
Table 13 shows that top management commitment and organizational and work environment are both perceived to be of very high significance. Risk management philosophy and culture are perceived to be highly significant also.

Table 14
Degree of Importance/Significance of Some Factors According to Company

<table>
<thead>
<tr>
<th>Critical Factors</th>
<th>ORYX GTL Mean</th>
<th>Description</th>
<th>Qatar Petroleum Mean</th>
<th>Description</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Culture</td>
<td>7.20</td>
<td>Highly significant</td>
<td>7.25</td>
<td>Highly significant</td>
<td>0.605</td>
</tr>
<tr>
<td>b. Risk Management philosophy</td>
<td>8.12</td>
<td>Highly significant</td>
<td>8.16</td>
<td>Highly significant</td>
<td>0.648</td>
</tr>
<tr>
<td>c. Risk Appetite</td>
<td>6.00</td>
<td>Moderately significant</td>
<td>5.84</td>
<td>Moderately significant</td>
<td>0.075*</td>
</tr>
<tr>
<td>d. Top Management Commitment</td>
<td>8.61</td>
<td>Very Highly significant</td>
<td>8.65</td>
<td>Very Highly significant</td>
<td>0.724</td>
</tr>
<tr>
<td>e. Organizational and work environment</td>
<td>8.75</td>
<td>Very Highly significant</td>
<td>8.30</td>
<td>Very Highly significant</td>
<td>0.342</td>
</tr>
</tbody>
</table>

*Significant at 10% level

Results:

Between ORYX GTL and Qatar Petroleum, there’s no significant difference in the perception of the respondents regarding the degree of significance of some factors. These factors are Culture, Risk Management philosophy, Top Management Commitment, and Organizational and work environment.

Regarding Risk appetite, ORYX GTL has considered a significantly higher degree of importance/significance than that of Qatar Petroleum.
Impact of risk management implementation and practices on organizational performance

Table 16 reveals that strong stakeholders' confidence, compliance with government requirements, and profitability have a very great extent of the effect on organizational performance. Also, improved decision making has a great extent of the effect.

Table 16
Extent of Effect of Risk Management Implementation and Practices on Organizational Performance of Oil and Gas Companies

<table>
<thead>
<tr>
<th>Organizational Performance</th>
<th>Degree of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>a. Profitability</td>
<td>8.60</td>
</tr>
<tr>
<td>b. Improved Decision Making</td>
<td>8.11</td>
</tr>
<tr>
<td>c. Strong Stakeholders' Confidence</td>
<td>8.72</td>
</tr>
<tr>
<td>d. Compliance with Government Requirements</td>
<td>8.66</td>
</tr>
</tbody>
</table>
Table 17
Extent of Effect of Risk Management Implementation and Practices According to Company

<table>
<thead>
<tr>
<th>Organizational Performance</th>
<th>ORYX GTL</th>
<th>Qatar Petroleum</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Description</td>
<td>Mean</td>
</tr>
<tr>
<td>a. Profitability</td>
<td>8.64</td>
<td>Very Great Extent</td>
<td>8.56</td>
</tr>
<tr>
<td>b. Improved Decision Making</td>
<td>8.09</td>
<td>Great Extent</td>
<td>8.12</td>
</tr>
<tr>
<td>c. Strong Stakeholders' Confidence</td>
<td>8.65</td>
<td>Very Great Extent</td>
<td>8.80</td>
</tr>
<tr>
<td>d. Compliance with Government Requirements</td>
<td>8.71</td>
<td>Very Great Extent</td>
<td>8.61</td>
</tr>
</tbody>
</table>

*Significant at 5% level

Results:

Between ORYX GTL and Qatar Petroleum, there’s no significant difference in the perception of the respondents regarding the extent of effects of the tree indicators of organizational performance. These are profitability, improved decision making, and compliance with government requirements.

Regarding strong stakeholders' confidence, Qatar petroleum has a significantly higher rating than ORYX GTL.
APPENDIX 3:

Table 11: Level of ERM Implementation According to Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Internal Environment</th>
<th>Objective Setting</th>
<th>Event Identification</th>
<th>Risk Assessment</th>
<th>Risk Response</th>
<th>Control Activities</th>
<th>Information &amp; Communication</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>3.54</td>
<td>3.61</td>
<td>3.58</td>
<td>3.30</td>
<td>3.62</td>
<td>3.54</td>
<td>3.68</td>
<td>3.64</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>3.83</td>
<td>3.69</td>
<td>3.77</td>
<td>3.50</td>
<td>3.83</td>
<td>3.57</td>
<td>3.70</td>
<td>3.80</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>3.87</td>
<td>3.75</td>
<td>3.80</td>
<td>3.30</td>
<td>4.03</td>
<td>3.70</td>
<td>4.00</td>
<td>4.36</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>3.73</td>
<td>3.67</td>
<td>3.58</td>
<td>3.31</td>
<td>3.71</td>
<td>3.56</td>
<td>3.76</td>
<td>3.86</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>3.88</td>
<td>3.74</td>
<td>3.63</td>
<td>3.33</td>
<td>3.74</td>
<td>3.60</td>
<td>3.80</td>
<td>3.92</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>3.77</td>
<td>3.75</td>
<td>3.52</td>
<td>3.30</td>
<td>3.59</td>
<td>3.50</td>
<td>3.78</td>
<td>3.58</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>3.72</td>
<td>3.80</td>
<td>3.89</td>
<td>3.35</td>
<td>4.00</td>
<td>3.78</td>
<td>3.90</td>
<td>4.30</td>
</tr>
<tr>
<td>h. Production</td>
<td>3.80</td>
<td>3.73</td>
<td>3.65</td>
<td>3.35</td>
<td>3.77</td>
<td>3.61</td>
<td>3.79</td>
<td>3.93</td>
</tr>
<tr>
<td>i. Technical</td>
<td>3.89</td>
<td>3.74</td>
<td>3.84</td>
<td>3.51</td>
<td>3.84</td>
<td>3.76</td>
<td>3.82</td>
<td>3.94</td>
</tr>
</tbody>
</table>

*p-value* 0.003** 0.039** 0.001* 0.225 0.004* 0.026** 0.442 0.004*

*Significant at 1% level

**Significant at 5% level
Results:

There’s no significant difference in the level of ERM implementation according to department in terms of two facets namely; Risk assessment and Information and communication.

In terms of Internal Environment, Objective Setting, Event Identification, Risk Response, Control Activities, and Monitoring, there are significant differences in the level of ERM implementation.

In terms of Risk Response, the top three departments are: 1. Technical, 2. Warehouse, 3. Learning and development. The departments with the lowest level of implementation are the DOT, IT, and Maintenance departments.

In terms of Objective Setting, the IT department has the highest level of implementation. Tied at second are the Learning & development and Health & safety departments. DOT has the lowest level of implementation, followed by the Maintenance and Engineering departments.

In terms of Event Identification, the IT department has the highest level of implementation; followed by the Technical and the Learning & development departments. Health & safety departments has the lowest level of implementation, followed by the DOT and Maintenance departments.

In terms of Risk response, Learning & development department has the highest level of implementation followed by the It department. Health & safety department has the lowest level of implementation, followed by the DOT and Maintenance departments.

In terms of Control activities, IT and Technical departments have the highest level of implementation, followed by the Learning & development department. Health & safety and the DOT departments have the lowest level of implementation.

In terms of Monitoring, Learning & development department has the highest level of implementation, followed by the IT department. Health & safety and the DOT departments have the lowest level of implementation.
### Table 15
Degree of Importance/Significance of Some Factors According to the Department

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>Culture</th>
<th>Risk Management Philosophy</th>
<th>Risk Appetite</th>
<th>Top Management Commitment</th>
<th>Organizational and Work Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>7.13</td>
<td>8.20</td>
<td>5.93</td>
<td>8.40</td>
<td>8.60</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>8.40</td>
<td>7.20</td>
<td>6.20</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>7.20</td>
<td>7.80</td>
<td>7.40</td>
<td>9.40</td>
<td>8.40</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>6.95</td>
<td>8.05</td>
<td>6.17</td>
<td>8.60</td>
<td>8.54</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>7.30</td>
<td>7.50</td>
<td>5.90</td>
<td>9.10</td>
<td>8.30</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>7.20</td>
<td>8.30</td>
<td>6.40</td>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>6.90</td>
<td>7.70</td>
<td>5.70</td>
<td>8.50</td>
<td>8.80</td>
</tr>
<tr>
<td>h. Production</td>
<td>7.31</td>
<td>8.26</td>
<td>5.90</td>
<td>8.70</td>
<td>8.68</td>
</tr>
<tr>
<td>i. Technical</td>
<td>7.34</td>
<td>8.23</td>
<td>5.23</td>
<td>8.37</td>
<td>8.14</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>0.009</strong></td>
<td><strong>0.003</strong></td>
<td>&lt;<strong>0.0001</strong></td>
<td><strong>0.005</strong></td>
<td><strong>0.999</strong></td>
</tr>
</tbody>
</table>

**Results:**

- There’s no significant difference in the perception of the respondents regarding the degree of significance of Organizational and work environment when grouped according to the department. However, with the other four factors, significant differences are present.
- The significance of Culture has its highest degree of significance at the Engineering department. It is followed by the Technical and Production departments. The departments which have the lowest ratings on culture are the IT and maintenance departments.
- The significance of Risk management philosophy has its highest degree of significance at the Health & safety department. It is followed by the Production and Technical departments. The Engineering department has the lowest rating, followed by the Warehouse and IT departments.
- On Risk appetite, Learning and development has the highest rating. The lowest ratings were given by the Technical and IT departments.
- On Top management commitment, Learning and development department gave the highest rating, followed by the Engineering department. The lowest rating was given by the Health and safety department.
Table 17
Extent of Effect of Risk Management Implementation and Practices According to Department

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>Profitability</th>
<th>Improved Decision Making</th>
<th>Strong Stakeholders' Confidence</th>
<th>Compliance with Government Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. DOT</td>
<td>8.87</td>
<td>8.00</td>
<td>8.93</td>
<td>8.80</td>
</tr>
<tr>
<td>b. Engineering</td>
<td>8.20</td>
<td>8.40</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>c. Learning &amp; Development</td>
<td>7.40</td>
<td>8.00</td>
<td>9.20</td>
<td>8.20</td>
</tr>
<tr>
<td>d. Maintenance</td>
<td>8.69</td>
<td>8.38</td>
<td>8.74</td>
<td>8.65</td>
</tr>
<tr>
<td>e. Warehouse</td>
<td>8.30</td>
<td>8.50</td>
<td>8.10</td>
<td>8.50</td>
</tr>
<tr>
<td>f. Health &amp; Safety</td>
<td>8.60</td>
<td>8.30</td>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td>g. Information Technology</td>
<td>8.40</td>
<td>8.00</td>
<td>8.90</td>
<td>8.40</td>
</tr>
<tr>
<td>h. Production</td>
<td>8.66</td>
<td>8.03</td>
<td>8.71</td>
<td>8.68</td>
</tr>
<tr>
<td>i. Technical</td>
<td>8.46</td>
<td>7.80</td>
<td>8.51</td>
<td>8.71</td>
</tr>
<tr>
<td><em>p</em>-value</td>
<td><strong>0.001</strong></td>
<td>&lt;<strong>0.0001</strong></td>
<td><strong>0.003</strong></td>
<td><strong>0.199</strong></td>
</tr>
</tbody>
</table>

Results:

There’s no significant difference in the perception of the respondents regarding the extent of the effect of compliance with government requirements on organizational performance.

The DOT and Maintenance departments perceived the highest extent of the effect of profitability on organizational performance. The lowest is the learning and development department.

Regarding the extent of the effect of improved decision making, learning and development department gave the highest rating. The lowest rating was given by the technical department.

With regards to the effect of strong stakeholders' confidence, the engineering and learning and development departments gave the highest rating. On the other hand, the warehouse department gave the lowest.
APPENDIX 4

Bahkit Appendix
4.xlsx