



**ERGONOMICS AND THE PERFORMANCE OF MICRO-FINANCE BANK WORKERS IN ENUGU STATE,
NIGERIA**

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ABSTRACT: the focus of this paper was on understanding the place of ergonomics in workers performance. The study adopted the survey research approach and covered a population of 109 employees from five selected micro-finance banks in Imo State, Nigeria. The data used in the study were generated from both primary and secondary sources. However, the major instrument for data collection was a five point likert scale questionnaire titled Ergonomics and Workers Performance questionnaire (EandWPQ). The data gathered were analysed using Pearson Product Moment Correlation Coefficient (PPMCC) and simple regression analysis with the aid of the 20.0 version of statistical package for social sciences (SPSS). It was therefore concluded by this paper that ergonomics has enormous effects on the performance of workers. In line with the findings and conclusion above, this paper recommends that Ergonomics should be leveraged as a policy and strategic drive towards enhanced workers performance. Moreover, achieving job-man-equipment-fit should be a prime guide in developing task performance process.

KEYWORDS: efficiency, ergonomics, creativity, job design, productivity, safety, office design

INTRODUCTION

In an effort to curb employees' disengagement from the workplace, it has become a new challenge for top management to develop work environment that attracts, retain and motivate its workforce. Organizations are stepping outside their time-tested policies and comfort zones to develop new work environment that satisfy both the psychological and the physical needs of the employees at its core. They are creating work environments where people enjoy what they do, feel like they have a purpose, have pride in what they do and are allowed to reach their full potential. This paradigm may not be unconnected with the new thinking that the work environment affects employee morale, productivity and engagement- both positively and negatively. Furthermore, it is not just a twist of fate that new programs addressing lifestyle changes, work life balance, health and fitness that were previously not considered key benefits are now primary considerations of potential employees, and common practices among the most admired companies. Today's work environment is different, diverse and constantly changing. The typical employer/employee relationship of old has been modified significantly. Workers are living in a growing ICT driven economy, hence, information and access to job opportunity information are easier and closer. This combination of factors has created an environment where the business needs its employees more. The Nigerian telecommunication industry is witnessing a "close race" competition, making it expedient for telecommunication companies in Nigeria to strive to retain their talented workforce. Beyond competitive remuneration, telecommunication companies are leveraging workplace design (ergonomics) to attract and keep highly skilled personnel in the industry. How well this work environment design contributes to employees' performance is the task of this study to resolve. Moreover, the question of industrial safety is fast changing the way workplaces and jobs are designed. While workplaces are designed to suit employees deficiencies like concern for the physically challenged employees, jobs are designed not just to reduce and/ eliminate industrial hazards but ensure that the health of the employees like avoiding sitting all day long is factored in. All this are aimed at achieving one thing; work environment-employee-job-fit. Roeloelofsen, (2002), posits that ergonomics is a science concerned with the 'fit' between people and their work. It puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that tasks, equipment, information and the environment fit each worker. By assessing people's abilities and limitations, their jobs, equipment and working environment and the interaction between them, it is possible to design safe, effective and productive work systems.

Another significant definition of ergonomics is given by the Cambridge dictionary as the scientific study of people and their working conditions, especially done to improve effectiveness

(dictionary.cambridge.org). Commenting on the relevance of ergonomics to employees' performance, Taiwo (2010), states that work systems do not only affect commitment, competence and cost effectiveness but also have long term effects on physical health, mental health and longevity of employees. One major benefit derived from pursuing office ergonomics is that it reduces the risk of injury by adapting the work to fit the person instead of forcing the person to adapt to the work. In addition to injury prevention, ergonomics is also concerned with enhancing work performance, by removing the barriers that exist in many work places that prevent employees from performing to the best of their abilities. This ultimately helps people work more effectively, efficiently, and productively at their jobs (Washington State Department of Labor and Industries, 2002). According to the Washington State Department of Labor and Industries, ergonomics improvements to the work environment are primarily used to create a safer and healthier work environment, and that a company may experience other benefits including increased productivity, increased work quality, reduced employee turnover, reduced absenteeism, and increased morale. Employees' performance is a very significant factor affecting profitability of an organization (Bevan, 2012). Inefficient job performance will create problem for the organization with respect to lower productivity, profitability and impairment of overall organizational effectiveness (Okoyo & Ezejiolor, 2013). As pointed out by Viswesvaran and Ones (2000), job Performance is the core construct of today's work place. Job performance is defined as behaviors or activities that are performed towards achieving the organization's goals and objectives. Performance is important for organizations as employee performance leads to business success and performance is important for individual as accomplishing tasks can be a source of satisfaction (Muchhal, 2014).

STATEMENT OF PROBLEM

Due to increasing flux of investment in Nigeria, organizations are experiencing incredible pressures to become more efficient, while simultaneously maintaining a high level of responsiveness to environmental changes. These pressures are translated into intense demand on employees and their collective performance. However, the right processes and facilities required to meet these demands are in most cases lacking. This puts a snag on the effectiveness and efficiency of the employees. Employees' creative capacity cannot be maximized if the management fails to provide the right behavioural environment for innovativeness to thrive. To be efficient both at individual and organizational level is to reduce waste in the organization to its barest minimum. Organizations today need to reduce waste in the areas of industrial accident compensation which creates loop holes for both lost man hour and finance. Organizations need to achieve certain level of environment-employee-job-fitness if the employees must be at their best always which impacts on

their abilities to deliver on the job for which they are hired and the satisfaction which they seek from their job. Hence, where ergonomics is not considered as a continuous organizational policy and strategic attempt to enhance employee's performance, the organization will be faced with both employees' productivity problem and market competition challenges. Therefore, the research problem is to examine how organizations attain improved employees performance through ergonomic practices.

OBJECTIVES OF THE STUDY

The broad objective of this study is to assess the influence of ergonomics on employee performance. The specific objectives are;

- i) Determine the influence of the job design on employees' efficiency
- ii) Examine the influence of workplace safety on employees' creativity
- iii) Ascertain the influence of office design on employees' productivity

HYPOTHESES

The researcher made the following null hypotheses for this study

H₀₁: Job design does not have significant influence on employees' efficiency

H₀₂: Workplace safety does not have significant influence on employees' creativity

H₀₃: Office design does not have significant influence on employees' productivity

REVIEW OF RELATED LITERATURE

Ergonomics is the scientific discipline that is concerned with understanding of the interactions among humans and other elements of a system. It applies theory, principles, data and methods to design, so as to improve human well-being and overall system performance (International Ergonomics Association (IEA, 2000). Ergonomics aims at designing the workplace so that it will fit the needs and physical capabilities of employees, instead of physically forcing the worker's body to fit the job, (Ghosh et al, 2011). Ergonomic factors that can elicit job satisfaction could be derived from a wide range of issues that emanate from the workplace. For instance, if work environment is poorly designed, it could hinder or slow down the employee's performance in the workspace, and this could eventually lead to frustration which, in turn, affects job satisfaction. According to IEA (2012) Ergonomics (or human factors) is the scientific discipline 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. The United Kingdom based Health and Safety Executive (HSE), in 2003 defined Ergonomics as the scientific study of human work. It considers the physical and mental capabilities and limits of the worker as he or she interacts with tools, equipment, work methods, tasks and the

working environment. The publication further postulates that the application of Ergonomics to workplace improves health and safety by: reducing the potential for accidents, reducing the potential for injury and ill health and improves performance and productivity.

Many business executives are under the mistaken impression that the level of employee performance on the job is proportional to the size of the employee's compensation package. Although compensation package is one of the extrinsic motivation tools, it has a limited short term effect on employees' performance. A widely accepted assumption is that better workplace environment motivates employees and produces better results (Leblebici, 2012). Essentially, an elegant and functional workplace environment often culminates into improved employee efficiency and productivity. In recognition of this fact, most offices are now designed and furnished with the employee in mind to ensure that his workplace environment including furniture and equipment adequately support and induce high performance. The quest to situate employees in a most suitable workplace environment, furniture, equipment, tools and techniques to discharge their duties efficiently and effectively is the fundamental philosophy behind the development and growth of ergonomics. The performance of an employee is measured actually by the output that the individual produces and it is related to productivity. At corporate level, productivity is affected by many factors such as employees, technology and objectives of the organization. It is also dependent on the physical environment and its effect on health and employees' performance (Al-Anzi, 2009).

ERGONOMIC RISK FACTORS

Ergonomic risk factors include extreme forces, awkward postures, repetitive motions, mechanical stresses and vibration.

- i. **Force:** Force refers to the physical effort that is required to complete a task. Force is used in almost any application involving lifting, reaching, pinching, pushing and pulling. In some cases the application of a high force is needed by placing a mechanical load on muscles, tendons, ligaments and joints. As muscles effort increases to the response of higher task loads, the circulation to the muscles decreases causing the muscles to fatigue more rapidly (Putz-Anderson, 1988). When force requirements are high or demanding on an individual and a suitable amount of recovery time is not available during the task, then soft tissue injuries will occur. Armstrong's (1986) stated that acceptable limits of force on different parts of the body are conditioned by variables of age, sex, body build and general health, all of which determine the tolerable amount of force available.
- ii. **Mechanical stresses:** Mechanical stresses are injuries that are caused from hard, sharp edges, equipment and or instruments. The injuries generally occur while grasping, leaning, balancing, pushing or pulling. The muscles or tendons of the worker are impaired due to being

pressed against the hard or sharp edges of the object. It is the considered opinion of Warren and Sanders (2004) that force, pressure and compression of tissues against structures increases internal pressure which results in swelling of tissues and increases in the development of musculoskeletal diseases. When employees are using tools, the grip forces are transmitted to the soft tissues that underlie the tool. If the tool grip has a hard surface or is equipped with sharp edges, then the forces used to operate the tool will concentrate to a smaller area, thereby increasing the pain and tissue damage to that area.

iii. Vibration: Exposure to vibration generally comes from machines, vehicles and equipment throughout the workplace. Warren and Sanders also stated that when vibration is applied to the body, it causes oscillations in tissues and a bodily response will follow. The response will generally depend on frequency, direction, intensity, acceleration, point of application and the posture of the body at the point of vibration contact. The most prevalent types of musculoskeletal illnesses that employees could potentially encounter are cumulative trauma disorders of: tendon disorders, nerve disorders and neurovascular disorders.

ERGONOMIC CONTROLS

According to the British Standards Institution, (2007), the development of ergonomic controls must be carefully planned before implementing in the workplace. Management will justify the reasoning and cost of controls by prioritizing their implementation. The typologies of ergonomic controls according to the British Standards Occupational Health and Safety Management Systems are;

- ❖ **Elimination:** According to Marriarn-Webster's Dictionary (2008), elimination is defined as the act, process, or an instance of eliminating or discharging. When the risk of injury is apparent, the company must try and eliminate the risk if possible. Eliminating hazards throughout the workplace, work processes and entering the workplace, is the most effective method of control. It is easier and more efficient to eliminate hazards in the design stage because the exposure is not yet present
- ❖ **Substitution:** In the case that elimination is not practical or sufficient, appropriate steps must then be taken in order to reduce the risk through the control method of substitution. Substitution can be used with workplace hazardous materials and work processes. The substitution of work processes can include changing process procedures to provide workers with a safer workplace and a reduced exposure to hazards. An example of this could include using pneumatic tools rather than using manual tools in a manufacturing process to reduce the demanding manual work involved.
- ❖ **Engineering controls:** Engineering controls are physical changes to jobs that control employee exposure to risk without depending on the employee to protect themselves against

potential risks. Successful ergonomic projects are achieved primarily through implementing engineering controls which consist of changing tools, controls, piece presentation, workstations, and workflow to reduce or eliminate risk factors (Wynn, 2004). According to Putz-Anderson (1998), engineering controls try to achieve control over the job risk factors that are associated with the development of Cumulative Trauma Disorders (CTD's). Clark (2004), states that the goal of engineering controls is to "design out" ergonomic hazards. This is done by adjusting the demands of the job with an engineered improvement instead of expecting the worker to adjust their human capacity to the job demands. Implementing engineering controls will not only limit the apparent hazards to workers in the workstation, but optimize comfort, efficiency and total job satisfaction.

❖ **Administrative controls:** This control refers to actions taken by management or medical staff to limit the potential health effects on workers (Putz-Anderson, 1988). This is done by modifying personnel functions. Manuele (2008) signifies that administrative controls include: selecting personnel, applying or changing work methods and procedures, training, supervising, motivating workers, modifying behaviors, scheduling, rotating jobs and breaks, maintaining equipment, managing change and investigating, and inspecting. Stromme (2004), believes that administrative controls can be affected by human error and should not be relied upon to reduce risk exposure every time.

❖ **Personal protective equipment:** In the event that engineering and or administrative control fails to make significant effect on reducing or eliminating hazards, then PPE should be used to ultimately protect the worker from potential hazards and risks. PPE is a last resort mechanism in the hierarchy of hazard controls. PPE may include but is not limited to safety glasses, hearing protection, breathing apparatuses, face shields, safety shoes or boots, gloves, and helmets. PPE may be utilized when engineering controls are not feasible or are in the process of being developed, when safe work practices do not provide sufficient protection, and in the case of an emergency (Stromme, 2004).

CONCEPT OF EMPLOYEE PERFORMANCE

Every organization requires highly performing individuals in order to ensure competitive advantage and attainment of corporate goals. High employee performance is therefore one of the critical determinants of the level of organizational productivity and accomplishments. Accomplishing tasks and performing at a high level can be a source of satisfaction, with feelings of mastery and pride. In defining the concept of employee performance, Campbell et al., (1993) as cited in Sonnentag (2002) differentiates between an action (i.e. behavioural) aspect and an outcome aspect of performance. The behavioral aspect refers to what an individual does in the work situation. It encompasses behaviors such as assembling parts of a car engine, selling personal computers, teaching basic

reading skills to elementary school children, or performing heart surgery. The outcome aspect refers to the consequence or result of the individual's behavior. The above described behaviors may result in outcomes such as numbers of engines assembled, pupils' reading proficiency, sales figures, or number of successful heart operations. In simple terms, employee performance can be defined as the extent to which an organizational member contributes to achieving the goals of the organization.

FACTORS AFFECTING EMPLOYEE PERFORMANCE

Al-Anzi (2009) suggests that the key factors that affect employee productivity and performance fall into two categories: Management driven factors and Factors that arise from premises, offices or factory design.

A. Management Driven Factors: Al-Anzi also identifies the following as some of the management driven factors that tend to affect employee's productivity and performance:

- Organization plans such as the allocation of responsibilities at all levels of the organization, definition of job descriptions and the degree of access to the management and administrative support needed to complete their tasks
- Working patterns, shift-working, break times, absence or holiday cover; and
- Health and safety policies, including the provision of training, development of safe working practices and the adequate supply of protective clothing and equipment

B. Factors that arise from premises, offices or factory design: Al-Anzi proceeded to further identify the following as the key premises or office factors that tends to affect employee productivity and performance:

- Furniture
- Workspace availability
- Light intensity
- Weather/temperature
- Ventilation/humidity
- Noise/vibration
- Premises hygiene/welfare facilities

METHODOLOGY

The design for this study is the survey research and it covered a population of 109 employees from five selected micro-finance banks in Imo State, Nigeria. The data used in this study were generated from both primary sources and secondary sources. However, the major instrument for data collection was a five point likert scale questionnaire titled Ergonomics and Workers Performance questionnaire (EandWPQ). The statistical tools used for data analysis are Pearson Product Moment

Correlation Coefficient (PPMCC) and simple regression analysis using the 20.0 version of statistical package for social sciences (SPSS). The formula for PPMCC is as shown below;

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where, r = Pearson correlation coefficient, x = Values in first set of data, y = Values in second set of data and n = Total number of value

RESULTS AND DISCUSSIONS

In this section, we used Pearson Product Moment Coefficient (PPMC) techniques to test the three hypotheses stated in this study with the aid of statistical software known as the SPSS Software version 20.00.

H₀₁: Job design does not have significant influence on employees' efficiency

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1901.796	1	1901.796	66.091	.000 ^b
	Residual	230.204	8	28.775		
	Total	2132.000	9			

a. Dependent Variable: Job design

b. Predictors: (Constant), employees' efficiency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.949	2.422		1.218	.258
	Employees' efficiency	.827	.102	.944	8.130	.000

a. Dependent Variable: Job design

Since the p-value or sig. (0.000) < the alpha level (0.05), we reject the null hypothesis and conclude that job design has significant effect on employee's efficiency

H₀₂: Workplace safety and health does not have significant influence on workplace employees' creativity

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.679 ^a	.460	.393	15.20293	.460	6.827	1	8	.031

a. Predictors: (Constant), Health and Safety

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1577.868	1	1577.868	6.827	.031 ^b
	Residual	1849.032	8	231.129		
	Total	3426.900	9			

a. Dependent Variable: Employee's creativity

b. Predictors: (Constant), Health and Safety

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.770	7.293		1.888	.096
	Health and Safety	.838	.321	.679	2.613	.031

a. Dependent Variable: Employee's Creativity

Since the p-value or sig. (0.031) < the alpha level (0.05), we reject the null hypothesis and conclude that employee's health and safety programmes makes positive influence on employee's creativity

H₀₃: Office design does not have significant influence on employees' productivity

Descriptive Statistics

	Mean	Std. Deviation	N
Office Design	21.5000	17.74041	10
Employee's Productivity	22.4000	17.63960	10

Correlations

		Objective Feedback	Organizational Productivity
Objective Feedback	Pearson Correlation	1	.831
	Sig. (2-tailed)		.020
	N	10	10
Employee's Productivity	Pearson Correlation	.831	1
	Sig. (2-tailed)	.020	
	N	10	10

Since the p-value or sig. (0.02) < the alpha level (0.05), we reject the null hypothesis and conclude that office design has significant effect on employee's productivity

DISCUSSION OF FINDINGS

In this study, the major findings revealed that ergonomics is a strategic tool that can be leveraged to enhance the performance of employees in Nigerian micro-finance banks. The result of the various hypotheses tested in this study lends credence to the assertion above. The result of hypothesis one showed that the p-value is 0.000 which is less than the level of significance (0.05), therefore we reject the null hypothesis and conclude that micro-finance bank employees' efficiency can be enhanced significantly through appropriate job designs that are consistent with employees job characteristics (person-job-fit). In hypothesis two, the null hypothesis was rejected in place of the alternative hypothesis since the p-value was lesser than the level of significance (i.e. $0.041 < 0.05$), therefore we conclude that securing the safety and health of the workers can significantly influence creativity. At 0.020 outputs, hypothesis three proved that office layout and design has significant impact on ban workers' productivity. These findings are in consonance with the view of Pech and Slade (2006) who posits that there are many organizations in which employees encounter working condition problems related to environmental and physical factors. They argued that employee disengagement is increasing and it becomes more important to make workplaces to positively influence workforce. According to Pech and Slade, the focus is on symptoms of disengagement such as distraction, lack of interest, poor decisions and high absence, rather than the root causes. The working environment is perhaps a key root causing employee's engagement or disengagement.

CONCLUSION AND RECOMMENDATIONS

The performance of employees does not only depend on their competencies but on the suitability of the job to his personal characteristics, physical and psychological environment where the job is expected to be performed. It was therefore concluded by this paper that ergonomics has enormous effects on the performance of workers. In line with the findings and conclusion above, this paper recommends that Ergonomics should be leveraged as a policy and strategic drive towards enhanced workers performance. Moreover, achieving job-man-equipment-fit should be a prime guide in developing task performance process

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