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Influence of Safety Culture on Employee Safety Motivation and Error Behaviour in Selected Petroleum Industries in Niger-Delta

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The study assessed the influence of safety culture on employee safety motivation and error behaviour in selected petroleum industries in the Niger-delta. Perceived process safety culture has significant impact on employees' safety motivation and employee error behaviours in petroleum industries were the hypothesis tested for the study. Numerous empirical examinations states process safety culture failure as largely responsible for catastrophic occurrences in oil and gas platforms which has resulted in loss of lives, properties and caused diverse dangers to the environment. The study methodology is descriptive statistics utilising regression analysis. The field production / process plant operations workers of the Local/National and International Oil Companies were considered. The Population of the study: includes workers of the processing unit of ExxonMobil, Total Exploration & Production, Shell Petroleum Development Company, Agip Oil Company, Savannah Energy Public Limited Company (PLC), Network Exploration & Production, Frontier Oil, Aieteo Eastern Exploration & Production Company, Universal Energy Resources Ltd and Nigeria National Petroleum Corporation (NNPC). Population consist of one thousand workers of the processing unit of ten companies with a proportion of five selected International Oil

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Companies (IOCs) and five Local Oil Companies (LOCs) selected by convenience sample techniques with only 816 valid responses. The sampling technique was purposive, convenience and quota sampling. Statistical Package for Social Sciences (SPSS) IBM 20 was the software utilised for the analysis. The primary source of data collection was questionnaire. The questionnaire consists of Three (3) Sections and contains Thirty-seven (37) questions including the Socio-demographic data. Cronbach alpha coefficient from the reliability test carried out on the pre-test data showed an overall outcome of 0.872, which is considered very strong since and not far from 1.0. The study reveals that the Perceived process safety culture has no significant impact on employees' safety motivation. Also, perceived process safety culture has a significant impact on employee error behaviours in petroleum industries. The study recommended that organisations should continue performing activities that keeps employees personally motivated. While employees must find ways to motivate themselves towards safety. Employee safety trainings should be organised to improve safety culture and avoid error behaviour.

Keywords: Assessment; employee; safety motivation; error behaviour; petroleum industries.

1. INTRODUCTION

The industry overtime has lost scores of lives, billions in dollars of asset and has spent millions of pounds in recovering back what lapses in process safety culture caused it. Investigation into the 'Deepwater horizon' incident indicates that the leadership of the organization reckoned profit to be more important than a safe environment and safety of the employees, this obviously speaks volume on the organization's commitment to process safety- the first element on the risk based process safety model and also said much on their poor value, motivation, and attitude to process safety management [1]. Events related to process safety can simply be well-defined and occasionally can without problems be measured [2]. Nonetheless, measuring an organization's process safety culture can be a little idiosyncratic or subjective [3]. Numerous empirical examinations and industry reports submits that failures in process safety culture are largely responsible for catastrophic occurrences in oil and gas platforms have been identified as due to process safety culture failures which has resulted in loss of lives, properties and caused diverse forms of dangers to the environment (Oyet, 2018). Examples of these oil and gas catastrophic incidences are, the Piper Alpha oil platform which recorded fatalities 167 lives and total insured loss of around 1.7 billion pounds and the Esso Longford gas explosion which recorded an estimated 1.3 billion US dollars loss in assets and litigation (Hopkins, 2000; cited in Frank, 2007). On this background, the study assesses the influence of employee's safety motivation on process safety culture and employee's error behaviours.

2. LITERATURE REVIEWS

2.1 Employees Safety Motivation

Motivation is a force that influences or causes a person to do something or act in a certain way. Neal & Griffin [4] describes Safety motivation as an individual willingness to exert effort to adopt safety behaviour and the disposition connected to the behaviour.

Employees of an organisation can be encouraged to work when management meet their internal and external needs.

According to Herzberg work itself, responsibility, advancement and growth are motivating factors as "Motivators." The factors that contributed to job dissatisfaction were company policy and administration, supervision and relations with supervisors, work conditions, salary, peer relations, personal life, subordinate relations, status and security. Herzberg referred to these factors as "Hygiene." In other words, workers could become "dissatisfied" from hygiene factors such as less money, poor relations with their bosses, etc.

Hassard, Wang and Cox [5]. Listed some advantages of internal motivating factors to employee safety.

2.2 Advantages of Employee Safety Motivation

- Employee safety motivation is significant impact in increasing productivity rates and production.
- Employee motivation has been associated with decreasing absenteeism and associated sickness disability costs.

- It has a positive impact on presenteeism. It may result in enhanced levels of job satisfaction and organizational commitment among workers.
- It reduces staff turnover and an improvement in the recruitment of new workers. There may also be an improvement in staff morale, which can also have an indirect impact on the turnover rate. There is growing evidence, and awareness, that poor employee health and wellbeing is linked to the increased likelihood of industrial accidents and injuries. It is a beneficial indirect impact by reducing the costs incurred by companies due to occupational accidents and injuries.

2.3 Employees' Error Behaviour

Most accidents and injuries emanating from workplaces are attributed to unsafe worker behaviours, which are also a reflection of system deficiency and hazardous work environment [6,7]. Unsafe behaviour was defined by Alasamri, Chrisp and Bowles [8] as an intentional violation of standard procedures that may lead to errors. This definition emphasizes two types of unsafe behaviour: errors and violations. Shirali, Shekari, and Angali [9] described unsafe behaviour as an individual's likelihood of not following standard safety rules, procedures, instructions, and specified criteria for work imposed the organization. It represents a deliberate deviation from the recommended safety behaviours.

Most unsafe behaviours (errors) are manifest in the form of slip and lapses. Slip, on the one hand, refers to the unwitting deviation of action from intention (Frese and Keith, 2015); [10,8]. On the other hand, lapses involve memory failure and include errors such as omitted items in a checklist and place losing. An error leading to an accident may occur when an individual loses control over work procedures due to insufficient/inadequate training, long working hours, and stress/fatigue (Kirschenbaum et al. 2000).

Shristi, Sivaji, Sagarkumar, and Bikarama, [11] examined the link between accident and workers' behaviour utilizing the factors of human error behaviour based safety using Pareto analysis and BSS observation application. The study analyses the trend and causes of the incidents for a period of 4 years (2013–2016) through Pareto analysis to find the role of unsafe work behaviour in industrial incidents. The study discovered that incidents happen as a result of unsafe work behaviour of workers. The study showed the lack of commitment from the top management in implementing the safety procedures.

3. PROCESS SAFETY CULTURE

The International Nuclear Safety Advisory Group of the International Automatic Energy Agency defines a process safety culture as "that assembly of characteristics and attitudes in organizations and individuals, which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance" [12,13]. Goncalves [14] opined that the most widely cited definition of process safety culture was developed by the Health and Safety Commission (1993) and published in the Advisory Committee on the Safety of Nuclear Installations report. This report describes a process safety culture as "the product of individual and group-values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management."

3.1 Three Key Principles of Process Safety Culture Includes

Maintainance of a dependable practice: This ensures the practice is to be implemented consistently over time. To further maintain dependable practice, the RBPS Guidelines proposes four essential features for maintaining a dependable practice.

Develop and Implement a Sound Culture: The attitudes and behaviours' that an organization accepts as valid and subsequently incorporates into its culture are those that have been demonstrated to successfully deal with the internal and external challenges faced by the organization (Schein, 2004).

Monitor and Guide the Culture: Any management system requires a feedback loop to determine whether desired objectives are being achieved. Many of the potential work activities described in the RBPS Guidelines for each of these essential features suggest relevant leading indicators (i.e., inputs in the effort to establish and maintain a sound process safety culture) that could be monitored.

The following are Symptoms of a weak culture according to (Wasileski, 2017) includes; little value is assigned to process safety,

Sense of vulnerability is not highly developed, Risk is not properly understood, Insufficient or no resource is devoted to risk control, Process safety warning signs is often over looked, Housekeeping in plant is poorly practiced, Poor performance and other deviation is accepted and normalized and Strong reliance on management to identify hazard.

3.2 Study Area

Niger Delta region which is the study area is located geographically at coordinate 4°49'60" N and 6° 0' 0" E. With about 70,000Km^2 landmass of wetland, the region is regarded as the largest wetland region in Nigeria and Africa and only third in the world. Niger Delta host a large deposits and exploitations of oil and gas in the Country, and these resources provides at least Ninety-five percent (95%) of Nigeria foreign exchange incomes (Oviasuyi & Uwadiae, 2010). There are approximately 606 oilfields which comprises of 355 onshore and 251 offshore assets in the Niger-Delta region. The region environment consists of four (4) ecological areas, which is, coastal barrier islands; freshwater swamps; mangrove swamp forests and lowland rainforest (Kamalu & Nwokocha, 2011). See Fig. 1 for a map of the study area.

4. MATERIALS AND METHODS

This Research was a descriptive cross-sectional petroleum based study. As regards study population, this study considered only the field production / process plant operations workers of the Local/National and International Oil Companies with more emphasis on those who work at the sensitive (process plant) area of the selected companies. These are the selected IOC's and LOC's in the Niger-Delta region that forms the Population of the study: workers of the processing unit of ExxonMobil, Total Exploration & Production, Shell Petroleum Development Company, Agip Oil Company, Savannah Energy Plc, Network Exploration & Production, Frontier Oil, Aieteo Eastern Exploration & Production Company, Universal Energy Resources Ltd and Nigeria National Petroleum Corporation (NNPC). This Study utilized non-probability sampling method combining purposive, convenience and quota sampling techniques. Purposive sampling is centred on the intent or purpose of the study

Fig. 1. The map of Nigeria showing the oil producing states in Niger Delta Region

(Ben-Shlomo, Brookes, & Hickman, 2013). Therefore, selection of the elements in the population for the study should was hinged on the knowledge and characteristics that is suitable for the study. The process operations workers or workers who work in various section of the oil and gas plants are suitable for the study, this is because their daily routine is processing crude oil to the point of delivery which proves that they have the knowhow on the associated risk prevalent in the work and they know what is obtainable with regard to perceived process safety culture in process safety management procedure for their section in their respective industry. On this premise, this study selected one thousand (1000) process operations workers in the selected Local Oil Companies (LOC's) and International Oil Companies (IOC'S) across the Niger-Delta region by means of convenience sampling technique and Eight hundred and Sixteen (816) valid responses were gotten. In quota sampling, the sample is drawn from a population with same characteristics and selection based on equal proportion (50%-50%). Decision for selection is mostly on some pre-set standard (Warmbrod, 2001). The data gotten from the survey fulfill the criterion of primary data; in summary, this study utilized the outcomes from survey (both hardcopy questionnaires and google form) as the primary data. However, sourced data such as journals, e-book, newspapers e.t.c., from the internet on related topic forms the study secondary data. The methodology is a descriptive statistics utilising regression analysis. The instrument used was a pre-tested, well-structured, adopted self-administered questionnaire, designed in order to achieve the objectives of this study. The Questionnaire consists of Three (3) Sections and contains Thirty-seven (37) questions which also includes the Socio-demographic data. The socio-demographic consist of five (5) items, meanwhile, Process Safety Culture, Employee Safety Motivation and Employee Error Behaviour consists of thirteen (13), ten (10) and nine (9) items respectively. The other sections apart from section A (Socio-demographic data) comprised questions with responses which were measured on a five-point Likert scale which ranged from "1 = strongly disagree" to "5 = strongly agree" i.e. 1 is S.D, 2 is D, 3 is N, 4 is A, and 5 is SA. Cronbach alpha coefficient from the reliability test carried out on the pre-test data shows an overall outcome 0.872, which can be considered very strong since it is not far from 1.0 regarded as the strongest reliability scale. This is a strong indication that the instrument is devoid of error and Researcher's bias. According to Anochie & Mgbemena [15], total completion rate is the percentage of total completed questionnaires divided by the percentage of total distributed questionnaires. By adopting this formula, a total completion rate of 81.6% was gotten. This is considered excellent completion rate [12].

A sum of Eight hundred and Sixteen (816) completely filled and returned were analysed. Normality test and Reliability tests were carried out on the data before presenting and analysing the data. According to Bayram & Ünğan [16], Shapiro-Wilk Test is capable of handling data as large as 2000, even though it is more appropriate for data less than 50. According to Hector, & Mason [17], a data is normally distributed when the significance value of the Shapiro-Wilk Test (See Table 5) is greater than the significance level at 95% confidence level, i.e., 0.05. The results from the above demonstrated that all the Shapiro-Wilk Test significance are greater than significance level 0.05. Hence, the data is normally distributed. The purpose of reliability test is to known how acceptable the internal and external consistency of the data is. According to Moore (2012), Cronbach's alpha (α) >=0.6 specifies that the internal consistency is acceptable; if the test-retest reliability is 0.7 or greater, then it has good external reliability. The Cronbach's alpha (α) gotten from reliability test carried out by the researcher on the instrument showed 0.856. This is an indication that the instrument has a very strong reliability. This mean the instrument was devoid of error and bias from both Participants and Researcher. The study adopted linear regression statistics for testing the study hypotheses. Before deeming regression statistics fit for testing the hypotheses a check on multicollinearity was necessary. A common thumb rule is that awkward multicollinearity may be in existence when the coefficient of Variance Inflation Factor (VIF) is higher than 5.0 [18]. The coefficient of VIF of the linear regression statistics for the tested hypotheses (1.000 and 1.035) shows acceptability of regression statistics for analysis.

4. RESULTS

4.1 Socio Demographic Data of Respondents

The study socio demographic characteristics is presented in this section. Table 1 shows the overall socio-demographic data of participants.

Table 1. Socio-demographic data of participants

Variables	Frequency (F)	Percentage (%)
Total Valid Responses = 816		
Age group(Years)		
25-34	81	9.9
35-44	451	55.3
45-54	204	25.0
55-64	80	9.8
Above 65	0	0.0
Sex		
Male	574	70.3
Female	242	29.7
Cadre		
Senior Management	201	24.6
Junior Management/Supervisor	451	55.3
Junior Staff	164	20.1
Classification of Company		
Local Oil Company (LOC)	412	50.1
International Oil Company (IOC)	404	49.9
Years of Work Experience(Years)		
Below 5	82	10.0
6 -10	82	10.0
11 -15	287	35.2
16 – 20	201	24.6
Above 21	164	20.1

The Table 1 above reveals the socio-demographic data of the respondents utilised in the study. From the data on age group, it is revealed that majority of respondents 451 (55.3%) are aged 35-34. Followed by age 45-54 which is a total of 204 respondents (25.0%). This is probably because majority of oil and gas workers in the studied region have a good number of years of work experience and have also spent some years gathering knowledge through professional trainings. Respondents aged 25-34 were the least represented at 81 (9.9%) as well as respondents 55-56 years of age who were 80 (9.8%). This is probably because people in this age grade (25-26) may be not experienced enough and need to first go through certain trainings to qualify them for proper knowledge on process safety. Also, those aged 55-64 are around retirement age while some of this age grade have resigned to run their personal businesses. Thus this age group is limited. The data on sex of respondents reveals that majority of respondents 576 (70.3%) are male while female are just 242 (29.7%). This is probably because of the rigorous nature of the oil and gas job and the demanding nature of the job. Most men can sacrifice their time to work seven days of the week while women are often under the authority of their husbands' and parents if single considering the patriarchal nature of the country. Most female respondents are likely to work in the administrative department of the oil and gas companies which has limited workers. The data on cadre reveals that majority of respondents are junior management/ supervisor 451 (55.3%), this is probably because the junior management/ supervisors were more accessible at the time of the research. Junior staff were the least represented 164 (20.1%) probably because they were on duty, more occupied and could hardly be assessed. Data on years of work experience revealed that majority of respondents 287 (35.2%) have 11-15 years of work experience probably the more the years of experience a worker has, the more productive they are and the higher the probability of being retained in the oil and gas industry. Next to respondents with 16-20 years' work experience 201 (24.6%), followed by respondents with more than 21 years of work experience. This indicates that experience is very relevant for workers of the oil and gas sector. The least represented are those with less than 10 years' work experience.

Table 2. Responses on Process Safety Culture (PSC)

Questions	SA F (%)	A F (%)	D F (%)	SD F (%)	N F (%)
Total Number Respondents (N) = 816. Percentage (%) = 100.					
My company is very serious about safety	340(41.7)	269(32.9)	85(10.4)	105(12.9)	17(2.1)
My company clearly states that safety is vital	352(43.1)	314(38.5)	67(8.2)	77(9.4)	6(0.8)
My company has clear goals and targets for safety	369(45.2)	283(34.7)	44(5.4)	88(10.8)	32(3.9)
My company is interested in workers' views on safety	123(15.1)	492(60.3)	85(10.4)	76(9.3)	45(4.9)
The safety committee does a good job on safety	257(31.5)	369(45.2)	85(10.4)	63(7.7)	42(5.2)
We get sufficient information from management on safety matters	245(30.0)	328(40.2)	123(15.1)	101(12.4)	19(2.3)
When you break a safety rule, you will be treated equally	80(9.8)	162(19.9)	205(25.1)	123(15.1)	246(30.1)
If you raise a safety concern, someone follows up very quickly	126(15.4)	445(54.5)	98(12.0)	107(13.2)	40(4.9)
The workforce are regularly happy with management's decisions on safety	80(9.8)	226(27.7)	200(24.5)	105(12.9)	205(25.1)
Safety workers generally do a good job	121(14.8)	615(75.4)	40(4.9)	29(3.5)	11(1.4)
The safety program is well managed in this company	60(7.4)	492(60.3)	144(17.4)	83(10.4)	37(4.5)
We have good safety standards in this company	161(19.7)	492(60.3)	82(10.0)	41(5.0)	40(4.9)
Safety training and drills in this company is of high quality	205(25.1)	369(45.2)	122(15.0)	119(14.6)	1(0.1)

Source: Researcher's online survey, 2020. Note: SA is Strongly Agree, A is Agree, D is Disagree, SD is strongly Disagree, and N is Neutral. F represents Frequency respondents, while (%) represent percentage of respondents

Table 1 above examines process safety culture (PSC). In response to whether respondents company is serious about safety, it was discovered that majority of respondents 340 (41.7%) strongly agreed, 269(32.9%) agreed while 105(12.9%), 85(10.4) strongly disagreed and disagreed respectively; 17(2.1%) respondents were neutral. 352(43.1%) and 314(38.5%) respondents strongly agreed and agreed that their company clearly states that safety is vital while 77(9.4%). Majority respondents 369(45.2%) and 314(38.5%) agreed that their company has clear goals and target for safety while 88(10.8%) strongly disagreed. 492(60.3%) respondents agreed that their company is interested in workers' views on safety while 76(9.3%) respondents strongly disagreed. Majority of respondents 346(42.4), 242(29.7) agreed and strongly agreed that they can trust their supervisor and 205(25.1%) and 20(2.4%) disagreed and strongly disagreed. Most respondents 369(45.2%) agreed that their safety committee does a good job on safety while 63(7.7%) strongly disagreed and 42(5.2%) were neutral. 328(40.2%) agreed that they get sufficient information from management on safety matter while 101(12.4%) respondents strongly disagreed. 246(30.1%) agreed that when they break safety rule, they are treated equally as others while 80(9.8%) respondents strongly agreed. 451(55.2%) respondents agreed that their supervisor listens to their ideas on safety while 111(13.6%) strongly disagreed. 445(54.5%) respondents agreed that if they raise a safety concern, someone follows up immediately while 98(12%) disagreed and 40(4.9%) respondents were neutral. In response to whether their workforce is regularly happy with management's decision on safety, most respondents 200(24.5%), 105(12.9%) disagreed and strongly disagreed while 80(9.8%) strongly agreed. Majority of respondents 615(75.4%) agreed that safety workers generally do a good job while 29(3.5%) respondents strongly

disagreed. Most respondents 492(60.3%) agreed that the safety program is well managed in their company while 83(10.4%) respondents strongly disagreed. In response to whether there are good safety standards in respondents' company, 492(60.3%) respondents agreed that they have good safety standard while 40(4.9%) respondents were neutral and 41(5.0%) respondents strongly disagreed. 369(45.2%) agreed and 205(25.1%) strongly agreed that safety training and drills in their company is of high quality while 119(14.6%) respondents strongly disagreed.

Table 2 examined the error behaviour of employees. Majority of respondents 433(53.1%) strongly agreed that they feel it is profoundly vital to maintain safety at all times while 47(5.8%) respondents strongly disagreed. 374(45.8%) respondents strongly agreed that safety in the plant is a crucial issue while 78(9.6%) strongly disagreed and 23(2.8) respondents were neutral. 492(60.3%) respondents agreed that they feel it is required to use effort to reduce accidents and incidents at their workplace while 52(6.4%) respondent strongly disagreed. 380 (46.6%) and 328(40.2%) respondents strongly agreed and agreed that it is vital to encourage others to use safety practices while 44(5.4%) respondents strongly disagreed. In response to whether it is imperative to promote safety programs, 488(59.8%) respondents strongly agreed, 60(7.4%) respondents disagreed and 13(1.6%) were neutral. 236(28.9%) respondents and 298(36.5%) strongly agreed and agreed that they are able to follow all safety guidelines and processes while 72(8.8%) respondent disagreed. Most respondents 359(44%) and 236(28.9%) respondents agreed and strongly agreed that they understand how to follow work safety instructions and processes while 20(2.5%) strongly disagreed. Majority of respondents 298(36.5%) and 236(28.9%) respondents agreed and strongly agreed that they have safety errors owing to not knowing how to work safely while 71(8.7%) disagreed. In response to whether respondents seldom make error that initiate risk in working, 363(44.4%) and 294(36%) respondents agreed and strongly agreed while 16(2.0%) respondents strongly disagreed.

Table 4 examined employees' safety motivation. 402(49.3) respondents and 324(39.7) strongly agreed and agreed that their company does a lot for its workers while 21(2.6) ad 60(7.4) respondents disagreed and strongly disagreed. Majority of respondents agreed that their job is secured with their company while 240(29.4) and 287(35.2) strongly agreed and strongly agreed that Workers can trust the management in their

Table 3. Responses on Employee Error Behaviour (EEB)

Questions	SA F (%)	A F (%)	D F (%)	SD F (%)	N F (%)
Total Number Respondents (N) = 816. Percentage (%) = 100.					
I feel it is profoundly vital to maintain safety at all times.	433(53.1)	242(29.5)	74(9.1)	47(5.8)	20(2.5)
I believe safety in the plant is a crucial issue.	374(45.8)	242(29.7)	99(12.1)	78(9.6)	23(2.8)
I feel that it is required to use effort to reduce accidents and incidents at my workplace.	203(24.8)	492(60.3)	58(7.1)	52(6.4)	11(1.4)
I feel it is vital to encourage others to use safety practices.	380(46.6)	328(40.2)	56(6.9)	44(5.4)	8(0.9)
I feel it is imperative to promote safety programs.	488(59.8)	178(21.8)	77(9.4)	60(7.4)	13(1.6)
I am able to follow all safety guidelines and processes.	236(28.9)	298(36.5)	72(8.8)	168(20.6)	42(5.1)
It is plain to me how to follow work safety instructions and processes.	297(36.4)	359(44.0)	66(8.1)	20(2.5)	74(9.1)
I have made safety errors owing to not knowing how to work safely.	236(28.9)	298(36.5)	71(8.7)	169(20.7)	42(5.1)
I have seldom made errors that initiated risks in working.	294(36.0)	363(44.5)	65(8.0)	16(2.0)	78(9.6)

Source: Researcher's online survey, 2020. Note: SA is Strongly Agree, A is Agree, D is Disagree, SD is strongly Disagree, and N is Neutral. F represents Frequency respondents, while (%) represent percentage of respondents

Table 4. Responses on Employee Safety Motivation (ESM)

Questions	SA F (%)	A F (%)	D F (%)	SD F (%)	N F (%)
Total Number Respondents (N) = 816. Percentage (%) = 100.					
My company does a lot for its workers.	402(49.3)	324(39.7)	21(2.6)	60(7.4)	9(1.0)
My job are secure with this company.	274(33.5)	415(50.9)	77(9.4)	48(5.8)	2(0.4)
Workers can trust the management in my company.	240(29.4)	287(35.2)	169(20.7)	28(3.4)	92(11.3)
Management is genuinely serious about safety.	200(24.5)	210(25.7)	123(15.1)	80(9.8)	203(24.9)
Management at all times puts safety first.	40(4.9)	328(40.2)	243(29.8)	123(15.1)	243(29.8)
Management listens to workers' views on safety.	40(4.9)	328(40.2)	164(20.1)	123(15.1)	161(19.7)
My supervisor genuinely cares about safety.	122(15.0)	451(55.3)	40(4.9)	123(15.1)	80(9.8)
My supervisor always puts safety first.	123(15.1)	451(55.3)	120(14.7)	41(5.0)	81(9.9)
If you work safely, you will get recognition for it.	80(9.8)	410(50.2)	246(30.1)	67(8.2)	13(1.7)
I am happy to work for this company.	205(25.1)	328(40.2)	123(15.1)	151(18.5)	9(1.1)

Source: Researcher's online survey, 2020. Note: SA is Strongly Agree, A is Agree, D is Disagree, SD is strongly Disagree, and N is Neutral. F represents Frequency respondents, while (%) represent percentage of respondents

company while 28(3.4) respondents strongly disagreed. 200(24.5) and 210(25.7) respondents strongly agreed and agreed that Management is genuinely serious about safety while 80(9.8) strongly disagreed. 328(40.2) agreed that Management at all times puts safety first while 243(29.8), 123(15.1), 243(29.8) disagreed, strongly disagreed and neutral. 328(40.2) agreed that Management listens to workers' views on safety while 123(15.1) respondents strongly disagreed. 451(55.3) agreed that their supervisor genuinely cares about safety while 40(4.9) respondents disagreed. Majority of respondents 451(55.3) agreed that their supervisor always puts safety first and 41(5.0) strongly disagreed. 410(50.2) respondents agreed that when they work safely, they get recognition for it 67(8.2) strongly disagreed 328(40.2) respondents agreed that they are happy to work for their company and 123(15.1) respondents disagreed.

The study's first hypothesis examined whether process safety culture has significant impact on employee safety motivation. The result from the Table 6 shows 0.089 significance which is greater than 0.05 Sig Level. We therefore we fail to accept the stated hypothesis 'perceived process safety culture has significant impact on employees' safety motivation'.

The study second hypothesis examined whether process safety culture has significant impact on employees' error behaviour. From the Table above 0.001 significance level is observed which less than 0.05 Sig Level is. We therefore accept the stated hypothesis that Perceived process safety culture has a significant impact on employee error behaviours in petroleum industries.

Table 5. Normality test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
PSC	.299	816	.105	.770	816	.850
ESM	.260	816	.211	.843	816	.881
EEB	.337	816	.162	.798	816	.835

a. Lilliefors Significance Correction

Table 6. Hypothesis (H_1) test outcome

Coefficients[a]											
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Correlations**			**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Zero-order**	**Partial**	**Part**	**Tolerance**	**VIF**
1	(Constant)	3.325	.442		7.527	.000					
	PSC_1	.086	.025	.107	3.394	.089	.059	.059	.059	.967	1.034

a. Dependent Variable: ESM

Table 7. Hypothesis (H_2) test outcome

Coefficients[a]											
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**	**Correlations**			**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Zero-order**	**Partial**	**Part**	**Tolerance**	**VIF**
1	(Constant)	-.914	.327		-2.798	.005					
	PSC_1	1.338	.086	.479	15.585	.001	.479	.479	.479	1.000	1.000

a. Dependent Variable: EEB

Table 8.Result of descriptive statistics of employee safety motivation and process safety culture

Descriptive statistics			
	Mean	**Std. Deviation**	**N**
ESM	4.0754	.59920	816
PSC_1	3.3035	.18072	816

Source: SPSS, 2020. Note: The 5-points Likert scale is measured as an interval scale by description, from 1-1.8 means very low level, 1.81-2.60 means low level, 2.61-3.40 means neither high nor low level from 3.41-4.20 means high level, from 4.21-5 means very high level

According to Nkogbu, & Okorodudu [19], in order to define the maximum and minimum dimension of 5-points Likert scale type, we first find the range through calculation i.e., (5 – 1) and then divide the outcome by 5 which is the highest value of the scale, the outcome which is the 'range' will be 0.80, which then can be added to for example One (1) which is lowest value on the scale to give the upper limit of the interval of strongly disagree. From Table 8 Mean ± standard deviation 4.0754±0.59920 and 3.3035±0.18072 for Employee Safety Motivation and Process Safety Culture respectively were *observed* which is high and neither high nor low.

Table 9 above revealed 0.059 for PSC which shows a weak correlation to ESM 1.000. Also going by the findings on Table 8 above which reveals neither high nor low degree, the stated hypothesis is rejected. Also, the sig. for 1-tailed is 0.055 which is greater than the significance level 0.05. This is in agreement with the result of the regression analysis.

According to Nkogbu, & Okorodudu [19], in order to define the maximum and minimum dimension of 5-points Likert scale type, we first lrst find the range through calculation i.e., (5 – 1) and then divide the outcome by 5 which is the highest value of the scale, the outcome which is the 'range' will be 0.80, which then can be added to for example One (1) which is lowest value on the scale to give the upper limit of the interval of strongly disagree. From mean of 4.5035±0.18072 for PSC and 4.1734±0.50423 for EEB were observed making the MEAN very significant. Thus we accept the stated hypothesis.

Table 9. Correlation of employee safety motivation and process safety culture

Correlations			
		ESM	**PSC_1**
Pearson Correlation	ESM	1.000	.059
	PSC_1	.059	1.000
Sig. (1-tailed)	ESM	.	.045
	PSC_1	.055	.
N	ESM	816	816
	PSC_1	816	816

Table 10. Descriptive statistics showing the mean and standard deviation of employee error behaviour and process safety culture

Descriptive Statistics			
	Mean	**Std. Deviation**	**N**
EEB	4.1734	.50423	816
PSC_1	4.5035	.18072	816

Source: SPSS, 2020. Note: The 5-points Likert scale is measured as an interval scale. By description, from 1-1.8 means very low level, 1.81-2.60 means low level, 2.61-3.40 means neither high nor low level from 3.41-4.20 means high level, from 4.21-5 means very high level

Table 11. Correlations

		EEB	PSC_1
Pearson Correlation	EEB	1.000	.879
	PSC_1	.879	1.000
Sig. (1-tailed)	EEB	.	.000
	PSC_1	.000	.
N	EEB	816	816
	PSC_1	816	816

Table 11 reveals Figure observed for EEB and PSC correlation is 0.879 is high which is close to 1, thus supporting the findings of the descriptive statistics on Table 10 above. Which agrees with the hypothesis two. Also, the sig. for 1-tailed is 0.000 which is less than the significance level 0.05. This is in agreement with the result of the regression analysis. A prove that the stated hypothesis should remain accepted. This is so because the means of employee error's behaviour (4.1734) and process safety culture (4.5035) from Table 10 appeared high and very high respectively. An indication that process safety culture has significant impact on employee error behaviour.

5. DISCUSSION OF FINDINGS

The demographic data revealed that majority of respondents' falls within the age range of 35-44years while the gender of respondents reveals that majority of respondents are male. The majority of respondents are junior management/ supervisor and majority of respondents have 11-15 years of work experience. From the examination carried out in the study, it was discovered that Perceived process safety culture has no significant impact on employees' safety motivation. This finding negates the findings of Kirschenbaum et al., (2001) who saw a link between employee safety motivation and perceived process safety culture and the findings of Cakit, Olak, Murata, Karwowski, Alrehalli, and Marek [20] who discovered that process safety culture influences the safety motivation of employees of petrochemical industry. This discovery indicates it is not the safety culture of an organisation that motivates employees towards safety, rather other factors can motivate employee towards safety. It could be the employees' religion, need to stay alive for family and loved ones, the personal attitudes of workers, which can influence the behaviour of the worker towards safety. If workers consciously avoid acts that will lead to accidents in the future their safety can be sure. If the organisation has good ways of motivating employees and the employees decide to be disobey stipulated laws the process safety culture of such organisation may not stand.

The findings can be utilised for safety management in the future and aid the absolute usage of safety knowledge of workers to advance the general safety performance. The discovery reveals the relevance for assessing and improving process safety culture in the oil and gas industry. Fogarty & Shaw [21] investigated the influence of management attitude towards safety and employees' attitude towards violation. The study discovered a significant influence of management attitude towards safety and employees' attitude towards violation. This discovery is in line with the current study in which process safety culture has a significant impact on employee error behaviours in petroleum industries. This finding is also in line with that of Kirschenbaum et al, (2001) who saw a link between perceived process safety culture and employee error behaviour. An error leading to an accident may occur when an individual loses control over work procedures due to insufficient/inadequate training, long working hours, and stress/fatigue (Kirschenbaum e. al. 2000). It is the role of the management to motivate workers by training them appropriately, this will give them the knowledge needed to avoid error at work and maintain a good process safety culture. Organisations who do not motivate their employees often times experience accidents as a result of error behaviour and lack of proper process safety culture. A worker may not be efficient in his or her work place as a result of ignorance.

The managerial implication is that measures must be put in place by management to punish error behaviour. If this is not done life and property will be endangered.

6. CONCLUSION AND RECOMMENDATION

The study examined Process Safety Culture perception in the process safety management of selected International Oil Companies (IOCs) and Local Oil Companies (LOCs) in Niger Delta and also to identified safety culture development opportunities and potential safety performance improvements. The study reveals that the Employees safety motivation has no impact on perceived process safety culture. It also revealed that perceived process safety culture has a significant impact on employee error behaviour in oil and gas industries. The following recommendations was made based on the findings of this study:

- Employee safety trainings should be organised to improve process safety culture and avoid error behaviour.
- Organisations should continue performing activities that keeps employees personally motivated. While employees must find ways to motivate themselves towards safety. Ways to motivate employees to adopt the safety habit should be adopted it may be done using the carrot and stick method propounded by Abraham Maslow. However, management must learn to choose the most suitable approach for employees in their organisation. If the carrot method works better with their employees,
- management must learn to reward workers for applying safety in all their activities at work. Awards can be given at the end of every quarter to the most safety conscious employee or acts of recognition or even monetary rewards.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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