

Workplace Safety as an Engineering Drive to Workers Productivity in Production Industries

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ABSTRACT

This study focused on Workplace Safety as an Engineering Drive to Workers Productivity in Production Industries. The study was guided by two research questions and hypotheses which are consistent with the research objectives. It adopted survey research approach in its design and covered a population of 253 members of staff from where a sample of 155 members of staff was drawn using Taro Yamene formula. The data used in the study was generated from both Primary and Secondary sources and was analyzed using the Chi-square test (X^2) with the aid of the 23.0 version of statistical package for social sciences (SPSS) software. The study based on its findings concludes that enhanced workers productivity must be pursued in a workplace that is safety compliant and that takes into cognizance the employees characteristics in its design and layout. It was therefore recommended that teaching of safety rules in production industries should be made a continuous process and not just a one off event at the orientation program for new employees, Organizational reward system should be designed to accommodate a special package for safety compliant staff, this will help entrench safety culture in production firms, Organizations should ensure safe work spaces and equipment in order to improve their employees' efficiency and that Organizations should also take into cognizance the need to ensure that communication and interactions are enhanced among its staff members

Keywords: Ergonomic Work Environment, Productivity, Safety Rules, Workplace safety

INTRODUCTION

The study of employees' productivity is one that has its root to the formal study of the management of industrial organizations. This is so because the very essence of management is the attainment of organizational goals within the least waste of resources. To achieve this requires an understanding of individual workers whose outputs crystallizes to organizational performance. As important

as workers productivity is to the organization, it cannot be insulated from organizational work environment, it therefore behooves on the management to provide a workplace environment that is both safe and supportive of the employees. Workplace safety which is also regarded as industrial safety was defined by [1] and revised in 1995 as the promotion and maintenance of the

highest degree of physical, mental and social well-being of workers in all occupation. The definition above streamlined workplace safety into three critical areas which include physical; this border on physical work environment addressing issues of workspace, work equipment, workplace design etc. The mental aspect addresses cognitive health while social well-being is concerned with the social interactions among workers and all other issues of sociological importance. Not meeting these, the physical, psychological and sociological safety of the workers may be endangered and this may affect their productivity greatly.

Productivity according to the [2], is a relationship between outputs and inputs. It rises when an increase in output occurs with a less than proportionate increase in inputs, or when the same output is produced with fewer inputs. The concept of productivity can be viewed from different levels; individual's productivity may be reflected in employment rates, wage rates, stability of employment, job satisfaction or employability across jobs or industries. At organizational level, in addition to output per worker, productivity may be measured in terms of market share, profitability and overall

corporate goal attainment. At societal level, productivity can be gleaned from increased competitiveness and employment or in a shift of employment from low to higher productivity sectors. Brady (2000) state that, perhaps none of the resources used for productivity in organizations are so closely scrutinized as the human resources. Many of the activities undertaken in an HR System are designed to affect individual or organizational productivity. Pay, appraisal systems, training, selection, job design and compensation are HR activities directly concerned with productivity. [3] Continues to state that controlling labour costs and increasing productivity through the establishment of clearer linkages between pay and performance are considered to be key human resource management (HRM) component of competitive advantage. In addition, increased concerns over productivity and meeting customers' requirements have prompted renewed interest in methods designed to motivate employees to be more focused on meeting (or exceeding) customer requirements and increasing productivity. This study therefore shall investigate the impact workplace safety has on the ability of the employees to be very productive

STATEMENT OF THE PROBLEM

Today's industrial organizations are focusing efforts at acquiring new technologies that enhance the output of their employees. While this may not be out of place, it may have contributed to the increasing level of industrial accident and reduced workers productivity, this may not be unconnected to the failure of organizations to entrench organization wide workplace safety culture and poor enforcement of safety policies where they exist. Employees in an industrial environment are exposed to a wide variety of work-related injuries, potential

irritants, temperature swings, and at times, difficult working conditions. These can lead to visible industrial accidents such as puncture wounds, bruises, scalds, sprains, contusions, fractures, dislocations, crush injuries, amputations, asphyxiation, lacerations, electrocution, fractures, head injuries and unspecified injuries among others. The cost of these problems on the organization includes reduction in productivity, dampening confidence and commitment which leads to both poor satisfaction and failure to achieve productivity targets.

OBJECTIVES OF THE STUDY

The central objective of this study is to examine the impact of industrial safety on worker's productivity; however, it was aimed at meeting the following specific objectives

- i. Examine the impacts of ergonomic work environment on employees efficiency
- ii. Examine the impacts of the availability of safety rules on employee's commitment

Research Questions

The study was guided by the following research questions;

- i. What is the impact of ergonomic work environment on employee's efficiency?
- ii. What is the impact of the availability of safety rules on employee's commitment?

Hypotheses

The following tentative null hypotheses were made for this study;

H₀₁: Ergonomic work environment does not have significant impact on employee's efficiency

H₀₂: Availability of safety rules does not have significant impact on employee's commitment

REVIEW OF RELATED LITERATURES

Conceptual Framework

Industrial safety

Industrial safety is primarily concerned with investigation of facts by logic and knowledge on a safe working condition to ensure that personnel and equipment operate harmoniously in a defined working environment which will not encounter unexpected or inadvertent events that would result in industrial accident. It is also the provision and maintenance of plant and systems of work in an industry that are safe and without risks to human health. Industrial safety is therefore understood in this study to mean the management of safety activities within a certain industry for the purpose of reducing risks and injuries in a certain occupational function. The field of occupational Safety and health is concerned with preserving and protecting human and human resources in the workplace. Practitioners in the field try to prevent needless deaths and worker-related accidents. It is also concerned with improving organizational quality and efficiency. For example, safety professionals review the way products are moved from place to place and how to minimize product movement and redundant handling to reduce exposure to possible injuries. This approach not only benefits the employees in term of lower exposure to industrial accidents, but also tend to decrease processing times and

improve the efficiency of operation. By reducing the number of times a product is touched, they may also improve quality. Industrial safety professionals attempt to eliminate property and facility damage, waste, and cost that lessen an organization's ability to operate profitability [4].

The goals of occupational safety and health programmes include fostering a safe and healthy work environment. OSH may also protect co-workers, family members, employers, customers, and many others who might be affected by work-related risks. Since 1950, the International Labour Organization (ILO) and the World Health Organization (WHO) have shared a common definition of occupational health and safety. It was adopted by the Joint ILO/WHO Committee on Occupational Health and Safety at its first session in 1950 and revised at its twelfth session in 1995. The definition reads: Occupational health and safety should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in

an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job.

The inception of OSH regulations/bills in Nigeria runs from the introduction of the Labour Act of 1974 to the passage of the Labour, Safety, Health and Welfare Bill of 2012. During the above period, the Factories Act of 1987 (now known as Factories Act of 1990), which [5] reports as a substantial revision of the Factories Act of 1958 (i.e. colonial legislation), the Workman's Compensation Act of 1987, the Labour Act of 1990, the Workman's Compensation Act of 2004, the Employee's Compensation Act of 2011 (which repeals the Workman's Compensation Act of 2004) were introduced; some of these laws are criticized as inadequate. Unfortunately, despite the existing industrial safety regulations that responsible for not only levy fine but also seek criminal prosecution of business owners and managers who willfully neglect the safety and health of their employees, many employers have not had to bear the full cost of injuries and killing members of their workforces. Workers uninformed and unaware of their legal rights; they have often shouldered the costs of business not operating safely.

Ergonomics Work Environment

Ergonomics can roughly be defined as the study of people in their working environment. More specifically, an ergonomist (pronounced like *economist*) designs or modifies the work to fit the worker, not the other way around. The goal is to eliminate discomfort and risk of injury due to work. In other words, the employee is our first priority in analyzing a workstation. [6], define workplace environment as composition of three major sub-environments which include the technical environment, the human environment and the organizational environment. According to them technical environment refers to tools, equipment, technological infrastructure and other physical or technical elements of the workplace. The human environment includes the peers, others with whom employees relate, team and work groups, interactional issues, the leadership and management. The human environment can be interpreted as the network of formal and informal interaction among colleagues; teams as well as boss-subordinate relationship that exist within the framework of organizations. Such interaction (especially the informal interaction), presumably, provides avenue for dissemination of information and knowledge as well as cross-fertilization of ideas among employees. The third type of work environment, organizational

environment includes systems, procedures, practices, values and philosophies which operate under the control of management. In the words of [7] organizational environment refers to the immediate task and national environment where an organization draws its inputs, processes it and returns the outputs in form of products or services for public consumption. The task and national environment includes factors such as supplier's influence, the customer's role, the stakeholders, sociocultural factors, the national economy, technology, legislations, managerial policies and philosophies. All these go a long way in influencing people's psych and attitude towards work

Employee Productivity

According to [8], productivity is a measure of the quantity and quality of work done, considering the cost of the resources used. The more productive an organization, the better its competitive advantage, because the costs to produce its goods and services are lower. Better productivity does not necessarily mean more is produced; perhaps fewer people (or less money or time) was used to produce the same amount. [9] further states that, results are usually the final and specific outputs desired from the employee. Results are often expressed as products or services for an internal or


external customer, but not always. They may be in terms of financial accomplishments, impact on a community; and so whose results are expressed in terms of cost, quality, quantity or time. He further notes that measuring productivity involves determining the length of time that an average worker needs to generate a given level of production. You can also observe the amount of time that a group of employees spends on certain activities such as production, travel, or idle time spent waiting for materials or replacing broken equipment. The method can determine whether the employees are spending too much time away from production on other aspects of the job that can be controlled by the business.

Determinants of Workers Productivity

Factors that influences or determines how productive an employee can be are discussed below under two broad categories, though this list is not exhaustive

1. Organizational Factors

Various environmental factors are reviewed based on what already exist while linking them to productivity. These include work environment, infrastructure and employee appraisal.

 *Work Environment:* Employees need to have essential tools to carry out

their duties. This consists of appropriate equipment, machinery and computer technology and also sufficient lighting, working space and ergonomically-correct seating [10]. Poor work conditions owing to physical components leads to low production levels and an overall job dissatisfaction. The second one particularly, if it is not considered it makes employees feel unappreciated and eventually they may quit [11]. [12] were of the opinion that a safe working environment leads to increased level of job satisfaction and this can help the organization to retain employees for a longer time. This makes the organization to have an experienced workforce which is more skilled and perform better at work.

✚ *Work Infrastructure:* [13], were of the opinion that lack of open office layout leads to an isolated working environment that hinders employees from interacting freely with their colleagues and thus influence cases of employees' turnover. In addition to make working environment suitable, organization should be well prepared in case of an emergency situation. [14], stated that electrical and other hazards should be avoided in the workplace through proper maintenance, work equipment should be frequently serviced and safety precautions, such as wearing safety goggles and other safety gears that includes helmets, gloves or

steel-toed work boots, should be enforced by the organization.

✚ *Performance Appraisal:* Employers use several approaches to measure employee productivity. Budget-conscious employers track several core measures related to employee performance. Employee productivity or the relative efficiency of how employees produce goods or provide services is a part of a larger package of measures, including overtime rates, annual employee turnover and staff satisfaction [15]. All these measures taken together give executives insight on how to achieve superior performance from their workforce.

✚ *Employee Rewards:* According to [16] designing and implementing an effective reward system is a critical human resources activity which influences the attainment of performance targets and effectiveness of an organization to deliver on its mission and mandate. A reward system is a very important tool in managing the human capital and failure to reward the staff for their collective and individual efforts often leads to dissatisfaction manifested in various forms for example industrial strikes, go slows or the so called wild cat strikes and grievances against the employer [17]. This affects productivity and leads to loses in terms of lost man hours, high staff turnover and loss of profits or revenue. When hardworking

staff or those who put in extra efforts in their work are not rewarded for their efforts, the level of dissatisfaction is phenomenal.

2. Employee Factors and Productivity

In this sub-section, employee characteristics and how they affect productivity are reviewed as follows

✚ *Education:* [18], asserted that education in general is a kind of learning where knowledge, skills, and habits of a group of people are passed from one generation to the next one through teaching, training, or research. Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational.

✚ *Age:* According to [19] labor markets differ in how employment opportunities are allocated among people of different ages. Employment rates for people of different ages are significantly affected by government policies with regard to higher education, pensions and retirement age. The employment rate for a given age group is measured as the number of employed people of a given age as a ratio of the total number of people in that same age group.

✚ *Gender:* According to [20] gender inequality is an intricate phenomenon. Stripped of all technicalities, gender inequality is the differential treatment

and outcomes that deny women the full enjoyment of the social, political, economic and cultural rights and development. It is also argued that gender is relational and social and hence, the focus is not on women per se but on power relations between men and women and among those of the same gender in various settings [21].

✚ *Training and Experience:* Training is the process that enables people to acquire new knowledge, learn new skills and performs tasks differently and better than before [22]. Its objectives are to teach employees how to perform particular activities or a specific job. [23], stated that, smooth and efficient running of any organization depends directly on how well employees are equipped with relevant skills. New employees will need some form of training before taking up their jobs while older employees will need some of training to keep them abreast of technology development. Therefore employees must be from time to time trained to perform better in their present positions and to prepare them for transfer, promotion and introduction of new technology and ways of doing things. Thus training involves changing in skills, knowledge, attitudes or behaviour. This may mean changing what employees know, how they work, or their attitude towards their jobs, co-workers, managers and the organization [24]. For a

successful safety programme, safety education and training are necessary for personnel in the factory as well as in whole organization. Safety education has developed safety consciousness among employees and results in safety when handling of equipment [25]. It also ensures safe work performance on part of every employee by developing his skill in the use and operating safe equipment.

An effective organization wishes to have amongst his ranks individuals who are qualified to accept increasing responsibilities. Though it is true that unplanned learning through job experience helps development, the experience of most organizations is that it is advantageous to plan systematic training program of various types as a regular part of an adequate personal development programmes [26]. Such programmes are definite assets in helping managers to learn correct job methods to achieve a satisfactory level of job performance and to acquire capabilities that would be valuable in possible future jobs. Work experience is any experience that a person gains while working in a specific field or occupation, but the expression is widely used to mean a type of volunteer work that is commonly intended for young people often students to get a feel for professional working environments [1]. The American equivalent term is internship. Trainees

usually have the opportunity to network and make contacts among the working personnel, and put themselves forward for forthcoming opportunities for paid work. Work experience contributes to a person's achievements, engagement, skills and progression [6]. Successful work experience significantly increases motivation, self-esteem and attendance develop key and employability skills, helps learning to be applied in wider contexts outside school [8].

✚ *Marital Status:* According to [13] it is against the law to discriminate against anyone in the workplace because of their actual or assumed marital status. Marital status refers to whether someone is, or is not, single, married, divorced, widowed, separated or with a domestic partner. Employees are protected from discrimination at all stages of employment including recruitment, workplace terms and conditions and dismissal.

Female or male, married or single - worker marital status can have an impact on perceptions of employees where some organizations rate a married female job applicant less suitable for employment than a single counterpart with identical qualifications [9]. The married woman is often seen as less willing to work long hours, less committed to advancing in the company, more distracted by social responsibilities and outside work, and

less likely to succeed on the job. On the other hand, married male applicants tend to be perceived more positively in line with predictions that a recently married woman's job performance and dedication

would decline over time, but a recently married man's dedication would arise [17]. This difference made people more willing to lay off the woman than the man.

METHODOLOGY

The research design for this study is the survey. The choice of survey design is appropriate since the number of element (population) under study is known and data was gathered using questionnaire. The population for this study consists of all the 253 personnel of ---, the researchers used the Taro Yamene method to determine the sample size which is given as $(n) = 155$ members of staff, however, only the 137 validly filled and returned questionnaire was used for the analysis. The data used in this study was generated from both primary and secondary sources the major instrument for data collection however was a five

point likert scale questionnaire titled: industrial safety and workers productivity questionnaire (IS&WPQ). The statistical tools used for data analysis is the chi-square test (X^2) at 5% (0.05) level of significance. The chi-square test is mathematically expressed as; $\chi^2 = \Sigma (E-O)^2 / E$ where X^2 = Chi - square, Σ = Summation, O = Observation and E = Expected frequency. The analysis was carried out with the aid of the 23.0 version of statistical package for social sciences (SPSS). The decision rule is to accept H_0 if $X^2_{tab} > X^2$ otherwise reject and accept H_1 if $X^2_{tab} < X^2_{cal}$ otherwise reject

TEST OF HYPOTHESES

In this section, the researcher used Chi-square test (X^2) to test the hypotheses stated in this study.

Hypothesis One

H₀₁: Ergonomic work environment does not have significant impact on employee's efficiency

Responds on Research Question One

| S/NO | SA | A | U | D | SD | TOTAL |
|--------------|------------|------------|------------|-----------|-----------|------------|
| 1 | 19 | 55 | 39 | 15 | 9 | 137 |
| 2 | 22 | 63 | 44 | 6 | 2 | 137 |
| 3 | 25 | 69 | 38 | 5 | 0 | 137 |
| 4 | 20 | 68 | 41 | 8 | 0 | 137 |
| 5 | 16 | 59 | 45 | 13 | 4 | 137 |
| TOTAL | 102 | 314 | 207 | 47 | 15 | 685 |

Source; *field survey, 2019*

NPARTESTS
 /CHISQUARE=EWEandEE RANKS
 /EXPECTED=EQUAL
 /STATISTICS DESCRIPTIVES
 /MISSING ANALYSIS.

NPar Tests

| | Descriptive Statistics | | | | |
|----------|------------------------|---------|----------------|---------|---------|
| | N | Mean | Std. Deviation | Minimum | Maximum |
| EWEandEE | 25 | 27.4000 | 22.77060 | .00 | 69.00 |
| RANKS | 25 | 3.0000 | 1.44338 | 1.00 | 5.00 |

| | Test Statistics | |
|-------------|-------------------|-------------------|
| | EWEandEE | RANKS |
| Chi-Square | .920 ^a | .000 ^b |
| Df | 23 | 4 |
| Asymp. Sig. | 1.000 | 1.000 |

a. 24 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.0.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 5.0.

From the SPSS output above. The $X^2_{cal} < \text{the level of significance } (0.000 < 0.05)$, we therefore reject the null hypothesis and accept the alternate which states that ergonomic work environment has significant impact on the efficiency of workers in production industries.

H₀₂: Availability of safety rules does not have significant impact on employee’s commitment

Responds On Research Question Two

| S/NO | SA | A | U | D | SD | TOTAL |
|--------------|-----------|------------|------------|------------|-----------|------------|
| 1 | 10 | 29 | 41 | 40 | 17 | 137 |
| 2 | 19 | 42 | 37 | 32 | 7 | 137 |
| 3 | 23 | 41 | 29 | 33 | 11 | 137 |
| 4 | 10 | 32 | 35 | 46 | 14 | 137 |
| 5 | 26 | 47 | 38 | 26 | 0 | 137 |
| TOTAL | 88 | 191 | 180 | 177 | 49 | 685 |

Source; field survey, 201

NPARTESTS
 /CHISQUARE=ASRandEC RANKS
 /EXPECTED=EQUAL
 /STATISTICS DESCRIPTIVES
 /MISSING ANALYSIS.

NPar Tests

| Descriptive Statistics | | | | | |
|-------------------------------|----|---------|----------------|---------|---------|
| | N | Mean | Std. Deviation | Minimum | Maximum |
| ASRandEC | 25 | 27.4000 | 13.28533 | .00 | 47.00 |
| RANKS | 25 | 3.0000 | 1.44338 | 1.00 | 5.00 |

| Test Statistics | | |
|------------------------|--------------------|-------------------|
| | ASRandEC | RANKS |
| Chi-Square | 3.000 ^a | .000 ^b |
| Df | 19 | 4 |
| Asymp. Sig. | 1.000 | 1.000 |

a. 20 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.3.
 b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 5.0.

From the SPSS output above. The $X^2_{cal} < \text{the level of significance } (0.000 < 0.05)$, we therefore reject the null hypothesis and accept the alternate. This implies that the availability of safety rules can significantly impact on the commitment of employee's

DISCUSSION OF FINDINGS

From the SPSS output for hypotheses 1 and 2, it was discovered that workplace safety has a very strong positive and significant impact on employee's productivity. The $X^2_{cal} < 0.05$ in the two hypotheses respectively (i.e $0.000 < 0.05$), we therefore rejected the null hypotheses

and accepted the alternates. Furthermore, no significant difference was noticed on the degree of impact of workplace safety proxies under study, it was therefore concluded that the level of impact is the same

CONCLUSION

Workers productivity has been established by this study to be engineered by a variety of factors, it is the conclusion of this study that enhanced workers

productivity must be pursued in a workplace that is safety compliant and that takes into cognizance the employees characteristics in its design and layout.

RECOMMENDATION

In line with the findings and conclusion above, the researchers recommend that;

made a continuous process and not just a one off event at the orientation program for new employees

- I. Teaching of safety rules in production industries should be

- II. Organizational reward system should be redesigned to accommodate a special package for safety compliant staff, this will help entrench safety culture in production firms
- III. Organizations should ensure safe work spaces and equipment in

order to improve their employees' efficiency

- IV. Organizations should also take into cognizance the need to ensure that communication and interactions are enhanced among its staff members.

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