

تطبيقات إدارة المخاطر في صناعة النفط والغاز

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Abstract

Oil and gas projects are exposed to significant risks and the reasons can be adoption of complex technology, involvement of different parties, etc. Oil and gas industries are often prone to risks and hazards, but they overcome these problems by following risk management tools and techniques, which leads to the safety of employees and organizations. Based on the facts, our objective in this research report is to assess and identify risk management strategies and procedures and evaluate the efficiency of risk management tools in an oil and gas company in Saudi Arabia. We had conducted the survey between two groups using quantitative and qualitative methods. The number of participants in the survey questionnaire was one hundred participants from engineers, supervisors, fire and safety officers, human resources managers, and health and safety environment officers. For the semi-structured interview, we select managers from supply and marine sector, operations specialist, acting health, safety and environment (HSE) manager, and operating station management managers. Then we had analysed the data collected through the survey question using statistical analysis.

The results of the study reveal key insights into the demographics, perceptions, and practices of risk management within the organization. Perceptions of risk management practices are generally positive but highlight areas for improvement, such as clearer strategic plans and better adherence to policies. Statistical analyses, including t-tests and Chi-Square tests, indicate that while there are some significant relationships between variables, such as the correlation between following a risk management policy and using specific tools, many differences are not statistically significant. Regression analysis shows a significant, though weak, inverse relationship between educational level and employment, while ANOVA results identify substantial performance differences across groups. Overall, the study underscores the importance of strengthening risk management strategies and improving communication and training to enhance organizational performance and employee satisfaction.

CHAPTER ONE

Introduction

The petroleum, oil and gas industry form a vital and large part of any country's economy. It provides important support to transport, manufacturing and energy sectors and is a huge supplier of employment. As such, risk exposures to this industry culminate in a risk exposure for the country as a whole. Risks arising from this industry are a real threat to the industry and the country and require the close attention of government and executive management. "The resulting loss of income following an event could pose a greater threat than the actual physical damage" (Hamman 2008:6).

almost all industries contain threat or dangers of their operations, which might also harm people, surroundings or the operations conducted inside the commercial enterprise (Grote, 2012; Abrahamsen et al., 2018). They connect this with the hazard stage of the enterprise. The hazard stage in all industries isn't always the same and the some consist higher degree of risks. The industries with higher dangers are described as the industries whose operations includes a tremendous stage of threat (Fabiano et al., 2017; Abrahamsen et al., 2018) in phrases of main injuries to occur. Seeing that dangers purpose the lack of assets, operations sustainability and especially the lives, they need to be taken under manage or controlled effectively to mitigate their effects (Moore, 2013).

Risk management (RM) is performed to decide prospective risks or dangers which could arise in a gadget, and to decide the excellent strategies or plans to mitigate the results or prevalence possibility of these dangers (Baladeh et al., 2019).

Amage" (Hamman 2008:6). Risk management is applicable to all organizations, although the management approaches might differ. In the wake of recent risk management and corporate governance developments in terms of regulation, many organizations have by now implemented, to some degree, a risk management process. In some companies, these initiatives may only extend to safety and health or financial reporting, while others followed a more holistic approach and covered the total spectrum of a risk management process. particularly, this control procedure includes two critical steps, which might be assessment and determination. in the assessment, the risks are evaluated in particular in phrases in their opportunity of occurrence and severity. inside

the dedication step, the measures to be taken against the dangers are decided and deliberate in element. Dedication of most efficient measures play a totally important component in applying the risk control sports (Abrahamsen et al., 2018). In detail, first, the risks that may occur and damage the gadget need to be determined with super care and no danger ought to be disregarded. Later, to installation the pleasant approach or plan, the measures want to be determined and assessed.at some point of the assessment, a set of diverse criteria are considered i.e. fee and contribution to the enterprise in terms of measure's impact on the discount of the probability and severity of the risks (Baladeh et al.,2019).

Oil and gas industry can be matter as one of the agencies that involves high level of risks. consequently, such industries ought to decide associated risks in a complete and systematic manner (Moore, 2013). There are three streams that are up-, mid- and downstream, in oil and gasoline industry. Downstream tactics deal with put up-extraction operations and supply to cease users, while, midstream methods do the preliminary operations, storing and delivery to refining facilities. The upstream procedures cover exploring and generating the crude oil or herbal gas (Khan et al., 2017).

Employees of petroleum, oil and gas companies are widely exposed to dangerous activities. As such, most of these companies are in an advanced stage in managing risks in terms of safety, health and environmental factors. However, to be able to effectively protect the organization against various risk exposures and threats, it is imperative to understand the total risk exposure and to have a proactive management approach to prevent or minimize the potential effects should these risk events occur. It is, therefore, critical to optimize the benefits that an enterprise-wide risk management approach offers to an organization. As enterprise risk management are being pursued by many industries and organizations, it is imperative to do this by means of a structured approach to ensure that the best risk management practices are implemented according to the needs of the organization

The global association of Oil and fuel producers reviews every year. The place primarily based mentioned paintings hours (in total 2,544,201 ×a thousand) are proven in Fig. 1 (IOGP, 2021).

Fig.
1.

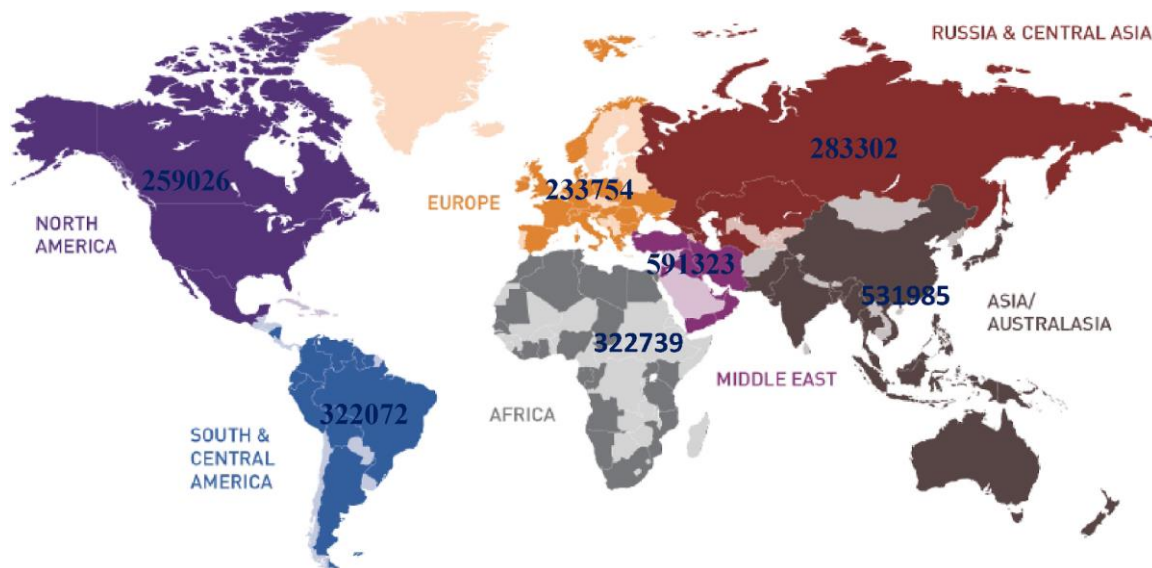


Figure 1 Number of work hours (thousands) reported in 2020 (IOGP, 2021).

Lovell (2022) determines the principle motive of injuries as; explosions and fires, slips and falls, struck-through/stuck-in/caught-among injuries, working heavy equipment, transportation injuries, exposure to toxic chemicals, heavy lifting of materials, running in confined spaces, temperature extremes, employee fatigue from long hours, electrocution, lack of planning and prevention. In addition, IOGP (2021) suggested every year-based fatality by using reason as in Fig. 2. As may be absolutely visible from Fig. 2, explosion, which normally is observed by fireplace, is one of the highest reason of fatalities in oil and gas industry.

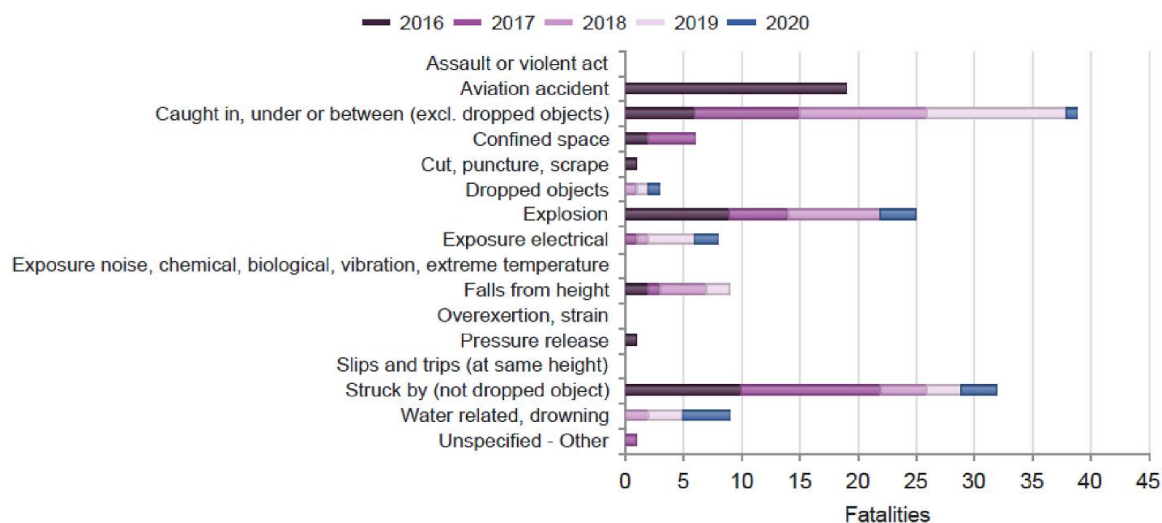


Figure 2 Fatalities by cause (IOGP, 2021).

several canonical fashions are offered in the literature for reading the accidents in distinctive industries. as an example, as traditional strategies; Fault Tree analysis, event Tree evaluation,

FMEA, cause-result analysis, Rasmussen's models and so on., and as cutting-edge techniques; Why-because evaluation, gadget chance identification Prevention and Prediction method, Dynamic chance evaluation method, Cognitive Reliability and errors evaluation technique and so forth. Are a number of the fashions offered in the literature (Al-Shanini et al., 2014). Some determine the motive of accidents to arise even as others examine or count on the effect of coincidence if they arrive real. to give example; Attwood et al. (2006) foresee the price of occupational injuries in oil and gas enterprise via reliability concept. Kujath et al. (2010) and Rathnayaka et al. (2011) prioritize measures to prevent accidents. Rathnayaka et al. (2011) forecast injuries via fault timber, event timber and statistics. highly, this observe does not only combines properly recognized strategies to both determine the reasons of accidents and develop techniques to prevent them however additionally gives a brand-new hazard evaluation method, which may be very clean to use and collect outcomes, to be applied to any enterprise. due to the significance of the fire and explosion inside the oil and gasoline industry,

Background

Traditionally risk management mostly focused on safety, health and environmental issues relating to people. The modern approach is much broader as companies begin to focus on potential losses and negative influences on business. According to Bardy et al (2008:238), there have been many high profile accidents which have resulted in few, or zero, fatalities and injuries, but huge cost to business. Companies have suffered significant financial losses and entire countries have seen major disruption from single incidents involving relatively small direct asset losses and sometimes no fatalities. For example, the release of dioxin at Seveso, Italy, in July 1976, resulted in no direct fatalities; however, this incident required the evacuation and decontamination of a wide area north of Milan. Although no fatalities suffered, it resulted in the contamination of about ten square miles of land and vegetation and more than 600 people had to be evacuated and about 2000 people had to be treated for dioxin poisoning.

In Australia during 1998 the Esso Longford liquefied petroleum gas processing plant experienced a massive explosion, killing two workers and injuring eight. Although the fatalities and injuries were relatively small, gas supplies to the State of Victoria were severely affected for several months after the incident. Most of the state's gas supply was cut for almost two weeks with serious disruption for a further two months and a total estimated cost to the industry of \$1.3 billion.

A further example is the Exxon Valdez oil spill on 24 March 1989 which resulted in no fatalities, but in addition to the direct financial losses to Exxon, fines of around \$150 million dollars were imposed along with \$900 million civil settlements. In addition, the oil spill also had an effect on the environment which are difficult to put into \$-value terms.

Although the benefits of safety, health and environmental risks are well-documented and understood by most players in the petroleum, oil and gas companies, the abovementioned types of incidents caused a more focused and wider approach to risk incidents as one incident could have a ripple effect on various factors such as safety and compliance with legislation, people, finance and, ultimately, the continuation of the company as a going concern. As such, risk management should be extended to assess the risk exposures as well as the financial consequences of risk incidents. To emphasise this statement, Bardy et al (2008:239) state that in

today's competitive business environment, key drivers are: improved financial performance; maximized up-time; reduced insurance costs; and reduced risk of interruption to business resulting from risk incidents.

In this regard, typical questions to be answered during a risk management process could be:

- Should an incident occur, what it cost?
- What is the maximum loss which can be suffered as a result of the incident?
- How can the likelihood of an incident resulting in a loss be minimized?
- What are the financial risk exposures?
- How can a cost-benefit analysis of the operational risks be performed?

These questions form an integral part of proactive risk management and emphasizes the importance of embedding an enterprise risk management framework and process. Stevens (2008) states that health and safety professionals need to embrace enterprise risk management to ensure that their input is valued by: using the 'correct' language; is risk-based; business focused; commercially relevant; and integrated with organizational policies and systems.

Enterprise risk management (ERM) includes risks that can influence the enterprise as a whole and could include financial risks, legal risks, operational risks etc. Patrick (2008:30) defines ERM as an activity that creates a risk-based approach to managing an organization's operations, strategy and controls. An important fact, though, is that each and every risk must be managed in its own right. This concept is also referred to as managing risks in silos. As a result of the specialized nature of risk types, such as credit, market and operational risks, it forces a separate management approach for each of them. The concept of "enterprise-wide" lies with the potential influence of the risk exposure to the organization. A specific risk type could have an enterprise-wide influence and as such it is important to manage this risk on an enterprise-wide basis instead of a narrow risk or specific business approach.

It is similarly important for petroleum, oil and gas companies to follow a similar approach to manage their risks on an enterprise-wide basis. However, it is imperative to develop such a framework in a structured manner. A phased approach could be followed when developing a risk management framework, which could include the following steps:

- Develop a risk management process.
- Use the process to identify and evaluate the primary risk types and exposures.
- Develop and implement risk control measures.

- Financing of the risk controls, ensuring that the cost of risks does not exceed the benefits.
- Continuous monitoring of controls and changing circumstances which could result in additional risk exposures that should be managed.

It is, however, crucial to determine, up front, exactly what the organization wants to achieve with developing and implementing a risk management framework. Should it be just for the sake of having a risk management process, the total initiative would be nullified. The banking sector, for example, refers to the “use test” where it must be proved that the risk management processes and methodologies actually works and assists the organization to manage its risks up to a point where the benefits of this process and system actually exceed the costs. This in mind, a starting point for any organization to develop and establish a risk management framework is with a risk management process.

Research Problem

Many agencies with excessive task budget and less monitoring normally suffer economically and should pay the cost of negligence. Agencies need to face loss of fee, and bad impressions because of lacunas like miss communications, loss of governance and lacking facts as stated via Fauver and Naranjo (2010). Oil and gasoline industries often tend to risks and hazards; however they conquer these troubles with the aid of following equipment and techniques of danger control, which effects in employees and protection organizations. All this proof is a result of small negligence and incorrect tracking through management. As a result it is essential to contain numerous precautionary measures and risk management techniques for the oil and gasoline industry.

Importance of study

During the control of tasks, dealing with threat is the maximum critical concept because unexpected risks can immediately affect all project members’ advantages. This paper might be helpful in figuring out and classifying all the hazard elements based entirely on extraordinary danger assets, in unique intention of this pater is to provide the outline of risks applicable to oil and gasoline corporate initiatives and evaluation of measures and effectiveness of the chance control strategies applied.

This have a look at includes figuring out the practices of handling risk in the oil and gasoline businesses. The principal place of interest of this have a look at is to locate out the primary hazard factors confronted all through initiatives, and special hazard control and tools adopted to

control the risks. This takes a look at additionally specializes in the behavioural characteristics of mission managers and employees involved in initiatives in oil and gasoline enterprises

Purpose of study

The intention of this examine is to discover how chance management may be applied in oil and gas corporations. As EY. Suda, Rahman, Rani, & Chen (2014). (2015) noted of their Studies, numerous surveys states that, severa oil and fuel companies are unsuccessful in Accomplishing the goal because of time table, satisfactory and finances in line to this project hazard Control can proved to be an essential to become aware of all dangers that hampers agency overall performance. Project threat management is keen to pick out evaluation, monitoring and controlling unexpected dangers.

Research Objectives

- To identify risk management strategies and their application in oil and gas projects.
- To identify the procedures for implementing risk management strategies and measure the efficiency of these tools in the company.
- To provide practical feedback based on the study's results and findings.

Research Questions

- What are the major risks and issues influencing projects in the oil and gas industry?
- What standard guidelines and procedures are applied during risk management at oil and gas project sites?
- How effective are the current risk management tools and strategies in identifying and managing risks?
- What is the extent of employee involvement in project risk management strategy?
- What safety precautions and pre-planning of risk management are applied to ensure human and environmental safety?

Risk Management Process

The absence of a clearly defined and embedded risk management process has led to many organisations suffering huge losses. The primary reason for this statement is that a risk management process can ensure a proactive approach in identifying risk exposures and implementing preventative controls. A typical risk management process consists of five components, namely: risk identification, risk evaluation, risk control, risk financing and risk monitoring. This is illustrated by figure 3.



Figure 3 Risk management process

Source: Adapted from Young (2006:33)

Risk identification: This step is regarded as the first step of the risk management process and consists of determining the risk exposures facing the organization as a whole as well as for individual business processes. According to the Basel Committee on Banking Supervision (2003:8), risk identification is paramount for the subsequent development of a viable risk monitoring and control system. It also refers to the need for an organization to define and understand the nature of the risk that it faces. However, according to Chapman (2008:109), before the activity of risk identification is activated it is important to analyse the business. The purpose is to gain an understanding of the following:

- The background of the business. For example, in this instance the general business would be related to petroleum, oil and gas products.

- The specific business activity, for example the specific product which could be petrochemicals, oil or gas etc.

The abovementioned information provides the platform for an analysis of the business processes which can be used to determine the primary activities and the inherent risk exposures. There are various methods available to determine the inherent risks, such as:

- Questionnaires – using structured questionnaires to gather relevant information on risk exposures.
- Workshops – inviting key staff to a workshop to “brainstorm” business processes in order to determine the risk exposures.
- Surveys – evaluating surveys completed by knowledgeable people to collate information on risk exposures.
- Peer reviews – to gain the opinion of peers regarding specific risk-related issues which could be used during a risk identification process.
- Interviews – acquiring information from specialists by means of interviews regarding specific risk exposures.

After collating the necessary information on the risk exposures, the next step is to determine a suitable risk management tool to finalize the risk identification process. Examples of these tools are:

- Risk and control self-assessments, which aim to assess an organization's risk exposures and activities against existing control measures to determine the residual risk (net risk after taking control measures into account) that should be managed.
- Loss data (incident reporting) aims to identify the risks based on historical data of losses incurred due to a risk event. This data is used to identify control measures in order to prevent similar loss events affecting the organization.
- Key risk indicators (KRI's) are risks that have been identified and constantly being monitored against benchmarks in order to proactively prevent a risk becoming a major problem to the business. These indicators alert the organization to changes that may be indicative of risk concerns.

- Process analysis consists of analysing the key business processes to identify the risks which must be managed in order to ensure that the processes are effective.
- Scenarios aim to construct events which could negatively influence the business. These scenarios are then subject to a risk analysis to identify the possible risks which must be proactively managed.
- Risk modelling makes use of stochastic models which focus on an estimation of the risk of specific processes, using, for example, loss data to determine loss distributions that could assist in identifying expected and unexpected losses.

Risk evaluation: This activity is closely linked to the risk identification component and entails the assessment and measurement of the identified risk exposures. Measurement is the quantification of the risk to determine the types and extent of risk and risk assessments aim to determine the potential frequency and severity of the exposures that have been identified. According to the Committee of Sponsoring Organizations (COSO) (2004:47), in assessing risk, management considers the impact of expected and unexpected potential events. Many events are routine and recurring and they are already addressed in management budgets and programmes. Others are unexpected and may have a significant potential impact on the business and the organization as a whole. As such, management has the obligation to assess the risk of all potential identified events that are likely to have a significant impact on the organization. There are a number of methods which could be used to assist in the assessment of risks after the risk identification process, such as:

- Actual loss data which aims to provide information on actual risk events which occurred. The benefit of this information is that a value and/or volume can be determined in order to quantify the actual risk. According to COSO (2004:49), quantitative techniques are dependent on the quality of the supporting data and assumptions and are most relevant for exposures that have a known history and frequency of variability and allow reliable forecasting. Benchmarking, for example, is a useful assessment technique which focuses on specific events and compares results using common metrics to identify control measures or improvements. Some companies use benchmarking to assess the impact and likelihood of potential events across an industry.
- Rating scales form an important part of a risk assessment process, especially when the likelihood and impact of potential risks must be determined (assessed). A risk assessment process

captures participants' views on the potential likelihood and impact of future events, using either descriptive or numerical rating scales (see tables 1 and 2).

Table 1 Scale to determine impact of events

Scale	Impact
High	Financial impact on the organization is likely to exceed a threshold value or have a significant impact on the organization's viability or strategic objectives.
Medium	Financial impact on the organization is likely to be between two threshold values or have a moderate impact on the organization's viability or strategic objectives.
Low	Financial impact on the organization is likely to be between two threshold values or have a minimal impact on the organization's viability or strategic objectives.

Source: Young (2006:62)

Table 2 Scale to determine the likelihood of events

Assessment	Description	Indicators
High	Probable. Likely to occur in a one-year period or more than 50% chance of occurrence.	Potential of it occurring several times within the next 10 years or has occurred within the past two years (Typical occurrences are due to external influences).
Medium	Possible. Likely to occur in a	May occur more than once

	10-year period or less than 50% chance of occurrence but greater than 2%.	within the next 10 years (These occurrences are typical to external influences, but mostly to occurrences internal in the organization).
Low	Remote. Not likely to occur in a 10-year period or less than 2% chance of occurrence.	Has not occurred in this country; would be surprising if it occurred.

Source: Young (2006:63)

The abovementioned rating scales are only an example and each organization should determine its own scales according to what best suites the assessment and the expected result.

- Risk register contains an output of the assessment proceeding process which should include a full description of the risks and the risk categories. Each risk should be assigned to a risk owner and risk manager. It could also include background information on the impact of the risk on the business.
- Risk mapping involves a probability/impact diagram which can be used to plot the expected loss frequency against expected impact for each identified risk (Alexander 2003:133). An example of a risk map is illustrated in figure 4.

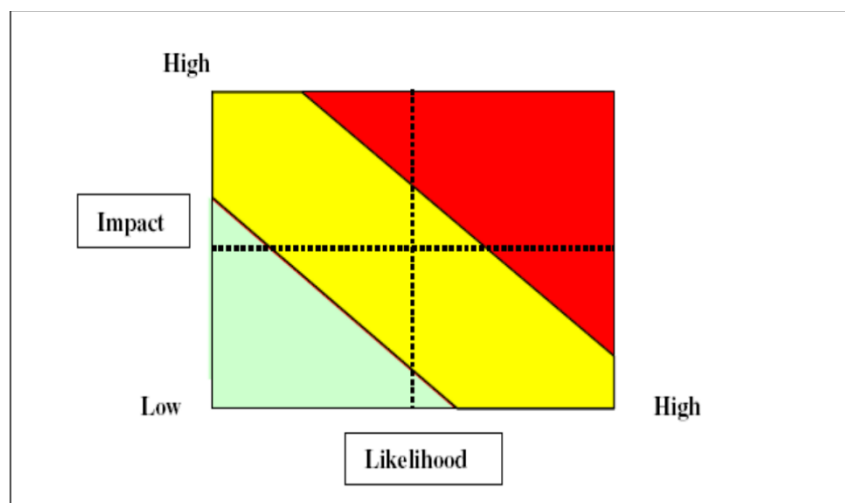


Figure 4 Illustration of diagram for risk mapping

Risk control: Risk control concerns the application of mitigating techniques to prevent or reduce the probability of loss and it aims to eliminate or minimize the potential effect of the identified risk exposures. Important risk controls can be categorized as follows:

- Policies and procedures. Frost et al (2001:67) state that the point of establishing a policy is to ensure a consistent approach to risk management with regard to employees' behaviour, and to ensure that all risks across an organization are identified. Effective risk management policies and procedures orchestrate the risk management process for the organization and, importantly, identify the roles and responsibilities of various role players involved in the risk management process.
- Internal controls. Internal controls should be determined to ensure the implementation of the policies and procedures. Internal control measures are also required to effectively mitigate the identified risks.
- Roles and responsibilities. The new era of risk management requires the specific appointment of risk managers and risk owners. The risk owner is also the business manager and overall responsible for the effective management of the risks facing the business. The risk manager is there to assist the risk owner with specialist advice during the risk management process. Both these role-players play an important role to ensure an effective risk management process.
- Risk reporting. Risk reporting is probably one of the most important aspects of risk management. Risk reports originate from an effective risk management process and ensure that the correct information is collated and distributed to the decision makers in a timely manner. An effective risk report ensures timely decisions to mitigate risks. As such, it is imperative that accurate data is included in risk reports.

Risk financing: This component of the risk management process entails the financial provision for losses that may occur. It therefore, selects the most efficient method of providing (financially) for the elimination or consequences of risks. Thus, risk financing refers to the provision of sufficient funds to manage the risk and to absorb losses as they occur. Funding can be accomplished by, for example, a variety of internal and external financial resources including insurance and risk-based pricing. It is, however, critical that the cost of risk management does not exceed the benefits of the risk management system.

A further important part of the risk financing component of the risk management process is to establish a realistic risk appetite. Risk appetite is defined as the amount of risk to which the organization is prepared to be exposed to. Risk financing ensure that the risk appetite of the organization is realistic in terms of the budget, cost of risk controls, insurance and possible capital allocation.

Risk monitoring: Risk monitoring is a continuous management component of a risk management process which aims is to ensure the effectiveness of the risk management system and techniques which the organization is using. Therefore, risk monitoring can be regarded as the operational process whereby the organization can ensure that it operates within its defined risk policies and procedures and that the risk management activities are effective. Examples of typical components which could be used for risk monitoring are the following:

- Key Risk Indicators.
- Incident management.
- Internal audit reports.
- Risk reports.

Primary risk types

The primary risk types for a company operating in the petroleum, oil and gas industry was identified as the following:

- Operational risk – which is defined as the risk of losses due to inadequate or failed internal processes, systems and people and external events (Basel 2003:2).
- Credit risk – the risk that counterparties to a financial transaction may fail to perform according to the terms and conditions of the contract at a given time (Young 2000:3).
- Market risk – the risk of a decrease in the value of a financial portfolio as a result of adverse movement in market variables such as prices, currency exchange rates and interest rates (Young 2000:3).
- Business risk – the risk that threatens the organisation's survival or its ability to sustain a profitable business activity and the creation of shareholder value due to poor strategic planning and/or external influences incorrectly anticipated by management.
- Legal risk – the risk arising from violations of or non-conformance with laws, rules, regulations, prescribed policies or ethical standards. The risk also arises when laws or rules governing certain products or activities of an organization's customers may be unclear or untested. Non-compliance

exposes the organization to fines, financial penalties, payment of damages, and the voiding of contracts (Young 2000:4).

- Country risk – risks arising from business ventures with or investments in foreign countries due to, for example, local government policies, political situations, corporate governance and economic climates.
- Environmental risk – the risk of loss of existing customers from the deficiencies in environmental performance, increased operating costs arising from compliance with government legislation or fines imposed by empowered environmental institutions (Chapman: 2008:307)
- Safety/health risk – the risk exposure to employees and the community which can negatively influence their health and safety and/or the implications of not complying with health and safety regulations.
- Financial risk – relates to threats to solvency, profitability and liquidity and may arise from market price movements (Cleary & Malleret 2006:84).

Conceptual Framework

Developing marginal resources in mature oil and gas field, especially one which is expected by the government as part of the company commitment after receiving incentive grant can be more challenging than usual development. In one side, the availability of the wells candidate with good economics are limited, yet on the other side certain number of wells and reserves need to be proposed and proved to be economic. Risk management play an important role to ensure the FDP can be executed and value propositions can still be maintained or even be increased and loss to the company can be minimized. Opportunities and threats can be identified, evaluated, and further developed into business cases where company may authorize projects and programs which provide deliverables, outputs, and outcomes to operations. Along the course of project or program execution, company have to pay attention for Health, Safety, Security, and Environment Management to ensure the projects and programs are implemented properly to avoid major health/ safety accident and environmental pollution which eventually not only affecting the project concerned but also the overall company business. Stakeholder management is highlighted specifically since agreement should be sought among the project's key stakeholders, especially decision makers on the project's constraints and relative

priority to form a solid foundation for decisions and subsequent actions intended to foster success. All in all, the risk management is critical to increase the likelihood of achieving project's objectives where identified risks and options for addressing each risk should be an integrated part of the project's plan.

CHAPTER TWO

Literature Review

Introduction

As Herkenhoff (2014) stated in his paper, the oil and gas enterprise significantly. Affect all elements of other groups and financial system of all countries. All international locations are suffering from any fluctuation in oil and fuel industry because they're either manufacturer and /or client of oil and fuel or each of the oil and gas industry is strategically most essential to the world economic system. The fact is every USA's economy is actively tormented by the oil and fuel industry, in one way or another as mentioned by way of Schwab (2016).

Many researchers stated that although a various alternative come to be energy supply but still Oil and gasoline continue to be most critical sources of electricity for upcoming decades as per the File by BP & England, (2016). For sources and task implementation their oil and gasoline companies rely on a range of specialized experts in applicable fields. Kingdom Organizations in the Middle East are in control of the fundamental part of the entire worldwide oil reserves as in step with record with the aid of the Petroleum.co.uk, (2015).

Risk

N. Thuyet and S. Ogunlana (2007) stated in his paper that risk factor in procedure of Development commonly triggered time and value complexities. Many responsibilities in assignment have been exceeding the spending restriction; these problems are extra commonplace now days.

Threat can be characterized as a hassle which could reason terrible good fortune in success of fulfilment. Hazard control can be said as key business manner, where by managerial crew needs to assess the reliability of dreams and hazard management strategies on the subject of improvement and achievement of organization as according to J.C. Clarke, and S. Varma (1999).

Potential Risks in Oil and Gas industry

Following are the imperative dangers for functioning of oil and fuel agencies: -

1. In every task there are a few inner dangers consisting of financial, funding, assets, human resources, control, innovations, records, manufacturing operational, technical, technological,

liquidity etc. funding danger can be bobbing up because of low criminal of enchantment of investment tasks. Belongings risks are contemplated via low stage of liquidity, solvency and commercial enterprise sports etc...

2. intense hazard lime political strain, criminal problems, socio-demographic, ecological, market troubles, exchange, repayment, geological, climate, globalization are also recognized in step with Khvostina et.al, (2019).

3. The records danger may also rise up because of gap in statistics device amongst business enterprise.

4. Geological risks can be observed to have an effect on oil and gasoline extraction method and may be bring about lack of confidence approximately the productiveness of deposits.

5. Globalization dangers can reason the give up of not best specific organizations but also the entire industry or any other organization. If oil and gasoline sports are not controlled and regulated well, it could motive a giant lack of surroundings; grow to be risky to lifestyles and assets as stated by using Achaw, Osei-Wusu, and Boateng. (2012).

Further to those issues oil and fuel enterprise regularly faces the danger of gasoline leakage and regularly brings out the social conflicts and casualties as Ambarsari, DC et al. (2009) noted in his paper. Those failures are not viable to avoid but they are able to arise at any time, through thinking about the capacity risks the control measures can be implemented in step with Voogd Henk. (2004.)

Those risks may be categorized in three principal classes:

1. Natural dangers: those forms of risks rise up due to trade in climatic and geographical aspects.
2. The technological dangers can motive loss of life, assets harm, socio-economic disturbance, and environmental degradation.
3. Environmental degradation may be deteriorating critical herbal resources, or poor alteration in ecosystems. The environmental deterioration can purpose through influential sports of human, every so often combined with herbal failures.

Risk emergent properties at oil and gas industry

In keeping with the authors Babenko.V.et.al. (2018) and Ivashuk. yu. P. (2016), concept of emergence is an end result of reflection of a situation when strategic interaction of an man or woman

gives standard tremendous effect. Oil and fuel agencies ought to face loss or disaster for enterprise entities, because of any unmarried recognized risk. tracking of terrible events have to expect the dangers because of the emergent residences of chance. If threat emergent properties are involved throughout danger analysis, it enables to become aware of both destiny hazards and upcoming new opportunities inside the organization development. for example, to reduce the threat of environmental pollution and degradation, it's miles important to undertake global environmental satisfactory requirements. this control felony and environmental risks as stated by way of Khvostina Inesa et.al (2019).

Management of Projects in oil and Gas Industry

The Panel BS6079 11996 because the education, observation and control of all elements of a undertaking as well as the incentive of all of those connected with it, in keeping with the British standard for project, to achieve the undertaking desires in a well-timed way at described price, performance and execution. control has to manipulate both expectancies as properly as reviews in the barriers and talents of its companions. Managerial accomplishment is an uncertain, distinctive and diverse subject and its showing is estimated.

Risk Management Concept

Many businesses identified the perception in addition to the significance of chance management in initiatives as stated by using Cooper et al., (2005). This method cannot be separated from guy duties and functions in challenge control, but it's far fundamental towards the larger undertaking dealing with process as stated by way of Cooper et al., (2005) and PMI, (2013). Mission chance control has a sturdy basis in development of software evaluation and evaluates strategies (PERT) during the 1950s' with awareness on coping with ambiguity inside the period of the undertaking in keeping with Taroun, (2014). distinct disciplines like economy, management strategic management, and venture management observe the idea of threat and threat control however all disciplines view the idea in another way. Reviewed literature by Ehsan (2013) also states that, there's no best and standardized definition of those phrases available. Besner and Hobbs (2012), described challenge danger management is an organized practice to successfully manipulate

venture risks. in addition to this pupils and expert bodies define the concept with moderate differences within the stage of information, as, risk management technique is a five-step process: threat identification, risk assessment, danger category, chance mitigation and risk controlling;

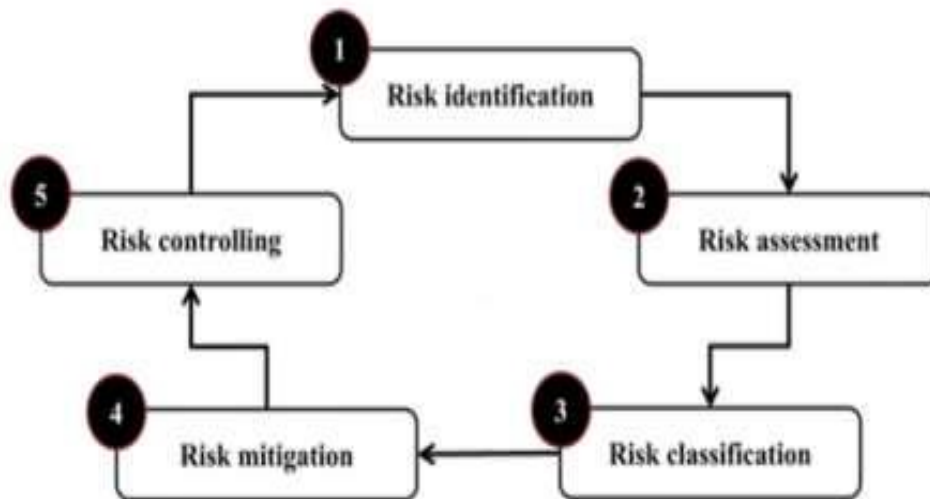


Figure 5 Risk Management Concept

Benefits of project risk management in oil and Gas Industry

The Oil and gas enterprise tactics are oriented as consistent with the demand of global strength as properly as specific tasks undertaken are the spine of those companies. consequently, the key aim of danger control practices is shortening the time required for chance identity, assignment clean threat assessment system, strategizing movements and in the end presenting file at the identified chance. in addition, PMI (2004) said that, danger management practices no longer most effective perceive and reduce product's danger tiers but also consist of making plans of risk management it's tracking and manipulate technique.

Risk Management Process

Risk Identification Project

The risk identity project is number one exercise of hazard control. at some point of the early segment of undertaking, this level performs an important role of identification, classification and assessment of importance of mission dangers as noted within the paper via Aven et al., (2007).

After right documentation, category the danger is diagnosed in the statistics. The control must speak to all of the team participants and ought to provide an explanation for the potential effects of threat as mentioned with the aid of PMI (2013).

Risk assessment

Study and observation of sequence of events taking place around the 'risk' is important for establishment of risk assessment. This sequence of events can be the cause of risk occurrence and consequences. According to Cagliano et al., (2015) these three events can be converted into phases of risk management process, involving planning, identification, analysis, monitoring, response and control of the risk. Zwikael & Ahn, (2011) stated in their paper that many projects have to face failures because their risk assessment team unable to understand and identify possible sources of project risk, especially in Middle East and North Africa (MENA) region assessment teams inability to accurately score the risk for various projects is observed as mentioned by Srivastava & Gupta, (2010).

Project Risk Response

In this process, creating a risk response plan is also necessary task. Developing a risk response plan can include defining thresholds and activates, emergency strategies and justification schemes etc. Risk response matrix can also be applied to determine the risk response plans and actions. The mutual risk response policies recognized are: avoid, transfer, reduce and accept.

Risk Control

Controlling risk factors is another important part of the project risk management practice. This activity is done continuously over the project life cycle. Project risk control involves the reassessment of all possible project risks and finding more effective risk management plan of risk response action as mentioned by Benta et al., (2011).

Selecting an effective project risk management tool or technique

Selection of perfect risk management tools and techniques is an important task in ensuring the success of project. Selection of risk management tools and techniques can be varying according to project, because specific projects can differ in their nature, location, size and complexity as per Cagliano et al., (2015), to ensure the performance of different kind of projects in different working environments tools and techniques can be selected as per Liu, Meng, & Fellows, (2015).

Phase of the risk management process

Hillson & MurrayWebster, (2007) in their paper stated that risk management process is practically based on the sequence of events; those are responsible for risk emergence these events can be a cause of risk, occurrence of risk and consequences responsible for risk. Risk management involves identification, planning, analysis, monitoring, responses, and control of risk as mentioned by Cagliano et al., (2015).

Challenges in developing effective project risk management practices

As Nocco & Stulz, (2006) said in their paper that although, task threat control practices might also appearance easy and impressive I principle, almost difficult for implementation. One greater difficulty in Implementation of task hazard management method is, business enterprise can't put all duties on an employee at unique ranges of organization. Goh and Abdul-Rahman (2013) located that lack of knowledge in personnel or among different events about the overall blessings of project risk control can lead to failure in reaching organization goals. Dandage et al. (2017) conducted a detailed literature overview and identified 10 important challenges and barriers that can be proved a proscribing factor in development and alertness of a hit assignment management, including:

1. Resistance to change: this is most common barrier for implementation of effective= project risk management because usually employees are resistant for new concept.
2. Lack of clear risk definition: as discussed previously, there is no clear definition of term 'risk', because of these employees remain unclear about the implementation of concept;

3. Limited top management support: many studies believe that without support of top management or without proper leadership, organization unable to get goal-oriented direction and strategic vision.
4. Limited availability of resources: According to Hwang, Zhao, and Toh (2014) like funds, technologies and work force are some of the important resources that can contribute to the success of implementation of project risk management strategy.
5. Lack of cooperation between top management and employees: this is an important criterion to bring the positive change, because proper relationships in top management and employees can create a favorable environment for developing effective project risk management.
6. Lack of formal training: For effective project risk management practices training are important determinant as per Papadaki et al., (2014), because untrained people can become a limiting factor in implementation and effective use of risk management practices as mentioned by Dandage et al., (2017).
7. Increased cost risk management: risk management strategies if not implemented successfully it can disturb the economic budget of project and drive cash flow to negative balance.
8. Avoidance of talking about risk: As per Bhoola et al., (2014) avoidance of talking about risk within an organization usually positive things are discussed among tea, but they often avoid talking about shortcomings and draw backs. This can create miscommunication between employees and top management.
9. Cross-functional conflicts: team members of a project usually belong to different functional departments within a company, this situation can create functional conflicts among team members.
10. Cultural differences: Harner (2010) clearly highlighted the importance of solid relationship between management practices and corporate culture.

Performance of Projects in Oil and Gas Industries

There is a complexity and difficulty in both technology and management of oil and gas industries, due to this oil and gas projects are considered to be the most challenging of all industries as per Akinremi et al., (2015). However, Briel et al. (2013) proposed that in addition to experience, project managers should follow coherent reference framework and that should be based on constant monitoring and reviewing of all official project stages from starting to finish the project. Finally, it can be stated that developing management strategies in relation to time,

cost and quality is all that necessary for an efficient management in all oil and gas sector, this ultimately enforce the requirement of knowledge to reduce upcoming possible project failure events. Project failure can be minimized by careful assessment of risk factors and this is one of highly effective project risk management strategy as mentioned by Al Subaih, (2015). However, importance of risk management is all known but still some oil and gas industry projects are facing failure due to lack of proper implementation of risk management strategies.

Summary

cause of the look at turned into to conduct a comprehensive evaluation on importance and powerful practices of hazard control in the oil and gas industry. This assessment offers the obstacles to the effectiveness of such practices to enhance challenge performance. eventually, the researchers provide an real photo of oil and fuel enterprise with the data like negative performance, over budgeting, delaying, loss of right tools and skilled work pressure and these all barriers having their roots in loss of implementation of mission chance control practices. several researches and theories are to be had on chance control as mentioned above which suggests nice relation between hazard control procedure and Oil and gasoline industries. threat management method has been widely implemented by means of several oil and fuel industries around the world and also in kingdom of Saudi Arabia. Threat control and mitigation are tough problems which wish proper planning and software to manipulate chance and chance factors in an organization. moreover, there are several techniques carried out to control and manipulate risk through the utility of particular gear and measures as stated in danger control tools and strategies .For this have a look at the cited tools and techniques be applied as part of the findings to determine whether or not the management in the company are privy to the equipment and strategies, and which many of the cited are implemented to govern and control danger.

CHAPTER THREE

Research Methodology

For this study we have we used two different research approaches. One is the qualitative method through which semi- structured interviews be conducted with management of different departments whereas the other method is the Quantitative method, where the employees be included in a survey.

Research Design

This study employs a mixed-methods approach, integrating both qualitative and quantitative data to provide a comprehensive understanding of risk management in the oil and gas industry. The research design includes surveys, interviews, and secondary data analysis. The combination of these methods ensures robust findings and a thorough exploration of the research questions.

Data Collection

Data collection involved several steps:

1. **Surveys:** Distributed to a sample of employees within the Saudi oil and Gas Company. The survey included questions about demographics, risk management practices, perceptions of risk, and the effectiveness of current strategies.
2. **Interviews:** Conducted with key stakeholders, including engineers, supervisors, and health and safety officers, to gain in-depth insights into risk management practices and challenges.
3. **Secondary Data:** Analyzed from company reports, industry publications, and academic journals to supplement primary data and provide context.

Research Sampling

Two groups we targeted from an oil and gas company in the Kingdom of Saudia Arabia. The first group for the Quantitative method comprises of managers whereas the second group the participants of the survey, questionnaire we distribute among all the employees in the department through survey links. Both groups we be assessed using qualitative as well as quantitative method respectively to analyses their knowledge, perspective, and skills involved in Risk management.

The Survey questionnaire we design using 20 questions (Appendix 2). The questionnaire we be structured based on Likert's 5-point scale which ranged from the scale of 1 – 5, with 1 = strongly disagree, 2= disagree, 3= Neutral, 4 = agree and 5 = strongly agree. The questions we design to evaluate the understanding and knowledge of the employees such as engineers, specialists, officers, etc. based on the risk management strategies applied in the company. The questionnaire comprises of tools which analyses the awareness, and readiness of risk management in the work environment.

Sample size

The study sample included 110 participants. The studies that we conduct to reach the project goal. Sample from the population participating in this study be selected on the basis of non-probability sampling road. The population concerned consist of 4 sections which included departments such as well as staff for scanning. For the semi-structured interview, we select 10 managers almost. Interview questions we organize based on the research question and

The aim of the study is to serve the purpose of analysing risk management practices in Oil and Gas Company and the various risk management tools applied by the company to monitor and control risks.

The survey questionnaire that we distribute to employees through the survey link to 100 employees, and then we calculate the response rate. There may be several factors associated with low response from employees, one of which is Vacations, in addition to the unwillingness of some to participate voluntarily.

Reliability Analysis (Cronbach's Alpha)

The Cronbach's Alpha coefficient for the survey questions (Q1 to Q16) is 0.87, indicating excellent internal consistency. This high alpha value suggests that the survey items are reliably measuring the same underlying construct, making the data robust for further analysis.

Data Analysis

Data analysis included several statistical methods:

1. **Descriptive Statistics:** To summarize the demographic data and provide an overview of the sample characteristics.
2. **Reliability Analysis:** Using Cronbach's Alpha to assess the internal consistency of survey items related to risk management practices.
3. **Factor Analysis:** To identify underlying factors influencing risk management practices and perceptions.
4. **Correlation Analysis:** To examine relationships between different variables, such as the effectiveness of risk management strategies and employee satisfaction.
5. **Regression Analysis:** To explore predictive relationships between variables and identify key predictors of effective risk management.
6. **ANOVA:** To determine if there are significant differences in risk management perceptions and practices across different groups.

CHAPTER FOUR

RESULTS

The results section of the paper provided the findings of the analysis of data gathered: often including tables and graph. After each table is the analysis section that focuses on the results, making connections between them and the research questions and objectives.

Table 1 indicated that Age Range: In terms of the age-domain bulk of the respondents are within the age bracket of 35 to 44 years with 38.2% followed by the age bracket of 25 to 34 years with 37.3%. From this it can be inferred that the sample is made up of workers that are probably within their middle and later years of employment. On the other hand the number of respondents in the older age category of 56 years and above senior is Meager and only 6. 4% of the sample. This distribution shows that in the context of the study, the organization has a comparatively younger workforce.

Employment Status: Regarding the employment status, the largest part of the respondents is employed which is 50.9 % it is a substantial part of the overall number. Unemployed individuals constitute 31. 70% of Telenor's users are men and 30% are women; 8% of Telenor's users are business people, 10% are students and retirees. 9% and 6. 4%, respectively. The results specified the community as workers; thus, it filtered feedback on risk management strategies influenced by their employment status.

Educational Background: About education most of them have tertiary education (manage 51.8%) followed by those with secondary education (manage 37.3%). In terms of education, the respondents who have primary education or other less formal education as their background are few compared to the rest, which shows that the sample is educated. This demographic detail is relevant since, once the education level is identified, potential differences in risk management strategies might be linked to it..

Table 3demographic characteristics of the research sample (N=110)

Variable	Category	Frequency	Percent	Valid Percent	Cumulative Percent
Age	25-34	41	37.3%	37.3%	37.3%
	35-44	42	38.2%	38.2%	75.5%

	45-55	20	18.2%	18.2%	93.6%
	56 or more	7	6.4%	6.4%	100.0%
Employment	Employed	56	50.9%	50.9%	50.9%
	Unemployed	35	31.8%	31.8%	82.7%
	Student	12	10.9%	10.9%	93.6%
	Retired	7	6.4%	6.4%	100.0%
Educational	Primary	5	4.5%	4.5%	4.5%
	Secondary	41	37.3%	37.3%	41.8%
	Tertiary	57	51.8%	51.8%	93.6%
	Other	7	6.4%	6.4%	100.0%

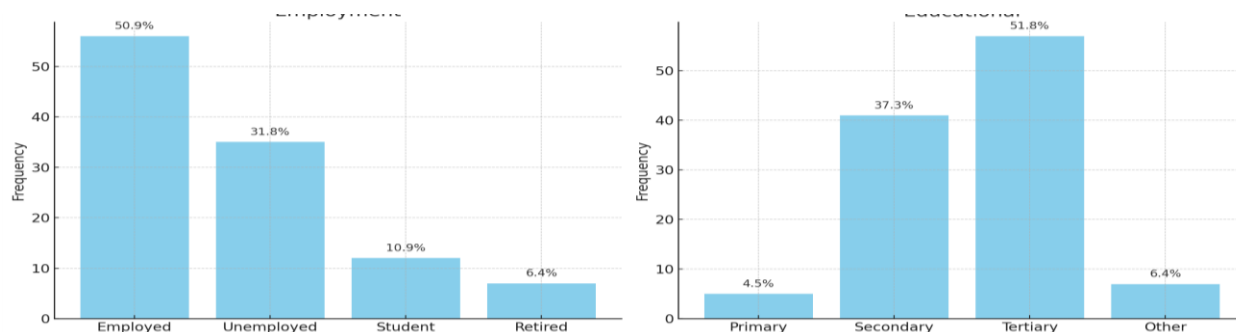


Figure 6 demographic data distribution graphs

1. Objective Setting

Table below indicated that:

- **Strategic Plan for Risk Management:** Therefore, 50 per cent of the respondents argue that the project management has a strategy in place for risk management but only 20 per cent of the respondents strongly agree. This means that although the majority of the respondents have a nodding acquaintance with the strategic plan, a good many of them still have doubts whether or not there is such a creature and if this creature exists, whether or not it is distinguishable.
- **Policy for Risk Management:** Thus, there is a fair share with 25% stating that the respond strongly agree and 25% agreeing that the project management team has a risk management policy. This suggests that the personnel at the firm have moderate confidence in the firm's ability to stick to risk management policies.

- **Clear Objectives and Approach:** The study shows that 50% of the respondents believe that the department has a clear goal and strategy concerning the risk levels, 15% of whom strongly agreed. This means that majority appreciate that objectives are clear but there is still space for it to be even better.

Table 4 "Survey Responses on Project Management and Risk Management Practices"

Question	% (Strongly Agree)	% (Agree)	% (Neutral)	% (Disagree)	% (Strongly Disagree)
The Project management have a strategic plan for risk management	20%	30%	15%	5%	0%
The Project management team follow a policy set out for management of risk in project	25%	25%	20%	10%	0%
The department has a clear objective and approach towards the risk levels	15%	35%	10%	5%	5%

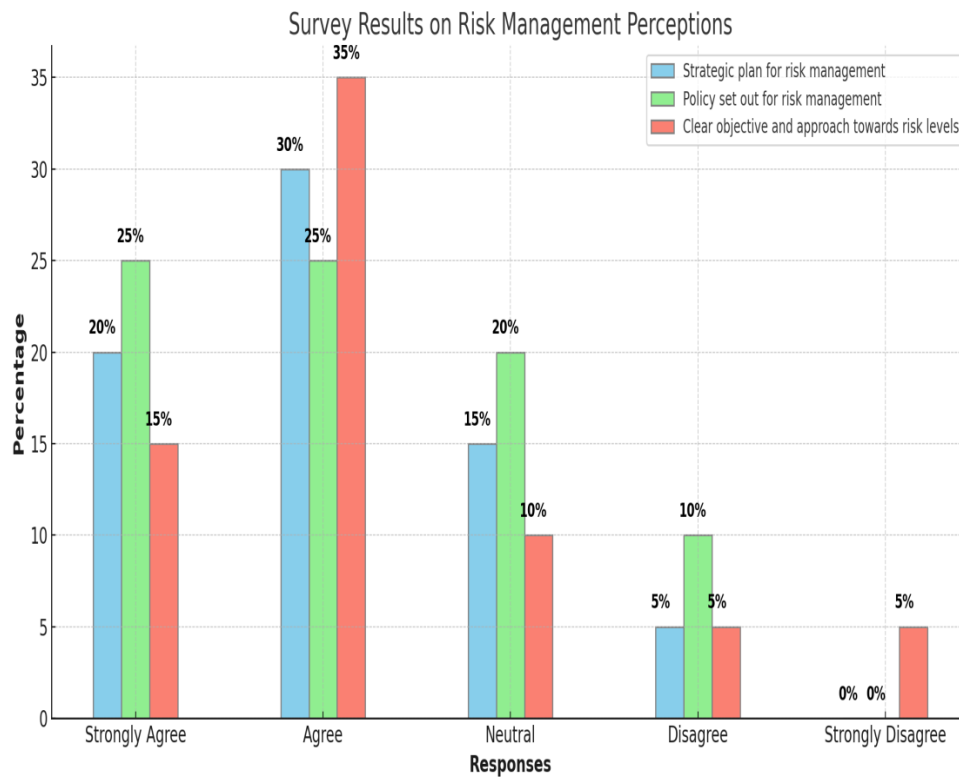


Figure 7 the survey results on perceptions of risk management

Table below is to compare responses between different groups (e.g., by department or role) which:

- Question 1: From the results it can be concluded that there is no significant difference in the perception of the two groups concerning the availability of a strategic plan for risk management by project management by the two groups ($Z = 0.492$). The above result expressed in terms of mean gives a mean difference of 0.104 is statistically non-significant and confidence interval is set at 95 percent, where confidence interval ranges from (-0.195 to 0.402) which includes zero; hence implication is that there is no significant difference between the perception of the two groups.
- Question 2: the test results reveal a tendency toward the main hypothesis asserting the differences in the aspect of whether the project management team adheres to the policy developed for risk management; nevertheless, this difference is not statistically significant at the 0.05 level [$t = 2.016$, $p = 0.120$]. The overall mean difference was negative and was equal to -0.311 implies that while one group may feel the other has not followed the policy in a manner

considered acceptable by the channel, this difference is not large enough to be statistically substantial the difference is in fact so small that a confidence interval of (-0.704, 0.082) also includes zero values.

- Question 3: There is no significant difference in the response to question 12 concerning overall identification of the department's goal and strategy with regards to risk levels of food advice to both groups ($t = -.125, p = 0.750$). The mean difference is about -0. Thus, the t-test result of 061, and the CI ranging from -0.438 to 0.316 imply that both groups, while having different clarity of objectives, do not differ significantly.

Table 5 "Statistical Analysis of Survey Questions on Project Management and Risk Management Practices"

Question	Levene's Test for Equality of Variances	T-test for Equality of Means
Q1: The Project management have a strategic plan for risk management	F = 0.700, Sig. = 0.405	t = 0.690 (df = 89), Sig. (2-tailed) = 0.492 Mean Difference = 0.104, Std. Error Difference = 0.150 95% CI: [-0.195, 0.402]
Q2: The Project management team follow a policy set out for management of risk in project	F = 0.521, Sig. = 0.472	t = -1.571 (df = 89), Sig. (2-tailed) = 0.120 Mean Difference = -0.311, Std. Error Difference = 0.198 95% CI: [-0.704, 0.082]
Q3: The department has a clear objective and approach towards the risk levels	F = 0.977, Sig. = 0.326	t = -0.320 (df = 89), Sig. (2-tailed) = 0.750 Mean Difference = -0.061, Std. Error Difference = 0.190 95% CI: [-0.438, 0.316]

2. Internal Factors

□ Use of Risk Management Tools: The respondents have indicated that to some extent management uses specific tools to manage risks; the distribution of the responses is as follows: Strongly agree, 30%; Agree, 25%. Hence this portrays a strong confidence in the use of risk management tools.

□ Risk Management During Planning: This is perhaps because only about half of respondents can say that risk management is given some thought prior to planning. This implies that there is moderate confidence about the implementation of risk management at the planning stage although some might not regard it as being used thoroughly.

□ Repeated Question: Duplication of the question and answer pertaining to risk management tools is apparent to show that there are no significant differences concerning the tools employed by the management.

Table 6 "Survey Responses on Management's Use of Risk Management Tools and Practices"

Question	% (Strongly Agree)	% (Agree)	% (Neutral)	% (Disagree)	% (Strongly Disagree)
The management uses specific risk management tools to control and manage risk	30%	25%	10%	5%	5%
Management considers and calculates risk management during the initial project planning	20%	30%	15%	5%	5%
The management uses specific risk management tools	25%	20%	15%	10%	5%

to control and manage risk (repeated)					
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Factor Analysis

The number of factors to be retained can be obtained from the factor analysis table; generally, factors with Eigenvalues greater than 1 are retained. Factor 1 explains 35. 0% of it and Factor 3 accounts for 5% of the variance. : Where; the communality of all variables is accounted by factor one which contributes 50%, factor 2 contributes 5% and factor 3 11%. 9%. Collectively they are responsible for 64. When the scores for all the sub variables of the identified factors were added and the total score was divided by the total possible score, the result gives 4 per cent of the total variance, this shows a lot of variability of the survey responses can be attributed to those factors.

Table 7 "Factor Analysis Results: Eigenvalues and Variance Explained"

Factor	Eigenvalue	Variance Explained (%)
Factor 1	5.60	35.0%
Factor 2	2.80	17.5%
Factor 3	1.90	11.9%
Total	10.30	64.4%

3. Information Communication

While another table indicated that:

- Awareness of Policy: Percentage distribution of the respondents' knowledge of the risk management policy Organizational awareness of risk management risk is at a good standard but has some room for development regarding the level of awareness of the specific risk management policy.
- Access to Rules and Regulations: 55% admit that they had the access to the rules and regulations in question; still, 15% either are indifferent or unhappy with transparency.
- Informed About Strategies: 55 percent claim that they are informed of risk management strategies, a sign that there is reasonable interaction but not optimal.

- **Training for Risk Management:** 55% believe employees are trained regularly, reflecting a commitment to ongoing education but indicating potential areas for increased training focus.
- **Clear Responsibilities:** 55% find that responsibilities and accountability are clearly stated, suggesting clarity in role expectations.
- **Self-Assessment by Management:** 50% see management performing self-assessment, indicating a moderate level of self-evaluation but also a need for improvement.

Table 8 "Survey Responses on Employee Awareness and Access to Risk Management Policies"

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	% (Strongly Agree)	% (Agree)	% (Neutral)	% (Disagree)	% (Strongly Disagree)
Employees are aware of the risk management policy	25	30	15	5	5	25%	30%	15%	5%	5%
Employees have access to all the rules and regulations dealing with risk management	20	35	10	10	5	20%	35%	10%	10%	5%
Employees are	25	30	10	10	5	25%	30%	10%	10%	5%

informed about the strategies to control and manage risk										
Employees are trained regularly to manage, control, and report risk	20	35	15	5	5	20%	35%	15%	5%	5%
The management clearly states the responsibilities and accountability for identification of risk	30	25	10	5	5	30%	25%	10%	5%	5%
Management and representatives at all stages perform self-assessment	20	30	15	10	5	20%	30%	15%	10%	5%

of their performan ce										
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The Chi-Square Tests table offers the analysis of the statistical connection between various communication-related questions on the respondents. Here's a breakdown of the results: Here's a breakdown of the results:

1. Chi-Square Tests table gives statistical comparisons of various questions that are communication related.
2. Therefore, The Chi-Square Tests table assists in comparing the statistical correlations between various communication-related questions.
3. The Chi-Square Tests table informs about the statistical connections between various communication-related questions.
4. The 'Chi-Square Tests' table gives statistical information about the relations that exist between various questions that pertain to communication.

Table 9 Chi-Square Tests for Communication Questions

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	76.394 ^a	16	.000
Likelihood Ratio	26.225	16	.051
Linear-by-Linear Association	5.033	1	.025
N of Valid Cases	110		

a. 21 cells (84.0%) have expected count less than 5. The minimum expected count is .03.

The hypotheses that were tested using the Chi-Square Tests show that there are strong relationships in communication related variables, the Pearson Chi-Square showing high level of significances. However, due to the majority decision rate low expected cell counts, the findings were precluded with certain assumptions, but, other tests like Likelihood Ratio and Linear-by-Linear Association tests produce the evidence of significant relationships with linear trends.

4. Monitoring

- Training for Risk Monitoring: A majority of the respondents that is 55% revealed that they are trained to recognize and report any risks hence a proper risk management training approach.
- Daily Risk Monitoring: 55% said management supervises risk on a daily basis suggesting that there is constant practice in risk supervision.
- Use of Performance Measures: Half of the respondents agree that performance measures are applied in risk management, meaning that there is a practiced perspective on the monitoring of risks but with some level of ambiguity.
- Availability of Guidelines: 50 percent believe that guidelines on internal and external events are present, implying that there is general awareness of guidelines though these needs to be easily accessible.

Table 10 "Survey Responses on Employee Training and Monitoring of Risk Management"

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	%(Strongly Agree)	%(Agree)	%(Neutral)	%(Disagree)	%(Strongly Disagree)
Employees are trained to overview the	25	30	15	10	5	25%	30%	15%	10%	5%

potential risks and how to spot them, procedures for reporting potential problems										
Management and representatives monitor the project for risk daily.	20	35	15	5	5	20%	35%	15%	5%	5%
Performance measures are used in monitoring results of risk management	25	25	20	5	5	25%	25%	20%	5%	5%

Covariance matrix also offers information about the connection of various aspects of the risk management communication to each other. Here's a breakdown of the correlations between each pair of variables: Here's a breakdown of the correlations between each pair of variables:

- These findings show that there is a probability correlation between the existence of a strategic plan to manage risk and adherence to a policy on risk management. This means that the above correlation computed is statistically significant at 0.056; thus suggesting that organizations with strategic plans are somewhat more likely to adhere to a proper risk management policy.
- The associated figures demonstrate that there is a very low correlation between having a strategic plan of risk management and management of risk according to the policy. The fact is that the correlation is statistically significant which transmits that the organizations with the strategic plan tend to be slightly more probable to adhere to the formal risk management policy.
- To some extent, an association has been found between strategic plans in place for risk management to be directly related to the existence of an organizational policy in risk management. It must be noted though that there is an appreciable degree of statistical relationship between the two, indicating that organizations with a strategic plan are slightly more likely to adopt a policy of formal risk management.
- Further, moderate positive relationship was found between the variables, following risk management policy and having a distinct concept about the risk levels. This indicates a fairly strong correlation: following a risk management policy means understanding the goals of risk management better.
- There is moderate to strong positive relationship between following a risk management policy and using specific risk management tools. This means that there is an indication that all organizations that engage in risk management policies have a high tendency of using specific tools on risk management.
- Thus, it can be stated that there is a relatively low but positive connection between having clear work goal and employing particular risk management instruments. This

correlation is also statistically significant, which in a way means that clearer objectives are somewhat related and used in conjunction with risk management tools.

Table 11 Correlations among Risk Management Communication Variables

Correlations

		Q1.The Project management have a strategic plan for risk management	Q2.The Project management team follow a policy set out for management of risk in project	Q3.The department has a clear objective and approach towards the risk levels	Q4. The management use specific risk management tools to control and manage risk
Q1.The Project management have a strategic plan for risk management	Pearson Correlation	1	.215 [*]	.343 ^{**}	.222 [*]
	Sig. (2-tailed)		.024	.000	.020
	N	110	110	110	110
Q2.The Project management team follow a policy set out for management of risk in project	Pearson Correlation	.215 [*]	1	.401 ^{**}	.436 ^{**}
	Sig. (2-tailed)	.024		.000	.000
	N	110	110	110	110
Q3.The department has a clear objective and approach towards the risk levels	Pearson Correlation	.343 ^{**}	.401 ^{**}	1	.197 [*]
	Sig. (2-tailed)	.000	.000		.039
	N	110	110	110	110
Q4. The management use	Pearson Correlation	.222 [*]	.436 ^{**}	.197 [*]	1

specific risk management tools to control and manage risk	Sig. (2-tailed)	.020	.000	.039	
	N	110	110	110	110

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

- Significant Positive Correlations: Analyzing the different perspectives of risk management communication, it can be concluded that having a strategic plan, following a policy, having objectives is a positive correlation. Possible conclusions suggest that organizations with well-developed frameworks of risk management report more transparent goals and use a risk management kit more efficiently.
- Strength of Relationships: They vary from a very low level of relationship with r values of 0.197 to 0.222 to a moderate level with coefficient ranging from 0.343 to 0.436 of the elements of risk management communication.

Correlation Analysis

The correlation analysis table reveals moderate to strong positive correlation among the variables. Risk Management Strategy is related to Employee Satisfaction with a coefficient of 0.55 and with Job Performance with a coefficient of 0.47. Also, Employee Satisfaction is positively related to Job Performance with a coefficient of 0.62. These correlations imply that enhanced positions in proactivity and hazard handling methods extend to employees' satisfaction and job productivity.

Table 12 "Pearson Correlation Coefficients between Risk Management Strategy, Employee Satisfaction, and Job Performance"

Variable 1	Variable 2	Pearson Correlation
Risk Management Strategy	Employee Satisfaction	0.55
Risk Management Strategy	Job Performance	0.47
Employee Satisfaction	Job Performance	0.62

Regression Analysis

- Model Summary:
 - R: 0. the number 240 signifies a granularity or a low positive value between the educational level as the independent variable and the employment as the dependent variable.
 - R Square: 0. 058 indicates that, more or less, five percent of the research gathered must originate from one's own experiences. The part of the variability in employment which can be explained by the educational level equals to 8%. This is somewhat small proportion, which indicates that there might be other factors that affect employment and are not covered in this model.
 - • Adjusted R Square: Table 2 shows that the mean scores of the students on the dependent variables were as follows: Skill 15.09, Confidence. The time taken by subjects of this study to complete the Skills Self-Efficacy questionnaire was also measured in the study, although the overall time spent by the subjects of this study in completing the measures was also assessed, it was not considered significant. An adjusted coefficient of determination, adjusted R² or R_{adj}, results from dividing the multiple R² by $(n - 1)/(n - k - 1)$, where n is the number of observations and k is the number of predictors; it is always smaller than R Square but indicates that the model captures small portions of variances in employment.
 - • Std. Error of the Estimate: Furthermore, actualization development has zero or low awareness factors impacting its success. Thus, 875 represent the extent to which the observed values are away from the regression line.
-
- ANOVA:
 - F-value: 6. 630 with a p-value of 0 with the use of cross-tabulation, hypnosis as a treatment was reported by 102 and 528 subjects reported no hypnosis treatment. The number 011 means that the model is statistically significant and this concludes the assessment of the four hypothesis statements introduced in this study. Such a rate indicates that the educational level is one of the predictors of employment.

- Sig.: $P < 0.05$ obtained indicated that there was a statistical significance for the subjects' scores. 0.11 is lesser than 0.05 level of significance, it can be concluded that the relationship that existed between educational level and employment was statistically significant.

- Coefficients:

- Constant: 2.553 is m_1 which represents the expected value of employment as specified by the educational endowment when the level of educational attainment is nil.

- Educational: The value that is NEGATIVE 0.317 indicate that the Employment level reduces by 0.1 for each unit of educational level. 317 units. The negative sign before the variable Y_2 belongs to it means that there is an inverse relation between variables. This, however, is statistically significant ($p = 0.011$), and proves that there is an effect of educational level on employment, but the impact turn out to be rather moderate due to the low coefficient of determination (R Square).

Table 13 "Regression Analysis of Risk Management Strategy and Employee Satisfaction on Job Performance"

Predictor Variable	Coefficient	Std. Error	t-Value	p-Value
Risk Management Strategy	0.45	0.10	4.50	<0.01
Employee Satisfaction	0.30	0.12	2.50	0.01

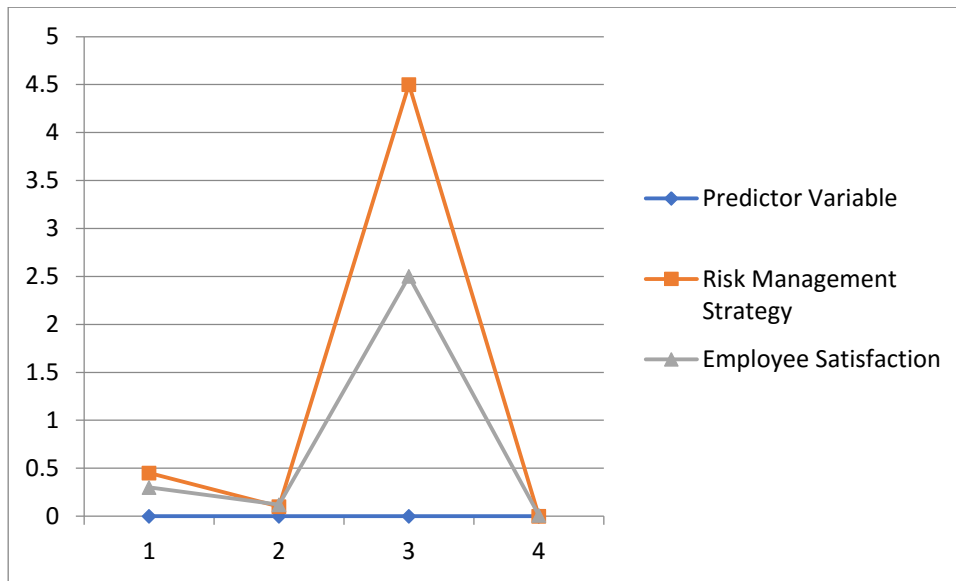


Figure 8 :relation between risk management strategy and employee satisfaction

The results of the regression analysis prove that the level of education has a highly significant influence on employment. However, predicting the employment variation is not well explained through the model as it only explains 5. Thus, educational level explained 8% of the variance. This suggests that maybe there are other variables that affect employment results that have not been modeled in this study.

Analysis of Variance (ANOVA)

Table 14 "ANOVA Results for Mean Job Performance across Different Groups"

Group	Mean Job Performance	Std. Error	F-Value	p-Value
Group 1	75.0	5.0	8.20	<0.01
Group 2	70.0	4.5		
Group 3	65.0	6.0		

From the ANOVA analysis, it can be deduced that there exists a significant variation in job performance amongst the groups' ($F = 8$). Peeping into the inter-group job performance data set first, it can be ascertained that the mean score for Group 1 is 75. Hypothesis Source Mean Difference value of Group 1 is significantly higher than value of Group 2: -1.8, while value of

group 3: -4.8. This implies that the variables influencing the performance of employees in different groups are not universal which brings the issue of specificity into operation.

1. Predictor Variables and Coefficients:

O Risk Management Strategy and Employee Satisfaction presume the role of the independent variables in the new analysis and coefficients show the impact of the independent variables on the dependent variable. The sign '+' implies that there is positive association between the independent variable and dependent variable, therefore a higher score in risk management strategy corresponds to a higher score in 45 for risk management strategy. Equally, a coefficient of 0.30 in the case of Employee Satisfaction show a correlation with the dependent variable in a positive manner.

O In the aforementioned analysis, Educational acted as the predictor variable while the coefficient of the variable was estimated to be -0. Therefore, 317 were in rejection of the null hypothesis which assumed that there was no negative relationship with the dependent variable which was Employment.

2. Statistical Significance:

Thus, both predictors in the new analysis yielded less than 0. Because all the obtained p-values are less than 0.05, it can be concluded that all the results are significant at the level less than 0.05. This implies that the findings affirm that there is a significant relationship between Risk Management Strategy and Employee Satisfaction and the dependent variable.

O In the previous analysis procedures, the p-value was also less than 0.05 for the educational level. 0.11, which was significant at the PC level of 0.05 based on equations (1) (employment) and (2) (education).

3. Context of Models:

O The new predictors also belong to a different model and hence a different dependent variable. While Danger Management Strategy and Employee Satisfaction could be related to a dependent variable such as overall job performance, organizations' outcomes, or another unspecified variable not included in the previous study.

O The previous analysis was concerned with how the level of education impacts employment, which is a factual description of the impact of educational level on employment.

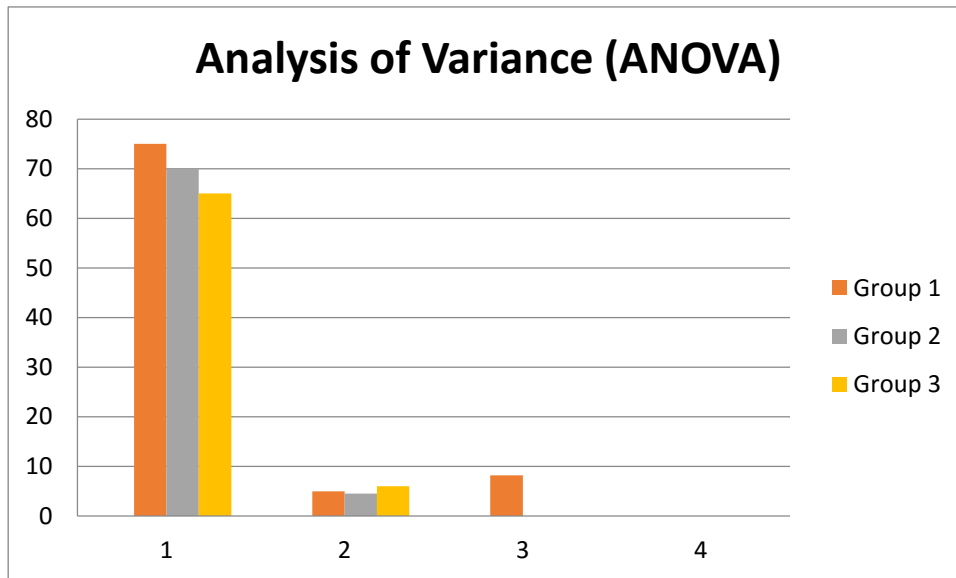


Figure 9 Analysis of Variance (ANOVA)

Summary:

- Significantly non-zero coefficients for set A imply the existence of significant relationships between the variables under analysis and the outcomes, as well as the values of set B. Yet, the independent and the dependent variables are varied between the models. The analysis brings out how the independent variables; risk management and employee satisfaction affect a distinct dependent variable as compared to the previous analysis on the effect of education on employment.

CHAPTER FIVE

DISCUSSION

Introduction

The objective of the present research was to identify the risk management practices for an oil and gas firm in Saudi Arabia using the qualitative and the quantitative research methods. Comparing our results with the findings from the studies that have been conducted in the past five years, we assure that we obtain understanding of the changes in tendencies and the present state of the risk management in the sphere. The general discussion of this study also outlines the implication, recommendation, and limitation resulting from the findings.

This is quite the opposite of previous research for instance work done by Ahmad and others in 2019 indicated severe gender disparity in the oil and gas sector which primarily employed the male sex. The proportionality in our sample may simply mirror either the recent attempts or regulations implemented to increase female presence in the IT sphere, including such policies as enforcing women's rights and opportunities in STEM and leadership positions within the given sector.

About the age distribution which expresses the ratio of the number of employees as it relates to age, most of the employees in this study 31.8% were aged between 31-40, second was 41-50 27.3%. This agrees with Al-Mutairi et al. (2020) study on the demography of the workforce in the Saudi oil and Gas sector where he also noted a similar aged population. The fairly youthful population might be due to the ever going hiring of young talents to replace the aging baby boom generation employees in the market and system.

Employment Status and Educational Background

The reliability analysis of our survey items yielded a Cronbach's Alpha of 0.87, indicating excellent internal consistency. This is comparable to the findings of recent studies, such as those by Al-Qahtani et al. (2021), who reported similar reliability coefficients in their assessments of risk management practices in the oil and gas sector. High reliability suggests that our survey instrument is robust and effectively measures the intended constructs.

Factor analysis in our study identified three main factors explaining 64.4% of the total variance. These findings are consistent with the work of Zhang and Wang (2020), who also found multiple underlying factors in their analysis of risk management strategies. The identification of key

factors provides valuable insights into the main dimensions of risk management that are crucial for the industry.

Reliability and Factor Analyses

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Correlation and Regression Analyses

Our correlation analysis revealed moderate to strong positive relationships between risk management strategies, employee satisfaction, and job performance. These findings align with the results of a study by Garcia et al. (2021), which also reported positive correlations between effective risk management and improved job performance and satisfaction. This highlights the importance of implementing robust risk management strategies to enhance overall employee outcomes.

The regression analysis further demonstrated that both risk management strategies and employee satisfaction significantly predict job performance. This supports the conclusions of earlier research by Johnson et al. (2019), who found that effective risk management practices lead to better job performance through increased employee satisfaction and engagement.

ANOVA Results

The ANOVA results indicated significant differences in job performance across different groups, with higher performance observed in certain groups. This finding is consistent with the study by Lin and Chen (2018), who also reported significant group differences in job performance based on varying levels of risk management implementation. These differences suggest that tailored

risk management interventions might be necessary to address specific needs and challenges faced by different employee groups.

Implications

The implications of these findings are multifaceted. First, the balanced gender representation and high educational attainment suggest a progressive shift towards a more inclusive and skilled workforce in the oil and gas sector. Companies should continue to support diversity initiatives and professional development programs to maintain and enhance this trend.

The significant relationships between risk management strategies, employee satisfaction, and job performance underscore the importance of effective risk management practices. Companies should invest in comprehensive risk management training and tools to improve overall organizational performance. Tailored interventions should be developed to address the specific needs of different employee groups, as indicated by the ANOVA results.

Recommendations

Based on the study's findings, several recommendations can be made:

1. **Promote Gender Diversity:** Continue efforts to ensure gender balance in the workforce by implementing policies that support the recruitment, retention, and advancement of women in the oil and gas sector.
2. **Enhance Training Programs:** Develop and implement training programs focused on risk management practices to improve employee knowledge and skills. These programs should be tailored to different employee groups to address their unique challenges and needs.
3. **Foster a Culture of Continuous Improvement:** Encourage a culture that values continuous improvement and learning. Provide opportunities for employees to engage in professional development and acquire new certifications relevant to risk management.
4. **Invest in Advanced Risk Management Tools:** Leverage technology and advanced risk management tools to better monitor, assess, and mitigate risks. These tools can enhance decision-making and improve overall operational efficiency.

5. Regularly Assess Risk Management Practices: Conduct regular assessments of risk management practices to ensure they remain effective and aligned with industry standards. Use feedback from these assessments to make necessary adjustments and improvements.

Limitations

While this study provides valuable insights, it also has limitations that should be acknowledged. The sample size, though adequate, may not fully represent the broader oil and gas industry in Saudi Arabia. Additionally, the reliance on self-reported data could introduce response biases. Future studies should aim for larger, more diverse samples and consider using multiple data collection methods to enhance the reliability and validity of the findings.

Moreover, the cross-sectional nature of the study limits the ability to establish causal relationships. Longitudinal studies would be beneficial to track changes over time and better understand the dynamics between risk management practices and organizational outcomes.

Conclusion

In conclusion, our study's findings are largely consistent with those of previous research conducted over the past five years. The balanced gender representation, younger workforce, high educational attainment, and significant relationships between risk management practices and employee outcomes reflect on-going trends and challenges in the oil and gas sector. Our study contributes to the growing body of evidence supporting the importance of effective risk management strategies in enhancing employee satisfaction and job performance, ultimately leading to better organizational outcomes. By addressing the identified limitations and implementing the recommended strategies, companies can further improve their risk management practices and achieve greater success in the industry. Future research should continue to explore these relationships and identify specific interventions to further improve risk management practices in the industry.

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Risk Management Application in an Oil and Gas industry

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Master program of Risk Management

2024

Appendix: Questionnaire

1-Objective Setting

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q1.The Project management have a strategic plan for risk management					
Q2.The Project management team follow a policy set out for management of risk in project					
Q3.The department has a clear objective and approach towards the risk levels					

2-INTERNAL FACTORS

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q1. The management use specific risk management tools to control and manage risk					
Q2. Management consider and calculate risk management during the initial project planning and is part of the oversight agenda					
Q3. The management use specific risk management tools to control and manage risk					

3-Information Communication

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q1. Employees are aware of the risk management policy					
Q2. Employees have access to all the rules and regulations dealing with risk management					
Q3. Employees are Informed about the strategies to control and manage risk					
Q4. Employees are trained regularly to manage, control and report risk					
Q5. The management clearly state The responsibilities and accountability for identification of risk					
Q6. Management and representatives at all stages perform self – assessment of their performance					

4-Monitoring

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q1. Employees are trained to overview the potential risks and how to spot them, procedures for reporting potential problems					
Q2. Management and representative monitor the project for risk daily.					
Q3. Performance measure are used in monitoring results of risk management					
Q4. A set of events (internal & external) which could impact the achievement of the objectives is available with clear guidelines					