



SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY |

Addis Ababa University
አዲስ አበባ ዩኒቨርሲቲ



COLLEGE OF BUSINESS AND ECONOMICS

Master of Business Administration (Management)

**The effect of workplace ergonomics on employee productivity: The case of
The Ethiopian Ministry of Mines and Petroleum**

By: - Ayantu Demissie

Advisor: - Amare Abawa (PhD)

**A Thesis Submitted to Addis Ababa University, College of Business and Economics in
Partial Fulfillment of the requirements for the degree of master of business administration
in management**

2023 G.C, Addis Ababa Ethiopia

Declaration

I certify that the thesis, "The Effect of Workplace Ergonomics on Employee Productivity: The Case of the Ministry of Mines and Petroleum of Ethiopia," is entirely original and has not been submitted for consideration for any other award or degree from any university. It is being provided for the award of Master degree of Business Administration in Management from Addis Ababa University. Every time another author's works are referenced, they are duly acknowledged.

Name: Ayantu Demissie

Advisor: Dr. Amare Abawa

Signature: _____

Signature: _____

Statement of Certification

This is to certify that Ayantu Demissie's thesis, The Effect of Workplace Ergonomics on Employee Productivity: The Case of the Ethiopian Ministry of Mines and Petroleum; was carried out under my guidance and supervision and has been approved for submission to the Department in partial fulfillment of the requirements for the award of Degree of Masters of Business Administration in Management.

Internal examiner

Signature

Date

External examiner

Signature

Date

Advisor

Signature

Date

Acknowledgements

First, I want to thank God for every good thing in my life. Additionally, I would like to express my sincere gratitude to my advisor, Dr. Amare Abawa, for his support, patience, and encouragement while I completed this research. Also, I want to express my gratitude to my family for their love, support, and encouragement. Finally, I would like to thank the staff members of the Ethiopian ministry of mines and petroleum who took part in this research.

Contents	
Declaration	I
Statement of Certification	II
Acknowledgements	III
List of Tables	VII
List of Figures	VIII
ACRONYMS	IX
Abstract	X
CHAPTER ONE	1
Introduction	1
1.1 Background of the Study	1
1.2 Statement of the problem	3
1.3 Research Questions	4
1.4. Research Objectives	4
1.4.1. General objective	4
1.4.2 Specific objectives	5
1.5. Significances of the study	5
1.6. Limitation of the study	6
1.7. Scope of the Study	6
1.8. Organization of the Study	7
CHAPTER TWO	8
Review of Related Literature	8
2.1 Introduction	8
2.2 Theoretical Foundation of the Study	8
2.2.1 The Two Factor Theory	8
2.2.2 Affective Events Theory (AET) or Emotive Events Theory	8
2.2.3 Person-Environment Fit Theory	9

2.3 Empirical Review of Literature	10
2.3.1. Employee productivity	11
2.3.2 Ergonomics	12
2.3.3 Workplace ergonomics and employee productivity	15
2.3.3.1. Lighting and productivity	17
2.3.3.2. Indoor air quality and productivity	19
2.3.3.3 Noise (Acoustics) and productivity	19
2.3.3.4 Office furnishing and employees productivity	21
2.3.3.5 Spatial arrangements and productivity	22
2.3.3.6. Office decor and productivity	22
2.3.3.7. Workplace flexibility and productivity	23
2.4. Conceptual Framework	25
CHAPTER THREE	26
Methodology	26
3.1. Introduction	26
3.2. Research Design and Approach	26
3.2.1 Research design	26
3.2.2. Research approach	27
3.3.1. Data source	27
3.3.2. Data collection methods	27
3.4. Population and Sample Size of the Study	28
3.4.1. Target population	28
3.4.2. Sample size determination	28
3.4.3. Sampling method	29
3.5. Measurement Scale	29
3.6. Data Analysis Methods	30
3.7. Validity	30

3.8. Reliability	30
3.9 Testing the multiple regression model	30
3.10. Ethical Considerations	31
3.11. Operational Definitions of Terms	31
CHAPTER FOUR.....	33
Data Analysis and Interpretation	33
4.1. Introduction	33
4.2. Data Screening	33
4.3. Response Rate	33
4.4. Reliability Analysis	34
4.5. Descriptive Statistics	34
4.5.1. Respondents Demographics	35
4.5.2 Descriptive Statistics of the Variables	38
4.6. Correlation analysis	47
4.7. Regressions Analysis	49
4.7.1 Multiple Regression Model	49
4.7.2. Testing Assumptions of Regressions Analysis	49
4.7.3 Regression Results and Analysis	54
4.10 Overall Discussions of the findings	61
CHAPTER FIVE	63
Conclusions and Recommendations	63
5.1. Summary of Major Findings	63
5.2 Conclusions	63
5.3 Recommendations	64
5.3 suggestions for further research	65
References.....	66
Appendix.....	79

List of Tables

Table 4. 1: Response rate	33
Table 4. 2: Reliability Analysis for the variables	34
Table 4. 3: Likert scale mean score	38
Table 4. 4: Descriptive statistics for lighting	39
Table 4. 5: Descriptive statistics for indoor air quality	40
Table 4. 6: Descriptive statistics for Noise (Acoustic)	41
Table 4. 7: Descriptive statistics for office furnishing.....	42
Table 4. 8: Descriptive statistics for spatial arrangements	43
Table 4. 9: Descriptive statistics for office decor	45
Table 4. 10: Descriptive statistics for office flexibility	46
Table 4. 11: Descriptive statistics for employee productivity	46
Table 4. 12: Rules of Thumb about Correlation Coefficient Size	48
Table 4. 13: correlation between the independents and the dependent variable.....	48
Table 4. 14: Multicollinearity Diagnosis (tolerance and VIF).....	50
Table 4. 15: Pearson's Correlation Coefficients of independent variables	50
Table 4. 16: skewness and kurtosis.....	52
Table 4. 17: model summary	55
Table 4. 18: ANOVA test (Analysis of variance).....	55
Table 4. 19: regression of coefficients table	56
Table 4. 20: lighting versus Employee productivity	56
Table 4. 21: Indoor air quality versus Employee productivity	57
Table 4. 22: Noise (acoustics) versus Employee productivity.....	57
Table 4. 23: Office furnishing versus Employee productivity.....	58
Table 4. 24: Spatial arrangements versus Employee productivity.....	59
Table 4. 25: Office décor versus Employee productivity	59
Table 4. 26: Office flexibility versus Employee productivity	59
Table 4. 27: Summary of Hypotheses Testing.....	62

List of Figures

Figure 2. 1: The conceptual model of the study	25
Figure 4. 1: gender distribution.....	35
Figure 4. 2: Age distribution of respondents	36
Figure 4. 3: Educational level of respondents	36
Figure 4. 4: Work experience of the respondents	37
Figure 4. 5: Working position of respondent	38
Figure 4. 6: Frequency Distribution of Standardized Residual.....	53
Figure 4. 7: Standardized Residual of Scatter Plot	53
Figure 4. 8: Normal P-P Plot of Regression Standard Residual	54

ACRONYMS

ANOVA	Analysis of Variance
MOMP	Ministry of Mines and Petroleum
HRM	Human Resource Management
EP	Employee Productivity
L	Lighting
IAQ	Indoor Air Quality
N	Noise
OF	Office furnishing
SP	Spatial Arrangement
OD	Office Décor
OF	Office Flexibility
OHS	Occupational health and safety
IBM SSPS	Statistical Package for the Social Sciences

Abstract

Several scholars have examined the effect of ergonomics on employees' productivity and have shown that workplace ergonomics is important to increase employee productivity. Companies should have a better understanding of ergonomics and its effect on employees' productivity. In Ethiopia ergonomics is a new concept and some companies are implementing ergonomics principles in rebuilding their offices in order to increase employees' productivity. The Ethiopian ministry of mines and petroleum is one of those institutions. However, there was no system to measure the productivity of employees after the implementation of ergonomics principles in the rebuilt office. This study examined the effect of workplace ergonomics on employee productivity by using office lighting, noise (acoustics), indoor air quality, office furnishing, spatial arrangements, office decor, and office flexibility of the workplace as a predictor of material ergonomics (physical ergonomics). To examine the effect of workplace ergonomics on employee productivity a quantitative research method was used. Primary data was collected by using structured questionnaires filled by 222 employees of Ethiopian ministry of mines and petroleum. A descriptive and explanatory research design was used to conduct the study. Data was analyzed by using IBM SPSS version 27 a quantitative analysis tool. A simple random sampling method was used to distribute the questionnaires. The major findings of this study were that lighting, indoor air quality, improved noise (acoustics), office furnishing, spatial arrangements, and office flexibility were found to be significant in order to boost employee productivity. Whereas office décor was found to be insignificant.

Key words: ergonomics, workplace, employee, productivity

CHAPTER ONE

Introduction

This chapter included a background of the study, statement of the problem, research questions, objectives of the study, significances of the study, limitation of the study, scope of the study, and in the end organization of the study.

1.1 Background of the Study

Numerous definitions of ergonomics have been put out since the advent of ergonomic knowledge, and these definitions have progressively become more ideal, accurate, and understandable. The Greek terms "ergos," which means "work," and "nomos," which means "laws of," are the roots of the word ergonomics. Therefore, ergonomics can be simply translated as "the laws of work" (Sluchak, 1992). According to Helander (2006), the profession of ergonomics uses theory, principles, data, and methodologies to design in order to optimize human well-being and total system performance. Ergonomics is the study of how humans interact with other components of a system. Applying ergonomic information often aims to create logical and acceptable relationships between workers and their surroundings, equipment, jobs, and organizations. Production and productivity are desired in this situation. In the workplace, which is a complex system connecting people, machines, and the environment, ergonomics can investigate and research the psychology and physiology of employees. In the workplace, which is a complex system connecting people, machines, and the environment, ergonomics can look into and research the psychology and physiology of employees (Sadra et al., 2012).

Although the idea of ergonomics is not new, its acceptance and use are evolving throughout time. Taghipou et al., (2015) stated that numerous management and engineering strategies and procedures are made possible because of ergonomics. Modern ergonomics is undoubtedly far more extensive and advanced than it was in the past. It is also still developing and prevalent in many domains of applied sciences for the administration of organizations. They addressed the significance of creating a healthy and appropriate work environment for human forces in terms of both physical and mental components, as a positive work environment fosters the rise of an honor sense about the job and the development of relationships between employees, whether it be in terms of the physical aspect, which includes providing facilities to reduce human pollutants, ongoing efforts to keep the workplace safer, lowering the context for work accidents,

and the introduction of an adornment culture boost productivity. They concluded that human management science or ergonomics is crucial for ensuring that employees are consistent with their jobs and the workplace environment.

Worker performs in an environment that is supportive of their requirements and compatible with their abilities while they are at an ideal workstation design. This may come to pass if organizations are successful in matching work procedures with the people who really carry out the duties. Ergonomics aims to achieve this. Instead of physically forcing the worker's body to fit the job, ergonomics is the science of structuring the job to fit the person. Through the interaction of the various system components, workstation design from an ergonomics perspective can effectively increase productivity and reduce stress (Dempsey et al., 2004).

Office ergonomics is crucial to improve worker productivity as well as staff safety and health-related problems. According to the Ethiopian Labour Proclamation, every employee has the right to appropriate protection, safety, and sanitary measures at work since the employer is expected to take all necessary precautions to protect employees' health and safety. Employers are not allowed to make their employees perform dangerous jobs that could endanger their lives. Employers must take the necessary steps to ensure that employees are properly informed on the hazards and dangers associated with their particular employment as well as the safety measures that must be taken to prevent accidents and health problems. It is required for employers to pay for the medical assessment of newly hired employees and employees performing hazardous employment. There should be precautions made to make sure that the working conditions do not provide physical, chemical, biological, ergonomic, or psychological risks to the worker's health and safety (Ethiopian Labour Proclamation No. 1156/2019).

According to the proclamation, it is essential to every organization's success in Ethiopia to use ergonomics principles at work in order to maintain employees' safety, health and also, to improve worker productivity. Major industry concerns, particularly in emerging nations, include raising worker productivity and ensuring occupational health and safety (OHS). Common issues include bad workplace design, poorly structured occupations, an unfavorable work environment, poor human-machine system design, and the use of the wrong management strategies. This causes risks at work, poor worker health, injuries from mechanical equipment, and disabilities; as a result, worker productivity is decreased, the quality of the produced goods and services is decreased, and costs are raised. The adoption of human factors or ergonomics has been shown to

increase worker satisfaction, safety, productivity, and health at work. Performance overall is affected by this in both direct and indirect ways. Therefore, it would be incredibly difficult to achieve business goals without taking ergonomics into account (Shikdar & Sawaqed, 2004).

This study, therefore, determined the extent to which the employees at the Ethiopian ministry of mines and petroleum are satisfied with the ergonomic features of the organization, and also to assess the impact of workplace ergonomics on the productivity of employees. The Ethiopian Ministry of Mines and Petroleum is a government ministry responsible for management of mining and petroleum sector in Ethiopia. It was reestablished in 2018 under Proclamation No 1097/2018 and Melese Alemu served as the first Minister of the position. In 2020, Takele Uma Banti succeeded as the Minister of Mines and Petroleum until 14 January 2023 (MOMP Website). The ministry has 497 employees according to the data collected from the HRM report of the Ethiopian ministry of mines and petroleum.

1.2 Statement of the problem

Even though academics believe that ergonomics at work optimizes the interaction between the human and machine environments to strike a balance between the needs of the worker and the demands of the task, increasing productivity and lowering health complaints (Makhbul, 2013; Tarcan et al., 2004). In Ethiopia, the application of ergonomics concepts is a relatively new occurrence. Such ergonomics-related tasks are not shared by employers and employees. This may be due to the dearth of studies examining how workplace ergonomics may affect employees' productivity in Ethiopia. Since Ethiopia is a developing nation, improving the ergonomics of a workplace is frequently viewed as a luxuriant activity rather than the most important thing to increase employee productivity, which in turn has an indirect impact on a nation's economic development. Despite the fact that these are the causes, there have been certain actions that are related to ergonomics changes in the workplace environment during the past five years, particularly in the ministry offices.

One of the governmental institutions that have been implementing office ergonomics change is the Ethiopian Ministry of Mines and Petroleum, which rebuilt a new office with a new ergonomics design. The Ethiopian ministry of mines and petroleum has changed its workplace in order to create a good environment for its employees and to achieve its missions and visions. Even if the ministry has changed its workplace ergonomics there isn't a shred of evidence that

shows how much the change has affects the productivity of employees that are working in the organization.

The relationship between workplace ergonomics and employees' productivity has been studied in different countries but there aren't studies in Ethiopia's context. Therefore, research should be conducted in the context of Ethiopia to show that there is a positive and significant relationship between workplace ergonomics and employee productivity.

Therefore, this study examined the effect of workplace ergonomics on employee productivity. As workplace ergonomics is a major concern for the company in enhancing workers' productivity, and this study showed how organizations can be benefited by creating a good working environment by applying ergonomics principles. The researcher was motivated to study this topic for two reasons: first, because there isn't enough research on the effect of workplace ergonomics on employee productivity in Ethiopia, so the researcher needs to fill this gap by conducting this research and second, because workplace ergonomics is a major concern for the company in enhancing workers' productivity companies should have a sufficient knowledge about workplace ergonomics and its relationship to productivity, therefore the researcher aims to give an insight about ergonomics and its relation to employee productivity for Ethiopian companies by conducting this research. This study also demonstrated how ergonomics determined and affected employees' productivity in the Ethiopian ministry of mines and petroleum which can be also used by similar organizations.

1.3 Research Questions

- To what degree does workplace light affect employee productivity?
- To what degree do workplace indoor air qualities affect employee productivity?
- To what degree do workplace noises (acoustics) affect employee productivity?
- To what degree do office furnishings in a workplace affect employee productivity?
- To what degree do spatial arrangements in a workplace affect employee productivity?
- To what degree does office decor in a workplace affect employee productivity?
- To what degree does office flexibility in a workplace affect employee productivity?

1.4. Research Objectives

1.4.1. General objective

The main objective of this study is to look at the effects of workplace ergonomics on employee productivity.

1.4.2 Specific objectives

The specific objectives of the study are:

- 📌 To determine whether an ergonomically built workplace has a substantial effect on the productivity of employees.
- 📌 To examine how lighting conditions in the workplace affect workers' productivity.
- 📌 To examine how much workplace indoor air quality affects worker productivity.
- 📌 To examine the effect of noise (acoustics) on employee productivity.
- 📌 To examine how much employee productivity is impacted by office furnishing.
- 📌 To examine how much spatial arrangements in a workplace affects workers' productivity.
- 📌 To examine the effect of decor on employee productivity.
- 📌 To examine the effect of office flexibility on employee productivity.

1.5. Significances of the study

This study is crucial for businesses, employees, and academics in different perspectives.

- ✓ This research is significant in aiding organizations in better understanding the value of applying ergonomics principles to increase employee productivity. It also helps them to understand how changing the ergonomics of the workplace will change the overall working environment and increase employees' satisfaction, motivation and improve employees' wellbeing in addition to their productivity.
- ✓ This study is significant to assist employees in improving their understanding toward the advantages of having an ergonomic workplace and how it is related to productivity. Additionally, it is significant to raise their knowledge of ergonomics concepts and its application to improve their comfort and productivity.
- ✓ This study is also significant for researchers as a source of data to show how workplace ergonomics affects workers' productivity and how companies can apply ergonomics principles to foster a positive work environment. Additionally, it added findings on the effect of workplace ergonomics on workers' productivity to previous studies. Additionally, it filled the knowledge gap regarding the connection between ergonomics and productivity.
- ✓ Finally, this study identifies and modeled important workplace ergonomic indicators (variables) that affect employee productivity. The study model's outcomes support its validity and reliability in measuring the impact of workplace ergonomics on employee

productivity. To that purpose, the study offers a model that can be used by companies to evaluate the effect of workplace ergonomics on employee productivity.

1.6. Limitation of the study

Various workplace ergonomics and employee productivity assessment models were looked at in this study to create an assessment model that was appropriate for addressing the study questions. The created model does, however, have several limitations. The following are a few of this research paper's limitations.

This study is restricted in terms of variables and only considered the physical (material) aspects of workplace ergonomics. It doesn't include the immaterial and other material components of ergonomics, as well as other predictors of workplace ergonomics. This study's other limitation is that, due to time and budget constraints; it was limited to one organization which is the Ethiopian Ministry of Mines and Petroleum and excluded other businesses that remodel their offices using ergonomics principles. Also, data for the study were solely gathered quantitatively only, the researcher doesn't use qualitative methods like interview questions for further and more information due to shortage of time. In addition, this study used a cross sectional study design only.

Finally, in Ethiopia, there is a shortage of empirical studies on how workplace ergonomics affect employee productivity. This has made it challenging to carry out this research further.

1.7. Scope of the Study

The scope of this study is the effect of workplace ergonomics on employee productivity only, employee productivity was used as the dependent variable and workplace ergonomics as an independent variable that was measured by using 7 predictors (lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office décor and office flexibility) only. The study was limited to one organization, the Ethiopian ministry of mines and petroleum which is found in Addis Ababa. This study was concerned only on the physical (material) ergonomics factors of a workplace it doesn't include the immaterial ergonomic factors. This study was conducted in one year. Exploratory, descriptive, and casual research design was used. Structured questionnaires were used to collect primary data from 222 employees of the Ethiopian ministry of mines and petroleum.

1.8. Organization of the Study

The study contains five chapters.

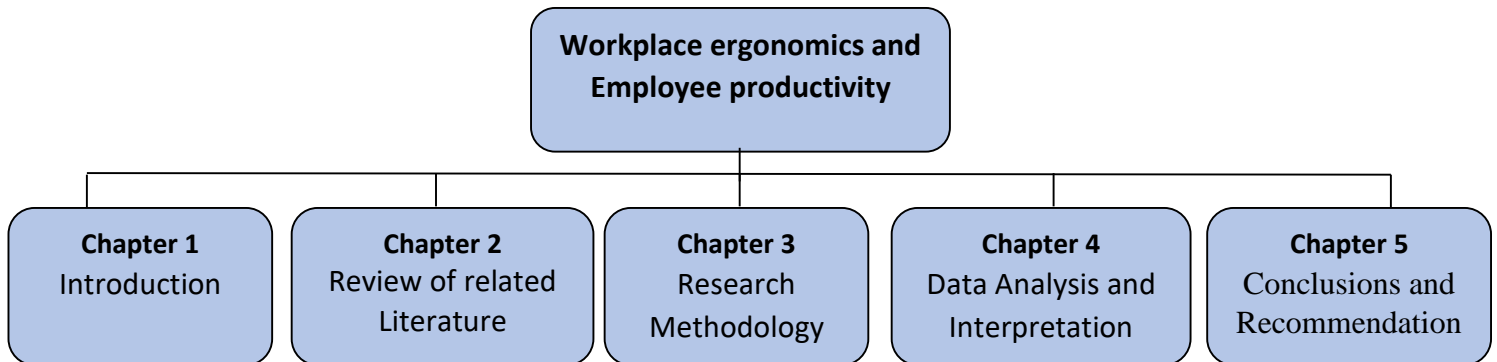
Chapter 1: This chapter introduces the thesis as a whole. It includes background of the study, statement of the problem, research objectives, research questions, research hypothesis, significance of the study, limitation of the study, scope of the study, and operational definition of words.

Chapter 2: The second chapter presents review of literature which consist theoretical and empirical literature, and the conceptual framework.

Chapter 3: This chapter described the research methodology.

Chapter 4: This chapter presents the results of the data analysis and interpretation. Includes the detail presentation of the findings and discussion

Chapter 5: This chapter presents the summary, conclusions and recommendations. The structure of this paper is shown in the diagram below.



CHAPTER TWO

Review of Related Literature

2.1 Introduction

This chapter included a review of the general theoretical literature, a discussion of the empirical investigations, and, in the end, a conceptual model for measuring the effect of workplace ergonomics on employee productivity.

2.2 Theoretical Foundation of the Study

2.2.1 The Two Factor Theory

Herzberg introduced the two-factor theory in 1959. Internal and external (hygiene and motivation) factors are two groups of variables that influence workers' attitudes, according to Herzberg. He clarified that while hygiene factors measure external factors to prevent any employee discontent, motivation factors measure intrinsic factors that may improve employees' work satisfaction. In accordance with the theory, employees have no control over external factors; instead, management of the company makes these decisions. These variables include compensation, workplace layout, and furniture, style of leadership, corporate culture, and motivation at work. The notion behind this theory is that an employee's ability to execute their job depends on their environment. The relevance of external (extrinsic) factors, such as workplace ergonomics in the context of this research on employee productivity, is emphasized by this theory, which is crucial to the study.

2.2.2 Affective Events Theory (AET) or Emotive Events Theory

Howard M. Weiss and Russell Cropanzano introduced the idea in 1996. According to the emotive events theory, there is a connection between an employee's internal factors and their responses to events that take place at work and have an impact on their performance, structure, dedication, and job satisfaction. It suggests that both happy and sad emotional workplace incidents have a significant psychological effect on workers' job satisfaction. This indicates that employees' conduct shows how the workplace affects their emotional responses. They contend that AET is limited to internal organizational events and measurements based on actual observation and theoretical analysis. It implies that both positive and negative occurrences at work have an impact on employees' well-being, which in turn has an impact on their performance and productivity.

2.2.3 Person-Environment Fit Theory

The theory of person-environment fit focuses on how traits of the individual and the environment interact, with the result that the individual not only impacts his or her environment but also is affected by it. Early in the 1970s, the Person-Environment Fit (PE Fit) model was created. French and colleagues (French & Kahn, 1962; French et al., 1974) were among those who first developed the Person-Environment Fit Theory. Later developments and improvements were made by Caplan (1983, 1987), Harrison (1978, 1985), and Edwards (1996) as well as Edwards & Cooper (1990) and Caplan (1983, 1996). According to the Person-Environment Fit Theory, when there is a mismatch between a person's surroundings and themselves, their well-being is compromised, which in turn affects their productivity. The Person - environment fit theory offers a special opportunity for the current research to explore the various elements of the workplace and how they affect worker productivity. The theory is the most useful because it addresses how a person interacts with their environment and how to cope with either a positive or negative work environment which is a concern of workplace ergonomics.

2.3 Empirical Review of Literature

Many people spend fifty percent of their time at work indoors, which has a significant impact on their mental health, actions, skills, and performance. Therefore, it is believed that a better workplace environment will lead to better outcomes and higher productivity (Hameed, 2009). Hameed also state that, Motivation, satisfaction, and performance of employees are significantly improved by ergonomic design and convenient position. Similar to this, Lablebici (2012) asserts that the workplace environment is crucial for employees within a company and that employee performance and productivity are influenced by the environment's quality. Employees can determine how much value their managers place on them by looking at the circumstances at work, according to research (Deouskar, 2017). Numerous studies have recommended office ergonomics as a means of providing workers with the tools they need to operate at their best. According to the studies, a worker's working setting has a significant impact on their level of motivation and, in turn, their performance. It goes without saying that companies, particularly those in the service sector like banks, who recognize the necessity of providing a conducive physical office environment will undoubtedly benefit from the workforce's dedication and cooperation more than those who do not (Alok and Shweta, 2011).

According to Sekar (2011), the relationship between work, the workplace, and the tools used at work becomes a crucial component of the actual job. He continued by saying that personal motivation and the physical infrastructure of the workplace are the two main areas of emphasis for management when determining how to maximize employees' productivity.

According to Moran (2012), management should not disregard the health risks brought on by slouched posture and repetitive office work. In his essay "Home Office Ergonomics," he examined how the absence of ergonomic practices in the workplace can have a negative impact on some of the most important body parts, including the eye, neck, wrist, arms, back, hips, legs, knees, and feet. In his final proposal, he notes that improper positioning of any of the human parts mentioned above could result in unpleasant medical conditions, which would have a negative impact on performance. Therefore, given the impact on productivity, it is in the best interests of the company as well as the workers to ensure that ergonomic factors are given the best consideration. On the other hand, repetitive tasks and excessive use of the arm, hand, or fingers, which have been identified as another source of employee discontent, obstruct efficient performance in the company (Zafir, et al, 2011).

By identifying the postures and tasks that significantly stress the musculoskeletal system, ergonomics has historically been utilized to reduce the number of occupational injuries. However, it's possible to boost productivity by applying ergonomics-based ideas. It may be possible to predict which postures and workstation arrangements will enhance employees' productivity using ergonomic recommendations (Resnick & Zanotti, 1997).

According to several academics, many organizations have been experimenting with new designs and construction methods to establish factories or offices that can increase worker productivity and, as a result, draw in more people as a result; some empirical studies have been conducted to evaluate the effect of work ergonomics on employees' productivity. Pickson et al., (2017), stated that any organization's employees' health and productivity can be greatly improved by the condition and fit of the workplace furniture. In their study titled 'Investigating the Effect of Ergonomics on Employee Productivity,' it was founded that there is a significant correlation between general workplace design and décor and employee productivity which is a feature of work ergonomics. The association was likewise strongly positive, suggesting that when a business pays attention to the overall layout and aesthetics of its workplace, it would also see an increase in worker productivity.

Haynes (2008) made an effort to look at how office comfort affects workers' productivity. According to the study, there is a relationship between employees' productivity and how physically comfortable they are there. According to the author's analysis of the research, there is adequate support for the argument that office comfort can affect productivity.

2.3.1. Employee productivity

Many scholars have defined employee productivity in different ways. Brochner (2017), states that productivity is what people can produce with the least amount of effort. Attar et al. (2012), defined productivity as the ratio of output to all or part of the resources (things like labor, money, energy, and raw materials) utilized to achieve that output is known as productivity. They also reported that productivity is often defined as the measurement of how effectively a certain entity uses its resources to create outputs from inputs. Additionally, Sutermeister (1976), define Productivity as output per employee hour, quality considered. Dorgan, (1994), defines productivity as the increased functional and organizational performance, including quality. An employee's output over a given time span can be used to measure productivity. A worker's productivity will typically be judged in comparison to the average of workers who perform

comparable tasks. Employee productivity is a crucial factor for businesses because it heavily depends on workforce productivity for any organization to succeed (Massoudi & Hamdi, 2017). According to Yankson (2012), there are two main factors that influence employees' performance and productivity, and they are those that are driven by management and those that result from working conditions. According to him, management-driven factors include the development of organizational plans, such as the allocation of responsibilities at all levels of the organization, the definition of job descriptions, the degree of access to management, and the administrative support needed to complete tasks, working patterns, shift working, break times, absence of holiday over, health as well as safety policies, including the provision of training and development of safe working practices. On the other hand, there are other factors that improve employee performance and productivity, such as office or factory design, equipment and workshop tools, workspace accessibility, office lighting and illumination, weather, temperature ventilation, humidity, noise, vibration, and hygiene, as well as the availability of welfare facilities and a certain caliber of office furniture. The need for offices to be set up in a way that encourages employee interaction and collaboration while they are on job has grown significantly.

2.3.2 Ergonomics

The science of ergonomics focuses on achieving the best possible relationship between employees and their workplace (Tayyari and Smith, 1997). The basic goal of ergonomics is to fit the task to the person, not the other way around. As an interdisciplinary science, ergonomics and human factors engineering are connected to a variety of fields including management, management science, engineering, art & design, and psychology. Ergonomics thus covers a variety of tasks and performances (Sadeghi et al., 2011). Chim, (2019) stated that ergonomics principles should be applied in the design of the workplace including both work and non-work areas. It includes the overall workplace layout, workstation design, seating, conveyor, storeroom, breakout area, canteen, restroom, gym room as well as the facilities such as ventilation system, lighting, sound insulation and windows. In addition, the entrance, exit, emergency facilities as well as any surrounding areas in the workplace premises should apply ergonomics in their design.

Ergonomics improves health and safety, reduces costs from absence and reduced productivity, and ensures that social and legal obligations of employers to their employees are being met (Emmanuel et al., 2014). The science of ergonomics focuses on adjusting working environments

and demands to the capacities of the workforce. High productivity, a lack of illness, satisfaction, and reduced risk of harm are all guaranteed by excellent and effective fit (Cohen, 1997). Ergonomics examines a system of interconnected elements, including the worker, the task (Cognition vigilance, Activities, Physiological/ biomechanical aspects, Forces/pressures, Information processing), the physical environment (Lighting, Heat/cold, Humidity, Air Quality, Acoustics), organizational aspects of the workplace (Medical management, Legal considerations, Management style, Shift work, Working hours, Training, Worker input/decision, Stress) and the workspace (Equipment, Tools, Displays/controls, Workspace design, Seating, Furniture, Work surface, Height/reach/ clearance/dimensions). The aim of ergonomics is to maximize worker comfort, safety, productivity, and efficiency by ensuring a good fit between the workers and their job. Also, developing ergonomics management is a worthwhile objective for companies therefore those organizations who want to stand out from the competition in today's market must: Emphasis on quality and perfection requires ergonomics management, which is recognized for its worth as a process that lowers costs while improving performance, quality, and productivity (Rowan & Wright, 1994).

Studies carried out in the 1970s and 1980s by ergonomists Marvin Dainoff, Michael Brill, Stephen Margulis, Tim Springer, and others, with a focus on workstations, showed a clear correlation between employee performance and work conditions, as noted by Fernberg (1992). Fernberg (1992) also points out that Managers are discovering that an understanding of ergonomics can result in cost savings by increasing individual and group productivity and lowering absenteeism. In addition to that Organizations that adopt ergonomic policies saves money by lowering staff turnover, training, and recruitment expenses; and decreasing sick leave and health care expenses. Also, he stated that Public managers should demonstrate their understanding that not all employees are suited to the same work environment. Fernberg concludes that the importance of the workplace to employee safety, satisfaction, and productivity must be recognized by public management.

According to Liravi & Baradaran (2019), Knowing ergonomics principles and how to apply them to the design of workstations is one of the most crucial that can be taken to improve occupational health and productivity at work. One of the potential elements that can reduce employee productivity is working in challenging circumstances. In their study, the effectiveness of

ergonomics on worker productivity was proven, and it was discovered that the material factor had a greater impact on worker productivity than the immaterial factor.

Taghipou, et al., (2015) stated that, it is obvious that a positive work environment fosters the emergence of a sense of honor in one's work and the development of friendships between coworkers, whether it be on the physical level through the provision of facilities to reduce human pollutants, ongoing efforts to keep the workplace safer, the reduction of risk factors for accidents, or the mental level through the promotion of credit and respect. These elements used together may have an impact on rising employee values, as well as their capacity and output. Ergonomics or human management science is therefore crucial for ensuring that employees are consistent with their jobs and the workplace environment.

According to Jeffrey (1995), the design of a workplace, piece of machinery, tool, product, environment, and system that considers a person's physical, physiological, biomechanical, and psychological capabilities in order to maximize efficiency and productivity while ensuring the workers' safety, health, and well-being is known as ergonomics. The goal of ergonomics is often to adapt the task to the individual rather than the individual to the task. The following outcomes are possible when ergonomic concepts are used in the workplace: Increased productivity, enhanced worker health, and safety, decreased workers' compensation claims, adherence to government regulations (such as OSHA standards), increased work quality, decreased worker turnover, decreased lost time at work, improved employee morale, and a decrease in absenteeism rate. Harisinghani, et al., (2004), also show how workplace ergonomics can significantly improve productivity and decrease fatigue.

In order to improve the design and evaluation of tasks, jobs, products, environments, and systems so that they are compatible with the needs, abilities, and limitations of employees, ergonomics is also expressed as a holistic approach that takes into account physical, cognitive, social, organizational, environmental, and other relevant. This novel idea demonstrates how ergonomics can enhance organizational success in addition to employee performance. Additionally, this idea entailed a broader and all-inclusive application of constructs that indicate potential areas of specialization within the field of ergonomics. Physical ergonomics, employee/cognitive ergonomics, and organizational ergonomics are these areas of specialization (International Ergonomics Association, 2017). There are also additional domains of ergonomics that are identified by Asante (2012), these are: Office Ergonomics, Engineering Psychology, and Macro

ergonomics. Office ergonomics is a domain of ergonomics which is concerned with the office environment which includes Workplace elements such as workstations, computers, chairs, lighting, noise level, room temperature etc. Office ergonomics, also referred to as work ergonomics, is a subfield of ergonomics that deals with how physical features of humans are considered when creating work environments (Deouskar, 2017). The focus of this study is on this area of ergonomics.

2.3.3 Workplace ergonomics and employee productivity

Numerous studies have demonstrated the benefits of incorporating ergonomic principles into workplace design, machine design, employment design, environment design, and facility design. According to academic research, there is a considerable and favorable relationship between overall office design and employee productivity. Dempsey, et al., 2004 stated that, an ergonomic approach in the design of workstation can reduce the stress level and enhance productivity through an interaction between human resources and different system components. Also, Ergonomic principles help in creating work environments where people enjoy what they do, feel like they have dignity and confidence in what they do and work safer, more comfortably and healthier. The enhancement of ergonomic intervention that take cognizance of comfort and wellbeing as well as the psychological and the physiological desires of employees will positively affect quality of work- life and improve service delivery (Ugwuzor, and Anichebe, 2022). Furthermore, better physical workplace environment will boost employees' performance and ultimately improve their productivity (Samson et al., 2015). Additionally, another study has found out that ergonomically designed workplace with appropriate ergonomic interferences will recover the employee productivity (Yeow and Nath Sen, 2003). Hameed and Amjah (2009) investigated the effect of office design on worker productivity in the context of banking institutions. Thirty-one bank branches from thirteen different banks were used in the study to determine the relationship between office design and productivity. The study's findings showed that workplace design is very important in improving staff productivity. They discovered that an ergonomic and comfortable office layout improves worker performance. Saleem et al., (2012) stated that office design is crucial for increasing employee productivity. As a result, a happy and comfortable work environment encourages people to perform better. The increase in employees' productivity and organizational performance is guaranteed by the physical design of the workplace and effective management procedures (Gensler, 2006). A successful office design

strategy would strive to comprehend and address an organization's aesthetic viewpoint and values. The "look and feel" of a workplace can affect the worker' productivity and sense of wellbeing (Al Horr et al., 2016). Also, according to (Pereira et al., 2019) A workplace intervention combining ergonomics and neck-specific exercise offers possible benefits for sickness presenteeism and health-related productivity loss among a general population of office workers and sickness absenteeism for office workers with neck pain in the longer-term.

A balance between worker characteristics and job demands can be achieved through the effective application of ergonomics in work system design. This may increase employee productivity, offer worker safety, promote their physical and emotional health, and increase their sense of job satisfaction (Burri & Helander, 1991; Das & Sengupta, 1996; Das & Shikdar, 1999; Resnick & Zanotti, 1997). The workforce suffers from inefficiency and discomfort when ergonomic principles are ignored. Poor workplace ergonomics can lead to bodily and mental stress, low productivity, and low-quality work (Ayoub, 1990 a,b). It is thought that workplace health risks, poor levels of safety, and decreased worker productivity and quality are all directly related to ergonomic deficiencies in the industrial sector. Although the use of ergonomics has significantly increased in developed nations, awareness is still minimal in developing nations. If used correctly, ergonomics technology can improve performance and eliminate or minimize OHS issues at work. Lower injury rates translate into cheaper medical and compensation expenses, less lost time from work and money for the company (Shikdar & Sawaqed, 2004).

Massoudi & Hamdi (2017) point out that, the workplace environment and employees' productivity are related. Paid that employees are a company's most precious asset; careful consideration should be given to workplace ergonomics since it is a necessary condition for increasing output quality and productivity. According to Lorsch and Ossema (1997) and Clements and Baizhan (1997), the most effective strategy to prevent productivity loss is to invest in improving the working environment because staff expenses are far higher than housing costs. Uncomfortable and unsafe working conditions can impair employees' ability to focus and their health. According to Weerdmeester (2008), an ergonomic method was created to lessen worker tiredness and discomfort to increase human safety, health, and comfort. The significance of environmental conditions is what drives worker productivity and performance, which generates revenue for the business.

Fernandez (1995) stated that Productivity can be raised by implementing ergonomic concepts in the workplace. He discussed some important issues that are related to ergonomics and points out that if the goal of the facilities manager is to decrease work-related injuries, increase productivity, and enhance the quality of life for employees, then those crucial issues that are related to ergonomics must be understood and put into practice. Additionally, environmental and cognitive ergonomics, such as room humidity, room temperature, brightness, also play important roles in worker productivity. It is crucial to understand these issues so that employers can offer better support for their employees in all sorts of working environments without sacrificing much productivity (Jiang & Duffy, 2021).

In order to evaluate the effects of sound on workplace productivity in Hong Kong, Mak and Lui (2012) took into account 259 office workers in 38 air-conditioned offices. The five environmental and office design factors—temperature, air quality, office layout, sound, and lighting—as well as the relationship between changes in office productivity, were also determined by the study. The findings showed that the main factors affecting office productivity were temperature and sound. Once more, it seems that changes in office productivity were strongly and significantly correlated with changes in sound, temperature, and office design.

Asante (2012) investigated the effect of workplace ergonomics on worker performance in Ghana using 98 employees of the Ghana National Petroleum Corporation. Office layout, furnishings, lighting, noise levels, and other ergonomic factors were found to have a detrimental impact on workers' performance by 20 to 80 percent.

As illnesses and injuries put the employee and machine system into conflict, Rowan and Wright (1995) emphasize the significance of ergonomics in the workplace. They therefore argue that ergonomics is essential in the workplace. They suggested that the productivity of workers is influenced by physical environmental variables such as temperature, noise, airflow, humidity, and furniture. Therefore, the indoor setting should take ergonomics into account.

2.3.3.1. Lighting and productivity

It is particularly challenging to make precise claims about lighting settings because their suitability greatly relies on the type of activity (Sutton and Rafaeli, 1987). However, there is consensus among academics that excessive glare, a lack of natural light, and lighting levels that are too low for a task can all have a negative impact on performance and well-being which will affect employee productivity as a result. Also, both physical health and improved mood are

influenced by the quantity and quality of light (Lamb & Kwok, 2016; Thayer et al., 2010; Veitch, Newsham, Boyce, & Jones, 2008; Viola, James, Schlangen, & Dijk, 2008).

From the perspectives of visual comfort, attentiveness, and mood, (Borisuit et al., 2015), assessed the effects of day lighting on office workers' performance. 25 young people participated in the study, spending two afternoons either in daylight or under electric lighting (without a window view). Despite the lack of direct outside views, they discovered considerably higher visual acceptance scores under day lighting than in electric lighting conditions. Subjective alertness and physical well-being dropped for both types of lighting in the afternoon, but respondents reported feeling sleepy more quickly when exposed to electric lighting than when exposed to sunshine. The physical state deteriorated during the afternoon with only electric lighting. One of the markers of office workers' job happiness can be their level of visual comfort, alertness, and well-being, and all these characteristics increase productivity as a result. The study by Sehgal, 2012 also state that the brightness of office light influences concentration, alertness, and task performance. Modifying the quality and nature of light can appreciably enhance working experience and productivity.

Study by Dianat et al., 2013 uses survey and physical illumination measurements to assess the effects of illumination levels and lighting conditions (lighting characteristics and disturbances) on worker happiness, job effectiveness, safety, and health. According to their research, lighting is important to both employee health and performance.

People are affected by light in both visual and nonvisual ways. Sunlight appears to be the most efficient source of illumination among all available options because it produces a sufficient amount of light that spans a wide spectrum. Additionally, it is the most significant source of vitamin D, which is essential for the health and strength of human bones. Natural light can enhance human subjective mood, attention, cognitive function, physical activity, sleep quality, and alertness in addition to its role as a catalyst for vitamin D production in the blood. Aspects could be regarded as essential components for the best academic and job performance. All of these elements may be regarded as essential components for the best academic and work performance (Shishegar and Boubekri, 2016).

According to Ajala (2012)'s research, a proper lighting program will increase organizational productivity by reducing worker weariness and eyestrain and boosting productivity and performance. Improved lighting at work will aid workers' eye-hand coordination, which will

increase productivity and decrease rejection/defect rates. It will also help prevent accidents. Ali et al., (2015) stated that in a workplace, whether in an office setting or in an industrial one, lighting is needed in order to ensure the workplace is safe and to allow all tasks to be completed on time and effectively. Lighting standards vary with different work environment and in order to perform various types of work, different types of lighting are required.

2.3.3.2. Indoor air quality and productivity

A key element in evaluating organizational comfort level is air quality. Poor indoor air quality directly affects health issues and creates unfavorable working conditions (Czubaj, 2002; Shiaw-Fen Ferng, 2002; Wilson, 2001). According to martin (1999), enhanced indoor air quality will enhance production qualities and increase worker productivity, by maintaining a healthy work environment. Workplace temperature needs to be controlled since extreme heat affects performance physically and increases the risk of making mistakes. Extreme heat also makes people sleepy and fatigued. Also, Job interruption will occur due to very low temperatures (Kroemer & Grandjean 2005). The study carried out by Lan et al., (2010) demonstrated a negative correlation between thermal discomfort caused by high or low air temperature and office workers' productivity. Taghipour et al., (2015) also stated that employees receive greater oxygen while they are working in a setting with the right temperature and ventilation, and this delightful work environment will improve both their performance and the production of the organization.

Lipczynska et al., (2018), noted that as individual thermal satisfaction rises, self-reported productivity—including alertness, level of concentration, and work productivity will be improved. According to Wargocki et al. (1999), air quality has a significant effect on office workers' productivity in both positive and negative ways. According to the Mak and Lui study from 2012, temperature and sound were the main factors affecting office productivity out of the five environmental and office design aspects investigated at.

2.3.3.3 Noise (Acoustics) and productivity

Unwanted sound that is audibly louder than humans can comfortably hear is referred to as noise. The noise in the workplace might have a negative impact on job performance. Noise is a highly dangerous attacker in the workplace since it destroys many auditory cells every day. When a worker or employee discovers an auditory loss, it is already too late because noise-induced hearing loss or deafness is permanent. Noise-related harm extends beyond just the ears and

affects the entire body. Noise has a direct or indirect impact through annoyance or job discontent (Abel, 1990).

According to research by Bragdon (1971), noise, particularly when it is unexpected and unusual, negatively affects job performance and productivity. Additionally, according to the studies produced by this researcher, noise levels above 90 dB decrease quality and productivity while also causing an increase in tension, weariness, and errors due to the physiological stimulant of detrimental organism reactions. Unfamiliar and distressing sounds can increase anxiety, prevent people from finishing tasks, and even disrupt spoken discussions. Noise pollution in the environment causes reactions that all point to physical health that is in danger, such as severe headaches, stomach pain, unusual exhaustion, poor resistance against damage, and extreme susceptibility to cardiovascular disease. Workplace noise also has an impact on mental health, causing impatience, irritability, stress, difficulty concentrating, and a lack of patience. Noise pollution can pose a severe hazard to workers and employees' safety in the workplace. High noise levels can impair focus, which obviously decreases job quality.

In accordance with a 2015 study by Taghipour et al., being exposed to noise for more than 2 hours will result in fatigue, stress, headaches, and ultimately a decrease in feedback which will lead to a decrease in productivity. Additionally, they claimed that if organizations can reduce noise or find solutions to noise-related issues by utilizing various processes, it will result in improved worker accuracy, high-quality production, and an improvement in both employee and employer satisfaction. In addition, Mak and Lui (2012) stated that sound has a significant impact on employee productivity in modern air-conditioned offices. Also, according to Ajala (2012)'s findings, workers' productivity increased when there was less noise since there were fewer distractions and instances of work-related stress.

Office noise can be distracting and, as a result, have a negative impact on people's ability to concentrate and focus on their job, which may then result in feelings of annoyance and an increase in tension (Banbury and Berry, 2005; Seddigh et al., 2014).

Office noise can have an impact on a person's physical health (headaches and fatigue), psychological (short-term memory failures, lack of concentration, and stress relief), cognitive well-being (knowledge transfer, asking for advice, giving it, and listening to others), and social well-being (sense of belonging) (Evans and Johnson, 2000).

2.3.3.4 Office furnishing and productivity

Offices and ergonomics can be related in a number of ways. We could observe how the office is organized, paying particular attention to where individuals sit in relation to tools, windows, and doors. Before the type of job that people are doing, we could make sure that the furniture and equipment are appropriate. This covers furniture such as chairs, desks, laptops, printers, and anything else they might need to perform their duties (O'Neill, 2013). Ergonomic furniture designed to fit the user's body or to stimulate alternating working postures, and thereby reduce musculoskeletal or visual discomfort while sitting (Robertson et al., 2013; Van Niekerk et al., 2012). Office furnishings have an important role in improving employee productivity. Many scholars have supported this idea. Discomfort is reduced by ergonomic, adjustable chairs (Amick et al., 2012; Robertson et al., 2013; Van Niekerk et al., 2012). To reduce the risk of musculoskeletal injuries and increase productivity, it is essential to incorporate important ergonomics principles and practices into the design and selection of furniture and equipment (Abdullah et.al, 2016). According to Saleem's research (2012), there is a significant relationship between lighting and furniture and productivity. Also, according to Mohanty & Mahapatra (2014), using ergonomically designed equipment not only improves job satisfaction but also lowers the risk of workplace injuries, which boosts worker effectiveness and productivity. The ergonomics of furniture and products like chairs, desks, computers, and equipment have a direct impact on how productive employees are. Considering ergonomics while designing new and old instruments will reduce muscular and articulation issues (Tarcan et al., 2004). The ergonomic chair will improve workers' productivity by lowering stress and weariness (Cook et al., 2004). There is strong evidence that the design of equipment and furniture has an impact on workers' stress levels, performance, and health (particularly with regard to diseases of the musculoskeletal system) (Westgaard & Winkel, 1997, Yeow & Sen, 2003). According to Pickson et al., (2017) research, there is a strong correlation between employee productivity and furnishing. Seating in an office chair for long periods of time while working puts strain on the spine's supporting mechanisms. Therefore, it's crucial to have an ergonomic workplace chair that supports the lower back, encourages good posture, and prevents the development or aggravation of back problems (Baba, Baba, & Oborah, 2021). They also stated that if the workplace is furnished with ergonomically designed work environments, furniture, and equipment, organizations would experience high productivity from the employees. Burke (2000) proposed that managers should

pay attention to furniture when creating an effective workplace, such as adjustable desks and chairs, which can support employees' productivity and produce well-performing work by the employees who must work full-time without any barriers.

2.3.3.5 Spatial arrangements and productivity

Currently, work environments support different ways of functioning. Compared to completely enclosed private offices; open plan offices are more adaptable and display ease of communication and interpersonal access. This shift to open plan offices has increased employee productivity in comparison to closed office spaces (Becker, 2002). According to Chandrasekar's (2011) research, office space has a greater impact on employees' productivity at work than other physical factors. Saleem, (2012) also stated that, workers require enough space for their private documents. Depending on his finding he also stated that, productivity and spatial arrangements have a slight and favorable connection. According to Deb and Sinha (2010), the significance of spatial planning has grown, and it must be in accordance with an organization's goals. Positive harmony would result from interactions and communications that are appropriate for the surroundings. The design of the spatial arrangement and its consideration can also be the most important human resource strategy for improving the possibility of balancing the workers' individual work and teamwork tasks, according to their explanation. According to (Badayai, 2012), workplace design and office space planning have received a lot of focus in environmental studies. The advantages of an open-plan workplace are the main factor in the spatial arrangement. There are mixed results, with some workers reacting completely negatively to the open-plan office, while those who respond favorably either came from dark, cramped former offices or preferred social interaction at work over enjoyment of the work itself.

2.3.3.6. Office decor and productivity

Pickson et al., (2017) tried to look into how general design and office decor affect worker productivity. According to their study, there is a substantial correlation between general workplace design and décor and employee productivity, which is a feature of work ergonomics. The association was likewise strongly positive, suggesting that when a business pays attention to the overall layout and aesthetics of its workplace, it would also see a boost in worker productivity. To find out whether workplace space decoration affected productivity, intriguing research was conducted. The research produced some intriguing findings, showing that employees were more productive when an office was decorated in a way, they found appealing.

The research even demonstrated that workers were more empowered and productive when given control over the office's décor (Greenaway et al., 2016). There are benefits to having some decor in the office, particularly live plants that can improve the environment's physical and mental health (Nieuwenhuis et al., 2014). Many academics have emphasized the value of adding plants to office decor because it helps turn a once-sterile space into a productive and healthy workplace. Nieuwenhuis et al. (2014), further explain the importance of having a green work environment, by saying the introduction of plants into the office space would drive a more efficient work environment, as well as the plants make the office space more collaborative and humane. According to Gray and Birrell (2014), who address this intriguing fact about plants in the workplace, having plants in a workplace has numerous advantages. The plants can be a resource for bettering indoor air quality and they can also encourage well-being, which will boost staff morale and productivity. Growing plants in the office have been shown to have a variety of positive effects, according to studies. Particularly, a number of academics have looked into how indoor plants affect things like office worker productivity and wellbeing. These results include job performance, emotional states, psycho-physiological stress responses, and room assessments (Adachi et al., 2000; Chang & Chen, 2005; Kim & Mattson, 2002; Liu, Kim, & Mattson, 2003). Choosing the correct color is very important. It has been proven to improve productivity, performance and raise employees' spirits. It contributes to the workplace by merely creating a pleasant atmosphere. Many studies have supported this idea, According to Baughan-Young (2001), color plays a significant role in the health and well-being of the human body, mind, soul, and productivity. Also, Kwallek (2002), stated that choosing the incorrect colors can have a negative impact on mental health, contributing to symptoms like eyestrain, headaches, and fatigue. Also, psychological studies stated that, colors can affect people's moods and evoke feelings (Carruthers et al., 2010). Warm colors typically inspire warming and positive emotions, while cool colors may arouse unhappy and depressive feelings. (Ching and Binggeli, 2012).

2.3.3.7. Workplace flexibility and productivity

Pickson et al., (2017) stated that, there is a positive significant relationship between employee productivity and the degree of workplace comfort and flexibility. This suggests that as the degree of workplace comfort and flexibility is increased, a corresponding rise in employee productivity is very important and significant. A flexible workplace delivers functionality. Flexibility-friendly workplaces and organizations promote good ergonomics. It is healthier to be able to change

positions while working by sitting, standing, moving around, and even lying down than to sit for long periods of time with 90-degree angles at the hips and knees. Examples of designs that assist good ergonomics include tables that can be adjusted to accommodate working heights for both sitting and standing positions, telephone and computer systems that are accessible from everywhere in the office, and comfortable, lie-down seats in quiet areas (<http://www.ergoweb.com>, Ontario, Computer Ergonomics: Workstation layout and Lighting, Health and Safety Guidelines, 2005).

👉 To fulfill the research objectives and based on the literature review done, the researcher had developed seven hypotheses. These are:

- H1. Lighting has a positive and significant effect on the productivity of employees.
- H2. Indoor air quality has a positive and significant effect on the productivity of employees.
- H4. Noise (acoustics) has a negative and significant effect on the productivity of employees.
- H3. Office furnishing has a positive and significant effect on productivity of employees.
- H5. Spatial arrangement has a positive and significant effect on the productivity of employees.
- H6 Decor has a positive and significant effect on the productivity of employees.
- H7 Office flexibility has a positive and significant effect on the productivity of employees.

2.4. Conceptual Framework

The conceptual framework was developed based on theories of ergonomics (the two-factor theory, Affective Events theory (AET) and Person environment fit theory) and empirical studies (which were discussed above) which present the relationship between workplace ergonomics and employee productivity.

Workplace ergonomics

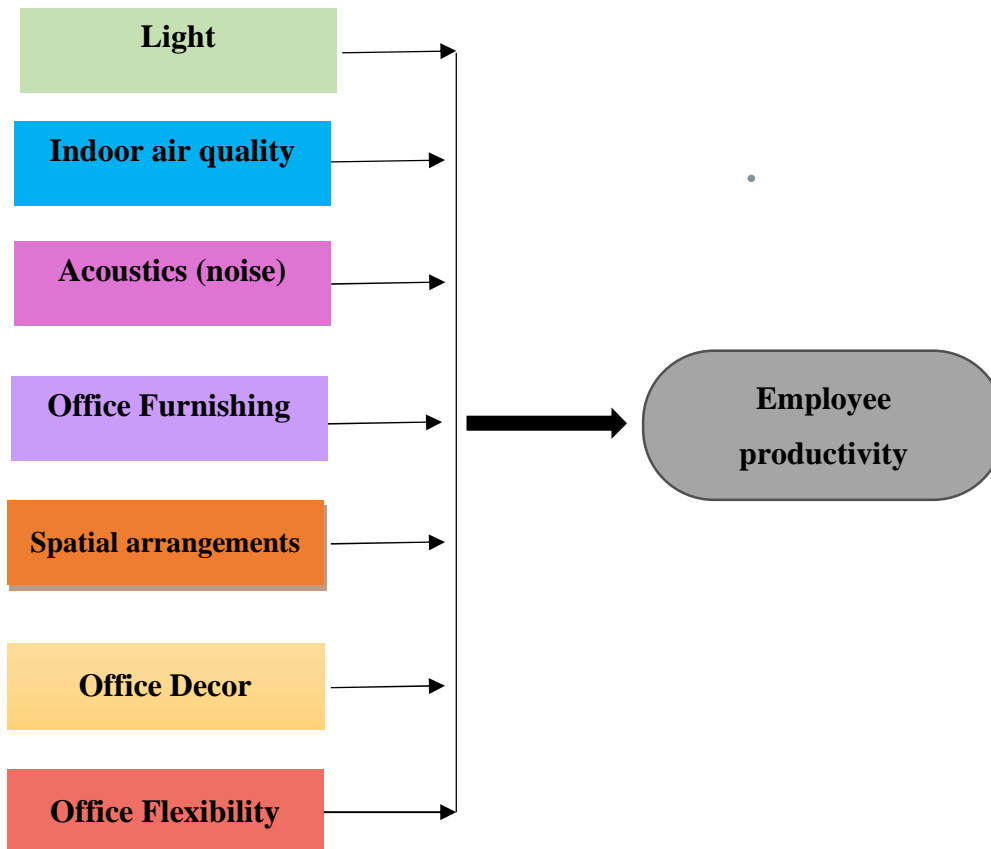


Figure 2. 1: The conceptual model of the study

Source: Compiled by the researcher depending on theories and prior studies

CHAPTER THREE

Methodology

3.1. Introduction

This chapter covers the population, sample size, sampling strategy, data source and collection methods, measurement scale, data analysis methods, validity and reliability. It also discusses the research design and approach.

3.2. Research Design and Approach

3.2.1 Research design

The research design serves as the conceptual framework for the study and serves as the manual for data collecting, measurement, and analysis (Kothari, 2004). In this study the researcher used exploratory, descriptive, and causal research designs.

In the beginning stages of the research procedure, exploratory research is conducted. It is a non-formal procedure that aids in identifying the acknowledged issue. This method entails analyzing the situation, talking with experts about the issue, evaluating the studies that have already been done on related subjects, etc. The type of information that must be gathered and the best way to conduct the research should be obvious to the researchers at the conclusion of this process (Sreejesh et al., 2014). This method was used to choose and identify factors affecting employee productivity also, to understand the topic.

A descriptive survey approach is recognized as a sort of quantitative research, which includes a thorough explanation of the phenomena in question, begins with a theoretical or practical research topic, and concludes with actual measurements and data analysis (Creswell, 2013). Its primary objective is to gather original data to describe or evaluate the attitudes and orientations of a large community (Babbie, 2005). This method was used in this study to describe the relationship between workplace ergonomics and employees' productivity. It also helped the researcher to ask many questions at one time, measure many variables, and test hypotheses in a single survey.

The fundamental goal of causal studies is to determine the cause-and-effect connection between variables. The core element of a causal relationship is that when we do one thing (the cause), it results in another thing (effect) (Sreejesh et al., 2014). The effect of workplace ergonomics on employee productivity was investigated by using this method.

3.2.2. Research approach

A quantitative research approach was used in this study. The creation of quantitative data that can be subjected to rigorous quantitative analysis in a formal and strict manner is a key component of the quantitative research approach (Kothari, 2004). Statistical, mathematical, and data processing are typically used in quantitative research to conduct systematic and empirical investigations of phenomena. The essential connection between empirical observation and the mathematical articulation of quantitative relations is provided by the process of estimation in quantitative research. The data used in quantitative research is normally chosen and examined numerically (Basias & Pollalis, 2018). In quantitative research, it's crucial to gather data accurately, store it safely in electronic databases, and analyze it using the right statistical techniques (Watson, 2015). The objective of the quantitative methodology is to acquire precise and reliable measurements that enable statistical analysis (Queirós et al., 2017).

3.3. Data Source and Method of Data Collection

3.3.1. Data source

Both primary and secondary data was used in this study. The primary data are those that are gathered afresh and for the first time, making them unique by nature. On the other hand, secondary data are those that have already been gathered and subjected to the statistical process by another party (Kothari, 2004).

3.3.2. Data collection methods

I. Primary data

Primary data was collected by using structured questionnaires. Structured questionnaires are questionnaires with specific, tangible, and pre-determined questions. Each respondent receives the questions in the same order, with the exact same language (Kothari, 2004). There are two parts in the questionnaire. The respondent's demographic details, including gender, age, educational attainment, years of employment with the company, and job title, were covered in Part One. The second part of the survey consists of scripted five-point Likert scale questions with predetermined answers about employee productivity and workplace ergonomics. There are eight sections in the second part: Section A, which is about lighting and contains five questions; Section B, which is about indoor air quality and contains six questions; Section C, which is about noise and contains five questions; Section D, which is about office furnishings and contains seven questions; Section E, which is about spatial arrangements and contains seven questions;

Section F, which is about office décor and contains four questions; and Section G, which is about office flexibility and contains three questions. The final section, H, contains six questions about employee productivity. The questionnaires were translated in to Amharic based on the advice of the HRM of the Ethiopian ministry of mines and petroleum. This was done to make sure that the questionnaires are understandable to respondents as the ministry office have employees with different educational level.

Most of part two questions i.e. from section A to G, were adopted and revised from different studies (Saleem et.al, 2012; Alzahrani, 2019, which was revised from Punadi, 2015; Makhbul, 2013, which was adopted from Tarcan et al., 2004; Asante, 2012; Makhbul et al., 2022, which was adopted from different studies. The rest were developed from literature reviews which were found to be appropriate for the study. Section H was developed and revised from Beatrice, 2014; Odhiambo, E.O. 2015 and from literature reviews which were found to be appropriate for the study.

II. Secondary Data

The secondary data was collected from relevant documents, organization reports, newspapers, and magazines.

3.4. Population and Sample Size of the Study

3.4.1. Target population

The target population of this study was all employees of the ministry of mines and petroleum (Ethiopia). With a total number of 497 employees according to the data collected from the HRM report of the ministry of mines and petroleum (Ethiopia).

3.4.2. Sample size determination

(Slovin, 1960) provides a simplified formula to calculate sample sizes. Accordingly, the following formula is applied to determine the number of respondents at 95% confidence level and 0.05 sampling error.

$$n = \frac{N}{1+N(e^2)}$$

$$n = \frac{497}{1+497(0.05^2)}$$

$$n = 221.6276 \quad 222 \text{ employees}$$

N = the population size proportion (all employees of the ministry of mines and petroleum (Ethiopia))

n = sample size

e = the level of precision (0.05)

3.4.3. Sampling method

A researcher used sampling as a technique (procedure or device) to systematically choose a smaller group of representative objects or people (a subset) from a pre-defined population to act as subjects (data sources) for observation or experimentation in accordance with the goals of his or her study. In this study, simple random sampling, which is a type of probability sampling, will be used. Probability sampling is also referred to as "random sampling" or "chance sampling." With this sampling strategy, each component of the universe has an equal chance of being included in the sample. Random sampling is considered as the best technique for selecting a representative sample because it supports the principle of statistical regularity, which argues that if a sample is typically picked at random, it will generally reflect the universe in terms of composition and attributes. Generally, every member of the population has an equal chance of being selected for the sample through random sampling (or simple random sampling), and all selections are made independently of one another. Additionally, it assigns an equal chance of selection to each potential sample combination (Kothari, 2004). A random number of matrix or computer-generated random number list is used to select the sample. Additionally, it can be done using a lotto system, cash, etc. (Acharya et al., 2013).

This technique has the advantages of first: the simplicity of the selection process. Since each member has an equal chance of being chosen, it is also regarded as a fair method of selecting a sample from a particular community. Second: The demographic representation of simple random sampling is another important characteristic. The only factor that could theoretically undermine its representativeness is chance (Sharma, 2017). All these factors led the researcher to select a simple random sampling technique.

3.5. Measurement Scale

This study used a Likert scale. Likert scales are described as A measure of attitude to allow respondents to rate how strongly they agree or disagree with carefully constructed statements, ranging from very negative to very positive attitudes toward some object (Zikmund et al., 2009). Likert scale was appropriate for this study because its primary objective is to assess how

workplace ergonomics affect employee productivity through employees' attitudes and opinions. In the study's questionnaires, a 5-point Likert scale with the values 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree is being used.

3.6. Data Analysis Methods

Statistical Package for Social Sciences (SPSS), version 27 a quantitative research analysis tool was used to analyze the results of this research. With the help of this tool, frequency, percentage, mean, standard deviation, regression and correlation were used for data presentation and analyses.

3.7. Validity

The degree to which a measure accurately measures what it is intended to measure is known as validity (Joseph et al., 2010). Beside this a questionnaire about workplace ergonomics and employee productivity is created in accordance with literature reviews and questionnaires related to the subject area in order to ensure the validity of the research tool. It was also evaluated by an academic advisor prior to the data collection in order to maintain its validity and to increase the exactness and effectiveness of the findings. Additionally, in order to collect questionnaires, the researcher also made direct contact with the firm's employees.

3.8. Reliability

According to Cooper & Schindler (2014), reliability is the extent to which measurements produce consistent findings. Cronbach's Alpha, a measure of internal consistency, was used to determine the reliability of the questionnaires used in this study.

3.9 Testing the multiple regression model

The R^2 value is the percentage of a dependent variable's variance that can be accounted for by its influencing variables. According to Cohen (1988), values of R^2 around 67% are indicative of strong explanatory power, values of R^2 around 33% are indicative of average explanatory power, and values of about 19% are indicative of weak explanatory power. In the study Adjusted R^2 was used to evaluate the explanatory power of the research models instead of R^2 because Adjusted R^2 will rise every time we add a variable (Miles, 2005); therefore to account for this, we utilize adjusted R^2 . Also In order to make a regression data analysis the researcher checked the assumptions of linear regression model which are multicollinearity, homoscedasticity, autocorrelation, normality and linearity.

3.10. Ethical Considerations

The rights of the participants are protected by ethics in study design. As a result, the researcher must inform participants about the advantages of the study, their rights, and protections, and receive their informed consent (Cooper & Schindler, 2014).

As a result, this research takes proper ethical issues into account at every level. The chosen samples for this study were asked to complete survey questionnaires anonymously. The participants were made aware that their answers would be kept anonymous, and that the information would only be utilized for research. The cover letter emphasized that strict confidentiality will be upheld at all times during the processing, storage, analysis, and reporting of the data collected from each participant. The letter also assured them that information would only be used for research reasons and explicitly outlined the study's aims. Additionally, the cover letter made it abundantly apparent that neither the respondents nor the organization would be harmed in any way by the data gathered, the manner in which it was gathered, or any information the participants volunteered.

3.11. Operational Definitions of Terms

📖 **Ergonomics:** is the study of how humans (employees) interact with other components of a system (workplace)

📖 **Workplace:** A workplace is a location where someone works, for their employer or themselves, a place of employment.

📖 **Productivity:** is what people can produce with the least amount of effort. Productivity is explained in this study by efficient working hours, high-quality services, achieving goals, volume of work completed, efficiency, and meeting deadlines.

📖 **Lighting:** is the deliberate use of light to achieve practical or aesthetic effects.

📖 **Noise:** Unwanted sound that is audibly louder than humans can comfortably hear.

📖 **Indoor air quality:** is the air quality within and around the workplace.

📖 **Office furnishing:** the office furniture, furnishings and equipment which are adjustable, moveable, and comfortable for work that are owned or leased by any of the Companies and used in the conduct of the Business.

📖 **Spatial arrangements:** the overall arrangement of the office space including the plan of the office (open plan or closed plan office), meeting areas, storage space, working space, and etc.

📖 **Office Decoration:** décors that are found in workplace which includes pictures, plants and colors.

📖 **Office flexibility:** working pattern that falls outside of traditional office locations. That can mean working in different spots around the same office.

CHAPTER FOUR

Data Analysis and Interpretation

4.1. Introduction

The purpose of this chapter is to present the results of the data analysis of the research. The chapter begins with a discussion of data screening and response rate. IBM SPSS (version 27) and the respondent responses of the questionnaire were used to analyze the descriptive statistics.

4.2. Data Screening

For this study, data was handling carefully from data collection until the end result in order to decrease occurrence of error or outliers. Therefore, there is very little chance of errors and/or outliers. In spite of these, the data was checked for outliers via the SPSS frequency distributions and the values were confirmed to be between 1 and 5 (the range of scale used in this study). There were only 8 missing data out of 230 respondents. Hair et al., (2019) refers to these missing data as ignorable data and no corrective action was taken.

Multicollinearity, linearity, homoscedasticity, Autocorrelation and normality have been checked in this study as multiple liner regression analysis (MLA) is employed for the main analysis of the data.

4.3. Response Rate

Simple random sampling was used as described on section 3.3.3 of this paper. Data collection was carried out over a one-month period from March to April, 2023 manually. 242 questionnaires were distributed and 230 were collected and only 222 were filled properly and complete. According to Hair et al.'s (2019) recommendations, these missing data were eliminated and considered as ignorable. Depending on this the response rate were 95.04%. The non-response rate was 4.96%.

Table 4. 1: Response rate

Category	Frequency	Percentage
Response	230	95.04%.
Not response	12	4.96%.
Total	242	100%

4.4. Reliability Analysis

Cronbach's Alpha, a measure of internal consistency, was used to determine the reliability of the questionnaires used in this study. If the Cronbach's alpha coefficients are close to 1.0, the items' internal consistency is greater. If > 0.9 , Excellent, >0.8 , Good, >0.7 , Acceptable, > 0.6 , Questionable, >0.5 , Poor, and < 0.5 , Unacceptable, according to George and Mallery (2003, p. 231). Since doing an internal uniformity test increases confidence in the validity of the research findings, the results are shown in Table 4.2 below, which show that each independent variable's parameters have "acceptable" and "good" internal consistency. The reliability test of the study is within the "Acceptable" category, and the study's average Cronbach's alpha value for the independent variables is $(= 0.839)$. The study's Cronbach Alpha score is 0.839. In Table 4.2, the scales determining the objective categories of the questionnaire are summarized.

Table 4. 2: Reliability Analysis for the variables

Scale	Cronbach's Alpha	No. of items
Dependent variable		
Employee productivity	.825	6
Independent variables		
Lighting	.734	5
Indoor air quality	.731	6
Noise (Acoustic)	.787	5
Office furnishing	.735	7
Spatial arrangements	.714	7
Office décor	.708	4
Office flexibility	.744	3
Average	.839	37

Source: **IBM SPSS 27 Output**

4.5. Descriptive Statistics

This section contains a computed summary of the descriptive statistics for the demographic data and the independent variable, including lighting, indoor air quality, noise (acoustic), office furnishings, spatial arrangement, office decor, and office flexibility and dependent variable (employee productivity) contained in the surveys. The mean and standard deviation were used to discuss each variable that was obtained from respondents.

4.5.1. Respondents Demographics

An analysis of the characteristics of the sample is presented in this section based on gender, age, level of education, work experience, work position in the Ethiopian ministry of mines and petroleum.

I. Gender

As shown in the Figure 4.1, the majority (59.5%) of the respondents were males, while the remaining 40.5% are females. These percentages demonstrate that the questionnaires were given to both males and females, demonstrating that the study included both genders in its conclusion. Also, in order to conduct a fruitful analysis.

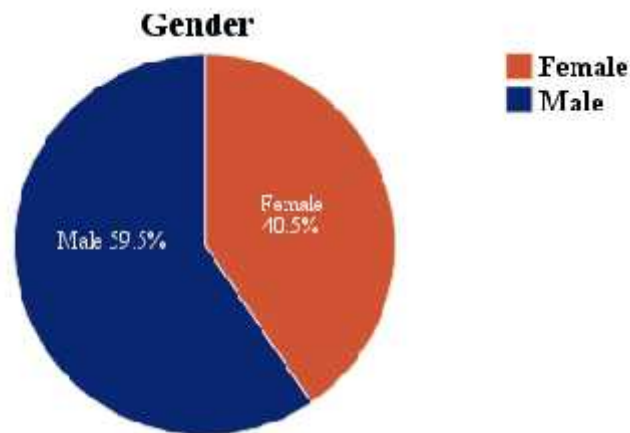


Figure 4. 1: gender distribution

Source: IBM SPSS 27 Output

II. Age

As shown on figure 4.2 below, the majority of the respondents (45.5%) were between the ages 31-40. While 22.5% of the respondents are between 20-30 years old, 20.3% of the respondents are between age of 41-50 and only 12.2% of the respondents are between 51-60 years old. Due to the respondent's age, the researcher was able to distinguish between the different categories of respondents. Additionally, the variance of respondents by age suggests that participants in this study ranged in age, which will lend credibility to the results.

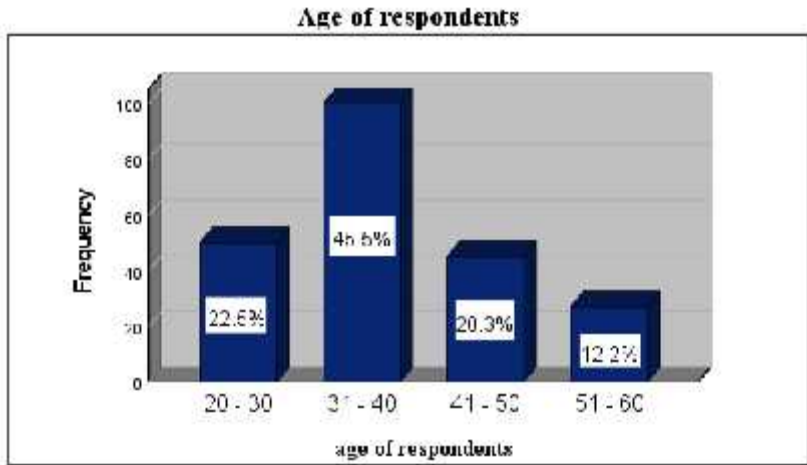


Figure 4. 2: Age distribution of respondents

Source: IBM SPSS 27 Output

III. Educational level

The survey on the educational level of respondents shows that about 52.7% of the respondents have a first degree, about 35.6% of the respondents have a master’s degree, about 8.1% of the respondents have diploma, and about 1.4% of the respondents have PhD. The rest of the respondents do have varying grade level of education as indicated on figure 4.3. These findings demonstrate that the majority of respondents are educated, capable of comprehending the purpose of the study and providing clear responses to the study's questions.

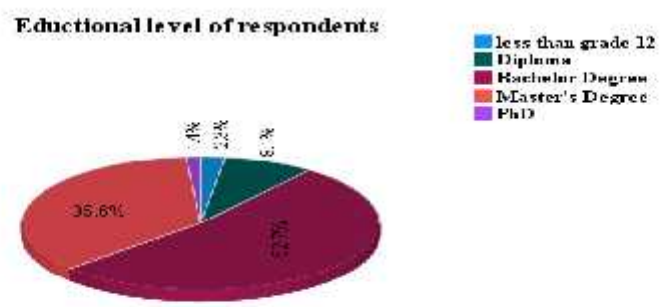


Figure 4. 3: Educational level of respondents

Source: IBM SPSS 27 Output

IV. Work Experience

Most of the respondent do have a work experience of between 3-8 years which is 52.3% as shown on the below pie chart, 27% of the respondents have working experience of between 9-14 years, 9.9% of the respondents have working experience of between 15-20 years, 8.1% of the respondents have working experience of 21-26, and the rest respondents (2.7%) have working experience of more than 27 years amongst the 222 valid respondents received. These findings demonstrate that the majority of respondents had a variety of years of work experience, which demonstrates their level of corporate knowledge. In this survey, every responder had more than three years of experience, indicating that they are knowledgeable about the organization and capable of providing accurate answers.

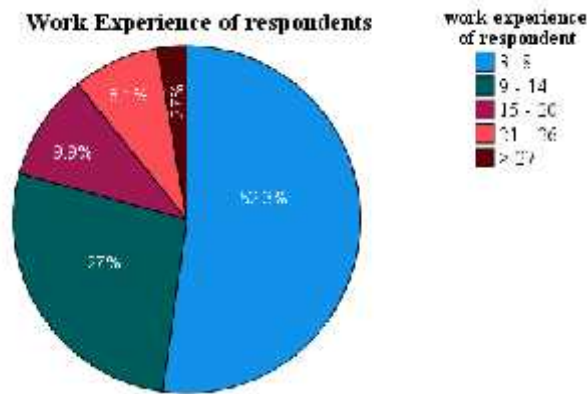


Figure 4. 4: Work experience of the respondents

Source: IBM SPSS 27 output

V. Working Position

The survey indicates that the respondents have different working position as shown on the figure. According to these findings, the majority of respondents hold various positions within their organizations, demonstrating their exposure to a variety of work settings. This allows them to know their working environment better and this provides accurate responses to survey questions of the study.

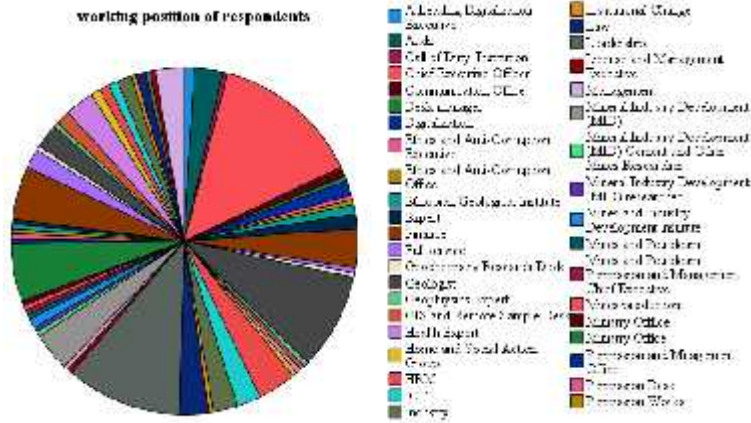


Figure 4. 5: Working position of respondent

Source: IBM SPSS 27 output

4.5.2 Descriptive Statistics of the Variables

This section contains a computed summary of the descriptive statistics for the independent variable, including lighting, indoor air quality, noise (acoustic), office furnishings, spatial arrangement, office decor, and office flexibility and dependent variable (employee productivity) contained in the surveys. The mean and standard deviation were used to discuss each variable that was obtained from respondents. Where the mean of a dataset is the sum of values in that dataset divided by the total number of observations, or average value of participants' response and the standard deviation shows how near each observed value is to the dataset's overall mean. The mean was interpreted according to Zaidatol and Bagheri (2009).

Table 4. 3: Likert scale mean score

Likert scale mean score	Interpretation
< =3.39	Low
3.40 - 3.79	Moderate
above 3.80	High

Source: Zaidatol and Bagheri (2009)

4.5.2.1. Lighting

Table 4. 4: Descriptive statistics for lighting

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I don't face any problems with lighting in my office	222	1	5	4.12	.730
Windows in my office provide me natural light	222	1	5	4.14	.705
My workspace is provided with efficient lighting so that I can work easily without strain on my eyes.	222	2	5	4.05	.687
There is enough natural light at my workspace	222	1	5	4.00	.731
I have control over the lighting on my desk (i.e., adjustable desk light on desk)	222	1	5	3.31	.959
Valid N (listwise)	222				
Average mean				3.92	.762

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to lighting related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were highly agreed with lighting with an average mean value of 3.92 and 0.762, standard deviation. From the 5 items, the second item has the highest mean (4.14), which indicates the respondents are highly agreed that windows in their office provide them natural light. The first item has the second largest mean (4.12), which indicate that the respondents are highly agreed that, they don't face any problems with lighting in their office. The mean of the third and the fourth item (4.05 and 4.00), also show that respondents are highly agreed that, their workspace is provided with efficient lighting so that they can work easily without strain on their eyes and There is enough natural light at their workspace. In the other hand item 5 has the lowest mean (3.31) from the 5

items which indicate that respondents are moderately agreed that, they have control over the lighting on their desk (i.e., adjustable desk light on desk).

4.5.2.2 Indoor air quality

Table 4. 5: Descriptive statistics for indoor air quality

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Our office is properly ventilated	222	1	5	3.98	.781
We have ample space in our office to allow for air circulation	222	2	5	3.82	.761
We have installed air conditioners in our office	222	1	5	3.57	.803
The window in our company facilitates allow for proper air circulation	222	1	5	3.95	.697
The overall temperature of my office is pleasant	222	1	5	3.85	.761
I can control my office temperature	222	1	5	3.52	.783
Valid N (listwise)	222				
Average mean				3.78	.764

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to Indoor air quality related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were moderately agreed with indoor air quality with an average mean value of 3.78 and 0.764 standard deviation. The first item has the largest mean (3.98) followed by item number 4 (3.95), which indicate respondents are agreed that their office is properly ventilated and the windows in their company facilitates allow for proper air circulation. Item number 5 has the mean value of (3.85) followed by item 2 which has the mean value of (3.82), these indicate that the respondents

are also agreed that the overall temperature of their office is pleasant and they have ample space in their office to allow for air circulation. Item number 3 has a mean value of (3.57) which shows that the respondents are moderately agreed that they have installed air conditioners in their office. The last item has the lowest mean (3.52) which also indicate that the respondents are moderately agreed that they can control their office temperature.

4.5.2.3. Noise (Acoustic)

Table 4. 6: Descriptive statistics for Noise (Acoustic)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
My work environment is quiet	222	1	5	1.89	.735
My workplace is free from noise distractions	222	1	5	2.07	.815
I can have quiet and undisturbed time alone.	222	1	5	2.21	.786
level of noise in my workplace is low	222	1	5	2.10	.733
I can do my work properly without noise distraction in my workplace	222	1	5	2.17	.758
Valid N (listwise)	222				
Average mean				2.09	.765

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to noise related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were weakly agreed with items related with noise with an average mean value of 2.09 and 0.765, standard deviation. All items have a mean value of (2.21, 2.17, 2.10, 2.07 and 1.89) which is less than 3.39. This indicates that the respondents are loosely agreed that their working place is quiet and undisturbed.

4.5.2.4. Office furnishing

Table 4. 7: Descriptive statistics for office furnishing

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
My office furniture is high in quality	222	1	5	4.08	.717
My office furniture is flexible to adjust, move, rearrange, and recognize my workspace.	222	1	5	3.80	.860
My office is well organized with office furniture	222	1	5	3.88	.752
I have the requisite furniture to perform my duties	222	1	5	3.87	.820
Our company has invested in ergonomic furniture	222	1	5	3.93	.802
My office furniture is comfortable enough so that I can work without getting tired	222	1	5	3.95	.750
I have easy access to equipment that I need to do my work	222	1	5	3.77	.815
Valid N (listwise)	222				
Average mean				3.89	.788

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to office furnishing related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were highly agreed with office furnishing with an average mean value of 3.89 and 0.788, standard deviation. The first item has the largest mean (4.08) which indicate that the respondents are highly agreed that their office furniture is high in quality. The sixth item has the second largest mean (3.95) followed by the fifth item with the mean value of (3.93) which indicate that the respondents are highly agreed that, their office furniture is comfortable enough so that they can work without getting tired and also their company has invested in ergonomic furniture. The third item has a mean value of (3.88) followed by the fourth item with mean of (3.87) which indicate that the respondents are highly agreed that their office is well organized with office furniture and they have the requisite furniture to perform their duties. The second item has a mean value of (3.80) which also indicates that the respondents are high agreed that their office furniture is flexible to adjust, move, rearrange, and recognize their workspace. The last item has the lowest mean (3.77) respectively which indicates that, the respondents are moderately agreed that, they have easy access to equipment that they need to do their work.

4.5.2.5. Spatial Arrangements

Table 4. 8: Descriptive statistics for spatial arrangements

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
My office/branch is open enough to see my colleagues working	222	1	5	4.09	.816
I am satisfied with the amount of space for storage, movements and displaying important materials.	222	1	5	3.66	.855

My workspace serves multipurpose functions for informal and instant meetings	222	1	5	3.72	.914
There are places for me to go to have privacy	222	1	5	3.55	.816
I have enough work surface area at my workspace	222	1	5	3.86	.835
The open office arrangement helps me to stay focused and “on task” at work.	222	1	5	3.86	.820
The open office arrangement helps me to collaborate with my coworkers	222	1	5	3.90	.775
Valid N (listwise)	222				
Average mean				3.81	.833

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to spatial arrangement related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were highly agreed with spatial arrangement with an average mean value of 3.81 and 0.833, standard deviation. The first item has the largest mean (4.09) followed by the last item with the mean value of (3.90) which indicate that the respondents are highly agreed that, their office/branch is open enough to see their colleagues working and the open office arrangements help them to collaborate with their coworkers. The fifth and the six items have equal mean values (3.86) which indicates that the respondents are highly agreed that, they have enough work surface area at their workspace and the open office arrangement helps them to stay focused and “on task” at work. The second has a mean of (3.66) followed by the fourth item which has a mean of (3.55) which indicate that the respondents are moderately agreed that, they are satisfied

with the amount of space for storage, movements and displaying important materials and that there are places for them to go to have privacy.

4.5.2.6. Office Décor

Table 4. 9: Descriptive statistics for office decor

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I am satisfied with my office décor	222	1	5	3.79	.792
My office décor is attractive, so it improves my mood	222	1	5	3.79	.803
My office décor makes me feel refreshed and at home	222	1	5	3.76	.804
my office is decorated with plants and pictures, which motivates me	222	1	5	3.68	.829
Valid N (listwise)	222				
Average mean				3.76	.807

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to office décor related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were moderately agreed with office decor with an average mean value of 3.76 and 0.807, standard deviation. The first and the second items have equal mean value (3.79) followed by the third and fourth items with the mean values of (3.76 and 3.68). These indicate that the respondents are moderately agreed that, they are satisfied with their office décor, their office décor is attractive, so it improves their mood, their office décor makes them feel refreshed and at home and that, their office is decorated with plants and pictures, which motivates them.

4.5.2.7. Office Flexibility

Table 4. 10: Descriptive statistics for office flexibility

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I can change positions while working by sitting, standing, and moving around	222	1	5	3.79	.797
My office provides a variety of different place for my work	222	1	5	3.79	.875
I can choose a workstation that makes me comfortable to do my work	222	1	5	3.63	.829
Valid N (listwise)	222				
Average mean				3.74	.834

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to office flexibility related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were moderately agreed with office flexibility with an average mean value of 3.74 and 0.834, standard deviation. The first and the second items have the highest mean (3.79) followed by the third item with the mean value of (3.63) which indicates that, the respondents are moderately agreed that, their office provides a variety of different place for their work and that, they can change positions while working by sitting, standing, and moving around and that they can choose a workstation that makes them comfortable to do their work.

4.5.2.8. Employee Productivity

Table 4. 11: Descriptive statistics for employee productivity

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I regularly deliver high quality services	222	1	5	3.76	.595

I use my working time properly	222	2	5	3.91	.667
I accomplish my daily tasks quickly and efficiently	222	2	5	3.81	.708
I do large amount of work each day	222	2	5	3.67	.690
I meet work deadlines promptly	222	2	5	3.77	.643
I achieve my work target	222	2	5	3.99	.525
Valid N (listwise)	222				
Average mean				3.82	.638

Source: IBM SPSS 27 output

The above table shows summary of the details for the issues related to employee productivity related factors by involving the number of respondents, mean, standard deviation, minimum and maximum values in each category. The finding of this study indicates that most of employees were highly agreed with the items with an average mean value of 3.82 and 0.638, standard deviation. The last item has the highest mean value (3.99) followed by the second and the third items with the mean values of (3.91 and 3.81) which imply that the respondents are highly agreed that, they achieve their work target, they use my working time properly and that, they accomplish their daily tasks quickly and efficiently. The fifth item has a mean of (3.77) followed by the first and the fourth item with mean values of (3.76 and 3.67) which indicate that they are moderately agreed that, they regularly deliver high quality services and do large amount of works each day.

4.6. Correlation analysis

The simplest and most practical way to measure the association between two or more variables is through correlations. Correlations, which are expressed as a single number called a correlation coefficient (r), include details about the relationship's direction (either positive or negative) and intensity (ranging from -1.0 to +1.0) (Marczyk, DeMatteo, & Festinger, 2010).

Table 4. 12: Rules of Thumb about Correlation Coefficient Size

Coefficient range	Strength of association
0.00–0.20	Negligible correlation
0.21–0.40	Small, Weak correlation
0.41–0.70	Moderate correlation
0.71–0.90	Strong correlation
0.91–1.00	Very strong correlation

Source: Hair et al., 2016

The linear relationship between two metric variables is measured by the Pearson correlation. Correlation coefficients are used to describe the numerical representation of the Pearson correlation. With 0 indicating no correlation between the two metric variables, it runs from -1.00 to +1.00. Although both -1.00 and +1.00 are feasible, only +1.00 shows a complete correlation between the two variables (Hair et al., 2016).

The results have been interpreted using the interpretation guide (Table 4.12) developed by Hair et al., 2016, and are presented in the following sections.

Table 4. 13: correlation between the independents and the dependent variable

		Lighting	Indoor air quality	Noise	Office furniture	Spatial arrangement	Office décor	Office flexibility
Employee Productivity	Pearson Correlation	.685	.655	-.664	.681	.699	.447	.463
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	222	222	222	222	222	222	222

Source: IBM SPSS 27 output

As the results shown in table 4.13 the independent variables (lighting, indoor air quality, office furnishing, spatial arrangement, office décor, and office flexibility) are significantly and positively correlated with the dependent variable: employee productivity. The Pearson correlation value illustrates that lighting ($r= 0.681$, $p<.001$), indoor air quality ($r= 0.655$, $p<.001$), office furnishing ($r= .681$, $p<.001$), spatial arrangements ($r= 0.699$, $p<.001$), office décor($r= 0.447$, $p<.001$), office flexibility ($r= 0.463$, $p<.001$) have positive and significantly moderate

relationship with employee productivity. In other hand noise has a negative and significantly moderate relationship with employee productivity ($r = -0.644$, $p < .001$).

All the independent variables (lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office décor and office flexibility) have a moderate relationship with employee productivity at 1% significant and 99% confident level as their Pearson correlation range between 0.41–0.70 as indicated above in the table.

4.7. Regressions Analysis

4.7.1 Multiple Regression Model

Multiple regression analysis (MRA) is the primary data analysis method employed for this study, as discussed in Chapter 3 of this paper. The MRA is an expanded form of basic regression used to examine linear correlations between a dependent variable and multiple independent variables. Because the independent factors in an MRA have an impact on the dependent variable, independent variables can be established once the dependent variable's validity has been verified. Because a multiple regression model is simpler than other statistical models, it is frequently utilized. It is, nevertheless, the most misused model because analysts fail to evaluate the model's predictions, minimize or correct potential model errors, or even consider the assumptions (Ngo and La Puente, 2012). In order not to misuse the model the research tested all assumptions in the next sections.

4.7.2. Testing Assumptions of Regressions Analysis

To maintain the data validity and robustness of the research regression results under the various regression models, the fundamental hypotheses must be upheld. All quantitatively based journal articles, theses, and dissertations must demonstrate that their data conform to the procedure's assumptions (Garson, 2012). Therefore, this study conducted multicollinearity, linearity, homoscedasticity, and normality assumption testing.

I. Multicollinearity

Multicollinearity in a multivariate regression analysis refers to the correlation between the independent variables. Tolerance and variance inflation factor (VIF), Pearson correlation coefficient were utilized in this study to test multicollinearity.

📌 The tolerance is percentage of a predictor's variance that cannot be explained by other predictors. A tolerance value around 1 denotes minimal multicollinearity, while a tolerance value near 0 denotes potential danger from multicollinearity (Senaviratna, & A. Cooray,

2019). Depending on these criteria, multicollinearity assumption is not violated in this study as tolerance value for each independent variable is 0.461, 0.457, 0.450, 0.415, 0.389, 0.432 and 0.578 respectively which are not near to 0.

✚ The VIF is a tool for calculating how inflated the variance is, it is a reciprocal of tolerance. According to (Senaviratna, & A. Cooray, 2019); if the VIF value is greater than 10, there is multicollinearity; if it is less than 10, there is not. According to these criteria, there is no multicollinearity problem in this study because, as can be seen in the table 4.13 below, all of the independent variables have a VIF value which is 2.169, 2.189, 2.221, 2.411, 2.573, 2.317 and 1.730. Which are less than 10 as shown in the below table 4.14.

Table 4. 14: Multicollinearity Diagnosis (tolerance and VIF)

Model	Collinearity Statistics	
	Tolerance	VIF
Constant		
Lighting	.464	2.155
Indoor air quality	.484	2.065
Noise	.484	2.066
Office furnishing	.412	2.428
Spatial arrangement	.393	2.547
Office décor	.706	1.417
Office flexibility	.835	1.198

Source: IBM SPSS 27 output

✚ Intercorrelation between the dependents above as a general rule .80 indicates a potential multicollinearity issue (Garson, 2012).

Table 4. 15: Pearson's Correlation Coefficients of independent variables

Variables	Lighting	Indoor air quality	Noise (acoustic)	Office furnishing	Spatial arrangements	Office decor	Office flexibility
Lighting	1						
Indoor air quality	.552	1					
Noise	-.626	-.540	1				

(acoustic)							
Office furnishing	.613	.647	-.586	1			
Spatial arrangements	.643	.640	-.633	.699	1		
Office décor	.442	.389	-.414	.498	.461	1	
Office flexibility	.325	.329	-.355	.279	.345	.194	1

Source: IBM SPSS 27 output

Since all of the variables have a person correlation of less than .80, it is clear from the table that multicollinearity is not an issue.

II. Autocorrelation

The Durbin-Watson test, which is based on the ordinary least squares residuals, is the most widely used statistical test for identifying autocorrelation (Greene, 2018). This test was performed to determine whether there was autocorrelation in this study or not. Because the Durbin-Watson test performs better in a regression model without lagged dependent variables (Uyanto, 2020), this test was employed. According to Garson (2012), the Durbin Waston statistic should be between 1.5 and 2.5. Based on the fact that 1.827 is in the middle of the range, autocorrelation is not violated in this study.

III. Normality

A distribution that resembles a bell curve is the normality distribution. One with a mean of 0 and a standard deviation of 1 is said to have a standard normal distribution. Standard scores, also known as z-scores on standardized data, are results of dividing the mean by the standard deviation and structuring the mean to produce results with a mean of zero and a standard deviation of one. A normal probability map can be used to visually evaluate normality (Garson, 2012). For this study skewnees and kurtosis (Z scores) and normal probability plot, histogram were used to assess normality.

A. Skew and Kurtosis

A distribution's skew is its tilt, and a distribution's kurtosis is how high it peaks. Running descriptive statistics to obtain skewness and kurtosis and dividing the results by their standard error serves as a basic rule of thumb test for normality. For data that is properly distributed,

skewness and kurtosis should be within +2 to -2 (Garson 2012). In this study, the skewness and kurtosis of the dependent variable is within this range as the value of skewness is -0.25 and the kurtosis is -0.32, which is found by dividing the result of skewness and kurtosis by the standard error. As the result indicates that the assumption of normality is not violated in this study.

Table 4. 16: skewness and kurtosis

Descriptives			Statistic	Std. Error
Employee	Mean		3.8168	.03142
productivity	95% Confidence	Lower Bound	3.7549	
	Interval for Mean	Upper Bound	3.8787	
	5% Trimmed Mean		3.8176	
	Median		3.8333	
	Variance		.219	
	Std. Deviation		.46817	
	Minimum		2.50	
	Maximum		5.00	
	Range		2.50	
	Interquartile Range		.67	
	Skewness		-.041	.163
	Kurtosis		-.103	.325

Source: IBM SPSS 27 output

B. Graphical test of normality

We can also use graphical method to assess normality. Thereby this method was also used in this study. Depending on the below figure (histogram) we can say that the data are normally distributed and normality was not violated.

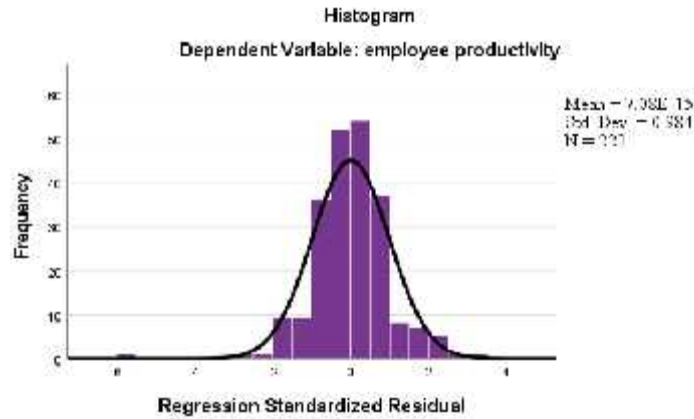


Figure 4. 6: Frequency Distribution of Standardized Residual

Source: IBM SPSS Version 27

IV. Homoscedasticity

Homoscedasticity describes a relationship that holds valid through the complete range of the dependent variable. In order to determine whether the relationship under examination is the same across the entire range of the dependent variable, homoscedasticity is required. Lack of homoscedasticity is shown by larger errors (residuals) for particular areas of the range, which can be observed on the scatter plot (Garson, 2012).

a) Graphical method to test Homoscedasticity

Homoskedasticity is one of the fundamental principles of linear regression, and when it is violated, heteroskedasticity results. Heteroskedasticity is identified using graphical techniques and heteroskedasticity tests. Visually inspecting the estimated model's residuals is one of the simplest ways to check for heteroskedasticity (ali & Terzi , 2021). This method was used to determine homoscedasticity in this study.

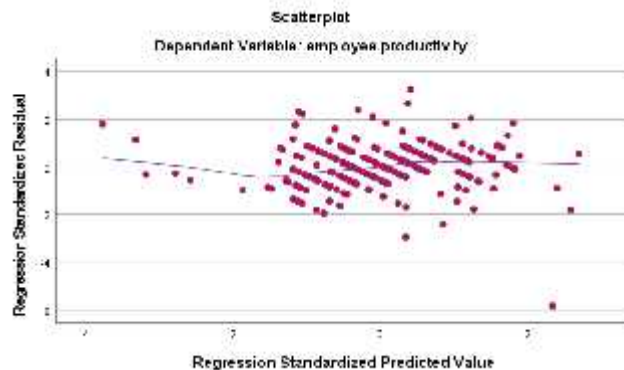


Figure 4. 7: Standardized Residual of Scatter Plot

Source: IBM SPSS Version 27

As shown in the above figure points are randomly and equally distributed throughout the plot. Therefore, it can be claimed that the assumptions of homoscedasticity have been satisfied in this study.

V. Linearity

Testing for non-linearity is important in regression analysis as it assumes linearity. Graphical method is usually used for linearity test. Other test for linearity are also available to test normality (Garson, 2012), but in this study the graphical method (Normal P-PPlot of Regression Standardized Residua) was used to test linearity as show in the figure 4.8.

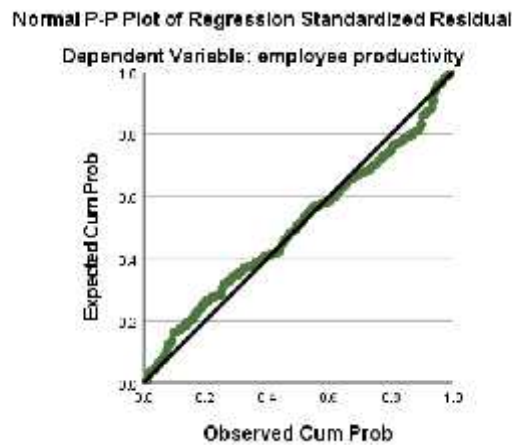


Figure 4. 8: Normal P-P Plot of Regression Standard Residual

Source: IBM SPSS Version 27

In Normal Probability Plot it is expected to show a substantially straight diagonal line from bottom left to top right. This would imply that there are no notable departures from normality. In this study linearity pattern was seen because the points were symmetrically distributed along the diagonal line. As a result, linearity was achieved as seen by the straight line relationship between the residuals and the projected dependent variable scores.

4.7.3 Regression Results and Analysis

A multiple regression model was used to examine the relationship between the dependent and independent variables and to identify the top predictors of the dependent variable (employee productivity), as the goal of this study was to investigate the impact of workplace ergonomics on employees' productivity. It served both as a model and hypothesis test. While the R^2 explains how much variance in the dependent variable is caused by the built variables, it gives information about the relevance of the variables that were included in the model. i.e., how much

employee productivity is described by the designed factors (lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office decor, and office flexibility).

I. Model Summary

Table 4. 17: model summary

Model Summary ^b										
Model	R	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Sig. F Change	Durbin-Watson	
				R Square Change	F Change	df1	df2			
1	.829 ^a	.688	.677	.26590	.688	67.300	7	214	<.001	1.827

a. Predictors: (Constant), office flexibility, office furnishing, lighting, noise (acoustic), indoor air quality, office decor, spatial arrangements

b. Dependent Variable: employee productivity

Source: IBM SPSS Version 27

Lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office décor and office flexibility were found to be satisfactory in explaining employee productivity in the Ethiopian ministry of mines and petroleum. This is shown by the adjusted R² of 67.7%. This value of adjusted R square implies that Lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office décor and office flexibility explain 67.7% of the variance in dependent variable which is employee productivity. This indicates that organizations have to be concerned about workplace ergonomics in order to increase their employees' productivity.

II. Analysis of variance

Table 4. 18: ANOVA test (Analysis of variance)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.309	7	4.758	67.300	<.001 ^b
	Residual	15.131	214	.071		
	Total	48.439	221			

a. Dependent Variable: employee productivity

b. Predictors: (Constant), office flexibility, office furnishing, lighting, noise (acoustic), indoor air quality, office decor, spatial arrangements

Source: IBM SPSS Version 27

As can be seen in the ANOVA table, the overall model was found to be statistically significant. The table shows that lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangements, office décor and office flexibility are good predictors of employee productivity as F is 67.300 which is significant at $P > 0.001$, which is less than the threshold for significance ($P < 0.05$). This finding indicates that workplace ergonomics is a key determinant of level of employee productivity.

III. Testing the hypotheses with regression analysis

Table 4. 19: regression of coefficients table

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		Sig.
Model		B	Std. Error	Beta	T	
1	(Constant)	1.038	.314		3.305	.001
	Lighting	.183	.049	.209	3.728	<.001
	indoor air quality	.152	.051	.162	2.953	.004
	noise (acoustic)	-.136	.046	-.164	-2.986	.003
	office furnishing	.172	.057	.180	3.031	.003
	spatial arrangements	.154	.056	.167	2.735	.007
	office décor	.019	.036	.024	.525	.600
	office flexibility	.118	.029	.171	4.089	<.001

Source: IBM SPSS Version 27

Hypotheses:

 **H1. Lighting has a positive and significant effect on the productivity of employees.**

Table 4. 20: lighting versus Employee productivity

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H1.	Lighting has a positive and significant effect on the productivity of employees.	.183	<.001	Accepted

The regression coefficient showed that lighting and employee productivity has a positive and significant relation ($\beta = .183, P = .001$). The regression of the coefficient implies that, holding the other factors constant when lighting is improved by one-unit employee productivity on average increases by .183 units and the relationship is statistically significant @ 1% significance level 99% confidence level and the alternate hypothesis was accepted @ 1% significance level. The visual comfort, alertness, and overall wellbeing of employees will increase with good or improved lighting in the workplace. This will allow them to complete their tasks correctly and efficiently, which will raise their productivity. This result is consistent with Dianat et al.'s (2013), Shishegar and Boubekri's (2016), Ajala's (2012), Saleem, 2012, and Lamb & Kwok's (2016) findings.

H2. Indoor air quality has a positive and significant effect on the productivity of employees.

Table 4. 21: Indoor air quality versus Employee productivity

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H2.	Indoor air quality has a positive and significant effect on the productivity of employees.	.152	.004	Accepted

The regression coefficient showed that indoor air quality and employee productivity has a positive and significant relation ($\beta = .152, P = .004$). The regression of the coefficient implies that, holding the other factors constant when indoor air quality is improved by one unit employee productivity on average increases by .152 units and the relationship is statistically significant @ 1% significance level 99% confidence level and the alternate hypothesis was accepted @ 1% significance level. Employee productivity can be improved and raised with adequate indoor air quality. An office with good air quality will improve productivity and working conditions by boosting alertness and concentration. Taghipour et al. (2015), Zakerian et al. (2016), Mak and Lui (2012), and Wargoeki et al. (1999) have comparable findings to this one.

H3. Noise (acoustics) has a negative and significant effect on the productivity of employees.

Table 4. 22: Noise (acoustics) versus Employee productivity

Hypothesis	Description	Unstandardized	Sig.	Conclusion
------------	-------------	----------------	------	------------

		Coefficients B		
H3.	Noise (acoustics) has a negative and significant effect on the productivity of employees.	-.136	.003	Accepted

The regression coefficient showed that noise (acoustics) and employee productivity has a negative and significant relation (=-.136, P=.003). The regression of the coefficient implies that, holding the other factors constant when level of noise (acoustics) is increased by one unit employee productivity on average decreased by .136 units and the relationship is statistically significant @ 1% significance level 99% confidence level and the alternate hypothesis was accepted @ 1% significance level. A higher level of noise in a workplace has a negative effect on employees' productivity as it increases tension, error, fatigue, stress, and headaches and prevents people from finishing tasks quickly and effectively which will decrease employee productivity as a result. This finding is similar with Zakerian et al., 2016 finding; Mak and Lui (2012) and Seddigh et al., 2014.

H4. Office furnishing has a positive and significant effect on productivity of employees.

Table 4. 23: Office furnishing versus Employee productivity

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H4.	Office furnishing has a positive and significant effect on productivity of employees.	.172	.003	Accepted

The regression coefficient showed that office furnishing and employee productivity has a positive and significant relation (=.172, P=.003). The regression of the coefficient implies that, holding the other factors constant when office furnishing is improved by one unit employee productivity on average increases by .172 units and the relationship is statistically significant @ 1% significance level 99% confidence level and the alternate hypothesis was accepted @ 1% significance level. By reducing discomfort, musculoskeletal ailments, stress, fatigue, and the likelihood of workplace accidents, ergonomic office furniture will increase productivity among employees. Zakerian et al. (2016), Saleem et al., (2012) and Pickson et al., (2017) findings are corroborating this conclusion.

H5. Spatial arrangement has a positive and significant effect on the productivity of employees.

Table 4. 24: Spatial arrangements versus Employee productivity

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H5.	Spatial arrangement has a positive and significant effect on the productivity of employees.	.154	.007	Accepted

The regression coefficient showed that spatial arrangement and employee productivity has a positive and significant relation ($\beta = .154$, $P = .007$). The regression of the coefficient implies that, holding the other factors constant when spatial arrangements are improved by one unit employee productivity on average increases by .154 units and the relationship is statistically significant @ 1% significance level 99% confidence level and the alternate hypothesis was accepted @ 1% significance level. By increasing communication and collaboration among employees, supporting different ways of functioning, providing storage and meeting areas a good spatial arrangement will increase employee productivity. Zakerian et al. (2016) and Pickson et al., (2017), Saleem et al., (2012) findings corroborate this conclusion.

H6 Decor has a positive and significant effect on the productivity of employees.

Table 4. 25: Office décor versus Employee productivity

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H6.	Decor has a positive and significant effect on the productivity of employees.	.019	.600	Rejected

The regression coefficient showed that office decor and employee productivity has no a positive and significant relation ($\beta = .019$, $P = .600$). The relationship is statistically insignificant @ 5% significance level 95% confidence level and there is no sufficient information to reject the null hypothesis therefore, the alternate hypothesis was rejected @ 5% significance level. This result differs from that of Pickson et al. (2017) and Haynes, (2008) findings.

H7 Office flexibility has a positive and significant effect on the productivity of employees.

Table 4. 26: Office flexibility versus Employee productivity

Hypothesis	Description	Unstandardized	Sig.	Conclusion
------------	-------------	----------------	------	------------

		Coefficients B		
H7.	Office flexibility has a positive and significant effect on the productivity of employees.	.118	<.001	Accepted

The regression coefficient showed that office flexibility and employee productivity has a positive and significant relation (= .118, P=<.001). The regression of the coefficient implies that, holding the other factors constant when office flexibility is improved by one unit employee productivity on average increases by .118 units and the relationship is statistically significant @ 1% significance level 99% confidence level. Improving workplace flexibility like providing different working station and flexible space that allow position changes like sitting, standing and moving will increase employee productivity. Therefore, organization should focus on improving workplace flexibility. This finding is similar with that of Pickson et al. (2017) and Haynes, (2008) findings.

The constant term

The constant term, which is also known as the intercept, is the average value that employee productivity would have if all explanatory variables had values of zero. The constant term value 1.038 shown in a coefficient table 4.19 indicate that employee productivity will stay positive when all independent variables (lighting, indoor air quality, noise (acoustics), office furnishing, spatial arrangements, office décor and office productivity) had a value of zero. This implies that there were other variables which were not included in this model that enhance employee productivity.

➤ **Regression model of the study**

$$EP = 1.038 + .183L + .152IAQ + -.136N + .172F + .154SP + .019OD + .118OF$$

Where:

EP = Employee productivity

L= Lighting

IAQ = Indoor air quality

N= Noise

OF= Office furnishing

SP= Spatial arrangements

OD = Office décor

OF= Office flexibility

4.10 Overall Discussions of the findings

This study found that variables such as lighting, indoor air quality, noise (acoustic), office furnishings, spatial arrangements, office decor, and office flexibility explain the variation of employee productivity at the Ethiopian Ministry of Mines and Petroleum by 67.7%. Employee productivity and organizational performance are closely related. Employee productivity is correlated with the amount of time an employee used productively while working for the company. Therefore, creating a decent, ergonomically built workplace will benefit both the organization and the employee by enabling them to carry out their duties effectively and efficiently. A more comfortable working environment for employees will reduce workplace issues since an ergonomically planned workplace will take their physical and emotional well-being into account. Employee productivity and well-being will increase by taking ergonomics principles into account when improving workplace lighting, indoor air quality, noise level, office furnishings, spatial arrangements, and flexibility. This will result in a more attractive, comfortable, and relaxing environment for workers, as well as better interaction between them and the equipment in their workspace.

Regression of coefficient revealed that employee productivity will remain positive when all independent variables are held constant, indicating that there are additional factors that influence employee productivity. These additional factors may include immaterial office ergonomics, such as organizational commitment, training and promotion, job feedback, etc.

The Ministry of Mines and Petroleum's employee productivity was found to be most positively predicted by lighting, which had the largest regression coefficient ($\beta = .183$, $P < .001$), followed by office furnishings ($\beta = .172$, $P = .004$), spatial arrangements ($\beta = .154$, $P = .007$), indoor air quality ($\beta = .152$, $P = .003$), noise (acoustic) ($\beta = -.136$, $P = .003$) and office flexibility ($\beta = .118$, $P < .001$). These imply that lighting, indoor air quality, office furnishing, spatial arrangements and office flexibility; which are elements of office ergonomics, have positive and significant effect on employee productivity. Also noise has a negative and significant effect on employee productivity. Therefore in order to improve employee productivity organizations should consider ergonomics in designing working places. The other one variable (office décor) which was included in the study model was found to be insignificant with regression coefficient ($\beta = .019$, $P = .600$).

Table 4. 27: Summary of Hypotheses Testing

Hypothesis	Description	Unstandardized Coefficients B	Sig.	Conclusion
H1.	Lighting has a positive and significant effect on the productivity of employees.	.183	<.001	Accepted
H2.	Indoor air quality has a positive and significant effect on the productivity of employees.	.152	.004	Accepted
H3.	Noise (acoustics) has a negative and significant effect on the productivity of employees.	-.136	.003	Accepted
H4.	Office furnishing has a positive and significant effect on productivity of employees.	.172	.003	Accepted
H5.	Spatial arrangement has a positive and significant effect on the productivity of employees.	.154	.007	Accepted
H6.	Decor has a positive and significant effect on the productivity of employees.	.019	.600	Rejected
H7.	Office flexibility has a positive and significant effect on the productivity of employees.	.118	<.001	Accepted

Source: IBM SPSS 27 output

CHAPTER FIVE

Conclusions and Recommendations

5.1. Summary of Major Findings

This study has examined the effect of workplace ergonomics on employee productivity: the case of the Ethiopian ministry of mines and petroleum by collecting data from 222 employees. The study used 7 independent variables (lighting, indoor air quality, noise (acoustic), office furnishing, spatial arrangement, office décor and office flexibility) as an indicators of workplace ergonomics. The findings indicate the lighting, indoor air quality, office furnishing, spatial arrangement, and office flexibility have positive and significant effect on employee productivity. It also indicates that noise (acoustic) has a negative and significant effect on employee productivity. Whereas the findings indicate that office décor has no positive and significant effect on employee productivity. Generally the findings indicate that workplace ergonomics explains the variation of employee productivity at the Ethiopian Ministry of Mines and Petroleum by 67.7%.

5.2 Conclusions

The research was conducted to examine the impact of workplace ergonomics on productivity of employees: In the case of the Ethiopian Ministry of Mines and Petroleum. The seven main questions of this study paper are attempted to be answered by the research. The following discussion includes the important findings for each research question.

- ✓ The results imply that lighting has a significant positive impact on employee productivity, and that adequate natural and artificial light in an office increases employee productivity.
- ✓ The findings imply that office ventilation and quality air boost employee productivity and that indoor air quality has a considerable positive impact on employees' productivity.
- ✓ The results suggest that employee productivity is decreased by high levels of noise, interrupted time, workspace that is not quit, distractions, etc., and that high levels of noise have significant negative effects on employee productivity.
- ✓ The findings imply that office furnishings have considerable beneficial effects on employee productivity and that high-quality, versatile, pleasant, and ergonomic types of furniture boost productivity of employees.

- ✓ The results suggest that spatial arrangements have a significant positive impact on employee productivity and that open offices that promote interaction and cooperation as well as movement, work, privacy, and exhibition increase employee productivity.
- ✓ The results imply that workplace décor has no effect on worker productivity.
- ✓ The findings suggest that workplace flexibility has measurable effect on employee productivity and that a flexible office that permits position adjustments while working and multiple working stations can boost employee productivity.

Overall, the results of this study are important in determining that ergonomically designed workplaces would increase employee productivity by creating admirable and cozy workspaces that enable workers to do tasks successfully and effectively. Since ergonomically designed workspaces can enhance workers' mental and physical health by providing a comfortable workplace. It is also extremely important to a company that needs to protect its workers' physical and emotional wellbeing because they are the engine of organizational growth and one thing that create competitive advantage in today's worldwide society.

5.3 Recommendations

Based on the findings and conclusions of this study, the following recommendations are offered.

- I.** Emphasizing and making improvements to the already identified variables in this study will have a significant impact on employee productivity because this study has already identified the key factors and key indicators of physical ergonomics that affect employee productivity with approximately 67.7% explanatory power. The Ethiopian Ministry of Mines and Petroleum and other comparable organizations should therefore allocate their resources and concentrate on improving lighting, office furnishings, spatial arrangements, indoor air quality, noise and office flexibility as these were significant and highly rated in this research when seeking to implement ergonomics to increase employee productivity.
- II.** Employees ought to undergo training on ergonomics-related issues. This will aid the employee in better understanding workplace ergonomics, a relatively new idea in our nation, and enable them to take part in designing ergonomically sound workspaces. This will help organizations decide where to focus their efforts while also assisting organizations in creating a comfortable working environment through the adoption of ergonomics concepts that is suitable for worker based on the type of work.

- III. In order to maintain a comfortable and effective working environment, organizations using ergonomics principles should periodically examine how employees are responding to their workplace and allow their employees to involve in the process of improving the workplace ergonomics.
- IV. Organizations should examine and research about their working environments and principles of ergonomics before starting ergonomics changes in their organizations to rebuild a comfortable working environment as there is a different ergonomics principle for different working areas depending on the type of job that is performed. Therefore before rebuilding any working place this should be take into account because this will help the organization to build a comfortable ergonomically sound workplace for their employees that will help them to be productive.

5.3 suggestions for further research

This study examined the effect of workplace ergonomics on employee productivity by using 7 variables as indicators of workplace ergonomics in the case of the Ethiopian ministry of mines and petroleum. The following are the recommendations of the researcher for additional future research.

This study is that it was restricted in terms of variables and only considered the physical (material) aspects of workplace ergonomics. Therefore, the immaterial and other material components of ergonomics, as well as other predictors of workplace ergonomics, should be the subject of further investigation. This study was limited to one organization which is the Ethiopian Ministry of Mines and Petroleum and excluded other businesses that remodel their offices using ergonomics principles. Therefore, it is necessary to undertake more study that includes various organizations. Also, data for the study were solely gathered quantitatively. Additional study ought to have a complete approach that combines qualitative and quantitative methods. Interviews could be used to delve deeper and gain a deeper understanding of the relationship between employee productivity and workplace ergonomics. Finally, because this study is cross-sectional study, it is important to conduct additional longitudinal research in this area of study.

References

- Abdullah, N. H., Wahab, E., Shamsuddin, A., Hamid, N. A. A., & Kamaruddin, N. K. (2016). Workplace Ergonomics and Employees' Health: A Case Study at Automotive Manufacturer. In *Proceedings of the 2016 international conference on industrial engineering and operations management* (pp. 917-923).
- Abel, S. M. (1990). The extra-auditory effects of noise and annoyance: an overview of research. *The Journal of otolaryngology*, 19, 1-13.
- Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: Why and how of it. *Indian Journal of Medical Specialties*, 4(2), 330-333.
- Adachi, M., Rohde, C. L. E., & Kendle, A. D. (2000). Effects of floral and foliage displays on human emotions. *HortTechnology*, 10, 59 – 63.
- Ajala, E. M. (2012). The influence of workplace environment on workers' welfare, performance and productivity. The African Symposium.
- Al Horr, Y., Arif, M., Kaushik, A., Mazroei, A., Katafygiotou, M., & Elsarrag, E. (2016). Occupant productivity and office indoor environment quality: A review of the literature. *Building and environment*, 105, 369-389.
- Ali, A. S., Chua, S. J. L., and Lim, M. E. (2015). The effect of physical environment comfort on employees' performance in office buildings. *Structural Survey*, Vol.33 Iss 4/5 pp. 294-308.
- Alok, S. and Shweta, J. (2011). Impact of ergonomic changes on office employees' productivity. *International Journal of Multidisciplinary Studies*, 2(1): 151-169.
- Alzahrani, N. A. (2019). Workplace ergonomics and academic staff performance in college of education in Umm Al-Qura university in Makkah. *Am. J. Educ. Res*, 7, 604-617.
- Amick, B. C., Menéndez, C. C., Bazzani, L., Robertson, M., DeRango, K., Rooney, T., & Moore, A. (2012). A field intervention examining the impact of an office ergonomics training and a highly adjustable chair on visual symptoms in a public sector organization. *Applied Ergonomics*, 43(3), 625–631.
- Asante, K. (2012) The Impact of Office Ergonomics on Employee Performance; A Case Study of the Ghana National Petroleum Corporation (GNPC). Unpublished Master's Thesis, Institute of Distance Learning, Kwame Nkrumah University of Science and Technology, Kumasi

- Attar, A. A., Gupta, A. K., & Desai, D. B. (2012). A study of various factors affecting labour productivity and methods to improve it. *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)*, 1(3), 11-14.
- Ayoub, M. A. (1990a). Ergonomic deficiencies: I. Pain at work. *Journal of Occupational Medicine*, 32(1), 52–57. Ayoub, M. A. (1990b). Ergonomic deficiencies: II. Probable causes. *Journal of Occupational Medicine*, 32(2), 131–136.
- Babbie, N. (2005) *Qualitative Evaluation Methods*. Sage Publications, Beverly Hills.
- Baba, E. I., Baba, D. D., & Oborah, J. O. (2021). Effect of Office Ergonomics on Office Workers' Productivity in the Polytechnics, Nigeria. *Journal of Education and Practice*, 12(3), 67-75.
- Banbury, S.P. and Berry, D.C. (2005), "Office noise and employee concentration: identifying causes of disruption and potential improvements", *Ergonomics*, Vol. 48 No. 1, pp. 25-37, doi: 10.1080/00140130412331311390.
- Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business & technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research*, 7, 91-105.
- Baughan-Young, K., 2001. The Color of Success. *Journal of Property Management*. Vol. 66, No. 5. Available on: <http://makassar.lan.go.id/dokumen/artikel%20Evie.pdf>. Retrieved on: 4th May 2014. Pp. 68±69.
- Badayai, A. R. A. (2012). A theoretical framework and analytical discussion on uncongenial physical workplace environment and job performance among workers in industrial sectors. *Procedia-Social and Behavioral Sciences*, 42, 486-495.
- Beatrice W. (2014), *Influence of Performance Management on Employee Productivity*
- Becker, F. (2002). Improving organisational performance by exploiting workplace flexibility. *Journal of Faculty Management*, 1(2), 154-162.
- Borisuit, A., Linhart, F., Scartezzini, J. L., & Münch, M. (2015). Effects of realistic office daylighting and electric lighting conditions on visual comfort, alertness and mood. *Lighting Research & Technology*, 47(2), 192-209.
- BröchnerJan, Jan Bröchner. 2017. Measuring the productivity of facilities management. *Journal of Facilities Management* 15:3, 285-301.

- Burri, G. J., & Helander, M. G. (1991). A field study of productivity improvements in the manufacturing of circuit boards. *International Journal of Industrial Ergonomics*, 7, 207–215.
- Burke, A. (2000). The challenge of seating selection, *Ergonomic Supplement*. Vol. 69, No. 4. Available on: <http://makassar.lan.go.id/dokumen/artikel%20Evie.pdf>. Retrieved on: 4th May 2014. Pp. 70±72.
- Caplan, R. D., Cobb, S., French, J. R. P., Jr., Harrison, R. V., & Pinneau, S. R. (1980). Job demands and worker health: Main effects and occupational differences. Ann Arbor, Mich.: Institute for Social Research.
- Carruthers, H. R., Morris, J., TARRIER, N., & Whorwell, P. J. (2010). The Manchester Color Wheel: development of a novel way of identifying color choice and its validation in healthy, anxious and depressed individuals. *BMC medical research methodology*, 10(1), 12.
- Chandrasekar, K. (2011). Workplace environment and its impact on organisational performance in public sector organisations. *International journal of enterprise computing and business systems*, 1(1), 1-19.
- Chang, C.-Y., & Chen, P.-K. (2005). Human responses to window views and indoor plants in the workplace. *HortScience*, 40, 1354 –1359.
- Chim, J. M. (2019). 6Ws in ergonomics workplace design. In *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018) Volume VII: Ergonomics in Design, Design for All, Activity Theories for Work Analysis and Design, Affective Design 20* (pp. 1282-1286). Springer International Publishing
- Ching, F. D., & Binggeli, C. (2012). *Interior design illustrated* (2nd ed.). John Wiley & Sons.
- Clements-Croome, D. and Baizhan Li (1997) ‘Assesment of the Influence of Indoor Environment on the Job Stress and Productivity of Occupants in Offices’, *Healthy Buildings/IAQ '97*, pp. 495–500.
- Clifford, B. (1971). *Noise pollution: the unquiet crisis*. Univ. of Pennsylvania Press [c1971]
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd Edition, Lawrence Erlbaum, Mahwah, NJ
- Cohen, A. L. (1997). *Elements of ergonomics programs: a primer based on workplace evaluations of musculoskeletal disorders*. DIANE Publishing.

- Cook, C., Burgess-Limerick, R. and Papalia, S., (2004). The Effect of Wrist Rests and Forearm Support During Keyboard and Mouse Use. *International Journal of Industrial Ergonomics*, 33: 463-472
- Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods* (12th ed.). McGraw-Hill Companies, Inc.
- Creswell, J.W. (2013) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications, Thousand Oaks, California.
- Czubaj, C.A., (2002). School Indoor Air Quality. *Journal of Instructional Psychology*, 29(4): 317-321.
- ali , I., & Terzi , S. (2021). Violation of the assumption of homoscedasticity and detection of heteroscedasticity. *Decision Making: Applications in Management and Engineering*, 4(1), 1-18.
- Das, B., & Sengupta, A. (1996). Industrial workstation design: A systematic ergonomic approach. *Applied Ergonomics*, 27(3), 157–163.
- Das, B., & Shikdar, A. (1999). Participative versus assigned production standard setting in a repetitive industrial task: A strategy for improving worker productivity. *International Journal of Occupational Safety and Ergonomics*, 5(3), 417–430.
- Dempsey, P. G., McGorry, R. W., & O'Brien, N. V. (2004). The effects of work height, workpiece orientation, gen-der, and screwdriver type on productivity and wrist deviation. *International Journal of Industrial Ergonomics*, 33, 339-346
- Deouskar, N. (2017). The impact of ergonomics on productivity of the employees in the organization. *International Journal of Marketing and Financial Management*, 1(6): 59-63.
- Dianat, I., Sedghi, A., Bagherzade, J., Jafarabadi, M. A., & Stedmon, A. W. (2013). Objective and subjective assessments of lighting in a hospital setting: implications for health, safety and performance. *Ergonomics*, 56(10), 1535-1545.
- Deb, S. and Sinha, S., 2010. Spatial Influence on Organizational Creativity: through Syntactic Analysis of Space. *Asian Journal of Management Research*. ISSN: 2229 ± 3795. Available on: www.ipublishing.co.in/ajmrvol1no1/sped12011/AJMRSP1010. Retrieved on: 4th May 2014. Pp. 114±129.

- Deouskar, N. (2017). The impact of ergonomics on the productivity of people. *International Journal of Marketing & Financial Management*, 5(6), 59-63.
- Dempsey, P. G., McGorry, R. W., & O'Brien, N. V. (2004). The effects of work height, workpiece orientation, gender, and screwdriver type on productivity and wrist deviation. *International Journal of Industrial Ergonomics*, 33(4), 339-346.
- Dorgan, C. E., Willman, A. J., & Dorgan, C. B. (1994). Productivity link to the indoor environment estimated relative to ASHRAE 62-1989. In *Healthy Buildings* (Vol. 94), Budapest, pp. 461–472.
- Edwards, J. R., and Cooper, C. L. (1990). The person-environment fit approach to stress: Recurring problems and some suggested solutions. *Journal of Organizational Behavior*, 11,293-307.
- Edwards, J. R. (1996). An examination of competing versions of the person-environment fit approach to stress. *Academy of Management Journal*, 39, 292-339.
- Emmanuel, O. D., Jonathan, F. O. & Ayodeji A. A. (2014). Assessment of Ergonomic Hazards and techno-Stress among the Workers of Obafemi Awolowo University, Ile-Ife. *Australian journal of business and management research*, 4(1),27 – 34.
- Ethiopia Labour Proclamation No. 1156/2019
- Evans, G.W. and Johnson, D. (2000), "Stress and open-office noise", *Journal of Applied Psychology*, Vol. 85 No. 5, pp. 779-783, doi: <http://dx.doi.org.lcproxy.shu.ac.uk/10.1037/0021-9010.85.5.779>
- Fernandez, J. E. (1995). Ergonomics in the workplace. *Facilities*.
- Fernberg, P. M. (1992). "Tailoring the Workstation to the Worker." *Modern Office Technology* 37,6 (June): 26-30.
- French, J. R. P., Jr., and Kahn, R. L. (1962). A programmatic approach to studying the industrial environment and mental health. *Journal of Social Issues*, 18, 1-48.
- French, J. R. P., Jr., Rodgers, W. L., and Cobb, S. (1974). Adjustment as person environment fit. In G. Coelho, D. Hamburg, & J. Adams (Eds.), *Coping and adaptation* (pp. 316-333). New York: Basic Books.
- Garson, G. D. (2012). Testing statistical assumptions
- George, D., & Mallery, P. (2003). Reliability analysis. *SPSS for Windows, step by step: a simple guide and reference* (14th ed.)

- Gray T, Birrell C (2014) Are biophilic-designed site office buildings linked to health benefits and high performing occupants? *International Journal of Environmental Research and Public Health* 11: 04-22.
- Greenaway KH, Thai HA, Haslam SA, Murphy SC (2016) Spaces that signal identity improve workplace productivity. *Journal of Personnel Psychology* 15: 35-43.
- Greene, W. H. (2018). *Econometric Analysis*. Pearson Education, Inc., New York, N.Y., 8th edition.
- Hameed, A. and Amjad, S. (2009) Impact of Office Design on Employee Productivity: A Case Study of Banking Organizations of Abbottabad, Pakistan. *Journal of Public Affairs Administration and Management*, 3, 1-13.
- Hameed, Amina, and Shehla Amjad. 2009. 'Impact of office design on employees' productivity: a case study of banking organizations of Abbottabad, Pakistan'.
- Hair, J.F., Black, W.C., Babin, B., Anderson, R.E., & Ronald, L. T. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning EMEA
- Hair, J.F, Celsi, M., Money, A., Samouel, P., & Page, M. (2016). *Essentials of business research methods* (3rd edition). Routledge.
- Harisinghani, M. G., Blake, M. A., Saksena, M., Hahn, P. F., Gervais, D., Zalis, M., ... & Mueller, P. R. (2004). Importance and effects of altered workplace ergonomics in modern radiology suites. *Radiographics*, 24(2), 615-627
- Harrison, R. V. (1978). Person-environment fit and job stress. In C. L. Cooper and R. Payne (Eds.), *Stress at work**(pp. 175-205). New York: Wiley.
- Haynes, B. P. (2008). The impact of office comfort on productivity. *Journal of facilities management*. <http://dx.doi.org/10.1108/14725960810847459>
- Helander, M. (2006). *A guide to human factors and ergonomics*. CRC press.
- Herzberg, F. (1959). MAUSNER. B.; SNYDERMAN, B. *The motivation to work*. New York: Willy.
- International Ergonomics Association, 2017.
- Jeffrey E. Fernandez, (1995), "Ergonomics in the workplace", *Facilities*, Vol. 13 Iss 4 pp. 20 - 27
Permanent link to this document: <http://dx.doi.org/10.1108/02632779510083359>
- Jiang, J., & Duffy, V. G. (2021). Modern workplace ergonomics and productivity—a systematic literature review. In *HCI International 2021-Late Breaking Papers: HCI Applications in*

- Health, Transport, and Industry: 23rd HCI International Conference, HCII 2021, Virtual Event, July 24–29, 2021 Proceedings 23* (pp. 509-524). Springer International Publishing.
- Joseph, F. H., William, C. B., Barry, J. B., & Rolph, E. A. (2010). *Multivariate Data Analysis* (7th ed.). Pearson Prentice Hall.
- Kim, E., & Mattson, R. H. (2002). Stress recovery effects of viewing red-flowering geraniums. *Journal of Therapeutic Horticulture*, 13, 4 –12.
- Kothari, C. R. (2004). *Research methodology: methods and techniques*. (2nd rev.)
- Kroemer, K. H., & Grandjean, E. (2005). *Manual de ergonomia: adaptando o trabalho ao homem*. Bookman Editora.
- Kwallek, N., 2002. Color in Office Environment. *Informe Design*. Vol. 5, No. 1. Regents of the University of Minnesota. Available on: www.informedesign.org/_news/jan_v05r-p. Retrieved on: 4th May 2014. Pp. 1±6.
- Lamb, S., & Kwok, K. C. S. (2016). A longitudinal investigation of work environment stressors on the performance and wellbeing of office workers. *Applied Ergonomics*, 52, 104– 111. doi: 10.1016/J.APERGO.2015.07.010
- Lan, L., Lian, Z. and Pan, L. (2010) The Effects of Air Temperature on Office Workers' Well-Being, Workload and Productivity-Evaluated with Subjective Ratings. *Applied Ergonomics*, 42, 29.
- Leblebici, D. (2012). Impact of workplace quality on employees' productivity: case study of banks in Turkey. *Journal of Business Economics and Finance*, 1: 38-49.
- Lipczynska, A., Schiavon, S., & Graham, L. T. (2018). Thermal comfort and self-reported productivity in an office with ceiling fans in the tropics. *Building and Environment*, 135, 202-212.
- Liravi, M. A., & Baradaran, V. (2019). Effects of Workplace Ergonomics on Productivity in an Offshore oil company. *Archives of Occupational Health*, 3(2), 346-354.
- Liu, M., Kim, E., & Mattson, R. H. (2003). Physiological and emotional influences of cut flower arrangement and lavender fragrance on university students. *Journal of Therapeutic Horticulture*, 14, 18 –27.

- Lorsch, H. G. and Ossema, A. A. (1994) 'The Impact of the Building Indoor Environment on Occupant Productivity — Part 1: Recent Studies, Measures and Costs', ASHRAE Transactions, Vol. 100, No. 2, pp. 741–749.
- Mak, C.M. and Lui, Y.P. (2012) The Effect of Sound on Office Productivity. *Building Services Engineering Research and Technology*, 33, 339-345.
<https://doi.org/10.1177/014362441141225>
- Makhbul, Z. M. (2013). Workplace environment towards emotional health. *International Journal of Academic Research in Business and Social Sciences*, 3(1), 183.
- Makhbul, Z. K. M., Shukor, M. S., & Muhamed, A. A. (2022). Ergonomics workstation environment toward organisational competitiveness. *International Journal of Public Health Science*, 11, 157-169.
- Marczyk, G. R., DeMatteo, D., & Festinger, D. (2010). *Essentials of research design and methodology* (Vol. 2). John Wiley & Sons.
- Martin, J. (1999). Addressing IAQ Concerns in Medical Facilities. *Engineered Systems*. 16(6): 53- 57.
- Massoudi, A. H., & Hamdi, S. S. A. (2017). The Consequence of work environment on Employees Productivity. *IOSR Journal of Business and Management*, 19(01), 35-42.
- Miles, J. (2005). R squared, adjusted R squared. *Encyclopedia of statistics in behavioral science*.
- Mohanty, P. P., & Mahapatra, S. S. (2014). An integrated approach for designing office chair with ergonomic consideration. *International Journal of Services and Operations Management*, 17(2), 194-220.
- MOMP Website
- Moran, G. (2012). Home office ergonomics [Online] Available from:
<http://www.aarp.org/work/selfemployment/info-90-20-w/home-office-ergonomics.html>
(Acc
- Ngo, T. H. D., & La Puente, C. A. (2012, April). The steps to follow in a multiple regression analysis. In *Proceedings of the SAS Global forum* (pp. 22-25).
- Nieuwenhuis M, Knight C, Postmes T, Haslam SA (2014) The relative benefits of green versus lean office space: Three field experiments. *Journal of Experimental Psychology Applied* 20: 199-214.

- Odhiambo, E.O. (2015). The Effect of Performance Management Practices on Employee Productivity A Case Study of Schindler Limited.
- O'Neill (2013). New workplace ergonomic research. Emerging risks and solutions. Retrieved from www.knoll.com/research/index.jsp on 12/5/2018.
- <http://www.ergoweb.com>, Ontario, Computer Ergonomics: Workstation layout and Lighting, Health and Safety Guidelines, 2005).
- Pereira, M., Comans, T., Sjøgaard, G., Straker, L., Melloh, M., O'Leary, S., ... & Johnston, V. (2019). The impact of workplace ergonomics and neck-specific exercise versus ergonomics and health promotion interventions on office worker productivity: A cluster-randomized trial. *Scandinavian journal of work, environment & health*, 45(1), 42-52.
- Pickson, R. B., Bannerman, S., & Ahwireng, P. O. (2017). Investigating the effect of ergonomics on employee productivity: a case study of the butchering and trimming line of pioneer food cannery in Ghana. *Modern Economy*, 8(12), 1561-1574. <https://doi.org/10.4236/me.2017.812103>
- Punadi, R. P. (2015). 'The Ergonomic Influence on Academic Staff Performance in Phei (Private Higher Education Institution)', *South East Asia Journal of Contemporary Business, Economics and Law*, 7.
- Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European journal of education studies*.
- Resnick, M. L., & Zanotti, A. (1997). Using ergonomics to target productivity improvements. *Computers & Industrial Engineering*, 33(1-2), 185-188.
- Robertson, M. M., Ciriello, V. M., & Garabet, A. M. (2013). Office ergonomics training and a sit-stand workstation: Effects on musculoskeletal and visual symptoms and performance of office workers. *Applied Ergonomics*, 44(1), 73-85. doi: 10.1016/J.APERGO.2012.05.001
- Rowan, M. P., & Wright, P. C. (1994). Ergonomics is good for business. *Work study*.
- Rowan, M. P., & Wright, P. C. (1995). Ergonomics is good for business. *Facilities*, 13(8), 18-25
- Sadeghi Naeini, H., & Heidaripour, M. K. (2011). Kansei Engineering and Ergonomic Design of Products. *International Journal of Occupational Hygiene*, 3(2), 81-84.

- Sadra Abarqhouei, N., Hosseini Nasab, H., & Fakhrazad, M. B. (2012). Macro ergonomics interventions and their impact on productivity and reduction of musculoskeletal disorders: including a case study. *Iran occupational health*, 9(2), 27-39.
- Saleem, A., Shah, A., Zaman, K., Arif, M., Shehzad, K. and Ullah, I. (2012) The Impact of Interior Physical Environment on Academicians' Productivity in Pakistan Higher Education Institutes Perspectives. *Iranian Journal of Management Studies (IJMS)*, 5, 25-46.
- Samson, G. N., Waiganjo, M. and Koima, J. (2015). Effect of workplace environment on the performance of commercial banks employees in nakuru town. *International Journal of Managerial Studies and Research*, Vol 3, pp. 76-89.
- Seddigh, A., Berntson, E., Bodin Danielsson, C. and Westerlund, H. (2014), "Concentration requirements modify the effect of office type on indicators of health and performance", *Journal of Environmental Psychology*, Vol. 38, pp. 167-174, doi: <http://dx.doi.org.lcproxy.shu.ac.uk/10.1016/j.jenvp.2014.01.009>.
- Sehgal, S. (2012). Relationship between Work Environment and Productivity. *International Journal of Engineering Research and Applications*, 2(4), 1992-1995.
- Sekar, C. (2011). Workplace environment and its impact on organizational performance in public sector organizations. *International Journal of Enterprise Computing and Business System International Systems*, 1(1): 203-215.
- Senaviratna, N. A. M. R., & A Cooray, T. M. J. (2019). Diagnosing multicollinearity of logistic regression model. *Asian Journal of Probability and Statistics*, 5(2), 1-9.
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
- Shiaw-Fen Ferng, L.W.L., (2002). Indoor Air Quality Assessment of Day-Care Facilities with Carbon Dioxide, Temperature, and Humidity as Indicators. *Journal of Environmental Health*. 65(4): 14-18.
- Shikdar, A. A., & Sawaqed, N. M. (2004). Ergonomics, and occupational health and safety in the oil industry: a managers' response. *Computers & Industrial Engineering*, 47(2-3), 223-232.

- Shishegar, N., & Boubekri, M. (2016, April). Natural light and productivity: Analyzing the impacts of daylighting on students' and workers' health and alertness. In *Proceedings of the International Conference on "health, Biological and life science" (HBLs-16), Istanbul, Turkey* (pp. 18-19).
- Sluchak, T. J. (1992). Ergonomics: origins, focus, and implementation considerations. *AAOHN Journal*, 40(3), 105-112.
- Slovin, E. (1960). Slovin's formula for sampling technique.
- Sreejesh, S., Mohapatra, S., Anusree, M. R., Sreejesh, S., Mohapatra, S., & Anusree, M. R. (2014). Business research design: Exploratory, descriptive and causal designs. *Business research methods: An applied orientation*, 25-103.
- Sutermeister, R. A. (1976). *People and productivity* (No. 658.3124 S8 1976).
- Sutton, R. I. and Rafaeli, A. (1987). Characteristics of Work Stations As Potential Occupational Stressors. *Academy of Management Journal*. 30(2): 260-276.
- Taghipour, M., Mahboobi, M., Nikoeifar, A., & Mowlodi, E. S. (2015). Analysing the effects of physical conditions of the workplace on employee's productivity (including case study). *International Journal of Environmental Protection and Policy*, 3(4), 111-119.
- Tarcan, E., Varol, E. S. and Ates, M. (2004). A Qualitative Study of Facilities and Their Environmental Performance. *Management of Environmental Quality: An International Journal*. 15(2): 154-173.
- Tayyari, F., & Smith, J. L. (1997). *Occupational Ergonomics; Principles and Applications*. London:Chapman & Hall.
- Thayer, J. F., Verkuil, B., Brosschot, J. F., Kevin, K., West, A., Sterling, C., ... Sternberg, E. M. (2010). Effects of the physical work environment on physiological measures of stress. *European Journal of Cardiovascular Prevention & Rehabilitation*, 17(4), 431-439. doi:10.1097/HJR.0b013e328336923a
- The Gensler+Performance Index. The U.S. Workplace Survey (2006). Retrieved October 26, 2011 from www.gensler.com.
- Ugwuzor, M., & Anichebe, N. A. Ergonomics and Quality of Work-Life for Waste Management Service Providers in Nigeria. *Journal of Research in Business and Management* Volume 10 ~ Issue 6 (2022) pp: 74-79.

- Uyanto, S. S. (2020). Power comparisons of five most commonly used autocorrelation tests. *Pakistan Journal of Statistics and Operation Research*, 119-130.
- Van Niekerk, S.-M., Louw, Q. A., & Hillier, S. (2012). The effectiveness of a chair intervention in the workplace to reduce musculoskeletal symptoms. A systematic review. *BMC Musculoskeletal Disorders*, 13(145), 145. doi:10.1186/1471-2474-13-145
- Veitch, J., Newsham, G., Boyce, P., & Jones, C. (2008). Lighting appraisal, well-being, and performance in open-plan offices: A linked mechanisms approach. *Lighting Research & Technology*, 40(2), 133–151. doi:10.1177/1477153507086279
- Viola, A. U., James, L. M., Schlangen, L. J., & Dijk, D. J. (2008). Blue-enriched white light in the workplace improves self-reported alertness, performance and sleep quality. *Scandinavian Journal of Work, Environment & Health*, 34 (4), 297–306.
- Wargocki, P., Wyon, D. P., Baik, Y. K., Clausen, G., & Fanger, P. O. (1999). Perceived air quality, sick building syndrome (SBS) symptoms and productivity in an office with two different pollution loads. *Indoor air*, 9(3), 165-179.
- Watson, R. (2015). Quantitative research. *Nursing standard*, 29(31).
- Westgaard, R. H., & Winkel, J. (1997). Ergonomic intervention research for improved musculoskeletal health: a critical review. *International journal of industrial ergonomics*, 20(6), 463-500.)
- Weerdmeester, B. (2008). *Ergonomics for beginners: a quick reference guide*. CRC Press.
- Wilson, S., (2001). Graduating to Better IAQ. *Consulting-Specifying Engineer*. 29(6): 24-28.
- Yankson, E. (2012). The effect of health and safety standards on productivity in Ghana Rubber Estates Limited. Unpublished Master's Thesis, Institute of Distance Learning, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- Yeow, P. H. P., & Nath Sen, R. (2003). Quality, productivity, occupational health and safety and cost effectiveness of ergonomic improvements in the test workstations of an electronic factory. *International Journal of Industrial Ergonomics*, 32, 147-163.
- Zafir, M.M., Syed, S.A., Shaza, M.A. and Norliza, A. T. (2011). Ergonomics and work stress issues in banking sector. *Australian Journal of Basic and Applied Sciences*, 5(9): 1301-1309.

- Zaidatol, A. L., & Bagheri, A. (2009). Entrepreneurship as a center choice: An analysis of entrepreneurial self-efficiency and intention of university student. *European Journal of social science*, 9(2), 338-346
- Zakerian, S. A., Garosi, E., Abdi, Z., Bakhshi, E., Kamrani, M., & Kalantari, R. (2016). Studying the influence of workplace design on productivity of bank clerks. *Journal of Health and Safety at Work*, 6(2), 35-42.
- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffith, M. (2010). *Business Research Methods* (8th edit.). Canada, South-Western Cengage.



COLLEGE OF BUSINESS AND ECONOMICS

Master of Business Administration

Appendix

Questionnaires: to be filled by employees of Ethiopian ministry of mines and petroleum

Dear respondents,

I am postgraduate student undertaking a Master of Business Administration at Addis Ababa University. I am collecting research data for my thesis research, which will examine office ergonomics and employee productivity. In this regard, I kindly request you to fill this questionnaire. Your participation is highly valuable for the successful completion of the study. I also want to assure you that all information with respect to this research will be treated confidentially and will not be shared until it has been summarized. Your assistance and cooperation will be highly appreciated.

Thank You in Advance!

Ayantu Demissie

Email: emulucky55@gmail.com

Part One : Socio – Demographic Data

Please tick () mark for each question to indicate your most appropriate response.

1) Gender Male Female

2) Age group (in years) 20 - 30 31-40 41-50 51 - 60

3) Educational level (Qualification): less than grade 12 Diploma Bachelor' Degree
Master's Degree PhD

Other please specify _____

4) How long have you been working in Ethiopian ministry of mines and petroleum?

3 – 8years 9- 14years 15-20 years 21 – 26 years more than 27 years

5) Working position: Ministry office

The Chief Executive Officer leadership communication office

Finance Audit Law

Other please specify _____

Part two: workplace ergonomics and employee productivity

Listed below are statements dealing with various attributes of workplace ergonomics and employees' productivity. Please put a tick () mark for each question to indicate your most appropriate response.

Section A; lighting

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I don't face any problems with lighting in my office					
2	Windows in my office provide me natural light					
3	My workspace is provided with efficient lighting so that I can work easily without strain on my eyes.					
4	There is enough natural light at my workspace					
5	I have control over the lighting on my desk (i.e., adjustable desk light on desk)					

Section B; Indoor air quality

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Our office is properly ventilated					
2	We have installed air conditioners in our office					
3	We have ample space in our					

	office to allow for air circulation					
4	The window in our company facilitates allow for proper air circulation					
5	The overall temperature of my office is pleasant					
6	I can control my office temperature					

Section C; Noise (acoustic)

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	My work environment is quiet					
2	My workplace is free from noise distractions					
3	I can have quiet and undisturbed time alone					
4	level of noise in my workplace is low					
5	I can do my work properly without noise distraction in my workplace					

Section D; office furnishing

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	My office furniture is high in quality					

2	My office furniture is flexible to adjust, move, rearrange, and recognize my workspace.					
3	My office is well organized with office furniture					
4	I have the requisite furniture to perform my duties					
5	Our company has invested in ergonomic furniture					
6	My office furniture is comfortable enough so that I can work without getting tired					
7	I have easy access to equipment that I need to do my work					

Section E; spatial arrangements

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	My office/branch is open enough to see my colleagues working.					
2	I am satisfied with the amount of space for storage, movements and displaying important materials.					
3	My workspace serves multipurpose functions for informal and instant meetings.					
4	There are places for me to go					

	to have privacy					
5	I have enough work surface area at my workspace					
6	The open office arrangement helps me to stay focused and “on task” at work.					
7	The open office arrangement helps me to collaborate with my coworkers					

Section F; office decor

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I am satisfied with my office décor					
2	My office décor is attractive, so it improves my mood					
3	My office décor makes me feel refreshed and at home					
4	my office is decorated with plants and pictures, which motivates me					

Section G; office flexibility

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I can change positions while working by sitting, standing, and moving around					
2	My office provides a variety of different place for my work					

3	I can choose a workstation that makes me comfortable to do my work					
----------	--	--	--	--	--	--

Section H; Employee productivity

No.	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I regularly deliver high quality services					
2	I use my working time properly					
3	I accomplish my daily tasks quickly and efficiently					
4	I do large amount of work each day					
5	I meet work deadlines promptly					
6	I achieve my work target					

Thank you for your participation once again!



Addis Ababa University
አዲስ አበባ ዩኒቨርሲቲ



SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY |

አዲስ አበባ ዩኒቨርሲቲ
የድረ ምረቃ ትምህርት ቤት
የቢዝነስ አስተዳደር ትምህርት ክፍል

የስራ ቦታ ስነ ምጽት በሰራተኞች ምርታማነት ላይ የሚያስከትለውን ውጤት ለማጥናት የተዘጋጀውን መጠይቅ ለመሙላት ስለተባበሩኝ በቅድሚያ ምስጋናዬን እያቀረብኩ ቀጥሎ ባሉት ገጾች የተቀመጡት ጥያቄዎች ስለስራ ቦታ ስነ ምጽት እና የሰራተኞች ምርታማነትን የተመለከቱ ናቸው። በመሆኑም ያለዎትን አስተያየት በተቀመጡት ሳጥኖች የራዬት ምልክት() በማስቀመጥ እንዲገልፁ በትህትና እጠይቃለሁ። ከዚህ ጥናት ጋር በተያያዘ ሁሉም መረጃዎች በአጥኚው ተጠቃለው እስኪቀርቡ ድረስ ለሶስተኛ ወገን ይፋ አይደረጉም። ለምታደርጉት ትብብር ምስጋናዬ ከልብ ነው ።

አመሰግናለሁ!

አያንቱ ደምሴ

Email: emulucky55@gmail.com

ክፍል አንድ: የምላሽ ሰጪዎች የግል መረጃ

ለእያንዳንዱ ጥያቄ ተስማሚ ምላሽዎን ለመጠቀም እባክዎ የራይት () ምልክት ያስቀምጡ

- 1) ጾታ: ወንድ ሴት
- 2) እድሜ: 20 - 30 31-40 41-50 51 - 60
- 3) የትምህርት ደረጃ: ከ12ኛ ክፍል በታች ዲፕሎማ የመጀመሪያ ዲግሪ
ማስተርስ ዲግሪ ሶስተኛ ዲግሪ ሌላ
እባክዎን ይግለጹ _____
- 4) በኢትዮጵያ የማዕድን እና ነዳጅ ሚኒስቴር ውስጥ የሰሩት ለምን ያህል ጊዜ ነው?
3 - 8 ዓመት 9 -14 ዓመት 15-20 ዓመት 21-26 ዓመት
ከ 27 ዓመት በላይ
- 5) የሚሰሩበት የሰራ ክፍል: ሚኒስቴር ፅፈት ቤት
ዋና ሰራ አስፈጻሚ ሥራ አመራር ህዝብ ግንኙነት
ግዥ ክፍል ህግ ክፍል
አዲት ክፍል
ሌላ እባክዎን ይግለጹ _____

ክፍል ሁለት: የስራ ቦታ ሰነድ ምቹት እና የሠራተኞች ምርታማነት

ከዚህ በታች የተዘረዘሩት የሥራ ቦታ ሰነድ ምቹት እና የሰራተኞች ምርታማነትን የተለያዩ ባህሪያትን የሚመለከቱ መግለጫዎች ናቸው። ለእያንዳንዱ ጥያቄ ተገቢ የሆነ ምላሽዎን ለመጠቀም እባክዎን የራይት () ምልክት ያስቀምጡ

(ብርሃን)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ቢሮዬ ውስጥ ከብርሃን ጋር የተያያዘ ምንም አይነት ችግር አይገጥመኝም					
2	በቢሮዬ ውስጥ ያሉ መስኮቶች የተፈጥሮ ብርሃን ያስገባሉ					
3	የስራ ቦታዬ በቂ የሆነ ብርሃን ስላለው በዓይኖቼ ላይ ውጥረት ሳይፈጠር በቀላሉ ስራዬን መሥራት እንድችል ረድቶኛል					
4	በሥራ ቦታዬ በቂ የተፈጥሮ ብርሃን አለ					
5	ጠረጴዛዬ ላይ ያለውን መብራት መቆጣጠር እችላለሁ (ማለትም በደብዳቤ ላይ ሊስተካከል የሚችል የደብዳቤ መብራት)					

(የአየር ሁኔታ)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ቢሯችን ውስጥ በሚገባ አየር ይናፈሳል።					
2	በቢሯችን ውስጥ የአየር ማቀዝቀዣዎችን ገጥመናል					
3	በቢሯችን ውስጥ ለአየር ዝውውር					

	የሚሆን ሰፊ ቦታ አለ					
4	በቢሯችን ውስጥ ያለው መስኮት ተገቢው የአየር ዝውውር እንዲኖር ያስችላል					
5	የቢሮዬ አጠቃላይ የሙቀት እና የቅዝቃዜ መጠን ጥሩ ነው					
6	የቢሮዬን የሙቀትና የቅዝቃዜ መጠን መቆጣጠር እችላለሁ					

(ድምጽ)

ተ.ቁ		እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ጠየሥራ አካባቢዬ ጸጥታ የሰፈነበት ነው					
2	የሥራ ቦታዬ ከጫጫታና ትኩረት ከሚከፋፍሉ ነገሮች ነፃ ነው					
3	ጸጥታ የሰፈነበትና ያልተረበሸ ጊዜን ብቻዬን ማሳለፍ እችላለሁ					
4	በሥራ ቦታዬ ያለው ጫጫታ እና አላስፈላጊ ድምጽ ዝቅተኛ ነው					
5	በሥራ ቦታዬ ከጫጫታ እና ትኩረት ከሚከፋፍሉ ነገሮች ነጻ ሆኜ ሥራዬን በተገቢው መንገድ ማከናወን እችላለሁ					

(የቢሮ ዕቃዎች)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	የስራ ቦታዬ የቢሮ እቃዎች ጥራት ከፍተኛ ነው					
2	የቢሮ ዕቃዎቼን በቀላሉ ማስተካከል፣ ማንቀሳቀስ፣ እና የሥራ ቦታዬን ለማስተዋል እንደ ሁኔታው መለዋወጥ እችላለሁ።					

3	የስራ ቦታዬ በቢሮ እቃዎች በሚገባ የተደራጀ ነው					
4	ኃላፊነቶቼን ለመወጣት የሚያስፈልጉኝ የቢሮ ዕቃዎች አሉኝ					
5	ኩባንያዎችን ምቹ የቢሮ እቃዎች ላይ ገንዘብ ወጪ አድርጓል					
6	የቢሮዬ እቃዎች ሳይደክሙኝ መስራት እንድችል ምቹ ናቸው					
7	ሥራዬን ለማከናወን የሚያስፈልጉኝን መሣሪያዎች በቀላሉ ማግኘት እችላለሁ					

(የስራ ቦታ የክፍሉ አቀማመጥ ሁኔታ)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ቢሮዬ/ቅርንጫፍ የስራ ባልደረቦቼ ሲሰሩ ለማየት ክፍት ነው።					
2	ቢሮዬ ውስጥ ለማከማቻ ለእንቅስቃሴ እና አስፈላጊ ቁሳቁሶችን ለማሳያ በተዘጋጀው ቦታ ደስተኛ ነኝ					
3	የሥራ ቦታዬ መደበኛ ያልሆኑ እና ቅጽበታዊ ስብሰባዎችን ለማከናወን ያገለግላል					
4	ብቻዬን ጊዜ ለማሳለፍ የምሄድባቸው ቦታዎች አሉ					
5	በሥራ ቦታዬ በቂ የስራ መስሪያ ቦታ አለኝ					
6	.ክፍት የሆነው የቢሮ አደረጃጀት ትኩረቴን በሥራ ላይ እንዳውል "በሥራ ላይ" እንዳተኩር ረድቶኛ					
7	ክፍት የሆነው የቢሮ አደረጃጀት ከስራ ባልደረቦቼ ጋር በተግባራት እንድስራ አግዞኛል					

(የቢሮ ማስገቢያዎች እና ማስዋወቂያዎች)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ቢሮዬ ባሉት የቢሮ ማስገቢያ እና ማስዋወቂያዎች ደስተኛ ነኝ					
2	የቢሮዬ ገቢዎች እና ማስዋወቂያ ማራኪ ስለሆነ ስሜቴን አሻሽሎታል					
3	የቢሮዬ ገቢዎች እና ማስዋወቂያዎች ቤት ውስጥ እንዳለሁ እና ምቹት እንዲሰማኝ ያደርጋሉ					
4	ቢሮዬ በእጽዋት እና ስዕሎች ያጌጠ ስለሆነ ስሜቴን ሊያነቃቃው ችሏል					

(የቢሮ ተለዋዋጭነት)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	ስራዬን ስሰራ በመቀመጥ፣ በመቆምና በመንቀሳቀስ የቦታ ለውጥ ማድረግ እችላለሁ					
2	ቢሮዬ ለሥራዬ የተለያዩ ቦታዎች አዘጋጅቷል					
3	ሥራዬን ለመሥራት ምቹ የሚሆነኝን የሥራ ቦታ መምረጥ እችላለሁ					

(የሠራተኞች ምርታማነት)

ተ.ቁ	መግለጫ	እጅግ አልስማማም	አልስማማም	ገለልተኛ ነኝ	እስማማለሁ	እጅግ እስማማለሁ
1	አዘውትራ ከፍተኛ ጥራት ያላቸው አገልግሎቶችን አቀርባለሁ					
2	የስራ ሰዓቴን በአግባቡ እጠቀማለሁ					
3	የዕለት ተዕለት ተግባራን					

	በፍጥነትና ውጤታማ በሆነ መንገድ አከናውናለሁ					
4	በየቀኑ በርካታ ሥራዎችን እሰራለሁ					
5	የስራ ማስረከቢያ የጊዜ ገደቦችን በአገባቡ እጥብቃለሁ					
6	የሥራ ዓላማዬን እና ግቤን አሳካለሁ					

አመሰግናለሁ!