Impact of Effective Safety Administration on Occupational Health and Safety Performance in Selected Oil Companies in Rivers State

Vik-Benibo A. Nene; Ugwoha Ejikeme; and Chinemerem, Patricks
Center for Occupational Health, Safety and Environment,
Faculty of Engineering University of Port Harcourt,
Port Harcourt, Rivers State, Nigeria
adelethankgod@yahoo.com

ABSTRACT

The aim of this research was to assess the impact of proficient safety management on the occupational health and safety outcomes in Nigerian oil and gas businesses operating in Rivers State. Drawing upon the leadership theory paradigm as a theoretical framework, this study utilised a descriptive cross-sectional research design to investigate two prominent oil corporations (IOGC and IOC) operating in Rivers State, Nigeria. The study specifically concentrated on the Eleme, Port Harcourt, and Obio/Akpor Local Government Areas (LGA's) in Rivers State. A sample size of 380 employees was selected from a study population of 3,800 workers using the Taro Yamane Formula. The study adopted a questionnaire, modified from the IOGP (2013) Safety Leadership reference document, for the collection of data. The findings of the study revealed notable disparities in safety leadership attributes, such as credibility, feedback and recognition, vision, teamwork, communication, and accountability, across the two chosen organisations, IOGC and IOC. A significant proportion of participants from IOGC had a negative stance (83.1%) towards the existence of positive safety leadership attributes. Conversely, a minority (14.8%) held a positive viewpoint, while a small percentage (2.2%) strongly disagreed and an even smaller percentage (3.8%) strongly agreed with the notion. Therefore, the study concluded that the quality of safety leadership is essential for leaders who seek to cultivate a favourable safety culture. This particular cultural environment fosters an atmosphere in which individuals are encouraged to openly address safety-related issues without fear of reprisal or coercion. Thus, the study recommended that organisations should conduct informative workshops to enhance understanding of the advantages associated with safety leadership attributes, as well as their influence on safety performance and the overall organisational culture.

Keywords: Effective safety administration, occupational health and safety performance, oil companies

1. INTRODUCTION

Safety leaders may not always possess formal qualifications or professional expertise in the field of health and safety. In light of the increasing prevalence of occupational injuries worldwide and the imperative to prioritise the avoidance of harm to individuals, the environment, assets, and the reputation of organisations, it is essential for leaders to exhibit emotional dedication to the welfare of their employees. This entails prioritising intrinsic qualities over extrinsic qualities, as emphasised by Patricks (2021). In contemporary times, it has become imperative for the whole industry to prioritise the examination of behaviours and cultures in order to surpass the current

safety plateau (Patricks, 2021). Since the occurrence of the Piper Alpha incident in 1988 and subsequent industrial disasters, the oil and gas industry has implemented various measures aimed at preventing incidents and injuries. These measures include the utilisation of tools such as risk assessment and competence evaluation. However, despite these efforts, accidents and injuries continue to occur, and there has been a lack of significant improvement in safety performance (Reason, 1998). The imperative to possess leaders that prioritise not only production efficiency and overall profitability assumes critical importance in enhancing organisational safety culture and safety performance (Geller, 2005; Patricks, 2021).

Nigeria is positioned as one of the prominent global producers of oil and gas, with its economy heavily reliant on the generated earnings from the marketing and exportation of these resources. Nigeria has derived several advantages from the presence of oil mining and operating firms, including the provision of employment opportunities, energy supply, foreign exchange reserves, as well as the development of local content and infrastructure (Vaaland et al., 2012; Elum et al., 2016). Regrettably, the oil and gas industry in Nigeria has been identified as posing significant risks to the health and safety of workers, as well as to the biophysical and social environment. Numerous studies have reported that workers in this industry are consistently exposed to a wide range of work-related health hazards (Anumadu et al., 2014; Ezejiofor et al., 2014). The acknowledgment of unsafe behaviour as a significant factor in workplace accidents has been documented by Kvalheim and Dahl (2016) as well as Okoye and Okolie (2017). Patricks, (2021) places significant importance on comprehending the underlying factors that drive the actions demonstrated by individuals working in the oil business. Additionally, it recognises the crucial role that expected safety leadership traits have in influencing these behaviours, ultimately leading to enhanced safety performance.

In the same vein, it is imperative to identify positive measures that can be implemented to enhance safety performance and mitigate at-risk behaviours (Patricks, 2021). Numerous studies have demonstrated the considerable impact that safety leadership exerts in promoting a secure and well-functioning work environment. The leadership of an organisation plays a crucial role in shaping and maintaining its safety culture, as they are responsible for developing, nurturing, and perpetuating the organization's commitment to achieving excellence in safety (HSE, 2008). The leadership of an organisation is responsible for establishing the overarching vision and strategic direction, allocating necessary resources, and consistently emphasising and reinforcing the significance of safety to both individuals and the overall organisation. According to Cooper and Finley (2013), the lack of competent safety leadership is a hindrance to the performance of numerous organisations. In addition, the effectiveness of leadership within an organisation plays a crucial role in determining the degree to which the organisation is able to accomplish its goal and vision, particularly in the face of the unpredictable and ever-changing commercial landscape within which the organisation operates (Harris et al., 2007).

Hence, there exists a significant apprehension within the contemporary oil and gas industry operating milieu regarding the imperative need to discern discernible and efficacious methodologies for cultivating a favourable culture of prevention. This endeavour aims to foster an intrinsically motivated workforce that exhibits a genuine commitment to occupational safety and health (Patricks, 2021). According to a study conducted by the Department of Energy in 2012, recent research in the field of accident prevention has indicated that adherence to safety and health regulations has a limited impact on the reduction of accident rates. The primary advantage of regulation is commonly perceived as its ability to prioritise safety and health concerns, thereby serving as a reminder to employers of their obligation to ensure the well-being and protection of their employees (Walker, 2010). According to the Health and Safety Executive

(HSE, 2001), companies can further reduce accident rates after implementing a safety and health system that guarantees adherence to regulations. According to Geller (2005) and Walker (2010), a significant majority of accidents, ranging from 80 to 90%, can be attributed to unsafe acts committed by individuals or groups, as opposed to unsafe conditions. According to Krause (2005), the enhancement of occupational safety and health (OSH) performance necessitates the implementation of safety leadership strategies that extend beyond the mere enforcement of regulatory compliance. According to Cooper (2001), the establishment of a safety culture is imperative in order to achieve a substantial decrease in accident rates. This entails fostering a transformation in the attitudes of both leaders and employees, thereby enhancing their safety behaviour. According to Krause (2005) and Broadbent (2004), safety leaders who foster a safety culture that promotes active engagement of employees in ensuring their own safety and the safety of others are more likely to successfully decrease accident rates. This research examines the promotion of crucial safety leadership qualities and responsible safety leadership actions among business leaders. It also investigates practical measures that can enhance occupational health and safety performance within the oil industry. This study investigated the perspectives of both individual workers and senior managers regarding safety leadership and its impact on promoting exceptional safety performance within the Nigerian oil and gas industry.

Statement of the Problem

The reports on investigations conducted on significant accident events that have taken place in recent years within various oil and gas companies in Nigeria, particularly those located in Rivers state, along with data obtained from safety alerts and lessons learned from previous incidents, have revealed notable deficiencies in the methods employed at most operational sites to implement and uphold occupational health and safety standards. The aforementioned gaps encompassed the inadequate and unfavourable perception of safety among the workforce in relation to their leaders' dedication to health and safety. Frequently, it is evident that leaders engage in superficially expressing their commitment to addressing crucial health, safety, and environmental (HSE) requirements in the workplace. Conversely, there are instances where leaders are observed to have made concessions on matters pertaining to the well-being and protection of individuals. The existing body of literature, as shown by Patricks (2021), DNV (2020), Energy Institute (2015), and Marlin et al. (2009), has demonstrated that around 85% of occupational accidents and injuries can be attributed to dangerous behaviours. Adugbo (2017) reported that the Nigerian Department of Petroleum Resources (DPR) compiled statistics indicating a rise in deaths inside the Nigerian upstream and downstream oil and gas industry operations, from 21 in 2010 to 54 in 2015. The aforementioned cases are to deadly occurrences that occurred in the workplace, which may potentially have been prevented had there been enough monitoring and a strong commitment from leadership towards enhancing safety measures on a daily basis. According to Krause and Weekley (2005), it has been confirmed that numerous organisations are experiencing a rise in the number of injuries and fatalities. These occurrences pose significant worries and challenges, hence presenting a formidable challenge for safety leaders who strive to establish a sustainable resolution.

Aim and Objectives of the Study

The aim of this study was to ascertain the impact of effective safety administration on occupational health and safety performance in Nigerian oil and gas companies operating in Rivers state.

The objectives of this study were to:

i. Determine the variation in safety leadership qualities across the selected oil companies in Rivers state.
ii. Ascertain the relationship between safety leadership and safety culture in the selected oil companies in Rivers state.

2.   METHODOLOGY
2.1   Study Area

The research employed a descriptive cross-sectional study design. The study was carried out within a specific subset of oil and gas businesses operating in Rivers State of Nigeria. These companies were chosen based on their operational sites and base offices, which were situated in three prominent local governments. The aforementioned entities encompass Eleme, Port Harcourt, and Obio/Akpor Local Government Areas (LGAs).
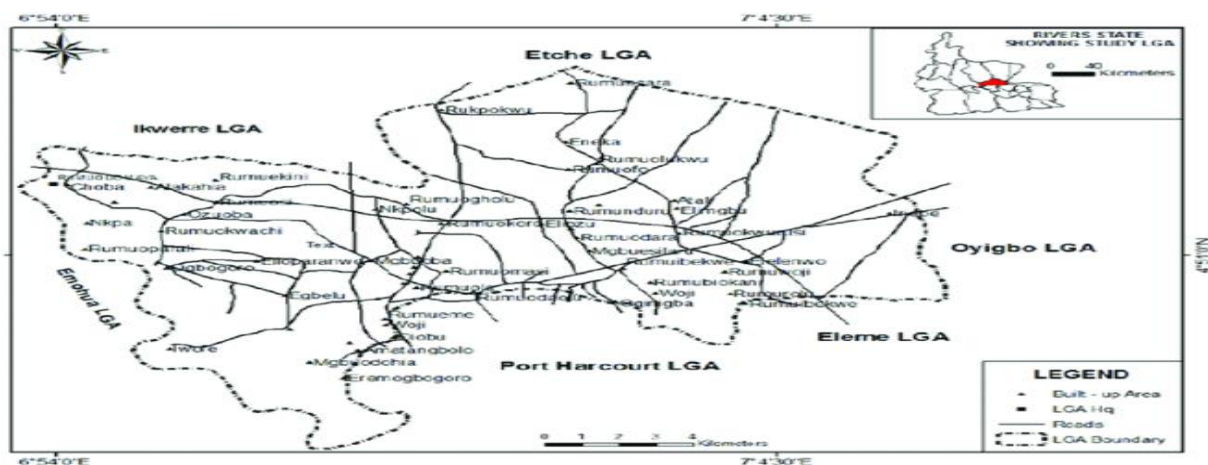

Figure 2.1: Map of Rivers State showing local Government areas (Google Maps.com)

2.2   Study Population and Sample Size

The study encompassed a sample population estimated to be 3,800 individuals employed by the two oil corporations operating in Rivers State, Nigeria. The study's sample size consisted of 380 personnel, determined through the utilisation of the Taro Yamane Formula. The study employed purposive or convenient sampling methods. The Taro Yamane formula is described in Equation (3.1).

$$n = \frac{N}{1 + N(e)^2} \qquad (3.1)$$

Where n= sample size
N= total population size (3,800)
e= Level of significance (0.05 for 95% Confidence Interval)
Applying the formulae, determined Sample size (n) =362

2.3   Method of Data Collection

The selection of participants for this study involved the creation and distribution of survey questionnaire utilising a 5-point Likert scale. The utilisation of purposive sampling was important in maintaining adherence to the specified inclusion and exclusion criteria in this

investigation. This study utilised both primary and secondary data sources. The primary data was collected by utilising a questionnaire that was adapted and modified from the IOGP (2013) Safety Leadership reference document No. 452 titled "Shaping safety culture through Safety leadership". The questionnaire was developed with a modified 5-point Likert scale.

2.4   Statistical Analysis

The data obtained from the completed surveys were inputted into the SPSS Windows software, which is a widely used statistical package for social sciences. The data were analysed using the SPSS 25 software on a PC. The statistical techniques employed in this study encompassed analysis of variance (ANOVA) and sample t-test. These approaches were utilised to assess the extent of variation in safety leadership traits among the chosen oil companies (IOGC and IOC) in Rivers State.

3.   Results and Discussion
Variations in Safety leadership qualities across the selected companies (IOGC and IOC)

The research objective 1was achieved using an independent sample T-test to identity variation in safety leadership qualities across the companies studied. T-test was used because the group under study is less than three otherwise, a one-way ANOVA would have been used. From Table 1a the result revealed variations in credibility (0.008), feedback and recognition (0.029), vision (0.001), collaboration (0.009), Communication (0.002) and accountability (0.004) across the companies studied. This indicates a significant variation in leadership qualities across the companies. These results showed that safety leadership across the selected companies varied as the respondents in their perceptions did not feel the same way across all the safety leadership qualities when compared to how they feel their leader's actions correspond to these qualities.

Table 1. An independent sample t-test showing variation across the companies

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	t
CREDIBILITY	Equal variances assumed	7.220	.008	-1.665
	Equal variances not assumed			-1.665
FEEDBACK_AND_RECOGNITION	Equal variances assumed	4.784	.029	-1.146
	Equal variances not assumed			-1.146
VISION	Equal variances assumed	11.627	.001	-1.486
	Equal variances not assumed			-1.486
COLLABORATION	Equal variances assumed	6.912	.009	-1.477

	Equal variances not assumed				-1.477
	Equal variances assumed	10.225	.002		-1.903
COMMUNICATION	Equal variances not assumed				-1.903
	Equal variances assumed	8.535	.004		-.962
ACCOUNTABILITY	Equal variances not assumed				-.962
	Equal variances assumed	6.795	.010		-.920
Impact_of_safety_leadership	Equal variances not assumed				-.920

As shown in table above for the IOGC respondents, The result showed that 83.1% Disagree on the characteristic of safety leadership qualities items of questionnaire, 14.8% Agree, 2.2% Strongly Disagree and 3.8% Strongly Agree. IOCs had 76.5% Disagree, 19.1% Agree, 3.8% strongly Disagree and 0.5% strongly Agree. These results showed that safety leadership across the selected companies varied as the respondents in their perceptions did not feel the same way across all the safety leadership qualities when compared to how they feel their leader's actions correspond to these qualities.

Table 2: Weighted Mean of Variation in safety leadership qualities across the companies

S/N	Item	Org.	SA	A	U	D	SD	W.M	Remark.
1	Leaders pay lip service to safety issues	IOGC	0	27	2	147	7	3.087	Accept
		IOCs	1	29	0	139	14	3.093	Accept
2	Leaders create an atmosphere of open discussion	IOGC	0	27	2	148	6	3.093	Accept
		IOCs	1	36	0	136	10	3.153	Accept
3	Leaders influence and inspire team members	IOGC	0	27	2	151	3	3.109	Accept
		IOCs	3	36	4	132	8	3.142	Accept
4	Leaders create teams that are free from intimidation and are willing to give feedback through intervention	IOGC	0	27	2	149	5	3.098	Accept
		IOCs	1	36	0	136	10	3.153	Accept
5	Leaders provide adequate resources to support health and safety	IOGC	0	28	1	143	11	3.082	Accept
		IOCs	1	36	3	133	10	3.120	Accept
6	Leaders are emotionally committed to the	IOGC	0	27	2	148	6	3.093	Accept
		IOCs	1	35	5	132	10	3.093	Accept

	wellbeing of team members								
7	Leaders coach and mentor team members to improve competence	IOGC	0	27	2	146	8	3.082	Accept
		IOCs	3	35	0	136	9	3.175	Accept
8	Leaders are more concerened and interested in saving cost, production efficiency, speed and pays less attention to safe systems of work	IOGC	1	25	3	145	9	3.066	Accept
		IOCs	2	28	5	137	11	3.060	Accept

Relationship between safety leadership and organizations safety culture

To establish the degree and strength of association between safety leadership and organizational safety culture, a correlation analysis was done. Hence, the objective number 4 was achieved using inferential statistics of correlation to determine the relationship between safety leadership and the organizations' safety culture. Persaons'correlation revealed statistically significant correlations between safety leadership qualities like credibility, feedback and recognition, vision, collaboration and communication and safety culture in the organizations surveyed. This showed positive correlation which means that the variables and characteristic elements of the safety leadership qualities when exhibited by the leaders and the more these safety leadership qualities are demonstrated the more the dependent variable (safety culture) becomes more positive for the companies studied and when these safety leadership qualities are lacking, the safety culture also becomes poor or negative..

Table 3: Result of correlation analysis showing the degree of relationship between safety leadership and safety culture for IOGC/IOC with respect to specific qualities

Company Type			CREDIBILITY	FEEDBACK_AND_RECOGNITION	VISION
IOGC	CREDIBILITY	Pearson Correlation	1	.748**	.682**
		Sig. (2-tailed)		.000	.000
		N	183	183	183
	FEEDBACK_AND_RECOGNITION	Pearson Correlation	.748**	1	.855**
		Sig. (2-tailed)	.000		.000
		N	183	183	183
	VISION	Pearson Correlation	.682**	.855**	1
		Sig. (2-tailed)	.000	.000	
		N	183	183	183

IOCs	COLLABORATION	Pearson Correlation	.704**	.797**	.940**
		Sig. (2-tailed)	.000	.000	.000
		N	183	183	183
	COMMUNICATION	Pearson Correlation	.674**	.769**	.940**
		Sig. (2-tailed)	.000	.000	.000
		N	183	183	183
	ACCOUNTABILITY	Pearson Correlation	.665**	.812**	.956**
		Sig. (2-tailed)	.000	.000	.000
		N	183	183	183
	Impact_of_safety_leadership	Pearson Correlation	.685**	.838**	.954**
		Sig. (2-tailed)	.000	.000	.000
		N	183	183	183
	CREDIBILITY	Pearson Correlation	1	.786**	.775**
		Sig. (2-tailed)		.000	.000
		N	183	183	183
	FEEDBACK_AND_RECOGNITION	Pearson Correlation	.786**	1	.910**
		Sig. (2-tailed)	.000		.000
		N	183	183	183
	VISION	Pearson Correlation	.775**	.910**	1
		Sig. (2-tailed)	.000	.000	

Table 4: Result of correlation analysis showing the degree of relationship between safety leadership and safety culture for IOGC/IOC with respect to specific qualities

Table 4.16, Figures 4.16a and 4.16b show that the extent to which respondents agree or disagree that there is a relationship between safety leadership and safety culture. Across the IOGC 80.9% Disagree, 14.8% Agree and 4.4% Strongly Disagree within the IOGC respondents, while in the IOCs, 75.4% disagreed, 18.6% agreed, 4.4% strongly disagreed and 1.6% strongly agreed. This shows that the organizations' Safety Culture is poor due to poor safety leadership within the organizations as the perception of respondents have shown.

Discussion of Results

Variations in Safety leadership qualities across the selected companies (IOGC and IOC)

Objective 1 was achieved using an independent sample T-test to identity variation in safety leadership qualities across the companies studied. The sample T-test was preferred because the group under study is less than three otherwise, a one-way ANOVA would have been used. The

result revealed variations in credibility (0.008), feedback and recognition (0.029), vision (0.001), collaboration (0.009), Communication (0.002) and accountability (0.004) across the companies studied. The result showed that personnel in their respondents agree to this significant variation. This indicates a significant variation in safety leadership qualities across the companies. These results showed that safety leadership across the selected companies varied as the respondents in their perceptions did not feel the same way across all the safety leadership qualities when compared to how they feel their leader's actions correspond to these qualities. For example, The result revealed that Credibility of the leaders is not visible in the organizations under study. Also, Table 4.3, Figures 4.8a and 4.8b revealed that respondents do not perceive their leaders demonstrating the safety leadership quality related to feedback and recognition across the two groups sampled. Again, considering that both companies represented huge diversity in culture and human resources it was expected that the International oil company (IOC') respondents will differ and have varied opinion and perception when compared with the respondents from the Indigenous oil and gas companies (IOGC). These findings are in line with the findings of Patricks (2017) and Geller (2005) that safety leadership varied across employee socio-cultural divide and based on organizational hierarchy, belief and climate.

Relationship between safety leadership and organizations safety culture

To establish the degree and strength of association between safety leadership and organizational safety culture, a correlation analysis was done. Hence, the objective number 4 was achieved using inferential statistics of correlation to determine the relationship between safety leadership and the organizations' safety culture.

Perasons'correlation revealed statistically significant correlations between safety leadership qualities like credibility, feedback and recognition, vision, collaboration and communication and safety culture in the organizations surveyed. This showed positive correlation which means that the variables and characteristic elements of the safety leadership qualities when exhibited by the leaders and the more these safety leadership qualities are demonstrated the more the dependent variable safety culture becomes more positive for the companies studied and when these safety leadership qualities are lacking, the safety culture also becomes poor or negative. The results agree with the works of the United states Department of Energy (DOE, 2012) where it was stated that safety leadership and safety culture are two sides of the same coin. They affirmed that neither can be realized without the other. Safety Leaders create and manage the safety culture in their organizations by maintaining safety as a priority, communicating their safety expectations to the workers, setting the standard for safety through actions, leading needed change by defining the current state, establishing a vision, developing a plan, and implementing the plan effectively. These results also agree with IOG (2013 that safety leaders build and shape the safety culture through their daily actions and exhibition of important safety leadership qualities.

Validation of Hypothesis.

From the result of the correlation analysis both null hypothesis were rejected and the alternate hypothesis was accepted. The null hypothesis has been formulated to guide the study and were tested with an alpha value of 0.05 level of significance against determined P-values.

At a determined P-value of 0.001, the null hypothesis stating that there is no significant relationship between safety leadership and health and safety performance in the selected oil companies in Rivers State was rejected while the alternate hypothesis was accepted showing a significant relationship between safety leadership and health and safety performance in the selected companies in Rivers state. Similarly, at P-value of 0.001 less than alpha value of 0.05, the next null hypothesis stating that there is no significant relationship between safety leadership and organizational safety culture in the selected oil companies in Rivers State was also rejected

showing that there is significant relationship between safety leadership and organizational safety culture.

Conclusion

The study concluded that safety leadership quality is an essential attribute for every organizational leader to have in order to drive a positive safety culture where personnel feel free to express their concerns about safety matters without fear of intimidation. Also, there is no conflict between exhibiting important safety leadership qualities and driving for the achievement of business success. From the study findings, the more the organizational leaders exhibit the identified safety leadership qualities they more production efficiency increases (positive impact and correlation).

It is recommended that an awareness workshop be organised in order to introduce initiatives aimed at providing a comprehensive understanding of the advantages associated with safety leadership skills, as well as their influence on safety performance and the overall safety culture within an organisation. Furthermore, there is a necessity to systematically monitor and observe the everyday activities of frontline supervisors and operational line managers in the workplace in order to evaluate their performance in relation to the distinct attributes that define each individual safety leadership quality.

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