

ASSESSMENT OF SAFETY PROGRAMMES ON EMPLOYEE PRODUCTIVITY IN THE OIL AND GAS INDUSTRY IN THE NIGER DELTA AREA, NIGERIA

Abstract

This study evaluates the effectiveness of safety programmes on employee productivity in Indigenous and Multinational Oil and Gas companies in the Niger Delta. Key safety constructs—management commitment, safety participation, safety compliance, safety promotional policies, safety training, safety knowledge, and employee involvement—are assessed for their impact on productivity. Data from structured questionnaires were analyzed using descriptive statistics and reliability tests. The findings reveal that Multinational companies generally exhibit stronger positive correlations between safety constructs and productivity compared to Indigenous companies, suggesting more effective safety management systems in Multinational firms. For instance, management commitment shows a stronger correlation with productivity in Multinational companies ($r = 0.35$) than Indigenous firms ($r = 0.15$). The study concludes that Indigenous companies could improve productivity by adopting more structured safety frameworks and enhancing employee engagement and training programmes. Indigenous companies could explore underlying factors, such as better resources, more rigorous safety standards, or stronger organizational cultures across all the safety constructs to further enhance productivity.

Keywords: Safety Programmes, Employee Productivity, Indigenous, Multinational, Oil & Gas, Safety Training, Employee Involvement

1. INTRODUCTION

In evaluating the effectiveness of safety programmes on employee productivity in the oil and gas industry, particularly focusing on indigenous and multinational firms in the Niger Delta, several safety constructs must be examined. These constructs include management commitment, safety participation, safety compliance, safety promotional policies, safety training, safety knowledge, and employee involvement. Each construct plays a vital role in shaping the relationship between safety programmes and employee productivity.

According to [1], Productivity comprises three components: efficiency, effectiveness, and quality. Efficiency compares planned input use with actual implementation, while effectiveness measures the extent of targets met in terms of quantity and timeliness; quality assesses how well consumer expectations are fulfilled. Employee productivity is vital as it directly influences profitability and competitiveness, enabling companies to produce more in less time. High productivity reflects effective management and leads to greater job satisfaction and engagement, fostering employee motivation and ongoing contributions to organizational success.

Organizations depend on a productive workforce, yet inadequate safety measures can hinder productivity as **underscored** by the European Employee Productivity Institute in 2019. Globalization, legal changes, and technological advancements have introduced new safety concerns in workplaces, as noted by [2]. Obrenovic et al. [3] highlight that traditional safety programmes may not address these evolving hazards. While [4] emphasize the need for comprehensive safety programmes, many organizations remain hesitant due to limited empirical evidence linking safety to productivity [5],[6].

Productivity is the ability to turn talents and ideas into tangible outputs, influenced by the relationship between inputs and results. High workplace safety standards reduce accidents and health issues, enhancing productivity. Productivity involves optimizing time, materials, and energy, requiring improvements in work systems and workforce proficiency. Safety is crucial, as healthier employees perform better, contributing to both the quality and quantity of output. Neglecting safety can harm health and productivity, underscoring the importance of the relationship between safety, health, and optimal performance [7].

The need to assess effectiveness of these safety constructs (safety compliance, safety knowledge, safety participation, safety training, employee involvement/participation, safety promotional

practices and management commitment) in improving productivity is essential to understand the full impact of safety measures on industrial performance. This study aims to bridge this gap by evaluating safety programmes and their effects on employee productivity in selected industries within the Niger Delta.

2. MATERIALS AND METHODS

Descriptive statistics was adopted as part of the data analyses methods. Descriptive research, according to [8] seeks to correctly and methodically describe a population, circumstance, or phenomena. What, where, when, and how inquiries can be answered, but why questions cannot. Descriptive statistics is used to summarize data in an organized manner by describing the relationship between variables in a sample or population [9]. Calculating descriptive statistics represents a vital first step when conducting research and should always occur before making inferential statistical comparisons [10]. The descriptive statistics presented in this study provides a comprehensive overview of the safety programme constructs and employee productivity measuring the mean and standard deviation across all respondents. The results reveal generally positive perceptions and high scores across all constructs.

The study area used in this research work is selected Industries in Niger Delta Area. It is focused on the assessment of safety programmes on employee's productivity in selected Oil and Gas Industry in Niger Delta Area. Two categories of companies were assessed. Multinational and Indigenous Oil and Gas companies respectively.

2.1 Instruments

This study was carried out as a cross-sectional study given that the data were collected within a specified time frame [11]. Structured questionnaire was the research instrument administered to 250 employees by random sampling; while the selection of the oil companies was by purposive sampling. Demographic variables captured in the questionnaire included Gender, Age, Level of education, Marital status and Years of experience. The administered questionnaire also includes information on the following: Level of compliance to statutory safety programmes, Worker's Knowledge on Safety Standards, Safety Promotional Policies, Employee's participation, Management Commitment, Safety programmes that influence productivity, Employee's Productivity and How to improve Productivity. There are 5 broad questions on respondent's demographic, 10 questions on Level of compliance to statutory safety programmes, 7 questions on Worker's Knowledge on Safety Standards, 7 questions on Safety Promotional Policies, 7 questions on Employee's participation, 7 questions on Management Commitment, 10 questions on Safety programmes that influence productivity, 8 questions on Employee's Productivity and 10 questions on How to improve Productivity using Likert Scale.

A brief summary on each of the seven safety key safety construct:

- a. **Management Commitment:** In organizations, top management is responsible for assigning safety-related assignments, tasks, and establishing work standards and policies to maintain workplace safety. Although workers play an important role in improving workplace safety, top management's responsibility is to achieve organizational goals and objectives [12]. This commitment is reflected in the allocation of resources for safety training, the enforcement of safety regulations, and the provision of safety equipment. In the Niger Delta's construction industry, multinational companies often display higher

levels of management commitment to safety compared to indigenous firms, which may struggle with limited financial resources [13].

- b. **Safety Training:** Safety training is the transfer of safety knowledge in order to perform job tasks safely without experiencing occupational accidents. Safety training is one of the most important practices for enhancing safety performance. In organizations, safety training is conducted by formal and informal training programs and capacity-building programs provide an opportunity for employees to develop behavioral safety and safety skills. In the construction industry, safety training is especially important due to the variety of tasks that workers are required to perform, many of which involve operating heavy machinery or working at heights. Companies that invest in regular safety training sessions typically report lower accident rates and higher productivity levels [12].
- c. **Safety Compliance:** Compliance with safety regulations is essential for maintaining a safe working environment. In Nigeria, most significant factors contributing health and safety non-compliance are lack of adequate regulations, lack of proper of OSH regulations enforcement, inadequate funding, lack of management commitment and higher profit margin[14]. Multinational companies, on the other hand, are often subject to stricter internal safety policies and international regulations, which contribute to higher compliance levels [15].
- d. **Safety Promotional Policies:** In total quality management (TQM), using incentives and rewards to enhance employee motivation for safety improvement is a key component of organizational behavior safety strategies. Recognizing and appreciating safe behaviors encourages workers to take an active role in managing workplace hazards. A well-structured reward system can effectively influence safety behavior and reduce accidents.

Research shows that incentives are crucial for maintaining safety and positive behaviors in the workplace. Additionally, effective safety-promotion policies significantly reduce workplace accidents and injuries, contributing to overall safety improvements in successful organizations [12].

e. **Safety Knowledge and Safety Participation:** Safety knowledge refers to the understanding that employees have about safety procedures and best practices. Safety participation involves the active involvement of employees in safety activities, such as reporting hazards or participating in safety audits. Both of these constructs are important for creating a safety culture within an organization [16]. In the Niger Delta's construction industry, multinational companies typically invest more in safety education and encourage greater employee participation in safety initiatives, which has been linked to higher productivity levels [13].

f. **Employee Involvement:** Employee involvement in safety programmes has been shown to enhance safety outcomes and improve productivity. When workers are actively engaged in identifying risks and developing safety solutions, they are more likely to adhere to safety protocols and work more efficiently [17]. Multinational companies in the Niger Delta often implement more structured employee involvement programmes compared to indigenous firms, which may lack the resources or organizational capacity to engage workers effectively [18].

2.2 Data Analysis and Procedures

The collated data for this study were analyzed using Statistical Product and Service Solution (IBM SPSS version 26 and Xlstat version 16). Data were analyzed using descriptive statistics including frequencies, percentages, mean and standard deviation showing the distribution of key

demographic criteria of the multinational and indigenous oil and gas workers respectively in the Niger Delta area. The responses to the questionnaire from the respondents were subjected to a reliability test using Cronbach alpha. Interpretation was made on the results achieved.

3. RESULTS AND DISCUSSION

The analysis revealed good internal consistency across all measures, with Cronbach's alpha values ranging from 0.630 to 0.916 as shown in Table 1.

Table 1: Cronbach Alpha for the Constructs

Groups	Constructs	Cronbach Alpha	Standardized Cronbach Alpha	Internal Consistency
Safety Programmes	Management Commitment	0.916	0.920	Good
	Safety Participation	0.630	0.741	Good
	Safety Compliance	0.862	0.861	Good
	Safety Promotional Policies	0.848	0.850	Good
	Safety Training	0.895	0.898	Good
	Safety Knowledge	0.867	0.877	Good
	Employee Involvement/Participation	0.849	0.850	Good
	Productivity	Employee Productivity	0.785	0.787

The descriptive statistics presented in Table 2 provide a comprehensive overview of the safety programme constructs and employee productivity measure across all respondents. The results reveal generally positive perceptions and high scores across all constructs, with means ranging from 3.78 to 4.66 on a 5-point scale.

Safety Compliance emerged as the highest-rated construct, with a mean of 4.66 (SD = 0.46), indicating that employees strongly adhere to safety protocols and guidelines. This construct also

had the highest minimum score of 3.00, suggesting a consistently high level of compliance across all respondents. Following closely is Safety Knowledge, with a mean of 4.60 (SD = 0.43), reflecting employees' strong understanding of safety standards and practices.

Safety Participation and Safety Training both received high ratings, with means of 4.43 (SD = 0.46) and 4.42 (SD = 0.70), respectively. This suggests that employees actively engage in safety-related activities and perceive their safety training as effective. Management Commitment also scored well, with a mean of 4.23 (SD = 0.75), indicating that employees generally perceive strong support for safety initiatives from their leadership.

Employee Productivity, the key outcome measure, showed a positive result with a mean of 4.14 (SD = 0.55), suggesting that employees perceive themselves as highly productive. Safety Promotional Policies received a mean score of 4.06 (SD = 0.79), indicating that employees view their organizations' safety promotion efforts favourably.

The lowest-rated construct was Employee Involvement/Participation, with a mean of 3.78 (SD = 0.90). While still above the midpoint of the scale, this score suggests there may be room for improvement in involving employees in safety-related decision-making processes. Notably, this construct also had the widest range of responses, with a minimum of 1.00 and a maximum of 5.00, indicating varied experiences or perceptions among respondents.

It's worth noting that all constructs showed some variability in responses, as evidenced by the standard deviations and the ranges between minimum and maximum scores. This variability was most pronounced for Employee Involvement/Participation (SD = 0.90) and Safety Promotional

Policies (SD = 0.79), suggesting diverse experiences or perceptions in these areas across the respondent pool.

Overall, these results paint a picture of a workforce that is highly compliant with safety measures, knowledgeable about safety practices, and actively participates in safety initiatives. The high scores across most constructs suggest that safety programmes are well-established and positively perceived in the surveyed organizations. However, the relatively lower score for Employee Involvement/Participation indicates a potential area for enhancement in safety programme implementation. The strong mean score for Employee Productivity, coupled with high scores in safety-related constructs, suggests a positive relationship between robust safety programmes and perceived productivity, though further analysis would be needed to confirm this relationship statistically.

Table 2. Descriptive Statistic Results for Safety Programme and Productivity

Construct	Minimum	Maximum	Mean	Std. Deviation
Management Commitment	1.86	5.00	4.23	0.75
Safety Participation	2.83	5.00	4.43	0.46
Safety Compliance	3.00	5.00	4.66	0.46
Safety Promotional Policies	1.83	5.00	4.06	0.79
Safety Training	1.40	5.00	4.42	0.70
Safety Knowledge	3.17	5.00	4.60	0.43
Employee Involvement/Participation	1.00	5.00	3.78	0.90
Employee Productivity	2.20	5.00	4.14	0.55

The relationship between the safety programme construct and employee productivity in the Oil and Gas (Indigenous) industry is presented in Table 3. Management Commitment (MC) exhibits a weak positive correlation with EP ($r = 0.15$), suggesting a minimal direct impact on

productivity [19],[20]. Safety Participation (SP) also shows a weak positive relationship with EP ($r = 0.24$), indicating that involvement in safety programmes only modestly influences productivity. Safety Compliance (SC) presents a moderate positive correlation with EP ($r = 0.37$), showing that compliance with safety regulations does contribute to productivity in this industry [12]. Safety Promotional Policies (SPP) and Safety Training (ST) demonstrate weak to moderate positive correlations with EP ($r = 0.29$ and $r = 0.49$, respectively), indicating that while these factors play a role, they are not the primary drivers of productivity. This indicates that promotional strategies are more effective in enhancing productivity in Multinational companies, possibly due to better implementation and communication [21], [22].

Safety Knowledge (SK) exhibits a moderate positive relationship with EP ($r = 0.47$), underscoring the importance of knowledge in ensuring productivity. Employee Involvement (EI) shows a weak positive correlation with EP ($r = 0.22$), implying that engaged employees are somewhat more productive, though the relationship is not strong.

The higher safety parameters such as management commitment, safety compliance, and training correlate with greater productivity. This is supported by [23] and [24], who found that effective safety programmes improve safety performance and productivity.

Table 3: Pearson Correlation between the safety programme and productivity for oil and gas industry (Indigenous)

Construct ⁺	MC	SP	SC	SPP	ST	SK	EI	EP
MC	1.00							
SP	0.31	1.00						
SC	0.38	0.61	1.00					

SPP	0.72	0.44	0.31	1.00				
ST	0.69	0.35	0.32	0.67	1.00			
SK	0.06	0.48	0.45	0.29	0.28	1.00		
EI	0.81	0.45	0.29	0.84	0.71	0.16	1.00	
EP	0.15	0.24	0.37	0.29	0.49	0.47	0.22	1.00

Values in bold are different from 0 with a significance level $\alpha=0.05$

⁺**Construct:** MC=Management Commitment; SP= Safety Participation; SC= Safety Compliance; SPP= Safety Promotional Policies; ST= Safety Training; SK= Safety Knowledge; EI= Employee Involvement/Participation; & EP= Employee Productivity.

The simple linear relationship between the safety programme construct and employee productivity in the Oil and Gas (Multinational) industry is presented in Table 4. Management Commitment (MC) has a stronger positive correlation with EP ($r = 0.35$) compared to the other industries, suggesting that management's role is more influential in driving productivity in this context. Safety Participation (SP) shows a notable positive correlation with EP ($r = 0.56$), indicating that active participation in safety programmes significantly enhances productivity [16].

Safety Compliance (SC) also demonstrates a moderate positive correlation with EP ($r = 0.47$), emphasizing the importance of compliance in maintaining productivity. Safety Promotional Policies (SPP) show a moderate positive relationship with EP ($r = 0.56$), highlighting that effective promotional policies can positively impact productivity. Safety Training (ST) and Safety Knowledge (SK) also exhibit moderate positive correlations with EP ($r = 0.46$ and $r = 0.52$, respectively), further supporting the importance of knowledge and training in enhancing productivity. This suggests that continuous safety education is more impactful in Multinational firms as opined by [18]. Employee Involvement (EI) shows a moderate positive correlation with

EP ($r = 0.51$), suggesting that engaged employees are more productive in this industry. This suggests Multinational companies have more effective employee engagement practices [17].

Table 4: Pearson Correlation between the safety programme and productivity for oil and gas industry (multinational)

Variables	MC	SP	SC	SPP	ST	SK	EI	EP
MC	1.00							
SP	0.22	1.00						
SC	0.47	0.63	1.00					
SPP	0.45	0.50	0.54	1.00				
ST	0.63	0.51	0.62	0.66	1.00			
SK	0.56	0.47	0.70	0.51	0.67	1.00		
EI	0.31	0.57	0.49	0.62	0.64	0.35	1.00	
EP	0.35	0.56	0.47	0.56	0.46	0.52	0.51	1.00

Values in bold are different from 0 with a significance level $\alpha=0.05$

5. CONCLUSION

All the seven constructs subjected to Cronbach Alpha test yielded values from 0.63 – 0.91 ww indicating good internal consistencies.

The descriptive statistics on the seven constructs yielded mean values of 3.78 for Employee Involvement/Participation to 4.66 for Safety Compliance. In other words, safety compliance has the highest rating, while Employee involvement/participation has the least. The variability in the mean distribution of the constructs give credence on their level of sensitivity with respect to safety programs which invariably affect productivity.

The linear relationship between individual constructs and productivity for indigenous oil & gas companies gave a range of values of correlation coefficients from 0.15 (Management Commitment) to 0.49 (Safety training). Apparently, safety training affects employee productivity optimally than other constructs and it should be sustained.

The linear relationship between individual constructs and productivity for multinational oil & gas companies gave a range of values of correlation coefficients from 0.35 (Management Commitment) to 0.56 (Safety Promotional Policies). In effect, Safety Promotional Policies affects employee productivity optimally than other constructs and it should be sustained.

On a comparative basis, the multinational company seems to have higher correlation coefficients with respect to employee productivity against the individual safety constructs; for management construct, the indigenous has 0.15 while multinational has 0.35.

Based on the findings, an increase in workplace safety programmes will leads to an increase in employee productivity in terms of productive time, the accomplishment of tasks, and value-added. Therefore, indigenous companies should improve and invest in effective workplace safety programmes.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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