



THE CONCEPTUAL FRAMEWORK OF GREEN ERGONOMIC AWARENESS AND EMPLOYEE PERFORMANCE

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1. Introduction

The purpose of this chapter is to explore the relevant literatures related to Green Ergonomics Awareness and Employee Performance. This chapter begins with a review of the problem statement, hypothesis on green ergonomic awareness and employee performance. Next, a review of the literature on the variables for this study and their relationships are explored. Both the independent and dependent variables of the study are analysed to identify the dimensions and the relationship between variables. Past empirical findings of the relevant relationship will be discussed. Finally, the chapter ends with a proposed study framework and the discovery of study approach for the variables

2. Ergonomic Awareness and Employee Performance

Office ergonomics is a commonly acceptable means of offering an enabling atmosphere that best promotes efficiency and overall productivity for employees. There has been a powerful trend for corporate organisations and companies over the previous centuries to reconfigure their office spaces in new design and fresh ways. Furthermore, the revolution to a more enjoyable and flexible workplace setting and the need to satisfy the varied and increasing expectations from distinct employees have resulted into a discussion about how and where productive work is carried out. The study conducted by (Olabode, Adesanya, & Bakare, 2018) examined the effects of ergonomics on employee performance by determining the level of ergonomics awareness in Nigerian organizations, identifying the factors hindering the use of ergonomic, and the best practices and methods adopted by various organizations across industries. Ergonomics or Human Factor design is not just limited to office workplace alone as identified by Chartered Institute of Ergonomics and Human Factors (2017).

A safe workplace is one where the risks are managed and where staff and their managers take steps to improve the work atmosphere and ensure the safety of workers. According to Exemplis Corp (2014), it is difficult for an employee to be productive when physically uncomfortable. Any office provisions (including furniture fittings, level of noise, workstations, lighting, temperature etc.) that makes



employees uncomfortable in the short or long period, can affect productivity. Study shows that an ergonomic office design motivates employees with increase performance. (OLABODE et al., 2018) This is because a working environment without ergonomic inputs can develop musculoskeletal abnormalities (MSDs) among an organization's employees. This disorder has been acknowledged as the most prevalent in the Nigerian agriculture sector of all safety problems (Obi, 2015). This could constantly limit employee effectiveness and performance.

According to Intergovernmental panel on climate change (2007) there is several growing evidence that human activities have resulted in severe degradation of multiple ecosystems services that threatens human well-being in many parts of the world. The need to combat such ecological damage is now of worldwide concern. There is concern on significant mitigation gains could be achieved from better building design and that the biggest potential gains were in developing countries. Large organizations are beginning to incorporate green design principles when building new offices or when refurbishing old ones, and recently, a green building rating system was launched. The environmental benefits associated with green buildings, it has been suggested that such buildings can offer occupants a healthier and more productive workspace. Therefore, by maintaining a healthier workforce can lower direct costs related to insurance and worker's compensation claims. It will also positively impact many indirect costs such as absenteeism and worker productivity (G. et al., 2002) Several authors have noted a number of different points at which ergonomics principles and methods can contribute to improving 'green' building design. These include: the ergonomics of 'green' building construction and building maintenance, ergonomics factors related to demolition, designing for sustainable work that ensures comfort and safety, understanding how 'green' buildings are used by their occupants, and understanding how 'green' building design innovations influence actual occupant behaviour. It also supports the development of the technology that enhances the management of some of the most crowded areas of airspace in the world, whilst maintaining an exemplary safety record.

3. Problem statement

The insufficiency of the ergonomic system is the factor influencing the reduction of this workplace harmony and efficiency. Not to prevent these factors in the workplace will trigger personnel exhaustion, reduced productivity and quality, increased health and safety issues (Isler, Küçük, & Guner, 2018). Regardless of a knowledge of importance to a growing number of researchers, the level of green ergonomics awareness is still low. This has resulted to the inability of decision-makers and employees of organizations to exploit the advantages of ergonomic models and execution in their multiple sectors. This can be observed in the low level of its adoption in academic and research environment. Hence, this research is a critical examination of previous research to evaluate how green ergonomic design and inputs have enhanced employee performance.

4. Research objective:

1. To analyse the impact on furniture on the employee productivity
2. To check the result of equipment influence on the employee productivity
3. To determine the impact of noise levels on worker productivity
4. To view the outcome of lighting on the employee productivity
5. To observe whether temperature influence the employee productivity
6. To examine the outcome of spatial arrangement towards the employee productivity

5. Hypothesis of the study

- H1: There is positive relationship between green ergonomics awareness and employee performance
H2: There is negative relationship between green ergonomics awareness and employee performance

Figure 1. Conceptual Framework

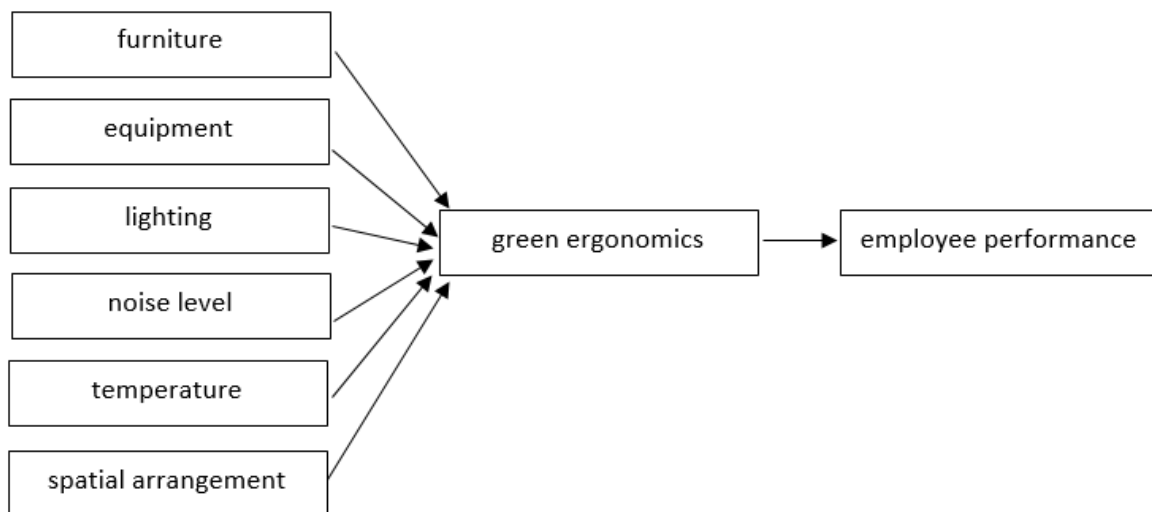


Figure 1. the conceptualized framework structure describes the set of workplace factors perceived to impact on an employee's outcome. These factors, such as noise level, temperature, etc., are fundamentally independent variables that affect employee performance, the dependent variable. According to (Kingsley, 2012) like other ergonomics researchers, revealed that deficiencies in ergonomic design and input factors have significant adverse effects on employee performance.

6. Literature Review

a) Green Ergonomics

According Thatcher, Andrew. (2012), green ergonomics is defined as ergonomics interventions that have a pro-nature focus; specifically, ergonomics that focuses on our affinity with the natural world. He founded that green ergonomics acknowledges that the planet (as a whole) is a closed system such that a disruption in one part of the system will inevitably have repercussions for other parts of the system. Hence, green ergonomics acknowledges the bi-directional relationships with the natural environment; humans influence the health of their natural environment and the health of the natural environment, in turn, impacts on the health and wellbeing of humans. Green ergonomic principles are consist of: eco-efficiency, eco-efficiency, and productivity of eco; ecological resilience; the native system/vernacular; and focuses on learning from natural systems (Thatcher et al, 2014). From an ergonomic green corner, it is not possible to have a human well-being and effectiveness when nature becomes poor and exhausted.

The study also found that green ergonomics play a function on one facet of the connection within the conservation and renovation of natural systems and, actively, the healing of natural structures. Alternatively, the green ergonomics provides a variety of offerings that people can harvest for a spread of human advantages. This green ergonomic element includes exercise centers for the recovery of human psychology and physical hobby, and to draw proposal and innovative energy. The application vicinity is protected in 3 classes as follows: low system design and product resources, green work design, and design for behavioral trade.(Lange-morales, Thatcher, & García-acosta, 2014)

Structures in these plans get credits for green highlights going over vitality, wellbeing and prosperity, water, squander, materials, transport, land use and biology and the board. Reasonable vehicle scores are not founded on movement use but rather dependent on the closeness to public vehicle, vehicle parking areas , bike kind disposition, and so forth.(Oyedokun, Jones, & Dunse, 2015)

(Oyewole & Komolafe, 2018) found that efforts should be made to increase the availability of green features that are eco-efficient such as “design which avoids the need for air condition/cooling system”, “use of recyclable materials”, “water installations, cable materials without PVC” “green common area” and others. The study also revealed that features linked to occupant use benefits such as “materials that protect against local weather”, “use of durable materials”, “indoor materials that are less air toxic” and “location of air intake far from sources of pollution” among others were more incorporated than features that are environmental friendly.

(Komolafe, Oyewole, & Kolawole, 2016) examined that Investment Property Forum (2009) examined the nature and degree of interest for economical workplaces in the UK. The quintessence of the study was to survey the degree to which supportability assumed a job in the inhabitants' last choice of office property. The investigation found that there was an expanding interest for sustainable workplaces yet different elements were progressively significant in deciding the clients' decision of offices.

b) **Lighting**

A study conducted by (Rickards & Putnam, 2012) at a computer-based routines companies, stated that representatives found both the decrease in screen glare and the capacity to modify the errand light at their workstation diminished eye strain, some additionally noticing a decrease in cerebral pains that were a continuous medical problem before the finish of a shift. Other study identified major ergonomic deficiencies to be Computer Workstation poor furniture, lighting and temperature control. The study reveals that 72%, 66%, 47%, 46% and 35% shown relative errors in terms of Chair height, chair back/arm rest, temperature, desk height and lighting respectively. The study revealed that these relative errors are responsible for most of the work-related musculoskeletal disorder (WRMD's) which are: eye strain, shoulder pain, arm pain and back pain. (Bayo Al, 2015) Overhead fluorescent lighting level be diminished to wipe out screen glare, and every workstation be given a position-customizable tasks light (Rickards & Putnam, 2012)

A study by (Croome, 1999) suggested that the nature of office space, the arrangements of daylighting and the lighting quality can significantly affect wellbeing, solace, fulfillment and efficiency of office laborers. Further, some electronic lighting gadgets can create radiation and electromagnetic fields, which would seriously influence inhabitants' wellbeing and productivity.

Workplace lighting contributes to the increase of worker's capability and fatigue minimization (Wojcikiewicz, 2003). This premise has been supported by Aaras et al. (2001) and Leather et al. (2003). They stated that low level of lighting will cause eye strains and increase work stress. It is however, difficult to make specific statement about the best level of lighting since their appropriateness depends heavily on the nature of a task (Sutton and Rafaeli, 1987). However, there is agreement among scholars that high level of glare, lack of natural light, and level of lighting that are too low for a given task can have negative effects on work stress outcomes (Sutton and Rafaeli, 1987). Negative relationship has been found by Oldham and Rotchford (1983) between darkness and employees' reactions including job satisfaction and well-being. As the green building is highly dependent upon natural lighting and ventilation, it possesses a significantly higher satisfaction level than conventional buildings (Azizi, N.S.M. et al., 2015; Pei, Z. et al., 2015).

In their study of optimal office lighting use, (Maleetipwan-Mattsson & Laike, 2015) examined that proportions between light-on times and occupancy times demonstrated that the utilization of programmed off controls drove, somewhat, to a decrease of light-on time contrasted with the utilization of manual on/off controls. The information on nonattendance span propose that the setting of programmed off after 10-15 min opportunity could be reasonable for the workplace inhabitants. Specifically, occupants turn off remote controls would work viably with tenants who leave their workplaces as often as possible during the



day. Then again, utilizing manual on/off controls might be adequate and furthermore practical if workers for the most part sit in their workplaces the vast majority of the day

c) **Noise level**

Noise, characterized as undesirable sound, is perceived as an annoyance in the living and workplace. It ought to be controlled and diminished to satisfactory levels since high commotion levels, aside from being an irritation and a wellspring of inconvenience, additionally make various unsafe impacts (Low, Liu, & Oh, 2008). Acoustic performance refers to how well noise is being managed in a space. According to (Low et al., 2008), acoustic performance is therefore dependent on the orientation of the building, the qualities of the materials used and the workmanship, as well as the interior layout of the space. According to the (Mallawaarachchi, De Silva, & Rameezdeen, 2017) there is a huge factual connection between green-constructed condition and occupants' efficiency was inferred relating to five basic assembled condition factors, for example, air quality, framework control, acoustical dividing, measure of room and open-plan office structure.

d) **Furniture**

Office furniture are responsible in influencing the motivation of employees productivity as well as organisational functioning, studies have shown that one of the most issues related in purchasing office furniture is for its ergonomics and the importance for employees comfort (SONALI SAHA, 2016). In addition, according to (Tarcan, Varol, & Ates, 2004) there is a direct relationship between the level of convenience given to employees towards organization's productivity. As for eco-furniture or "green" furnishings, it is defined as a furniture designed to reduce the effect on the environment across its life cycle (Papadopoulos et al., 2016). Although, numerous projects have been initiated in latest years concerning environmentally friendly furniture design and manufacturing but there may be some possible limitations in this study on the relationship between green furniture and employee performance.

e) **Equipment**

Office equipment consists of machines and other devices used to perform all the duties and operation required to conduct the assigned task. Research study carried out in 1996 pointed out that office equipment are the primary aspects that boost the productivity of staff as they enable them to generate more output in less time but also enable them to attain better quality of job compared to the past (Sultan & Zafar, 2016) . Furthermore, more research on the criteria for determining and selecting office equipment are not simple for the organization, as the choice of office equipment must also be made in accordance with the choice and convenience of the individual who is going to use the equipment and must also be made in accordance with the value of obtaining the equipment, its durability, reliability and efficiency in order to create more and more convenience (Cullen, 2012)

f) **Temperature**

The physical work environment has effects on the productivity of employees. The conditions of physical work environment influence the employee's functions and it will determine the well-being of organizations. Physical Work Environment includes the internal and external office layout, temperature, comfort zone and also the office work setting or arrangement. In order to maximize employee's productivity and satisfaction, shifting trend towards an office based on employee's needs be crucial. Therefore, the physical work environment like office layout and comfort level such as temperature should be designed as such that the clerical workers themselves feel comfortable in their working place. Distractions in the workplace have impacts on the productivity of the workers and major distractions include unsuitable physical work environment (comfort level, temperature). Temperature can be defined as a physical property that underlies the common understanding about hot and cold



(Seppanen, Fisk & Lei, 2006). Kaplan and Aronoff, (1996) and Schiller, Bauman and Benton (1988), emphasized that temperature in the office means the degree of hotness and coldness in the workplace where the workers spend their time also to do their job every day.

g) Spatial arrangement

Based on a description of what is meant by work environment and literature review findings, a strong interaction is found between job performance and physical working environment. The physical environment at work is critical to employees' performance, satisfaction, social relations and health. It is generally understood that the physical design of offices and the environmental conditions at work places are important factors in organizational performance. According to Chandrasekhar (2011), and Sundstrom, Town, Rice, Osborn and Brill (1994), the attention in the workplace environment is of rising concern because most employees spend at least fifty percent of their lives within indoor environments which influences their cognitive and emotional states, concentration, behavior, actions, and abilities and by extension performance.

h) Employee performance

Ten years prior, most consideration in the territory of green business places of business was focussed on environmental advantages and, somewhat, the cost reserve funds related with diminished operational expense. Be that as it may, as the green structure industry presently is moving past its foundation organize, the center is no won the advantages to occupiers from working in a green working environment. According to (Komolafe et al., 2016) the requirement for more sensitisation on the long haul effect of natural thought nearby client comfort/fulfillment. This won't just comply with worldwide patterns yet additionally guarantee the solace and efficiency of clients.

It was supported by (Armitage et al., 2011) Laborers' expanded fulfillment, wellbeing and efficiency in green structures are basically the aftereffect of better wind current, expanded measures of normal light and perspectives, utilization of less-dangerous structure materials and decorations, decrease of glare, expanded warm solace, fulfilling clamor levels and individual controllability of frameworks. This examination shows reactions that go somewhat further toward that path. This study shows that employers believe that the Green office has a positive impact on health and productivity but employees are not convinced. Employers were asked if the Green Star-certified building has helped to motivate their employees to be more productive or to have positive impacts on their health and well-being. About 89 per cent of the employers do believe their green office has a positive impact on both productivity and health. If management does not address ergonomics discomfort, a worker will act on a subconscious level, adapting his/her behavior to lighten the pain. When someone adapts behavior to avoid pain, it generally becomes both performance and safety issue. (Zafir Mohamed Makhbul, Durrishah Idrus, & Mat Rebi Abdul Rani, 2007)

Most of the researchers agree that work stress is caused by the work design and workplace environment. Work stress can affect workers in many ways, from lowering resistance to illnesses and depriving them of sleep, to interfering with their concentration so that more injuries and accidents occur. Measures of distress can be psychological (anxiety, depression, irritability), physiological (high blood pressure, high muscle tension levels), or behavioural (poor work performance, accidents, sleep disturbances, substance abuse). (Zafir Mohamed Makhbul et al., 2007)

6. CONCLUSION

This result clarifies the factor of workplace environment that could affect the employees' performance. Based on the research, that there are several factors that affecting the employees' performance related to the temperature and spatial arrangements.

The three independent variables in this research study also being included in which influenced the employees' performance. However, many factor need from employers to affecting the employees' performance. Need to improve their supervision towards the subordinates in order to create a significant relationship in between the temperature and spatial arrangements in workplace environment.

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