

# 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 in 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.

**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 Firman (2022), 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 Keraka (2020). Obrenovic et al. (2020) highlight that traditional safety programmes may not address these evolving hazards. While Saleem et al. (2021) emphasize the need for comprehensive safety programmes, many organizations remain hesitant due to limited empirical evidence linking safety to productivity (Ndegwa et al., 2022; Mutegi et al., 2023).

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 (Mora et al., 2020).

## **2. MATERIALS AND METHODS**

Descriptive statistics was adopted as part of the data analysis methods. Descriptive research, according to Shona (2020) seeks to correctly and methodically describe a population, circumstance, or phenomena. What, where, when, and how inquiries can be answered, but why questions cannot. The descriptive cross-sectional research design is often used to determine

whether exposure to specific risk factor is associated with particular outcomes or consequence. Cross-sectional study design is a type of observational study design. In a cross-sectional study, the investigator measures the outcome and the exposures in the study participants at the same time. Unlike in case-control studies (participants selected based on the outcome status) or cohort studies (participants selected based on the exposure status). The participants in a cross-sectional study are just selected based on the inclusion and exclusion criteria set for the study (Setia, 2016). 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**

Structured questionnaire was the research instrument administered to 250 employees. 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.

## 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**

<b>Construct</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
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 (Ehiaguina et al., 2024; Karam and Tasmin, 2020). 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 (Ajmal et al., 2022). 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 (Maduka and Okafor, 2014; Gupta and Shaw, 2014).

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.

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

Construct <sup>+</sup>	MC	SP	SC	SPP	ST	SK	EI	EP
MC	<b>1.00</b>							
SP	<b>0.31</b>	<b>1.00</b>						
SC	<b>0.38</b>	<b>0.61</b>	<b>1.00</b>					
SPP	<b>0.72</b>	<b>0.44</b>	<b>0.31</b>	<b>1.00</b>				
ST	<b>0.69</b>	<b>0.35</b>	<b>0.32</b>	<b>0.67</b>	<b>1.00</b>			

SK	0.06	<b>0.48</b>	<b>0.45</b>	<b>0.29</b>	<b>0.28</b>	<b>1.00</b>		
EI	<b>0.81</b>	<b>0.45</b>	<b>0.29</b>	<b>0.84</b>	<b>0.71</b>	0.16	<b>1.00</b>	
EP	0.15	<b>0.24</b>	<b>0.37</b>	<b>0.29</b>	<b>0.49</b>	<b>0.47</b>	<b>0.22</b>	<b>1.00</b>

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

<sup>+</sup>**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 (Dahl and Kongsvik, 2018).

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 Hanaysha (2016). 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 (Miller and Monge, 1986).

**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	<b>1.00</b>							
SP	<b>0.22</b>	<b>1.00</b>						
SC	<b>0.47</b>	<b>0.63</b>	<b>1.00</b>					
SPP	<b>0.45</b>	<b>0.50</b>	<b>0.54</b>	<b>1.00</b>				
ST	<b>0.63</b>	<b>0.51</b>	<b>0.62</b>	<b>0.66</b>	<b>1.00</b>			
SK	<b>0.56</b>	<b>0.47</b>	<b>0.70</b>	<b>0.51</b>	<b>0.67</b>	<b>1.00</b>		
EI	<b>0.31</b>	<b>0.57</b>	<b>0.49</b>	<b>0.62</b>	<b>0.64</b>	<b>0.35</b>	<b>1.00</b>	
EP	<b>0.35</b>	<b>0.56</b>	<b>0.47</b>	<b>0.56</b>	<b>0.46</b>	<b>0.52</b>	<b>0.51</b>	<b>1.00</b>

*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.

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