



Safety Practice and Employee Productivity in Selected Mining Firms in Ebonyi State, Nigeria

Lilian Obiageli Orogbu¹, Chinedu Uzochukwu Onyeizugbe² and ³Ewans Chukwuma
Department of Business Administration, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

Abstract

There is growing uncertainty about the application of safety practices for the desired employee productivity. This uncertainty arises from a disagreement from two schools of thought as to whether or not safety practices have a direct impact on the productivity of mining firms. This disagreement has resulted to ineffective application of safety practices in securing a healthy working environment necessary for operational excellence. Therefore, this study, sought to establish the correct link between safety practices and employee productivity of selected mining firms in Ebonyi State. The specific objectives of the study are: to determine the extent to which safety culture relates to production output of employees and to ascertain the extent to which safety procedures relate to work input of employees of the selected mining firms in Ebonyi State. The study employed a correlational design such that structured questionnaire designed in 5-point likert scale was administered on the sample of two hundred and eighty four (284) drawn from the three senatorial districts of Ebonyi State, out of which, 270 copies were returned, and subsequently used for the analysis. The data collected from respondents were analyzed with Pearson Product Correlation Coefficient via SPSS version .20. The study employed component factor analysis using varimax rotation to ensure the usability and suitability of the research instrument. Also, for sampling adequacy Bartlett Test of Sphericity and Kaiser-Meyer-Olkin were employed. Test retest approach was employed such that Cronbach alpha coefficient was used to determine the reliability of the research instrument. The study revealed that there is a significant and positive relationship between safety culture and production output of employees ($r = 0.83$) and a significant and positive relationship between safety procedures and work input of employees. From the findings, the study concludes that there is a significant relationship between safety practices and employee productivity. The implication of the result is that effective utilization of safety practices will provide convivial and healthy working environment necessary for improved production output and therefore recommended that management of these firms should take effective measure in ensuring full comply with safety practices of their organizations through hierarchy of control-system-mechanism.

Keywords: Safety Practices; Safety Culture; Safety Procedures; Productivity,

1. Introduction

Organizations whether construed as political, socio-technical, and rational systems, are increasingly demanding for superior skills, operational capability, higher productivity, and improved work-related attitudes from their workers [1]. They exert considerable efforts and time in resource mobilization, allocation and utilization in meeting the demands of the changing business environment without paying adequate attention to safety practices of their workers. Issues relating to safety practices in organizations have over the years, elicited several contentions with respect to employee's safety at work place. These agitations arisen due to the apparent nature of work environment especially in construction/mining industries where employees' are susceptible to environmental health hazards emitting from mining activities [2]. Sustaining a safe, healthy and supportive work environment is essentially a driving force of high performing organizations [3].

The reality and relevance of maintaining a safe and healthy work environment is relatively accredited to the work of Drill [4] who is known to have affirmed the imperativeness of maintaining a safe and healthy work environment as a prerequisite of improving organizational productivity. The aforementioned is predicative of the fact that a safety/healthy working environment create a convivial platform through which workers put in their efforts towards attainment of organizational goal. Safety practices in organization remains a current concern in the management of modern organizations whose operations have the potentiality of exposing workers to environmental health hazards. The seeming complexities of environmental health hazards in mining firms as evidenced in Ebonyi State mining sector brought into limelight the need for these firms to engender effective safety practice mechanism to forestall the recurrent work-related-hazards that may have hampered their productivity level in meeting the demands of the environment.

Ebonyi State is located in the South East geopolitical zone of Nigeria and it's made up of thirteen (13) Local Government Areas. The State is naturally endowed with mineral resources across the three senatorial districts of Ebonyi South, Central and North, respectively. The mineral resources include Lead Ore, Zinc Ore, Lime stone, Salts, etc., which have attracted over thirty (30) mining firms in Ebonyi State. The presence of these firms appears not to have ingrained and engendered effective safety practices in their operations to have yielded the desired expectations in their productivity level. The increasing rate of environmental health hazards as evidenced in the widespread of work disruptions emanating from work-related hazards raised strong arguments on the need to entrench effective safety practices for the desired performance.

Mining businesses often times pose health challenges on the workers which must not be undermined. For instance, pollution, dust, welding fumes, noise, chemical hazards and environmental degradation that arise due to mining activities have the potentiality of exposing the workers to environmental health hazards. Therefore, the susceptibility of workers to health hazards in mining firms heretofore call for the entrenchment of safety culture and safety procedure as multi-dimensions of safety practices in addressing issues relating to safety concerns of the workers. Therefore, safety practice is an organizational function, which ensures that all safety risks have been identified, assessed and satisfactorily mitigated [5].

Regrettably, these firms seemed to have allocated considerable attention, time and resources in exploring mineral resources in an attempt to meet the demands of the environment without paying adequate attention to safety practices on their operations. Achieving and sustaining a healthy working environment is sacrosanct in enhancing employee working capacity towards attainment of organizational goal. Environmental health hazards, for instance, body injuries, amputation, illnesses, strain injuries, muscular pain etc., that arise due to mining activities in Ebonyi State appears to be high, which may be an indicative of inefficient application of safety culture, safety procedures that would have protected the workers from these hazards. The application of safety practices of some mining firms may not have been effectively institutionalized to forestall the negative impact of environmental health hazards on their workers and therefore have a negative effect on their productivity. This study has become necessary in order to determine the underlying net effect(s) of the interactions of safety culture and safety procedures on the productivity of these firms.

The general objective of this study is to ascertain the degree of relationship safety practices of selected mining firms in Ebonyi State relates to their productivity. Specifically, the study seeks:

- i) To determine the extent to which safety culture relates to production output of employees of the selected mining firms in Ebonyi State.
- ii) To ascertain the extent to which safety procedures relate to work input of employees of the selected mining firms in Ebonyi State.

2. Conceptual Review

2.1 Safety Practices

Safety means freedom from the occurrence or risk of injury or loss. Safety is the protection of workers from any form of work-related hazards [6]. Safety can as well be referred to as the absence of injuries due to the interaction of the employee and the work environment [7]. Safety means a condition of being safe from the surge of environmental health hazards. Therefore, Safety practices are generally written methods outlining how to perform a task with minimum risk to people, equipment, materials, environment, and processes. Having a clear understanding of the dimensions and imperativeness of sustaining a safety and healthy working environment in generating the desired superlative performance heretofore made organizations to place emphasis on safety practices in order to buoy up employee commitment to work. The aforementioned is in congruence with the findings of Ewans, Olai and Offor [8] that organizations seldom achieve its organizational objectives without employees' commitment to work which is quintessential in high driving high performance organizations.

2.1.2 Safety Culture

Safety culture synchronizes with organization's safety-policy-statement enshrined as a working document of a typical organization that guides every segment of operations in securing healthy working environment. Safety culture is essentially an integral part of organizational culture that conscientiously integrate individual's perception, attitudes, pattern of behaviour and organization's safety concern in ensuring healthy working environment in organization [9]. Research findings according to Brown [10] have showed that the increasing rate of workplace related health hazards are results of breakdown in firm's policies, safety culture and procedures that were established to deal with issues relating to safety concern of the workers. Safety culture in this context is measured with stipulated safety policies, procedures, and beliefs of the organization. However, a sustainable safety culture could be engendered following management commitment to safety practices, care and concern for hazards shared across the workforce.

2.1.3 Safety Procedures

Safety procedures are well-articulated and generally accepted pattern of how work should be done within the whims and caprices of operations management in order to reduce work-related-hazards in organization [11]. It explains the pattern through which work should be done in order to forestall the increasing rate of environmental health hazards. Safety procedures are mostly entrenched in manufacturing and mining firms where workers are vulnerable to work-hazards relative to others. Safety procedures help organization to cushion the effect of work-related hazards through a careful work design, processes and implementation. For organizations to achieve efficiency on safety procedures call for tenacious monitoring and control of job flow processes to ensure compliance to standard.

2.1.4 Productivity

Productivity is the efficient employment and utilization of resources, labour, time, materials and information in the production of goods and services. Higher productivity means accomplishing more with the same amount of resources or achieving higher output in terms of quantity and quality from the same input. This is usually expressed as output/ Input ratio [12]. In general, labour productivity is equal to the ratio between a measure of output volume and a measure of input use (the total number of hours worked). Productivity in this context is measured with product output and employee work input. Therefore, labour productivity measurement could be represented mathematically as:

$$\text{Labour Productivity} = \frac{\text{Output volume}}{\text{Labour input used.}}$$

2.2 Theoretical Framework

The underpinning theory of this study is anchored on Domino's safety theory and Person-Environment (PE) fit theory.

2.2.1 Domino's Safety Theory

Domino's safety theory was propounded by Bird and Loftus [13]. The theory assumes that work-related-hazards could be personal or work-related-factors. The theory identified personnel factors to include personal problems, mental problems, illness, bad attitude and lack of operational skills needed for the job while work-related-factors include inadequate work, normal or abnormal wear and tear, low-quality equipment, and bad design or maintenance. The theory believes that these hazards constitute a bottleneck on operations management because it hampers the free flow of job processes in organization.

Organizations have to provide suitable protection for the probable risks that may arise due to personnel or work-related. The level of the protection must be defined logically in such a way that it should not cost more than required and, vice versa, not to be less than associated probable risks to be occurred. For instance, workers susceptibility to work-related hazards induces the organizations to incurable loss due to decreased productivity. To keep the company's productivity, to gain opportunities for the company, and to prevent unwanted and undesirable expenses are the main purposes in an organization. Therefore, such purposes can be threatened by unsafe acts and unsafe conditions. Unsafe acts and unsafe conditions as immediate causes play the most significant role in creating losses [14]. The theory believes that management at all levels has an important role in averting work-related risks by effective implementation of safety polices in organizations.

2.2.2 Person-Environment Fit Theory

Person-Environment (PE) fit theory which was propounded by French and Caplan [15].The theory takes into cognizance the ever changing phenomenon of individual in congruence with the work environment. Person-environment fit believes that environment of operations present various challenges, for instance, health, safety, work-related-hazards as he/she interact in a work environment. The theory assumed that human behaviour and attitudes is a function of the person and the environment and that a person's vocational satisfaction, stability and achievement depend on the congruence or fit

between the person and the environment in which the person works. In other words, the person environment fit is not a static model but a very dynamic one. It helps to delineates how employees choose environment fit or misfit that affects employee’s productivity. The theory is one of the few conceptualizations of a person’s relationships to the environment that encompasses such a broad range of relationships.

The person-environment fit theory is focused on interactional psychology generally accepted formula as, $B=f(P-E)$ which states that behaviour is a function of the person and the environment. The person environment fit orientation assumes that the congruence between individual characteristics and environmental characteristic predict attitudes and behaviour [16]. It is clear that what makes a good fit today may not be a good fit tomorrow but it solely depends on the stability of the variables on which matches are made. Some characteristics may be more changeable. For instance, Personality and values are mainly used to analyze person environment fit. Although, both personality and values are viewed relatively stable, values are less stable than personality and susceptible to various work-health hazards. Therefore, while fit in terms of personality similarity may be relatively stable, fit in terms of value congruence may change overtime. The person environment fit theory emphasizes that individual workers are susceptible to certain stimuli arising from the environment of operations. The theory argues that individual workers respond to its environment, therefore organizations should make the environment conducive for the desired performance. The following are the assumptions of the theory:

- i) Employee interaction with the changing environment to a large extent determines whether or not the situation is stressful or not.
- ii) The environment of operations influences workers perception, disposition, psychological and mental status in a work place.

This theory relate to the present study because it laid emphasizes on how employees’ respond to certain stimuli arising from the environment. The environment of any business could either make or mar employee job performance. Therefore, organizations should make the environment conducive for effective deployment of resources in meeting the demands of the changing environment.

3. Methodology

The study was a cross-sectional study that employed a correlational research design in establishing the degree of relationship between studied variables. Structured questionnaire drawn on 5 point scale rating was administered on the sample of two hundred and eighty four (284) drawn from the three senatorial districts in Ebonyi State. Two hundred and eighty four (284) copies of questionnaire were administered, out of which, 270 copies were returned, and subsequently used for the analysis. The data collected from respondents were analyzed with Pearson Product Correlation Coefficient via SPSS version .20. The study employed component factor analysis using varimax rotation to ensure the usability and suitability of the research instrument. Also, for sampling adequacy Bartlett Test of Sphericity and Kaiser-Meyer-Olkin were employed. Test retest approach was employed such that cronbach alpha coefficient was used to determine the reliability of the research instrument. The reliability results were 0.87 and 0.85 safety culture on production output and safety procedures on employee work input of the selected mining firms in Ebonyi State.

4. Results

Table 1: Components Factor Analysis			
Component extractions and items	Factor	Mean	Cronbach’s α if
Factor One: safety culture and production output	Loadings	Scores	item deleted
Safety policy guides employees’ activities	0.7640	5.9011	.798
Organizational health policy averts hazards	0.8735	4.5628	.889
Output in increased via healthy environment	0.8563	3.9016	.865
Efforts put in at workplace enhances output	0.9826	5.8752	.809
Reliability result = 0.88, eigenvalue =73.91, % variance =54.701 and Mean score =4.2625, $\chi^2 = 520.731$. KMO= 0.625.			
Factor Two: Safety procedures and work input of employees			

Work pattern determines work-hazards	0.823	4.632	.878
Organized work procedure engenders output	0.910	3.672	.881
Hours gainfully used at work results to increased output	0.845	3.981	.700
Time is of essence in achieving increased output.	0.710	3.672	.814
Reliability result = 0.76, eigenvalue =68.659, % variance =20.601 and Mean score =5.540. $\chi^2 = 410.562$. KMO= 0.529			

Computed by the researcher, 2018.

Table 1 above shows the component factor analysis of the instrument involving the use of varimax rotation for the study. A test re-test method on a pilot study was employed in an attempt to ascertain the internal reliability of the instrument. The employment of component factor analysis was appropriate in exploring sampling adequacy, which was shown by the Bartlett Test of Sphericity ($\chi^2 = 520.731$, $p < 0.000$) and the Kaiser-Meyer-Olkin measure of sampling adequacy was greater than 0.5 (KMO = 0.625), which show that use of factor analysis was appropriate. Further inspection of the correlation matrix for the factorability of R indicated that many coefficients were above 0.30, another strong evidence for the suitability of factor analysis. The resultant factor structure explained 54.701 per cent of the variance with eigenvalues greater than 0.5. More so, there was considerably evidence of high communalities subsisting across each scale components. In addition, the Cronbach's alpha (α) for each instrument was respectively calculated to establish the constructs of the component extractions.

Factor 2 above shows 20.601 percent variation in the four items loaded for safety procedures and work input of employees' of the selected mining firms in Ebonyi State, Nigeria. The overall mean score of the four items is 5.540 and the mean scores of all the constructs were also above .30. This means that the four measuring instruments were respectively significant in measuring safety procedures and work input of employees. The result of the Cronbach's alpha (α) values of the four instruments ranged from .700 to .881, respectively. Therefore, α coefficient of the total was 0.76, which is absolutely considered good indicators of reliability of the instrument.

Table 2: Correlation Analysis of Safety culture and Production output of employees of the selected mining firms in Ebonyi State.

		Safety Culture	Production output
Safety Culture	Pearson Correlation	1	.826**
	Sig. (2-tailed)		.000
	N	270	270
Production output	Pearson Correlation	.826	1
	Sig. (2-tailed)	.000	
	N	270	270
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 3: Correlation Analysis of Safety procedures and work input of employees of the selected mining firms in Ebonyi State.

		Safety procedures	Work input
Safety procedures	Pearson Correlation	1	.760**
	Sig. (2-tailed)		.000
	N	270	270
Work input	Pearson Correlation	.760	1
	Sig. (2-tailed)	.000	
	N	270	270

** . Correlation is significant at the 0.01 level (2-tailed).

5. Discussion of Findings

The correlation result in Table 2 shows that there is a significant positive relationship ($p=0.000$) between safety culture and production output of the selected mining firms in Ebonyi State, Nigeria. This was shown by a strong correlation coefficient (r) of (0.83). This implies that any level increase on the level of safety culture will substantially result to increase on production output of employees by 83% significantly. This implies that the entrenchment of safety culture would create a healthy working environment for operational ascendancy among employees for improved production output of the selected mining firms in Ebonyi State, Nigeria.

More so, the correlation result in Table 3 also shows that there is a significant relationship ($p=0.000$) safety procedures and work input of employees of the selected mining firms in Ebonyi State, Nigeria. This was shown by a strong correlation (above average) coefficient (r) of (0.76). The implication of the correlation coefficient (r) is that as the workers comply with the safety procedures of the organizations, it will streamline their mining activities for efficient work input that result to improved productivity. The result suggests that any unit increase on the level of compliance on the safety procedures will result to increased work input by 76% significantly.

6. Conclusion

From the findings, the study concludes that there is a significant and positive relationship between safety practices and employee productivity. The implication of the positive relationship is that the more these firms engender effective safety culture and safety procedures will result to significant increase in their productivity level. The study, however, provided empirical evidence that safety culture and safety procedures significantly predict the productivity level of these firms. The results of the correlation points to the need for mining firms to pay adequate attention to issues relating to safety practices in addressing the problem of environmental health hazards because the exposition of workers to work-related-hazards have a negative implications on the production output of these firms.

7. Recommendations

In the light of the findings, conclusion drawn and the following recommendations are made:

The mining firms should pay adequate attention to issues relating to safety practices generally in lieu of securing a healthy working environment because the growing incidence of environmental health hazards have the potentiality of truncating employee productivity to work, as a result, jeopardize the actualization of organizational goal.

The management of these firms should take effective measure in ensuring full comply with safety practices of their organizations through hierarchy of control-system-mechanism. This approach utilizes hazards elimination methods, wet methods, and personal protective equipments to forestall the susceptibility of workers to environmental health hazards. The implementation of hierarchy-control-system directly on work-related-hazards will create a healthy working environment capable of enhancing employee work commitment, which in turns, results to improved productivity.

The management of these firms should effectively educate/counsel their workers especially on issues relating to safety culture and procedures generally as a means of equipping them towards proper identification and dealing with the issues in ways that will reduce both the growing incidence of work-related-hazards and its negative effect on their productivity

level. For instance, there should be regular seminars and workshops on the apparent use of those personal protective equipments such as face mask, helmet etc., in pre-empting work-related hazards for the desired performance.

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