



Forensic Accounting in the Saudi Arabian Oil Industry

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ABSTRACT

The primary subject matter of this research is to examine the effects of diversity, equity and inclusion on the effectiveness of forensic accounting in the oil and gas industry of the world's largest producer and exporter of oil, Saudi Arabia. The specific objectives are: To review forensic accounting and determine the effect of diversity management on forensic accounting effectiveness in the oil and gas listed companies in Saudi Arabia; to ascertain the relationship between inclusion and forensic accounting effectiveness of oil and gas listed companies in the Saudi Arabia stock exchange, Tadawul; to ascertain the relationship between equity and forensic accounting effectiveness in oil and gas listed companies in Tadawul; and to explore the level of awareness of forensic accounting application in Saudi Arabian oil and gas companies and how it has engendered leadership efficiency in the industry. Descriptive Statistics are used to present quantitative descriptions in a manageable form. The collected data were analyzed with descriptive statistics using Ordinary Least Square (OLS) regression and *chi-square*. The study reveals that the use of forensic accounting is still very minimal in Saudi Arabian oil and gas publicly traded companies. The result revealed that diversity management and inclusion have significant effect on forensic accounting effectiveness in the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. Equity, however, found to have no significant effect on forensic accounting effectiveness in the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. That could be explained by saying that diversity management and inclusion have the potentials of assisting oil and gas companies in creating a climate in which employee will like to work harder with readiness to continue to work with the company.

Keywords: Forensic accounting effectiveness; Oil and gas industry, Diversity management; Equity; Inclusion; Tadawul and Saudi Arabia

INTRODUCTION

Saudi Arabia is proudly the world's largest producer and exporter of oil, and has one quarter of the world's known oil reserves more than 260 billion barrels. Saudi economy is primarily governed by the petroleum sector because the country has the world's second largest proven oil reserves and has the fifth largest natural gas reserves which made the country an "energy superpower". In 2019, the World Bank database ranked the kingdom of Saudi Arabia as the largest economy in the Middle East and the eighteenth largest in the world. Saudi Arabia's economy is primarily petroleum based. Almost 63% of

its budget revenue and 67% of exports are derived from the oil industry alone, and 45% of Gross Domestic Product (GDP) is attributable to the oil industry, while the private sector contributes only 40%. The country has oil reserves totaling 260 billion barrels, which is nearly one fifth of the world's total reserves [1].

Oil history in Saudi Arabia goes back to 1933 when King Abdelaziz Al-Saud, founder of the kingdom of Saudi Arabia, granted Standard Oil of California (SOCAL), later renamed Chevron, the right to prospect for oil in the new kingdom. In 1938, SOCAL discovered large quantities of oil in the Eastern

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boundary of Saudi Arabia, Dammam. Limited exports began in 1939, and picked up significantly with the end of World War II. In the late 1940's, SOCAL entered into a consortium with other American oil companies and was renamed with "the Arabian American Oil Company (Aramco)". By the 1970's, Saudi Arabia had become the top producer and exporter of oil in the world. Saudi Arabian oil industry entered a new era in 1980 when the Saudi government gained full ownership of Aramco, renaming it "Saudi Aramco". The company began exploring in areas that had previously been untouched, and discovered vast deposits of high grade crude oil. Apart from petroleum, the Kingdom's other natural resources include natural gas, iron ore, gold, and copper. Saudi Aramco operates the world's largest single hydrocarbon network, the master gas system. In 2013 crude oil production total was 3.4 billion barrels (540 million cubic meters), and it manages over one hundred oil and gas fields in Saudi Arabia, including 288.4 trillion Standard Cubic Feet (SCF) of natural reserves [2].

In January 2016, the deputy crown prince of Saudi Arabia, Mohammad bin Salman, announced the government intention to sell 5 per cent of Saudi Aramco in an international Initial Public Offering (IPO) to fund Saudi Arabia's ambitious economic reform plans. On December 11, 2019, shares amounting to 1.5 per cent of Aramco's value began trading on the Tadawul, Saudi Arabia's stock exchange giving the company a market capitalization of about U\$1.88 trillion and making Saudi Aramco the world's largest listed company. Aramco IPO promised to be the largest ever, greatly surpassing the \$25 billion offering of Chinese internet giant Alibaba in 2014 [3].

The Organization of the Petroleum Exporting Countries (OPEC) was founded in Baghdad, Iraq, with the signing of an agreement in September 1960 by five countries namely Saudi Arabia, Kuwait, Iraq, Venezuela and Iran. They were to become the founder members of the Organization. These countries were later joined by Qatar (1961), Indonesia (1962), Libya (1962), the United Arab Emirates (1967), Algeria (1969), Nigeria (1971), Ecuador (1973), Gabon (1975), Angola (2007), Equatorial Guinea (2017) and Congo (2018). OPEC's objective is to coordinate and unify petroleum policies among member countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those investing in the industry [4].

The integration of accounting, auditing and investigative skills results in the special field known as forensic accounting. Harris and Shanikat, et al. argued that there is a continuous demand in all sectors for accountants who work in the framework of forensic accounting. In the same vein, the survey done by McMullen, et al., found that the forensic accountants' demand might be increased in the upcoming future, especially in fraudulent financial reporting area. Forensic accounting arises from the effect and cause of fraud and technical error made by human. Forensic accounting techniques are fast becoming popular in providing evidence in the prosecution of corruption and as well assist in disputes resolution. It provides an accounting analysis that is suitable to the court which will form the basis for discussion, debate and ultimately dispute

resolution. Forensic accounting encompasses both litigation support and investigative accounting. The American Institute of CPAs (AICPA) anticipates significant growth in the field of forensic accounting. In a recent AICPA survey, current forensic accountants claimed to have witnessed an impressive 20 percent increase in demand in recent years. A 2016 report by the association of certified fraud examiners the world's largest anti-fraud organization and is a provider of anti-fraud training and education said that a typical organization loses 5 percent of its revenue to fraud each year. The report also mentioned that banking and finance were the most represented sectors in the fraud cases examined by the association [5].

The incidence of financial fraud is increasing and has been a central feature in a number of financial scandals in recent years. In spite of the fact that the cost of fraud is difficult to estimate because not all fraud is discovered and not all uncovered fraud is reported, different endeavors have been made to estimate fraud. For example, it has been estimated that six percent of US companies' revenue in 2002 was lost through fraud committed by employees and of the 491 Australian and New Zealand companies who responded to the KPMG survey in 2004, almost half had experienced a fraud costing them \$457 million. Therefore, the entire business community has become more aware of the threat of fraud and the need to be vigilant when searching for instances of fraud following the well-publicized corporate collapses earlier last decade [6].

Forensic accountants could be identified as experienced investigators of financial data who are external and could be contracted to detect suspicions of fraudulent financial activities and improve corporate governance practices which will finally lead to better performance. Forensic accountants can play vital role to improve corporate governance in a company by improving the company's control and accounting systems that ensures a proper recording, classification and reporting of all relevant transactions. Forensic accountants should always put an eye on corporate governance practices to ensure good corporate governance and improve responsibilities and accountability. They should also ensure the integrity of financial statements by actively investigating for fraud, identifying areas of risk and associated fraud symptoms, pursuing each anomaly aggressively, and delving into the finest details of accounting and financial anomalies. Forensic accounting is the application of financial skills and investigative mentality to unsettled issues, conducted within the context of the rules of evidence. In connection with the responsibility for the prevention and detection of fraud, the International Auditing and Assurance Standards Board (IAASB) of the International Federation of Accountants (IFAC) makes it clear in the International Standard on Auditing (ISA 240) that the primary responsibility rests with those charged with governance of the entity and with management [7].

The Kingdom of Saudi Arabia has had strict anti-bribery legislation in place since 1992 with the promulgation of Royal Decree No. M/36, known as the anti-bribery law. Saudi governmental and private regulators such as the general auditing bureau, the national anti-corruption commission (Nazaha), the Saudi Capital Market Authority (CMA), the Saudi Arabia Monetary Agency (SAMA), the Ministry of Commerce and

Investment, the Saudi Organization for Certified Public Accountant (SOCPA), and others have increased management's responsibilities for fraud risk management and prevention. Every corporation is susceptible to fraud, but not all fraud can be prevented, nor is it cost effective to try. The provisions of the anti-bribery law are targeted at acts involving public officials, and Saudi Arabia's continued adherence to Sharia law provides an additional layer of protection to acts that fall outside of this specific sphere. Responsibility for overseeing anti-corruption efforts has been charged to the national anti-corruption commission, also known as Nazaha, since its formation in 2012. Nazaha is responsible for investigating instances of graft in government contracts and ensuring that appropriate action is taken in cases where an offence has occurred [8].

On the Forth of November 2017, the Saudi government declares a Royal Decree authorizing the formation of a new anti-corruption committee ("The Anti-Corruption Committee"), led by the crown prince Mohammed bin Salman, with a view to eliminating illicit practices and corruption. The newly formed Committee has been granted enhanced powers to investigate and prosecute instances of corruption at all levels, and is comprised of high ranking officials from across various government branches including security, finance, and existing anti-corruption bodies. Despite the ability of Nazaha to refer specific corruption cases to the relevant authorities and conduct subsequent follow ups, the new committee will benefit from greater powers to investigate and prosecute instances of graft, including the capacity to issue arrest warrants and order interim measures such as asset freezing and issuing travel bans [9].

Saudi Arabian oil and gas companies just like other international oil and gas companies in the rest of the world are subject to fraud risks. International large frauds and crises as mentioned above have led to the downfall of the entire corporations, significant legal costs and noticeable business and investment losses which effect the confidence of investors and stakeholders. The financial crises mainly driven by undetected fraud and the increased corporate governance weaknesses in Saudi corporations has led to the need for multi-dimensional relationship (that is inter-relationship between the audit committee, the external auditor and the management) in corporate governance as to protecting the interest of shareholders and other stakeholders with the common goal of improving oversight function and ensuring good corporate governance. Weak corporate governance companied with financial fraud have led to poor performance and to corporate collapse resulting to huge lost of new investment. The abovementioned corporate structure failure has made academics and investigators realize that there is a great need for forensic accountants who can identify, expose and prevent corporate governance weaknesses and detect fraudulent financial statements. The possible way to solve this issue is that the public should be educated and be informed of the use and function of forensic accounting to prevent fraud occurrences. When the public is made known of the concept, then they could actually demand for the service in the company which they invest in the primary subject matter of this research is to examine the effects of diversity, equity and inclusion on the effectiveness of forensic accounting in the oil and gas industry of the world's largest

producer and exporter of oil, Saudi Arabian. The specific objectives are: To review forensic accounting and determine the effect of diversity management on forensic accounting effectiveness in the oil and gas listed companies in Saudi Arabia; to ascertain the relationship between inclusion and forensic accounting effectiveness of oil and gas listed companies in the Saudi Arabia Stock Exchange, Tadawul; to ascertain the relationship between equity and forensic accounting effectiveness in oil and gas listed companies in Tadawul; and to explore the level of awareness of forensic accounting application in Saudi Arabian oil and gas companies and how it has engendered leadership efficiency in the industry [10-13].

Research problem

Diversity means people from different backgrounds, age groups, cultures, gender and different regions working in the organization. It understands every person as unique and everyone has its own individual identity. Diversity management is the action of including people from different backgrounds, cultures, and religions, etc. in the organizational structure. In diversity management, there is respect for every individual, no matters from where a person belongs to. When an organization brings diversity in the management of the organization then it encourages the prosperity and gives better ideas to solve a particular problem in the organization. Workforce diversity in organizations has become an important part of HRM in today's time. Although in organizations there is huge decimation with people with different backgrounds it is the main goal of modern organizations to hire more and more diverse people for the organization. To remove all these decimation and differences in the people there is a huge need to implement the various policies and programs for the awareness of the people so that they consider all the employees equal. Management and inclusion of diverse workforce had become a major concern and salient problem in organizations across all sectors. Diversity management and inclusion are required for organizational survival in order to be able to meet up with the dictate of the spate of globalization around the world. Diversity involves recognizing, respecting, accepting and tolerating individual uniqueness and differences. It is a construct that depicts the differences in individuals' gender, race, ethnicity, age, religious beliefs, socioeconomic status, physical abilities, sexual orientation and other ideologies. Inclusion on the other hand has been described as the involvement of employees in the organizational systems and processes [14].

Inclusion, on the other side, could be a new concept among researchers and still at its infancy stage in the organizational literature, this is one of the major reasons why much study has not been done on it, they therefore advocated for more empirical work on this concept as it relates with organizational practices. Shore, et al. argued that despite the fact that inclusion has started gaining popularity, it is still a new concept with no consensus among researchers as regards its definition. Hanappi-Egger defined inclusion as a means of valuing and enabling employees' full participation in the entire organizational activities. Ponce-Pura defined inclusion as the individual employees' sense of belongingness as it relates to their experiences and perceptions being recognized for their qualities

and individuality within the organizational context. April and Blass argued that the inclusion of employees in their organization's processes and procedures had to do with equal opportunities among workforce in the workplace. Roberson described inclusion as the removal of hindrances to the employee full participation and contribution to organizational activities [15].

Equity and Equality are two different concepts when it comes to their interpretation. Equality can be defined as treating every individual in the same manner irrespective of needs and requirements. Whereas, equity can be defined as the quality of treating individuals fairly based on their needs and requirements. This does not denote that an equal material should be distributed to every individual. On the contrary, it highlights that things should be distributed based on the needs and requirements. This simply means that the two terms are intimate. We cannot explain equity without mentioning equality. The difference significantly contributes to the meaning of the two key terms.

Forensic accountants have played an increasingly important role in the litigation and other legal disputes fomented by these recent frauds and failures. The scandals that recently rocked the corporate world with classical examples being the often cited Enron and WorldCom cases have also brought the field of forensic auditing to the forefront. Forensic accounting is seen as encapsulating all the other areas in the use of accounting for investigative purposes. The diversity in management plays a great role in various aspects like employee performance, job satisfaction, and organizational performance, etc. Related literature mainly explores the diversity at the workplace in terms of gender, age, and performance, etc. However, up to the researcher knowledge, no study has concentrated on the effect of diversity management, equity, and inclusion on forensic accounting effectiveness in the oil and gas listed companies in a developing top oil producer country in the world, Saudi Arabia. Therefore, the current research paper explores the effect of diversity management, equity, and inclusion on forensic accounting effectiveness in the Saudi Arabian oil and gas listed companies in the Saudi Arabian Stock Exchange, Tadawul.

Research questions

The study is expected to answer the following questions:

- To what extent does diversity management affect forensic accounting of oil and gas publicly traded companies in Saudi Arabia?
- How does inclusion affect forensic accounting of oil and gas publicly traded companies in Saudi Arabia?
- To what extent does equity affect forensic accounting of oil and gas publicly traded companies in Saudi Arabia?

Research hypotheses

The following hypothesis will be tested:

H₀₁: Diversity management has no significant effect on forensic accounting of oil and gas listed companies in the Saudi Arabian stock exchange, Tadawul.

H₀₂: Equity has no significant effect on forensic accounting of oil and gas listed companies in the Saudi Arabian stock exchange, Tadawul

H₀₃: Inclusion has no significant effect on forensic accounting of oil and gas listed companies in the Saudi Arabian stock exchange, Tadawul

LITERATURE REVIEW

Forensic accounting is not a new term, however forensic accounting has been practiced since early 1940's. Auditors used to take responsibilities for fraud detection and play a forensic accountant role. Therefore, it could be said that forensic accounting techniques were used in audit. Back in 1940's, auditors and the accounting profession began to redefine the duties of an audit. Auditors were no longer primarily responsible for fraud detection and that the prime purpose of an audit is to enable the auditor express an opinion as to whether the financial statements of an organization showed a true and fair view of the entity's transactions. Forensic accounting is the systematic application of auditing skills to situations or circumstances that have legal implications or consequences. Dada, et al. argued that forensic auditing arises from the integration of accounting, investigative auditing, criminology and litigation services. Forensic auditors are experts in financial matters who are trained in detecting, investigating and deterring fraud and white collar crimes which are to be presented to court for legal action or to public discussion and debate [16].

Owojori, et al. states that the failure of statutory audit to prevent and reduce misappropriation of corporate fraud and increase in corporate crime has put pressure on the professional accountant and legal practitioner to find a better way of exposing fraud in business world. With the strident calls and pressures on modern audit to once again assume responsibility for fraud, the signs are that audit and forensic accounting will soon reunite again. Forensic accounting techniques by increasing the probability of fraud prevention and detection help in bridging the audit expectation gap as it relates to inability of an audit to detect fraud. Perception studies have shown that various stakeholder groups agree on the core skill sets required of the modern forensic accountant.

Price Waterhouse Coopers' (PWC) (2003) global crime survey showed that 37 percent of respondents in 50 different countries reported significant economic crimes with the average loss per company of \$2,199,930 (PWC, 2003). KPMG's fraud survey also concluded that more companies are: Recently experiencing incidents of fraud than in prior years; taking measures to combat fraud; and launching new antifraud initiatives and programs in response to the Sarbanes-Oxley Act of 2002 (KPMG, 2003).

Turning to the main issue of this study, Krithi, et al. examined diversity and inclusion and looked at a variety of empirical and conceptual studies on workforce diversity and its implications covering the period from 1987 to 2021. A literature evaluation was commissioned to focus on workplace diversity and inclusion with the implication of workforce diversity and inclusion to the

modern era. This study found a large body of research in the field of diversity and its outcomes. More study in the domain of inclusion and its related effects is needed because it is a comparatively recent topic of investigation. They examined the effectiveness of literature reviews in broadening existing knowledge on a specific area and formulating research prospects for future studies for researchers. This study contributes a theoretical perspective to the management of key diversity and the development of diverse organizations. Bakhri, et al. examined the relationship between diversity in management and culture. It basically explores the various previous studies done on diversity. By studying previous studies and concepts the study provided the theoretical perspective of diversity and the future perspective of the research in diversity management. It also suggests that human resources should make policies and rules for diversity management so that it should not become a hurdle for the organization.

Vijay, et al. investigated the diversity management in an educational institute in Pune, India. The study found out that various efforts made by the institutions to bring diversity in their organizations and the increased awareness of people for diversity management. The study concluded that there were various types of diversities that organizations can implement, however, many institutes were not ready for the diversity in their organizations. Nhat, et al., highlighted the impact of diversity management on organizational performance diversity management practice bring new and favorable opportunity in the organization as if there is proper diversity management practices then more able and efficient employees will be hired in the organization from different diversified areas with several difference in demographic factor, especially in hotels there is more scope and demand of diversified workforce, as in hotels customers visit from all over the world with different culture and language so in order to meet all the requirements of customers and make guest comfortable and satisfied it is important to have diversified staff. Finding of the study indicated that if diversity management were done in the correct manner and on right basis by considering all its challenges and problem raised by it, organizational performance would be more effective.

Ayega, et al., analyzed cultural diversity and organizational performance and suggested that when organizations have a proper system of diversity in the workforce, it will provide a competitive advantage to the organization. Further, this paper concluded that every organization should implement cultural diversity in the organization properly so that the performance of the organization can be better day after day. Ohunakin, et al., examined effects of diversity management and inclusion on organizational outcomes. The importance of diversity management and inclusion on organization is of immense benefit especially in a multinational corporations, where diversity and inclusion are parts of their core values. Kundu, et al., explored the relationship between diversity management and organizational performance in the IT industry and concluded that there was a significant relationship between diversity and organizational performance. It also stated that there was a positive relationship between gender and perception of employees regarding promotion. Davis, et al. identified the attitude of Australian managers towards diversity management

in the organizations. The study found that non HR managers in the organization understood the importance and relevance of diversity management in their organizations. Sharma investigated the four aspects with the diversity management namely: Performance appraisals, issues related to socio-cultural aspects, affirmative actions, and capabilities of the organization. The result concluded that the first aspect performance appraisals was found as the major source of discrimination in the organization. Therefore, organizations needed to develop strategies and capabilities to encourage diversity in their organizations.

The empirical literature of fraud detection and prevention shows results relating fraudulent actions to poor corporate governance, in contrast, this study investigates the impact of forensic accounting on fraud detection in a developing country, Saudi Arabia. As pointed out by Bozec and Bozec, most studies investigate characteristics of corporate governance components on fraud detection. Therefore, this study will try to investigate the impact of forensic accounting on the level of fraud detection as perceived by the respondents.

In the view of Howard and Sheetz, forensic accounting is the process of interpreting, summarizing and presenting complex financial issues clearly, succinctly and factually often in a court of law as an expert. It is concerned with the use of accounting discipline to help determine issues of facts in business litigation. Forensic accounting is a discipline that has its own models and methodologies of investigative procedures that search for assurance, attestation and advisory perspective to produce legal evidence. It is concerned with the evidentiary nature of accounting data, and as a practical field concerned with accounting fraud and forensic auditing; compliance, due diligence and risk assessment; detection of financial misrepresentation and financial statement fraud; tax evasion; bankruptcy and valuation studies; violation of accounting regulation.

Bhasin mentioned that forensic accountants are trained to look beyond the number and deal with the business realities of situation. He also reported that forensic accounting involve: Investigating, analyzing financial evidence, developing computerized applications to assist in the analysis and presentation of financial evidence, communication their finding in form of reports, exhibits and collect documents, and assist in legal proceedings, including testifying in court, as an expert witness and preparing visual aids to support trial evidence. Investigation is an examination of records and accounts of an organization for a specific purpose. According to Oxford Advanced learner's Dictionary (2010), fraud is defined as the crime of cheating somebody in order to get money or goods illegally. Arzova viewed fraud as enriching oneself by intentionally realizing the value or worth of an asset in secret. Okafor reported that fraud is a forensic term and embraces all multifarious means which human ingenuity can devise which can resort to by one individual to get advantage over another in false representation.

Adeniji and others summaries the types of fraud on the basis of methods of perpetration, include the following but not exhaustive as the methods are devised day in day out;

defalcation, suppression, outstripped, theft and embezzlement, tampering with reserves, insider abuses and forgeries, fraudulent substitutions, unauthorized lending, lending to ghost borrowers, kite flying and cross firing, fake payment, fraudulent use of firms documents, fictitious contracts and lot more. Oyejide opined that fraud is a subject matter that have received a lot of attention both globally. Bozkurt indicated that there are two types of fraud committed in business. These are: Personal use of business resources and drawing up of financial statement of business falsely. Research has shown that the amount of loss in public sector as a result of employees' fraudulent activities is far greater than that suffers as a result of citizens negligence. About 50% of employees is determined to commit fraud while 80% of employee might be inclined to commit fraud under a suitable condition. Researchers also observed that high rate of fraud committed in public sector are committed by married men is higher than unmarried with high level of education and higher IQ level of age 28 and above, under a suitable working environment who is entrusted with responsibility of taking care of fraud or their collaborators and occupies lucrative positions in the organization. The wide spread of fraud in developing countries have made traditional auditing and investigation ineffective in detection and prevention of fraud.

Forensic accounting is a rapid growing field in detection and prevention of fraud in the public sector. This has become a complex area of concern for the accounting profession. Forensic accountant apply accounting, auditing and investigating skills in detecting fraud and present litigation support service in the court. Forensic accountants are trained to look beyond mere numbers and deals with business reality. According to Zysman, forensic accountant are usually geared towards finding where money went, how it got there and who was responsible. Forensic accounting as a rapid growing field can be effective in detecting and preventing fraud in Saudi Arabian public and private sectors by application of its professional and expert technical skills to detect manipulated evidence, analyze financial document in fraud scheme, other illegal financial activities, asses the damages caused by auditor's negligence and fact finding as evidence used against defaulter as litigation support service in the court.

Recently, Saudi Arabia government is conducting a huge reform in its private and public sectors to prevent frequential activities and emphasizing that fraud, corruption and money laundry were becoming the greatest challenge and major hindrance to national development. This study amongst other studies try to introduce forensic accounting as an excellent tool to detect, reduce and prevent fraud. This became possible by introduction of forensic accounting training. Forensic accountants could be trained to look beyond mere members and deal with business realities of situations. Forensic accountants analyze, summaries, interpret, and present complex financial business related issues and also develop computerize application skills to assist in analyzing financial evidence.

To remain competitive in a changing world, Saudi corporations should update and control their forensic accounting practices so that they can meet new demands and new opportunities. The Saudi government also has an important responsibility for

shaping an effective regulatory framework that provides for sufficient flexibility to allow the Saudi market to function effectively and to respond to expectations of shareholders and other stakeholders. The way these principles should be adopted is the responsibility of the government and the market participants. Forensic accountants can make significant contributions in the area of corporate governance, fraud prevention and investigation, creating positive work environment, establishing effective lines of communication and vigilant oversight.

METHODOLOGY

The objective of the present research is to answer the research questions and explore the effect of diversity management, equity, and inclusion on the effectiveness of forensic accounting in the oil and gas publicly listed companies in the Saudi Arabian Stock Exchange, Tadawul. The population of this study is all listed oil and gas companies in Tadawul, namely Saudi Arabian Oil Company (Aramco), Arabian Drilling Company, Saudi Arabian Refineries Company, Rabigh Refining and Petrochemical Company, National Shipping Company of Saudi Arabia (Bahri), Aldrees petroleum and transport service, and National Gas and Industrialization Company (GASCO). This study made extensive use of secondary sources of data as well as dummy variables. The secondary sources used in this study includes: Journals, annual reports of the seven selected oil and gas listed companies. This study employs Ordinary Least Squares (OLS) and panel least square estimating regression equations using panel data between 2017 and 2021 covering period of 5 years for seven oil and gas listed companies in Saudi Arabia, to estimate and provide evidence on the nature of relationship between dependent and independent variables. Inferential statistics of the hypotheses were carried out with the aid of SPSS statistical software, using coefficient of correlation which is a good measure of relationship between two variables which provides clear indication about the strength of the relationship and its direction. Regression analysis predicts the value of a variable based on the value of the other variables and explains the impact or effect of changes in the values of the variables. In an attempt to determine the diversity, equity, inclusion and forensic accounting of oil and gas firms in the Saudi Arabian stock exchange, Tadawul [17].

The study adopts the following model:

$$FAE = \alpha + \beta_1 DMA + \beta_2 EQT + \beta_3 INCL + \mu$$

Where:

FAE=Forensic Accounting Effectiveness

DMA=Diversity Management

EQT=Equity

INCL=Inclusion

The survey method is selected for the purpose of this study in order to collect a sufficient amount of primary data. The use of questionnaires is the most widely used data collection technique in a survey and, in this study. Survey is a flexible research approach used to investigate a wide range of topics and it will be

the research methodology adopted for this study. The choice was predicted on the fact that descriptive survey method is one which looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees. Surveys often employ the questionnaire as a tool for data collection and the use of questionnaires is the most widely used data collection technique in a survey and, in this study. The data collected are analyzed using *chi-square* statistical software and OLS regression analysis. The *chi-square* test of independence was used to test for differences in responses involving categorical dependent variables for the between subject analysis. The Kruskal-Wallis non-parametric analysis of variance was used to examine differences in responses in the ranked data.

Table 1: Responses.

	Emailed accountants	Response percentage
Emailed questionnaires	100	63%
Undeliverable questionnaires*	4	4%
Complete questionnaires	58	58%
Incomplete questionnaires	5	5%
Unreturned questionnaires	37	37%
Response rate	58%	

The questionnaire was prepared, pre-tested, revised, and then e-mailed to the respondents. The questions included in the questionnaire were meticulously chosen to ensure the attainment of the research objectives. About 100 online survey copies of the questionnaire were electronically distributed on respondents. The researcher was able to enlist the help of mid-level employee and senior accountant at the Saudi oil and gas listed companies in the Saudi Arabian stock exchange, Tadawul, who facilitated the delivery and return of the questionnaires. Data were elicited from our respondents with the aid of the research instrument adopted in this study. The response rate was acceptable at 58 percent given that 58 copies of the questionnaire were completed and emailed back. However, 4 copies of the questionnaire were invalid as they were not properly filled out and 37 copies were not returned or undeliverable (Table 1). Simple percentages were used to analyze the distribution of responses. While this response rate is lower than might be desired, response rates of this level are not uncommon when certain types of individuals are surveyed. The author compared late responses with early responses and find no significant differences.

RESULTS AND DISCUSSION

This section is concerned with the presentation and analysis of data gathered from the research questionnaire administered on

Using a five point Likert scale test, the questionnaire was developed to measure responses of respondents on five scales: (1) Strongly disagree; (2) Disagree; (3) Undecided; (4) Agree; (5) Strongly agree. The values as generated through administration of questionnaire were subjected to empirical investigation. The data collected were analysed using frequency distribution expressed in percentages and *Chi-square* (X^2) statistics to test the hypotheses formulated for the study.

mid-level employee and senior accountant at the Saudi Arabian listed oil and gas companies in Tadawul. The author attempts to empirically examine the effects of diversity, equity and inclusion on forensic accounting in the oil and gas industry of the world's largest producer and exporter of oil, Saudi Arabian. Main analysis of this study was done here and results obtained in line with the objectives of study. The analysis was carried out in such a way that allowed a smooth flow that enabled implications to be drawn for tertiary institutions and policy making. The method of Ordinary Least Squares (OLS) estimating regression equations is employed (Table 2). The choice of this technique arises as a result of the following facts: (1) OLS estimates the unknown parameter in a linear regression model; (2) It is subject to some crucial assumption of the error term which provides the "best" (minimum variance), unbiased linear estimator (BLUE PRINT) of the parameter estimates of a single equation model; (3) The best linear unbiased estimator of the unknown parameters is obtained by minimizing the residual (error) sum of squares [18].

Table 2: Coefficients.

Model *	Unstandardized coefficients		t	Sig.
	B	Std. Error		
(Constant)	0.625429	0.236545	2.174356	0.0193
DMA	0.021654	0.0195326	2.153405	0.0092
EQT	0.758723	0.0193276	1.93429	0.0382
INCL	0.237643	0.127634	2.62054	0.0072

(*): Dependent Variable; FA: Forensic Accounting; DMA: Diversity Management; EQT: Equity; INCL: Inclusion

Data collected for the study was analyzed using multiple regression analyses on Statistical Package for Social Sciences (SPSS). Results of the data analyses are shown in Table 2. T statistics is the measure used to determine the individual statistical significance of the variables in the model. The results show that the coefficient of diversity management had a value of 0.021654 implying that there is positive relationship between diversity management and forensic accounting effectiveness in the oil and gas listed companies in the Saudi Arabia stock exchange, Tadawul. Thus, a one unit increase in diversity management is predicted to lead to 0.021654 units increase in the forensic accounting effectiveness in the oil and gas listed companies. The findings also show that there a positive relationship between equity and forensic accounting effectiveness in the oil and gas listed companies. With a coefficient of regression value of 0.758723 for the relationship between equity and forensic accounting effectiveness in the oil and gas listed companies implying that a one unit increase in equity is predicted to lead to a 0.758723 increase forensic accounting effectiveness in the oil and gas listed companies. The findings also show that there a positive relationship between inclusion and forensic accounting effectiveness in the oil and gas listed companies. With a coefficient of regression value of 0.237643 for the relationship between inclusion and forensic

accounting effectiveness in the oil and gas listed companies implying that a one unit increase in inclusion is predicted to lead to a 0.237643 increase forensic accounting effectiveness in the oil and gas listed companies. From the model results above, it was concluded that the diversity management is statistically significant, this implies that it effects forensic accounting effectiveness, while equity is statistically insignificant which implies that it has not contributed to forensic accounting effectiveness. Finally, inclusion is statistically significant indicating that it impacts on forensic accounting effectiveness.

The results in general as shown in the equation above are satisfactory. The diagnostic statistics obtained from the estimation exercise are very much impressive. Model summary as shown in Table 3 indicates that the coefficient of correlation (R) for forensic accounting effectiveness and the explanatory variables namely, diversity management, equity, and inclusion in the Saudi Arabian listed oil and gas companies after adjusting for degrees of freedom, the R squared stood at 0.926526, accounting which is about 93% of the total variations in the forensic accounting effectiveness carried out satisfies the sample period 2017-2021, justifying apparently that the fit to the data to the model was very good [19].

Table 3: Model summary.

Model	R square	Adjusted R square	F-statistics	Durbin-Waston stat	Prob. (F-statistics)
1	0.926526	0.910432	109.6250	1.965493	0.000000

Predictors: (Constant); DMA: Diversity Management; EQT: Equity; INCL: Inclusion

As shown in Table 3, with an f-value of 109.6250, it could be concluded that the overall model is found to be significant. The F-statistics measures the overall significance of the explanatory parameter. Table 3 shows that the computed value of f-statistics is 109.6250, while its probability is 0.000000, given this value the null hypothesis is rejected and accept the alternative hypothesis which state that there is a significant relationship between the variance of estimated regression model. Table 2 shows that diversity management is 2.153405 while its probability is 0.0092. Since its probability is less than 0.05% desired level of significance, this research rejects the null hypothesis and accept the alternative hypothesis. It could be therefore concluded that diversity management has significant

effect on forensic accounting effectiveness of the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. Results also show that the computed value for equity is 1.93429 while its probability is 0.0382 which indicates that the equity is statistically insignificant. Based on this analysis, the null hypothesis (H_0) is accepted and the alternative (H_1) is rejected improving that equity has no significant effect on forensic accounting effectiveness of the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. Results also show that the computed value for inclusion is 2.62054 while its probability is 0.0072 which shows that inclusion is statistically significant at 5% level of significance. Based on this result, the null hypothesis (H_0) is

rejected and the alternative (H_1) is accepted indicating that inclusion has significant effect on forensic accounting effectiveness of the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul.

The Durbin-Watson statistics was used to test for the presence or otherwise of autocorrelation in our model. If the value of Durbin-Watson is closer or above 2, it means the absence of autocorrelation amongst the explanatory parameter. Table 3 shows that Durbin-Watson result is (1.965493) which satisfies the above stated condition, indicating the absence of autocorrelation among the explanatory variables [20].

CONCLUSION

The past two decades have witnessed significant changes in the business environment in Saudi Arabia including globalization, technological advances and now with internationally reported high profile financial scandals, ways to improve public trust and investor confidence in Saudi companies' financial reports. Lack of formal training schools in forensic accounting techniques could contribute to high rate of financial fraud and other fraud related activities in the Saudi business economy. On the basis of this study findings, the author concludes that forensic accountants in Saudi Arabian oil and gas listed companies in the Saudi Arabian stock market, Tadawul, is still raw and needs more development and intensive care to provide Saudi oil and gas companies with the necessary tools to deter fraudulent activities. This study focuses on the effects of diversity, equity, inclusion on forensic accounting effectiveness in the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock market, Tadawul, in the period from 2017 to 2021. The study regressed the diversity, equity, inclusion against forensic accounting effectiveness, and the regression result reveals that about 92.65% of the systematic variation in the dependent variable is explained by the three independent variables which are: Diversity, equity, inclusion. The F-statistic is significant at the 5% level showing that there is a linear relationship between the forensic accounting and the three independent variables.

This paper findings conclude that forensic accounting services provide Saudi Arabian oil and gas companies with the necessary tools to deter fraudulent activities but does not curb fraudulent activities. The gap can be filled by introducing and adapt forensic accounting as financial strategy to curb economic and financial crimes. Forensic accounting indeed is a fast developing accounting area, especially given today's fraudulent business practices and international financial scandals, litigious business environment, and regulatory initiatives. The result revealed that diversity management and inclusion have significant effect on forensic accounting effectiveness in the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. Equity, however, found to have no significant effect on forensic accounting effectiveness in the Saudi Arabian oil and gas companies listed in the Saudi Arabian stock exchange, Tadawul. That could be explained by saying that diversity management and inclusion have the potentials of assisting oil and gas companies in creating a climate in which employee will like to work harder with readiness to continue to work with the company.

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