

Ergonomics as a Panacea for Workers Turnover and Productivity: A Study of Engineering Firms in Port Harcourt

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Date of Submission: 30-08-2020

Date of Acceptance: 08-09-2020

ABSTRACT: The study seeks to investigate impact of ergonomics on workers' productivity. The objective is to examine the impact ergonomics on workers performances. The study used a structured questionnaire to obtain data from 132 workers of different engineering firms under the study. Statistical package for social sciences (SPSS) version 23.0 was used for data analysis. Findings from the study revealed that ergonomics have a significant relationship with workers performance as it was discovered that it determines the productivity and rate of turnover. It was recommended among others that firms should ensure that general work environment is improved so as to optimize workers performance , reduce job accident and rate of turnover in the workplace.

keyword: ergonomics, workers, productivity, safety

I. INTRODUCTION

Globalization has awoken engineering organizations to its continues voyage towards modernization as it faces terrific challenges of 21st century. This rapid changes and development has raised concern on ergonomics. Due to this changes, more occupational accident and injuries at work place are the order of the day, as this are making headline news all over the globe . Ergonomics(or human factor) can be conceptualized to denote as the science concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system

performance (IEA,2000). Ergonomics explains the industrial or organizational relationship that exists between the workforce, machine, process, layout, furniture and fittings and the working environment. An understanding of a potential ergonomics risk by workers in their work environment is vital to the worker's survival in the organization as consequences of neglect are fatal like death and disability. Ergonomic factors that possibly exist in work place according to (Baba et al 2011) include repetitive motion, static posture, heavy lifting, forceful exertion, expose to excessive vibration etc. The lack of alertness by the workers on the existence of the potential ergonomics risk factors at their surroundings might endanger their safety and health of workers in the facility. Ergonomics examines the relationship which exists between machines and human beings, along with the effort to improve that relation.

An organizational environment or work site have the capacity to influence workers motivation .Workplace environment can influence workers : health and safety, error rate, level of innovation, collaboration with other employees, absenteeism and, ultimately, how long they stay in the job. According to Taiwo (2010), 86% of productivity challenges dwells in the organizations environment. Organizational environment has effect on its employees performances and level of commitment to a task.

Ergonomics as the scientific study of human work, gives an understanding of the physical and mental capabilities and thus the limits of the worker as they interacts with tools,

equipment, work methods, tasks and the working environment. The essence of ergonomics in the work place is to improve health and safety by: reducing the potential for accidents, reducing the potential for injury and ill health, reduce near miss and improves performance and productivity.

It has been misconceived in the past that the level of workers performance on the job is relative to the amount of the workers compensation package. While some organizational behaviorist might have a claim to this effect, Leblebici, (2012) was of the opinion that while, praise and recognition, compensation and financial reward impact on employee performance, compensation packages has been identified as a vital extrinsic motivational tools for improvement of workers productivity, it has a limited short term effect on employees' performance. A generally established assumption is that enhanced workplace environment motivates staff and produces excellent results. Basically, a well-designed and functional workplace environment often culminates in improved employee efficiency and productivity.

Yanar et al (2019) noted that risk of physical injuries in the work place increases extensively (3.5 times) among employees with risk exposures and under the support of their supervisor, as compared to peers with low exposure and direct support. In the same vein (Russo et al 2019), stressed the need to act to improve the mental well-being of workers to minimize their exposure to states that could pose a risk to their health while at work. Hanvold et al. (2019) in their study proved that ergonomic factors along with psychosocial factors, such as the worker's autonomy and a safe work place, are connected with an increased risk of injury for young workers. This is in consonance with the assertion of (Mansour, 2016), who stated that physical efforts continue to pose grave damage to workers' health and, as a result, the organizational efforts should be aimed at ergonomic and safe working environment. This is because according to (Natt et al .2017), a Sustained physical work can be responsible for bodily injury to workers, which in turn causes huge losses to the business in terms of money, time, and productivity. A number of safety and health organizations have proposed rules and regulations that limit workers' efforts so as to alleviate possible bodily injuries.

Furthermore, the Washington State Department of Labor and Industries (2002), was of the opinion that if workers needs to adapt and are exposed to a job that surpass their body's physical limitations, the workers can sustain injury, especially with Work-related Musculoskeletal

Disorders (WMSD's), which is responsible for more than 40% of all Washington State Fund workers' compensation claims among office workers. Also (Carnevale 1992, Clements-Croome 1997) as stated in their work, that studies on multiple offices and office buildings have pointed out that issues such as dissatisfaction, cluttered workplaces and environment are playing a significant role in the loss of workers productivity virtually in all firms.

The advancement of scientific knowledge concerning the understanding occupational accident rates, the search for causality, and subsequent data treatment which borders on reducing those rates in the workplace is the priority raised by this article. Over the years, occupational accident rates continues to give firms more concern with its significant socioeconomic implications virtually in all nations. The competitiveness of organizations and its performances are, in turn, conditioned by this setbacks because the worker's productivity is affected, and as a result, production costs increase and negatively impact on organizations performance.

An understanding of the importance of ergonomics in the work place is crucial as workers are bound to experience some discomfort, pains, fatigue, stress and some muscular disorder due to an awkward and unscientific posture, repeated movement on task and intolerable temperature and this, can adversely affect the musculoskeletal human system.

II. STATEMENT OF PROBLEM

The association between workers physical and mental well being in the engineering firms over the years have not been given a fair treatment due to the failure to understand the impact of ergonomics factor on the performance of employees especially in the work environment. One of the most demanding specialization that is engulfed with workers constant exposure to machine and tools of mechanical nature is the engineering field. (Siegrist and Marmot, 2004) noted that A working environment that implies placing high demands on people and that little supervision over the completion of tasks have adverse long-term health-related consequences. Studies conducted by (Russo et al 2019, Harvey et al.2018 and Giorgi 2014) have all emphasizes on the need to reduce workplace risk and exposure so as to minimize a health threatening situations that could pose a risk and distort workers both physical and mental wellbeing. These have contributed to the rate of employee's resignation and turnover as most workers end up losing their sanity, part of the

body, prestige, sight, hearing and in most cases live.

Regrettably, most engineering firms in rivers state have fail to understand that factors such as location and placement of both tools and machine, workflow system, sitting arrangement, temperature and in most cases lightening , repeated motion and sound have great impact on the performances of its workers. It is base on this background that the researchers sort to investigate the impact of ergonomics on the performances of engineering firms in Port Harcourt

Objective of the Study

The objective of this study is to

- I. Examine the effect of Cognitive ergonomics and mental well being of workers in engineering firms in Port Harcourt.
- II. Examine the impact of Physical Ergonomics and productivity of people at work place in engineering firms in Port Harcourt.
- III. Assess the impact of ergonomics on employee’s turnover. in engineering firms in port Harcourt .

Hypotheses of the Study

The following are the hypotheses of the study:

- I. Cognitive ergonomics have no significant impact on workers performances workers in engineering firms in port Harcourt.
- II. There is no significant relationship between Physical Ergonomics and productivity of people at work place in engineering firms in port Harcourt.
- III. Ergonomics have no impact on the turnover rate of employees in engineering firms in Port Harcourt.

III. METHODOLOGY

The study was conducted in port Harcourt using a descriptive survey research design and a well structured questionnaire to solicit and obtain data from 150 workers of the three selected organization in port Harcourt (Titan Energy limited, Acexpert Group, CNIS Limited , Webtech Networks limited ,UFT Engineering limited, Henob Engineering services limited , NEXVEN Nigeria Limited, Keton Technology and Neoxyt global services limited) .

However, due to unavailability of large population of staff in those branches due to the 2020 Covid-19 pandemic, a convenient sample technique was used to select a sample of 15 workers in each of the firm to make a total of 150 workers selected from each of the firms above for this study .However, only 132 respondent was found useful for further study and analysis making the sample size to be 132. The questionnaire was structured in five (5) sections (Section A – E). Section A compose the demographical variables of the respondents, Section B contains five (5) vital questions on ergonomics, Section C contains relevant questions firm performances , Section D contains relevant questions on cognitive ergonomics and employees functionality , E contains relevant questions on physical ergonomics and turnover .Data was analyzed with the help of Pearson Moment Coefficient Correlation using SPSS 23.0.

IV. DATA ANALYSIS AND INTERPRETATION

Test of Hypotheses and Interpretations

Regression and Correlation analysis were used to measure the effect of independent variable on dependent variables. All the hypotheses are tested with the help of .Pearson Product Moment Correlation Coefficient.

Table 1: Decision Rule

| S/N | P Value | | Decision Rule |
|-----|---------|-----------------|------------------------|
| 1. | < 0.05 | Significant | Reject Null Hypotheses |
| 2. | > 0.05 | Not Significant | Accept Null Hypotheses |

Hypothesis One

Restatement of Hypotheses

HO₁: Cognitive ergonomics have no significant impact on workers performances in engineering firms in Port Harcourt.

The objective is to examine the impact of Cognitive ergonomics and workers performance in engineering firms in Port Harcourt.

Table 2 Correlations

| | | Cognitive Ergonomics | Workers Performance |
|----------------------|---------------------|----------------------|---------------------|
| Cognitive Ergonomics | Pearson Correlation | 1 | .494** |
| | Sig. (2-tailed) | | .002 |
| | N | 132 | 132 |
| Workers Performance | Pearson Correlation | .494** | 1 |
| | Sig. (2-tailed) | .002 | |
| | N | 132 | 132 |

*. Correlation is significant at the 0.05 level (2-tailed).

Interpretation

Table 4.30 above reveal the output of correlation analysis carried out to check the impact of cognitive ergonomics on workers. The result reveals that there is a moderate relationship between cognitive ergonomics and workers performance with r value 0.494 (49.4%) and p value of 0.002 which is less than 0.05 level of significant. This implies that there is a moderate positive relationship between Cognitive ergonomics and workers performance in engineering firms in Port Harcourt which is significant since p value is 0.002 which is less than the 0.05 level of significant. The decision will be to reject the null hypothesis which stated that Cognitive ergonomics have no significant impact on workers performances in engineering firms in port Harcourt and accept the alternate hypothesis.

This suggest that the mental process such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system with a special emphasis on mental workload, decision-making, skilled performance, human-computer interaction, human reliability, work stress and training affects the performances of workers in the organization

Hypothesis Two

Restatement of Hypotheses

HO₁: There is no significant relationship between Physical Ergonomics and productivity of people at work place in engineering firms in Port Harcourt.

The objective is to examine the impact of Physical Ergonomics and productivity of people at work place in engineering firms in Port Harcourt.

Table 3Correlations

| | | Physical Ergonomics | productivity of people |
|------------------------|---------------------|---------------------|------------------------|
| Physical Ergonomics | Pearson Correlation | 1 | .647** |
| | Sig. (2-tailed) | | .000 |
| | N | 132 | 132 |
| productivity of people | Pearson Correlation | .647** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 132 | 132 |

** . Correlation is significant at the 0.05 level (2-tailed).

Interpretation

Table 3 above reveal the output of correlation analysis carried out to check the relationship between Physical Ergonomics and productivity of people at work place in engineering firms in Port Harcourt.

The result reveals that there is a strong relationship between Physical Ergonomics and

productivity of people at work place .with r value 0.647 (64.7%) and p value of 0.000 which is less than 0.05 level of significant. This suggests that there is a strong and positive relationship between Physical Ergonomics and productivity of people at work which is significant since p value is 0.000 which is less than the 0.05 level of significant. The decision will be to reject the null hypothesis and

accept the alternate hypothesis. This suggests that human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity with focus on working postures, materials handling, repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health etc determines the level of productivity of employees in that work environment .

Hypothesis Three

Restatement of Hypotheses

HO₁: Ergonomics have no impact on the turnover rate of employees in engineering firms in Port Harcourt.

The objective is to assess the impact of ergonomics on employee’s turnover. in engineering firms in port Harcourt .

Table 4 Correlations

| | | Ergonomics | Functional Value |
|---------------|---------------------|------------|------------------|
| Ergonomics | Pearson Correlation | 1 | .521** |
| | Sig. (2-tailed) | | .003 |
| | N | 132 | 132 |
| Turnover rate | Pearson Correlation | .521** | 1 |
| | Sig. (2-tailed) | .003 | |
| | N | 132 | 132 |

** . Correlation is significant at the 0.05 level (2-tailed).

Interpretation

Table 4.34 above shows the result of correlation analysis between the impacts of Ergonomics on turn over. The table shows that ergonomics have a strong impact on employees turnover rate with r value =0.521(52.1%) and p value 0.003. This means that the relationship is strong at 0.003 level of significance which is less than 0.05. This implies that the null hypothesis earlier stated that Ergonomics have no impact on the turnover rate of employees in engineering firms in Port Harcourt will be rejected and alternate hypothesis upheld. This also means that physical and mental capabilities of worker as he or she interacts with tools, equipment, work methods and the working environment especially a poor one which threatening the workers life and is viewed un-conducive to carry out operation can lead to workers leaving the organization and seeking job opportunity in another company. An excessive turnover rate affects firms performances.

V. CONCLUSION

This study examined the impact of ergonomics on workers productivity. from the foregoing analysis, it is worth knowing that Ergonomics can greatly benefit the productivity of employees in the organizations. This is because a good working environment saves workers from

both injury , near miss incidence and from reaching burnout stage soon. It is therefore concluded in this work that ergonomics has a significant relationship with the rate of workers turnover in the firm. Engineering firms focus should be on stressing upon both on workers mental and physical well being. It was further discovered in this work that repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health etc determines the level of productivity of employees in that work environment. This is because ergonomics helps both the firm and its employees to improve productivity, quality, employee’s engagement, safety and reduce employees compensation resulting from job related injuries.

Engineering firms attention should focus on improving workers work life balance and also enhancing the general working environment of the firm which will make the workers comfortable in exercising their full potentials and also motivate their work force and reduce the turnover rate through constant evaluation of the ergonomic factors.

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