IMPACT OF SAFETY MOTIVATION ON SAFETY PARTICIPATION AND COMPLIANCE IN OIL AND GAS INDUSTRY IN NIGERIA

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Abstract
The study investigated the impact of safety motivation on safety participation and compliance in oil and gas industry in Nigeria. Guided by three objectives and two hypotheses, the study adopted a cross-sectional survey design. The population of the study comprised of 1709 safety personnel from oil and gas companies in the Niger Delta region of Nigeria. However, the sample for the study comprised a total of 500 safety personnel selected using proportionate sampling technique. A survey questionnaire was used for data collection in the study. The instrument had three major sections used to collect data for safety motivation, safety participation and safety compliance. It was structured on a five-point scale. Data gathered were analyzed using mean and standard deviation as descriptive statistics, and regression analysis as inferential statistics. The result showed that there was moderate level of safety motivation, moderate level of safety participation and compliance in the oil and gas industry. It was also found that safety motivation had significant impact on safety participation as well as safety compliance. Based on the findings, it was recommended among others that to enhance safety compliance among workers in the oil and gas industry, management should streamline safety procedures to reduce perceived inconvenience while maintaining safety standards. It was further recommended that to enhance safety participation among workers in the oil and gas industry, management should regularly organize sensitization and collaborative programmes to encourage safety participation and involvement among workers.
Keywords: Safety in Oil and Gas Industry, Safety Motivation, Safety Participation, Safety Compliance.

INTRODUCTION

Oil and gas industry of any economy is one of the main sources of revenue as it highly contributes to economic development. Oil and gas export helps a country to earn a huge amount of foreign exchange, which in turn helps it to build its infrastructure (Khdair et al., 2011). The contributions of the oil and gas sector to any economy could be appraised from the following perspectives discussed in the following sub sections. In Nigeria, the oil and gas industry contribute to attraction of Foreign Direct Investment (FDI). FDI refers to an investment made to acquire lasting interest in enterprise operating outside of the economy of the investor (UNTAD, 2002).

The oil and gas industry plays a very significant role in the global economy. It serves as a major contributor to the source of the world energy requirement. The oil and gas industry also contributes to the Nigerian foreign exchange reserve. According to Odularu (2008), the oil industry in Nigeria has substantial foreign exchange reserves and is in the position of being able

to finance the foreign exchange cost of her development programme. This provides tremendous advantages for Nigerian consumers and businesses in the form of reliable, affordable and clean fuel for power generation, manufacturing and other industries; feedstock for chemical and agricultural products; and jobs opportunities. The oil and gas industry generates over 70% of government revenues and more than 90% of foreign exchange earnings (Edem et al., 2022). Revenue from the oil and gas industry is a major source of funding for government projects and services, directly impacting public welfare. According to Ikue et al. (2022), increased oil exploration correlates with higher individual income, demonstrating the sector's direct benefits to citizens.

In Nigeria, the survival of the economy depends largely on the oil and gas industry. Statistics shows that the oil and gas industry contributes 8.93 % to the total GDP in second quarter of the year 2020 (Kale, 2020). The oil and gas industry contributes major percent of the revenue generated in Nigeria (Varrella, 2021). Major multinational companies in Nigeria that contribute immensely to the revenue base of the country are players in the oil and gas industry.

Although the oil and gas industry contribute towards economic development of Nigeria, it is one of the risky industries (Smith, 2018). The oil and gas industry is characterized by potential hazards such as explosions, fires, and chemical exposure. Literature shows there exist persistent occurrence of accidents, underscoring the need for enhanced safety protocols and engineering controls (Mohan, 2024). These risks associated with the oil and gas industry necessitate rigorous risk management strategies and safety practice (Maharani et al., 2024).

Typical examples of hazards common in oil and gas industry include: vehicle collision, struck-by/caught-in/caught-between, fire and explosions, falls, confined space, ergonomic hazards, high pressure lines and equipment, electrical hazards, hazards related to machine operation among others (Occupational Safety and Health Administration, OSHA, 2019). Statistical report shows that between 2014 and 2016, a total eight hundred and one (801) occupational work-related accidents and incident occurred in the oil and gas industry globally. These incidents and accidents resulted in various degrees of impact such as loss of lives, damage to industrial machines and equipment. This figure only depicts reported cases of incidents which imply that the number of incidents may be more (El Bouti & Allouch, 2018). The Nigerian oil and gas industry is not left out in this situation. In a report by Nnadi et al.(n.d.), incidents on oil and gas pipeline between the years 1998 and 2013 in Nigeria have led to fire explosion, loss of lives, destruction of businesses and farmlands as well as environmental pollution. Hazards in oil and gas industry are detrimental to the smooth operation within the industry. It is capable of hampering on the performance of the companies. Since the oil and gas sector is a major contributor to national revenue, hazardous situations in the industry could lead to shortage in revenue generation and in turn could negatively impact the nation’s economy.

Incidents on oil and gas pipeline and the oil and gas industry has been blamed on limited information about incidents, inadequate identification of incidents and risk assessment, lack of comprehensive pipeline integrity management system, confusion between occupational health and process safety, poor compliance to international standards and legislation, poor enforcement and monitoring system, poor system for incident investigation and intervention, questionable operational practices, poor emergency management system, poor commitment of

management to safety, poor management of third party interference, poverty as well as poor education of the people and stakeholders, corruption and blaming culture and poor attitude to learning from past incidents (Nnadi et al., n.d.).

In light of the hazards, accidents and incidents associated with operations in the oil and gas industry and their possible negative impact on the society, safety practice is very paramount in the sector. Safety practice according to Nangih (2017)and Umoh and Torbira (2013) are policy statements, rules and procedures that guide the actions and operation of individuals in an organization for ensuring a hazardous and accident-free work environment towards achievement of set organizational goals. These practices could promote safety motivation which in turn can enhance safety compliance and safety participation in the oil and gas industry.Motivation can be specified as a management process, which encourages people to work better for the overall benefit of the organization, by providing them motives, which are based on their unfulfilled needs. Safety motivation reflects an individual's willingness to exert effort to enact safety behaviors and the passion associated with those behaviors (Neal, Griffin & Hart, 2006).

Safety participation constitutes an elective behavioral dimension of occupational safety that exceeds obligatory safety mandates, involving voluntary employee involvement in safety-oriented activities that enhance the overarching organizational safety culture (Neal et al., 2006). This construct encompasses anticipatory safety behaviors wherein employees actively engage in workplace safety through endeavors such as attending safety meetings, proposing safety recommendations, assisting peers in enhancing safety practices, and exhibiting additional diligence towards sustaining a secure work environment (Neal et al., 2006). Safety participation epitomizes a motivational and supportive paradigm of safety that surpasses formal job descriptions and statutory compliance.

Safety participation plays significant role both to an individual worker and the entire organization in different industrial environment, particularly within high-risk sectors such as the oil and gas industry. Empirical studies suggest that vigorous safety participation correlates with marked decreases in workplace incidents, heightened risk awareness, and an improved safety climate (Christian et al., 2009). Within the oil and gas sector, safety participation fosters knowledge dissemination, cultivates a collective safety ethos, and facilitates the early detection of potential hazards via collaborative employee involvement (Zohar, 2010). Organizations characterized by elevated levels of safety participation experience enhanced safety performance, diminished incident frequencies, bolstered organizational learning, and an augmented employee commitment to safety protocols. The collaborative essence of safety participation engenders a proactive safety culture wherein employees are empowered to assume collective accountability for workplace safety that extends beyond mere adherence to compliance mandates (Hofmann et al., 2003).

Safety compliance signifies the obligatory adherence to established safety regulations, procedures, and institutional safety standards that are either legally mandated or institutionally prescribed (Neal et al., 2006). This concept entails employees' commitment to conforming to stipulated safety protocols, utilizing mandated personal protective equipment (PPE), completing requisite safety training, and executing work tasks in alignment with defined safety

guidelines. Safety compliance fundamentally represents a normative dimension of workplace safety that prioritizes employees' conformity to formal safety requirements and organizational expectations (Neal et al., 2006).

Safety compliance offers essential protective frameworks for industrial environments, particularly in high-risk sectors such as oil and gas, by instituting standardized safety practices that mitigate potential hazards and legal liabilities. Effective safety compliance diminishes workplace incidents, ensures adherence to regulatory obligations, safeguards organizational reputation, and curtails potential financial repercussions associated with safety infringements. In the oil and gas industry, rigorous safety compliance is imperative due to the intrinsically hazardous nature of operations involving flammable substances, complex technological systems, and potentially catastrophic risks (Hopkins, 2000). Comprehensive safety compliance fortifies organizational resilience, manifests a commitment to employee welfare, and serves as a fundamental mechanism for the prevention of major industrial catastrophes and the protection of human lives (Dekker, 2014).

Safety motivation plays a crucial role in influencing safety participation among worker in work environment (Ahn, 2013; Ahn, 2014). This motivation is influenced by various factors, among which is safety climate (Jiang & Probst, 2016). Safety climate, especially management commitment, safety education, and preventive activity such as implementation of safety barriers, also positively influences safety motivation and participation (Ahn, 2014). Furthermore, safety knowledge and motivation are positively related to safety participation, with transformational leadership strengthening the safety knowledge-participation relationship and passive leadership weakening the safety motivation-participation relationship (Jiang & Probst, 2016).

A number of studies have examined the link between safety motivation and safety compliance in various industries. Findings from these studies show that safety management practices have positive impact on safety compliance. For example, Das et al. (2023) found that safety management practices significantly impact safety compliance, with safety motivation mediating this relationship. Similarly, Ansori and Widyanti(2021) highlighted the role of safety climate, motivation, and knowledge in influencing compliance and participation in SMEs. Shi & Mohamed Zainal (2021) focused on the petroleum industry, identifying safety-specific transformational leadership and safety management practices as predictors of mindful safety practices, mediated by safety motivation. Lastly, Sarita et al. (2019) emphasized the positive effects of safety knowledge and motivation on work compliance, which in turn reduces work accidents. These studies collectively underscore the importance of safety motivation and compliance in promoting a safe work environment.

Literature reveals that a number of research studies has been conducted to ascertain factors that influence safety performance in an industrial setting. Many of such studies have focused on factors that influence safety performance in mining industry (Tengilimogluet al., 2016); textile industry (Shaheen, et al., 2014); manufacturing companies (Lun & Wahab, 2017); educational environment (Wu, et al., 2008); construction industry (Sawacha etal., 1999;Alnunu& Maliha, 2015;Swedleret al., 2015; Nawiet al., 2016;Chen, 2017; Cornelissen et al., 2017;Agyekum, et al., 2018; Sarkamet al., 2018;Pourmazaherian&Baqutayan, 2019; Wong & Soo, 2019); oil and

gas industry (Khdair et al., 2011; Achaw, & Boateng, 2012; Stella et al., 2014).

The above studies have focused on how variables such as safety leadership, safety climate, safety motivation, safety culture, job satisfaction, safety awareness relate with safety performance. Others focused on factors that influence safety performance in the various industrial sectors listed. Factors considered in the various studies include: historical factors, economical factors, psychological factors, environmental factors, technical factors, procedural factors, organizational factors, human factors, management factors and their association with safety performance. Majority of these studies as listed in the preceding paragraph were conducted in the construction industry. Only a few studies which focused on safety performance were conducted in the oil and gas industry (Khdair et al., 2011; Achaw & Boateng, 2012; Stella et al., 2014). Although these studies were conducted in the oil and gas industry, none focused on investigating association or relationship between safety motivation and safety performance in terms of safety compliance and safety participation. The present study therefore focused on the impact of safety motivation on safety participation and compliance in oil and gas industry in Nigeria.

AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to investigate the influence of safety motivation on safety performance (safety participation and compliance in oil and gas industry in Nigeria. The objectives of the study are to:

1. ascertain the safety motivation of workers in oil and gas companies in Nigeria.
2. find out the safety compliance of employees of oil and gas companies in Nigeria.
3. find out the safety participation of employees of oil and gas companies in Nigeria.

RESEARCH HYPOTHESES

The following null hypotheses will be tested at 0.05 level of significance:

H_{o1}. Safety motivation has no significant effect on safety participation in oil and gas industry.

H_{o2}. Safety motivation has no significant effect on safety compliance in oil and gas industry.

METHODOLOGY

Cross sectional research design was adopted in this study. A cross sectional study is one in which the researcher collects data at a given point in time with aim of describing and situation as they are to help in decision making (Creswell, 2012). Survey method was used for data collection in the study.

The study adopted a target population of 1709safety personnel from oil and gas companies in the Niger Delta region of Nigeria. Specifically, the target population for the study constituted the safety personnel from multinational companies in the oil and gas industry. They include: Shell Petroleum Development Company (SPDC), Nigerian Agip Oil Company (NAOC), National Petroleum Corporation (NNPC), Exxon Mobil, Nigeria Liquefied Natural Gas, Chevron Nigeria Limited and Total Petroleum Nigeria Limited. The reason for making safety personnel of these companies the target population is due to the fact that, being multinationals; they would implement some level of safety measures to ensure safe operation in their domain. Consequently, they would have data to measure the variables of the study may be available. Furthermore, the target population comprised safety personnel who operate in critical area of safety in the oil and gas companies under the study area. These critical areas comprise well

heads and pipelines as well as facilities that carry flammable substances. The distribution of the population is shown in Table 1.

Table 1: Distribution of Study Population

S/N	Company	Population	Percentage (%)
1	Shell Petroleum Development Company (SPDC)	432	25.28
2	Nigerian Agip Oil Company (NAOC)	207	12.11
3	National Petroleum Corporation (NNPC)	321	18.78
4	Exxon Mobil	48	2.81
5	Nigeria Liquefied Natural Gas	487	28.50
6	Chevron Nigeria Limited	108	6.32
7	Total Petroleum Nigeria Limited	106	6.20
Total		**1709**	**100.00**

The sample size for the study was obtained through the Taro Yamen's sample size determination function shown in equation 1.After obtaining the population of the safety personnel on these companies, the value will be used to ascertain the sample with the formula.

$$n = \frac{N}{1 + N\,(e)^2} \qquad (1)$$

Where n is the sample size, N is the Population (1709), eis the level of significance (0.05). From the calculation, n is approximately 324.

Based on Taro Yamane calculation, the sample size was 324. However, to make the sample have abetter representation of the population and thus reduce marginal error (Nwankwo, 2016), it was increased to 500. The proportionate sampling technique was adopted in selecting the sample for the study. This was achieved by multiplying 500 by the population percentage for each company. The breakdown is presented in Table 2.

Table 2: Sample distribution for the study

S/N	Company	Population	Percentage (%)	Sampled Proportion
1	Shell Petroleum Development Company (SPDC)	432	25.28	126
2	Nigerian Agip Oil Company (NAOC)	207	12.11	61
3	National Petroleum Corporation (NNPC)	321	18.78	94
4	Exxon Mobil	48	2.81	14
5	Nigeria Liquefied Natural Gas	487	28.50	142
6	Chevron Nigeria Limited	108	6.32	32
7	Total Petroleum Nigeria Limited	106	6.20	31
Total		1709	100.00	500

Data for the study were collected through a questionnaire. The variables for the study were safety motivation and safety participation and safety compliance. Safety motivation is as a

person's willingness to exercise safety behavior and the zeal connected with such behavior. In the present study, safety motivation, was measured by taking safety officers' rating of the questionnaire items on a 5-point scale of Strongly Agree (SA) with a score of 5; Agree (A) with a score of 4; Somewhat Agree (SWA) with a score of 3; Disagree (D) with a score of 2 and Strongly Disagree (SD) with a score of 1. The other variables: Safety participation was used to mean the extent workers participate in safety while safety compliance was used to mean the extent they comply to safety in the oil and gas industry. In the study, safety participation and safety compliance are measured on a five-point scale of Very High Extent (VHE) with a score of 5, High Extent (HE) with a score of 4, Moderate Extent (ME) with a score of 3, Low Extent (LE) with a score of 2 and Low Extent (LE) with a score of 1. Data gathered for the study were presented using tables and charts and analysed using descriptive and inferential statistics. Descriptive statistics included: frequencies count, mean and standard deviation. The inferential statistics used was regression analysis.

RESULTS AND DISCUSSION

Return Rate of the Questionnaire

A total of 500 copies of the survey questionnaire were administered and a total of 489 copies were retrieved and used for data analysis. The result is shown in Table 3.

Table 3: Return Rate

S/N	Company	Copies Distributed	Copies Returned
1	Shell Petroleum Development Company (SPDC)	126	122
2	Nigerian Agip Oil Company (NAOC)	61	59
3	National Petroleum Corporation (NNPC)	94	93
4	Exxon Mobil	14	14
5	Nigeria Liquefied Natural Gas	142	140
6	Chevron Nigeria Limited	32	32
7	Total Petroleum Nigeria Limited	31	29
Total		500	489

Safety Motivation of Workers in Oil and Gas Companies in Nigeria

Table 4 presents result on the safety motivation of workers by examining their attitudes toward taking safety precautions, adhering to safety standards, encouraging others to practice safety, and personal feelings when making safety mistakes. The responses are measured using a five-point Likert scale, ranging from Strongly Agree to Strongly Disagree, with the mean (M) and standard deviation (SD) provided for each statement.

For the first item, "I feel it is essential to take steps to minimize accidents in the work environment", the mean score is $\bar{x}$= 3.09. Also, 28 strongly agreed, 128 agreed and 208 somewhat agreed that it is essential to take steps to minimize accidents in the work environment. This is an indication that majority of the participants are agreed that it is essential to take steps to minimize accidents in the work environment. A standard deviation of *SD* = 0.91 compared to S standard deviation for other items indicates that there was higher variation in the perception of participants regarding their responses on the item.

For the second item, "I believe compromising safety to increase production negates safety requirement at work", the mean score is $\bar{x}$= 3.12. Also, 24 strongly agreed, 127 agreed and 238 somewhat agreed that compromising safety to increase production negates safety requirement at work. A standard deviation of *SD* = 0.86 compared to standard deviation for other items indicates that there existed closeness in the responses of the participants on this item.

The third item, "I feel it is necessary to cheer up other workers to employ safety practices in the work", has the highest mean score, $\bar{x}$ = 3.25. Also, 29 strongly agreed, 150 agreed and 230 somewhat agreed that it is necessary to cheer up other workers to employ safety practices in the work. A standard deviation of *SD* = 0.83 compared to standard deviation for other items indicates that there existed closeness in the responses of the participants on this item.
The fourth item, "I feel bad when I make safety mistakes", has a mean score of $\bar{x}$= 2.97. Also, 9 strongly agreed, 103 agreed and 253 somewhat agreed that they feel bad when they make safety mistakes. A standard deviation of *SD* = 0.78 compared to standard deviation for other items indicates that there existed more similarity in the responses of the participants on this item.

Table 4: Safety Motivation of Workers

Safety Motivation of workers	SA	A	SWA	D	SD	$\bar{x}$	S.D.
I feel it is essential to take steps to minimize accidents in the work environment.	28	128	209	108	16	3.09	0.91
I believe compromising safety to increase production negates safety requirement at work.	24	127	238	86	14	3.12	0.86
I feel it is necessary to cheer up other workers to employ safety practice in the work.	29	150	230	74	6	3.25	0.83
I feel bad when I make safety mistake.	9	103	253	113	11	2.97	0.78

SA = Strongly Agree, A = Agree, SWA = Somewhat Agree, D = Disagree, SD = Strongly Disagree

SAFETY COMPLIANCE IN OIL AND GAS COMPANIES IN NIGERIA

Table 5 presents result on the safety compliance of workers in oil and gas industry in four dimensions. The result shows that the mean values range from 3.03 to 3.38 on a 5-point scale. This is an indication that workers demonstrate safety compliance to a moderate extent.

The first item, "I employ necessary safety tools in carrying out allocated tasks", has a mean of $\bar{x}$= 3.34. This indicates that workers comply with the use of safety tools to a moderate extent. As a follow up to this, the frequency count shows that majority of the participants (406) have responses of very high extent, high extent and moderate extent. A standard deviation of *SD* = 0.90 suggests that there is some variation among workers in terms of employing necessary safety tools in carrying out allocated tasks.

The second item, "I do my duties in a safe manner", has a mean of $\bar{x}$= 3.17. This indicates that generally comply with performing their duties safely to a moderate extent. This is evident by the majority of respondents choosing a moderate extent (217) on this item. A standard deviation

of *SD* = 0.89 suggests that there is some variation among workers in terms of doing duties in a safe manner. The third item, "I follow proper safety procedures in accomplishing my job role", has a mean of $\bar{x}$= 3.33. This indicates that workers comply with safety procedures in carrying out their duties to a moderate to high extent. This is evident by the majority of respondents choosing a moderate extent (201) and high extent (178) on this item. A standard deviation of *SD* = 0.87 suggests that there is some variation among workers in terms of follow proper safety procedures in accomplishing my job role. The fourth item, "I stick to safety procedures on the job even when it is inconvenient", has a mean of $\bar{x}$ = 3.03. This indicates that workers adhere to safety procedures to a moderate extent even when inconvenient. This is evident by the majority of respondents choosing a moderate extent (252) and high extent (118) on this item. A standard deviation of *SD* = 0.77, indicates a low level of variability in the responses compared to other items.

Table 5: Safety Compliance in Oil and Gas Industry

Safety Participation	VHE	HE	ME	LE	VLE	$\bar{x}$	S.D.
I employ necessary safety tools in carrying out allocated tasks.	44	169	195	71	10	3.34	0.90
I do my duties in safe manner.	29	141	217	88	14	3.17	0.89
I follow proper safety procedures in accomplishing my job role.	42	178	201	60	8	3.38	0.87
I stick to safety procedures on the job even when it is inconvenient.	9	118	252	101	9	3.03	0.77

VHE = Very High Extent, A = High Extent, ME = Moderate Extent, LE = Low Extent, VLE = Very Low Extent

Safety Participation in Oil and Gas Companies in Nigeria

The fourth objective of the study investigated safety participation in oil and gas in Nigeria. This was determined from the responses of safety personals in the studied companies.

Table 6 presents result on the safety participation of workers in oil and gas industry in four dimensions. The result shows that the mean values range from 2.94 to 3.28 on a 5-point scale. This is an indication that workers demonstrate safety participation to a moderate extent.

The first item, "**I am free to air out my views to management on safety issues"**, has a mean of $\bar{x}$ = 3.28. This indicates that workers feel free to express their safety concerns to a moderate to high extent. This is evident by majority of workers indicating a high extent (162) and moderate extent (209) of freedom in airing views on safety. The second item, "**I voluntarily take steps to ensure improvement in the safety of the work environment"**, has a mean of $\bar{x}$ = 2.94. This indicates that workers voluntarily take safety steps to ensure safety to a moderate extent. This is evident by majority of workers indicating a very high extent (22), high extent (102) and moderate extent (213) for this item. The third item, "**I collaborate with other workers to ensure workplace safety"**, has a mean of $\bar{x}$ = 2.96. This indicates that workers **collaborate with other workers to ensure workplace safety** to a moderate extent. This is evident by majority of workers indicating a very high extent (12), high extent (110) and moderate extent (233) for this item. The fourth item, "**Management is committed to supporting safety activities in the work environment"**, has a mean of $\bar{x}$ = 3.14. This indicates that **management is committed to supporting safety activities in the work environment** to

a moderate extent. This is evident by majority of workers indicating a very high extent (23), high extent (144) and moderate extent (214) for this item.

A standard deviation of *SD* = 0.84 for item 3 shows that there was less variability in the responses of the participants on this item than other items. On the other hand, a standard deviation of SD = 0.92 for item 2 shows that there was more variability in the responses of participants on this item than other items.

Table 6: Safety Participation in Oil and Gas Industry

Safety Compliance	VHE	HE	ME	LE	VLE	$\bar{x}$	S.D.
I am free to air out their views to management on safety issue.	35	162	209	73	10	3.28	0.88
I voluntarily take steps to ensure improvement in safety of the work environment.	22	102	213	128	24	2.94	0.92
I collaborate with other workers to ensure workplace safety.	12	110	233	116	18	2.96	0.84
Management is committed to supporting safety activities in the work environment.	23	144	214	95	13	3.14	0.87

VHE = Very High Extent, A = High Extent, ME = Moderate Extent, LE = Low Extent, VLE = Very Low Extent

TEST OF HYPOTHESES

Test of Hypothesis One

H_{01}**:** Safety motivation has no significant effect on safety compliance in oil and gas industry.

The aim of this hypothesis was to test the significance of the effect of safety motivation on safety compliance in oil and gas industry. The results are shown in Tables 4a, 7b and 7c. Table 7a shows the R^2 value for the regression analysis for effect of safety motivation on safety compliance. As shown, $R^2 = .159$. Multiplying this by 100 gives 15.9%. This implies that 15.9% variation in safety compliance is caused by safety motivation. Table 7b shows the F-value for regression analysis for effect of safety motivation on safety participation. As shown, F (1,487) = 185.207, $p < 0.05$. Based on this, the hypothesis is rejected. This implies that safety motivation has a significant effect on safety compliance in oil and gas industry. Table 7c shows the coefficient and constant value for the regression line as well as t and p values. As shown, t = 9.603, $p < 0.05$. This is an indication that safety motivation significantly predicts safety compliance among workers in oil and gas industry. Furthermore, the B-value (coefficient of safety motivation) is 0.418 and constant value of 1.781. With these values, the regression equation for the relationship between safety motivation (SM) barriers and safety compliance (SC) is

SC = 0.418SM + 1.781.

This regression line implies that for every unit increase in safety motivation, safety compliance will increase by 0.418 if other independent variables are kept constant.

Table 7a: Regression for Effect of Safety Motivation on Safety Compliance (Model Summary)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.399[a]	0.159	0.157	0.71649

a. Predictors: (Constant), Safety motivation

Table 7b: Regression for Effect of Safety Motivation on Safety Compliance (ANOVA)

	Sum of Squares	Df	Mean Square	F	p-value
Regression	47.345	1	47.345	92.225	.000[b]
Residual	250.008	487	0.513		
Total	297.353	488			

a. Dependent Variable: Safety compliance, b. Predictors: (Constant), Safety motivation

Table 7c: Regression Analysis for Effect of Safety Motivation on Safety Compliance (Coefficient)

	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
(Constant)	1.781	0.139		12.786	0.000
Safety motivation	0.418	0.044	0.399	9.603	0.000

a. Dependent Variable: Safety compliance

Test of Hypothesis Two

H_{o2}**:** Safety motivation has no significant effect on safety participation in oil and gas industry.

The aim of this hypothesis was to test the significance of the effect of safety motivation on safety participation in oil and gas industry. The results are shown in Tables 8a, 8b and 8c. Table 8a shows the R^2 value for the regression analysis for effect of safety motivation on safety participation. As shown, R^2 = .276. Multiplying this by 100 gives 27.6%. This implies that 27.6% variation in safety participation is caused by safety motivation. Table 8b shows the F-value for regression analysis for effect of safety motivation on safety participation. As shown, F (1,487) = 185.207, p< 0.05. Based on this, the hypothesis is rejected. This implies that safety motivation has a significant effect on safety participation in oil and gas industry. Table 9c shows the coefficient and constant value for the regression line as well as t and p values. As shown, t = 13.609, p< 0.05. This is an indication that safety motivation significantly predicts safety participation among workers in oil and gas industry. Furthermore, the B-value (coefficient of safety motivation) is 0.518 and constant value of 1.436. With these values, the regression equation for the relationship between safety motivation (SM) barriers and safety participation (SP) is SP = 0.518SM + 1.436.

This regression line implies that for every unit increase in safety motivation, safety participation will increase by 0.518 if other independent variables are kept constant.

Table 4.9a: Regression for Effect of Safety Motivation on Safety Participation (Model Summary)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.525[a]	0.276	0.274	0.63422

a. Predictors: (Constant), Safety participants

Table 4.9b: Regression for Effect of Safety Motivation on Safety Participation (ANOVA)

	Sum of Squares	Df	Mean Square	F	p-value
Regression	74.498	1	74.498	185.208	.000[b]
Residual	195.891	487	0.402		
Total	270.389	488			

a. Dependent Variable: Safety motivation, b. Predictors: (Constant), Safety participants.

Table 4.9c: Regression Analysis for Effect of Safety Motivation on Safety Participation (Coefficient)

	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
(Constant)	1.436	0.126		11.375	0.000
Safety participants	0.518	0.038	0.525	13.609	0.000

a. Dependent Variable: Safety motivation

DISCUSSION OF FINDINGS

The findings from the first objective of the study revealed that workers in the oil and gas industry were generally: motivated to follow safety precautions, discourage compromising safety for productivity, encourage others to adopt safe practices, and feel accountable when making safety mistakes. The level of motivation was especially high when it comes to encouraging peers to employ safety measures. This tells the importance of a supportive and safety conscious workplace culture. However, the variation in responses, particularly in terms of accident prevention is an indication that safety motivation could be further strengthened through consistent reinforcement and training across the workforce. The result agrees with that of Ekong and Ogunbawo (2023) who found a moderate level of safety motivation among oil and gas industry workers in Nigeria. The result also aligns with that of Aghogho (2024) who found a slightly high level of safety motivation among workers in oil and gas industry in Nigeria.

The findings for the second objective of the study which investigated safety compliance among workers in the oil and gas industry showed that compliance to safety practices in the oil and gas industry studied was moderate. This was particularly with regards to utilizing safety tools and following proper procedures. However, variations in responses suggest that there are inconsistencies in safety compliance among workers, particularly when tasks are perceived as inconvenient or when safety procedures seem difficult to follow. This points to a need for continuous training, reinforcement of safety culture, and perhaps simplifying safety procedures

to increase overall compliance across the workforce. These findings align with that of Stella et al. (2014) who found a slightly high level of safety practice, good level of awareness and compliance in oil and gas industry.

The findings of the third objective of the study revealed that there was moderate level of safety participation among workers in the oil and gas industry. This was particularly with regards to expression of safety concerns, voluntary participation, and collaborative effort with coworkers and management's support. The variation in responses across items, particularly the lower scores for voluntary safety improvement and collaboration, suggests areas where safety participation could be strengthened. This suggests that management in oil and gas industry could encourage a more collaborative atmosphere as well as taking proactive actions. This result corroborates the result by Nzomiwu (2021) that workers in construction industry in Lagos were allowed to participate in implementing safety programme, privileged to temporarily suspend suspected unsafe operation and they had laid down procedures used for reporting safety concerns.

The test of the first hypothesis showed that safety motivation had a significant effect on safety participation in oil and gas industry. The test of the second hypothesis showed that safety motivation had a significant effect on safety compliance in oil and gas industry. This is an indication that the more workers are motivated, the more they participate in safety activities. The result was expected and not surprising. Also, it implies that the more workers are motivated, the more they comply to safety rules, regulation and procedures. The findings align with that of Das et al. (2023) who found that safety management practices significantly impact safety compliance, with safety motivation mediating this relationship. Similarly, Ansori and Widyanti (2021)who found that safety climate, motivation, and knowledge played significant role in influencing compliance and participation in SMEs. Similarly, the findings corroborate the view of Sarita et al. (2019) that safety knowledge and motivation have positive effect on work compliance.

CONCLUSION

The study investigated the impact of safety motivation on safety compliance and safety participation in Oil and Gas Industry in Nigeria. Based on the findings, it is concluded that workers in oil and gas industry have high level of safety motivation and are generally motivated to follow safety precautions, discourage compromising safety for productivity, encourage others to adopt safe practices, and feel accountable when making safety mistakes. The level of motivation is especially high when it comes to encouraging peers to employ safety measures. It is also concluded that level of participation and compliance to safety was moderate in the oil and gas industry. Also, it was concluded that safety motivation had significant impact on safety compliance and safety participation in oil and gas industry.

RECOMMENDATIONS

Highlighted are the recommendations from the findings.

1. To further strengthen safety motivation among workers in the oil and gas industry management should conduct regular safety training and reinforcement programs that emphasize the importance of proactive accident prevention and accountability.
2. Management should also foster a supportive culture to encourage workers to motivate

each other and recognize safety efforts. This could go a long way to enhance collective safety consciousness and reduce complacency in safety practices.

3. To enhance safety compliance among workers in the oil and gas industry, management should streamline safety procedures to reduce perceived inconvenience while maintaining safety standards.

4. To enhance safety participation among workers in the oil and gas industry, management should regularly organize sensitization and collaborative programmes to encourage safety participation and involvement among workers.

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