

**AN ASSESSMENT OF THE IMPACT OF WORK ENVIRONMENT ON THE
PRODUCTIVITY OF CONSTRUCTION SKILLED WORKERS IN IMO STATE,
NIGERIA**

BY

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23/PGD/16146

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**A PROJECT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
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DEPARTMENT OF QUANTITY SURVEYING

FACULTY OF ENVIRONMENTAL SCIENCES

IMO STATE UNIVERSITY, OWERRI

FEBRUARY, 2026.

DECLARATION

I hereby declare that this Project entitled “**AN ASSESSMENT MENT OF THE IMPACT OF WORK ENVIRONMENT ON THE PRODUCTIVITY OF CONSTRUCTION SKILLED WORKERS IN IMO STATE, NIGERIA**” is written by me and that it is the record of my own research work. It has not been presented in any previous application for a higher or similar degree. All sources of information are specifically acknowledged using references.

NWACHUKWU AKOBUNDU

FEBRUARY, 2026.

CERTIFICATION

This Project entitled “**AN ASSESSMENT OF THE IMPACT OF WORK ENVIRONMENT ON THE PRODUCTIVITY OF CONSTRUCTION SKILLED WORKERS IN IMO STATE, NIGERIA**” meets the regulations governing the award of Post Graduate Diploma (**PGD**) and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to God of Heaven and of Earth, God of the Universe for His infinite mercies, steadfast love, and loving kindness towards me in my life endeavours, and including this PGD journey.

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ABSTRACT

The work environment plays a crucial role in determining the productivity of employees in the construction industry. Factors such as physical conditions, ergonomics, the social and cultural atmosphere significantly impact how well employees carry out their tasks. This study aims to assess the impacts of work environment on the productivity of construction skilled workers' in, Imo State, Nigeria. This study adopted descriptive research design. The results were presented in tables and chart form. Data for the study were collected through primary and secondary sources and were analyzed using Statistical Package for Social Sciences (SPSS) and Microsoft excel software. Information obtained from the respondents were summarized using descriptive statistics such as percentages. Chi-square was used to test the hypothesis. Opinion of the respondents was obtained using inferential statistics such as relative important index. A total of 150 questionnaires were distributed, which is considered adequate for analysis. The most significant factors affecting construction skilled workers' productivity in the work environment were found to be `disputes among workers, poor weather conditions, equipment failure, changes in orders during unpredictable execution, and major rework due to unforeseen conditions. At the end of the research, it was discovered that the construction work environment which employees find themselves, is greatly affecting their productivity. It is the roles of the construction firms to provide comfortable work environment which will positively affect worker's productivity in Imo State. The study recommended that there should be good work environment for workers in order to boost their morale to work hard and increase their productivity. The findings of this study can be applicable to construction industries in other states in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The construction industry plays a significant role in a nation's economy, contributing a substantial percentage to the Gross Domestic Product (GDP) both globally and in Nigeria (World Economic Forum, 2018; Olanrewaju et al., 2020). Despite its economic importance, the construction industry faces various productivity challenges, particularly related to the working environment of its workers. These challenges are prevalent in both developed and developing countries, and they significantly impact the performance of construction workers, (Naoum, 2016). Working environment plays an important role towards the worker's performance. Working environment is argued to impact immensely on employees' performance either towards negative or the positive outcomes (Chandrasekar 2011).

More than 111 million construction workers are concentrated in low-income countries. One of the main factors affecting construction growth is productivity, which is mainly associated with labour performance (Tanko, Ting and Idiake, 2020). Productivity generally describes the relationship between output and related input used in production (Azry & Hamza, 2019). It is one of the crucial problems that must be considered in the construction industry because productivity is used to measure the performance of a construction project. The cost spent on labour is 30% to 50% of the total project costs (Jarkas et al., 2012). The significant influence of construction labour productivity towards the project cost and the profitability of construction companies will ultimately affect the completion of the project. Thus, productivity improvement in the construction industry continues.

However, the uncertainties inherent in construction projects' environments contribute to the lack of universal consensus on a set of factors and classification of factors that affect construction labour productivity growth (Hughes & Thorpe 2014).

The performance of employees in the construction industry is influenced by multiple factors, including their well-being, safety, access to resources, and the overall work environment (Leblebici, 2012; Naharuddin & Sadegi, 2013). A conducive physical workplace encourages consistent and sincere employee engagement, minimizing absenteeism, job delays, and other unfavorable aspects (Chika & Dominic, 2017). Effective communication and motivation strategies also play a crucial role in inspiring employees to be highly committed to their work (Sprinkle, 2000; Kreitner & Kinicki, 2010; Gupta & Shaw, 2014).

The successful completion of construction projects within the agreed-upon timeframe and budget is a key measure of project success. However, the absence of a positive work environment can lead to a decline in employee performance (Chika & Dominic, 2017). Adverse work environments can cause chronic stress among employees, necessitating the identification and mitigation of such factors. Several indicators of the working environment that impact construction workers' performance have been identified in the literature. These include factors such as lighting conditions (Hyder, 2016), risks and safety measures (Parida et al., 2016), access to medical services (Aina & Adesanya, 2015), provision of training facilities (Ikediashi et al., 2012), challenges posed by environmental conditions (Venugopal, 2016), availability and maintenance of equipment (Attar et al., 2012; Sinha, 2015), job execution errors and delays (Zhang & Huo, 2015), coordination and

cooperation issues (Jarkas & Radosavljevic, 2013; Aina & Adesanya, 2015), transportation concerns (Adamu et al., 2011; Funso et al., 2016), and other related barriers.

Organization should address such issues in order to ensure high worker productivity. However, it should be noted from the perspective of the construction industry, productivity happens to be a significant aspect that may be used as an index for project production efficiency. Productivity is the correlation between output produced by a system and the qualities of input factors utilized by the system to yield output (Olughu et al., 2022). The difference between productivity and labour productivity is that while productivity stresses correlation between input and output, labour productivity emphasizes result of input.

The practice of using labour, especially direct labour inputs and costs can be ascertained and quantified more easily than those of other factors, and partly due to a legacy of classical economics thought which not only tends to regard direct labour as the sole source of value but also tends to regard all forms of indirect labour as “unproductive labour”. Therefore, it can be said that for productivity to be increased then labour needs to be improved. There are many ways by which this can be carried out. These include: Improvement in worker’s skills, availability of resources, conducive environment and provision of other general welfare packages (Ihedigbo, Olughu, Bello & Olonade, 2023).

1.2 Statement of Research Problem

A prosperous construction project has countless essential components. One of those is the labourers. Labourers play a very significant role in the construction business from the onset of the

task to its completion within a specified time, that is why their productivity should be observed. Working environment also plays a vital role in determining the productivity of labourers in the construction industry.

Productivity is usually taken to mean labour productivity; that is, unit of labour produced per man per day (David et. Al 2013). Working environment includes policies, rules, culture, resources, working relationships, work location, internal and external environmental factors, all of which influence the ways that workers perform their job functions (Opperman 2012).

Most construction project sites in Nigeria are being managed by unqualified persons who lack the requisite capacity to identify taste of work environment. Investigations have shown that there is serious declined in the number of young men and women working in specialized construction places. This has created a situation where most men and women (construction workers) who don't have proper and adequate training on the construction work environment and its procedures, such scenario constitute a serious problem to the construction process not only in terms of poor quality work, delay or abandonments of project but also in terms of low productivity which hinder national development in the long run.

Many factors are internally generated and these are controllable by management. Some factors are however beyond management control (e.g. nutrition, type of workers, change in climatic condition, etc) and their impact are beyond the scope of the present discourse.

This area of study was chosen because in this period under review, Imo state has witnessed a lot of infrastructural development, therefore there is need to assess the impact of construction work environment on the productivity of skilled workers in the State.

1.3. Aim and Objectives of the Study

The aim of the study is to assess the impact of Work Environment on the Productivity of Construction Skilled Workers in order to ensure efficiency in Project delivery

The following objectives were pursued in other to achieve the above aim

- i. To appraise the construction environmental factors that influence the productivity of construction skilled workers
- ii. To evaluate project delivery productivity factors in Owerri, Imo State
- iii. To assess the impact of incentive measures on skilled Labour's productivity
- iv. To examine the effect of construction supervisors on skilled worker's productivity

1.4 Research Questions

The study would consider the following questions to align with the research objectives.

This study would attempt to provide answer to the above questions

- i. What are the environmental factors that influence productivity of construction skilled workers?
- ii. What are the project delivery productivity factors in Owerri, Imo State?
- iii. What incentive measures can be adopted to improve the skilled worker's productivity?
- iv. What are the contribution of supervisors towards construction worker's productivity?

1.5 Hypotheses of the Study

The following hypothesis will be tested in order to achieve the aim of the study:

Ho1: There are no significant relationship between work environment and worker's productivity

Ho2: There is no significant relationship between incentive measures and construction worker's productivity

1.6 Significance of the Study

Productivity has a great significance in construction. Labour productivity constitute a significant part of production input for construction project. The study will therefore serve as a reference material for future researches in this area. Also, the results will throw more light on factors affecting worker's performance as far as their environments are concerned. The study is expected to provide knowledge and measures to improve the working environment of construction workers for better performance in Nigeria. The study would be of immense value to all the construction skilled workers in the construction work environments, finally the study would contribute to the growth of construction industry in Nigeria which will then strengthen the nation's economy.

1.7 Scope /Delimitation of the Study

Although the focus of the study is Imo State Nigeria, the study is limited to Owerri capital. The researcher chooses this area because of access to data collection. Owerri is the capital of Imo State where construction projects are going on both private and public projects. The study was streamlined to physical work environment, health and safety conditions, psychosocial work environment, welfare and support facilities. It is hoped that the study would achieve the intended aim and objectives.

1.8 Definition of Terms

Productivity: it is the relationship between goods produced or a service provided and the resource consume in doing it

Assessment: the value or amount at which something is calculated; it is the judgment or opinion of something.

Skilled workers: it is also known as tradesmen, these are any worker who has some special skills, knowledge or ability in their work especially in the construction industry.

Construction site: Pieces of ground were building construction or construction works/activities takes place.

Environment: This the sum total of all internal and external influences and conditions affecting construction in developing activities.

1.9 Organization of the Work

The study will be organized into five chapters. Chapter one will be introduction, statement of research problem, research objectives and significance of the study. Chapter two will consist of literature review which will comprise of conceptual definitions, theoretical review, empirical analysis and conceptual frame work. Chapter three will contain the research methodology which consist of the research design, study area, research population, sampling design, and data collection methods. Chapter four will highlight the presentation and interpretation of data as well as discussing of findings. Chapter five will contain the summary of the study, recommendations and conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Preamble

This chapter presents a comprehensive review of literature related to the impact of work environment on the productivity of skilled construction workers. This study also identifies gaps left by other researchers of similar studies. However, it attempts to fill those gaps so that the write-up can contribute to a new body of knowledge in the academic world. Through this review, literature is re-packaged and analyzed as a way of bringing new insights into the problem studied.

2.2 Nature of Construction Industry

The construction industry carries out a large number of activities which involves construction of different types and magnitudes of structure for the use of mankind. These structures are bridges, airfield, buildings, docks, canals etc. They are constructed to make provide goods and services to mankind. Construction projects can run through several towns, villages and cities e.g. road or airline projects. The execution may include construction of bridges, dams etc. which directly affect ecosystem (Nwosu 2013).

Construction activities gained a lot of power since the time of industrial revolution. The degree of development of a nation is measured through provision of fundamental infrastructures such as buildings, roads, bridges etc. Construction industry has grown round the globe. It has contributed remarkably to economic and social growth, and the same attributes in both grown and growing nations, which is job creation. The construction business has developed rapidly since years past, and played a vital part in creating world economy.

2.3 Conceptual Reviews

This provides definitions of key concepts such as work environment and Workers productivity from various sources.

2.3.1 Work Environment

Many scholars have attempted conceptualizing the working environment. Perhaps it may be defined in its simplest form as the settings, situations, conditions and circumstances under which people work. It is further elaborated by Briner, (2011) as a very broad category that encompasses the physical setting (e.g. heat, equipment's etc.), characteristics of the job itself (e.g. workload, task complexity), broader organizational features (e.g. culture, history) and even aspects of the extra organizational setting (e.g. local labour market conditions, industry sector, work-home relationships). It means that work environment is the sum of the interrelationship that exists among the employees and the employers and the environment in which the employees work which includes the technical, the human and the organizational environment. Opperman (2012) was quoted in Yusuf and Metiboba, (2012), to define workplace environment as composition of three major sub-environments which include the technical environment, the human environment and the organizational environment. According to them technical environment refers to tools, equipment, technological infrastructure and other physical or technical elements of the workplace. The human environment includes the peers, others with whom employees relate, team and work groups, interactional issues, the leadership and management (p.37). The human environment can be interpreted as the network of formal and informal interaction among colleagues; teams as well as boss-subordinate relationship that exist within the framework of organizations. Such interaction (especially the informal interaction), presumably, provides avenue for dissemination of

information and knowledge as well as cross-fertilization of ideas among employees. Of course, it has been established in previous studies that workers' interpersonal relations at workplace tend to influence their morale. Hypothetically, whatever affects morale on the job is likely to affect job commitment. According to Yusuf and Metiboba, (2012) the third type of work environment, organizational environment includes systems, procedures, practices, values and philosophies which operate under the control of management. In the words of Akintayo (2012) organizational environment refers to the immediate task and national environment where an organization draws its inputs, processes it and returns the outputs in form of products or services for public consumption. The task and national environment includes factors such as supplier's influence, the customer's role, the stakeholders, sociocultural factors, the national economy, technology, legislations, managerial policies and philosophies. All these go a long way in influencing people's psych and attitude towards work. These three types of environments can further be categorized into two basic types, based on the influence they exert on the people at work. In his study of employee personality profile at work as influenced by the working environment. Employee personality profile is not static. It is dynamic and changes with the working experiences in the organization environment. Hence, many authors classify the work environment into conducive and toxic environments. Work environments have many properties, components or factors that may affect both physical and psychological well-being of workers (Briner, 2011). How well employees engage with factors in their working environments influences to a great extent their error rate, level of innovation and collaboration with other employees, absenteeism and ultimately, how long they stay in the job which is a function of their commitment towards work. identified twelve factors in workplace environment which either lead to engagement or disengagement of workers (Chandrasekar, 2015). These factors include: goal-setting, performance feedback, role congruity,

defined processes, workplace incentives, supervisor support, mentoring/coaching, opportunity to apply new skills, job aids, environmental factors, and physical factors. A thorough understanding of these variables makes it palpable that they are identified along with many other factors, refined and compressed into six factors. six factors have determinants effects on whether workplace environment will be conducive or toxic. Conducive workplace environments give pleasurable experiences to the employees and help them actualize in the dimensions of personality profile while toxic workplace environments give painful experiences and de-actualize employees' behaviour. Irresponsible or uncommitted employees can change to be responsible and be more committed to job in conducive work environment because such environments reinforce the self-actualizing traits in them. While reverse may be the case under toxic environment. It is these two kinds of workplace environment that serves as conceptual framework of this study. Workplace environment is thus defined in this study as sum of the interrelationship between employees and employers and the environment in which they operate which may be conducive or toxic.

2.3.2 Employee's Productivity

The origin of the term productivity can be traced back to 1766. Two measures of productivity namely total factor productivity (TFP) and partial factor productivity (PFP) are commonly used in construction industry (Vaishant and Kansal 2014). The first measure of productivity total factor productivity is defined as the ratio of total output to total input.

Labor productivity plays an important role in the success of new construction projects such as high-rise buildings, roads, and bridges as poor construction labor productivity is a major cause of delay and cost overrun of construction projects (AbdulKadir, et al., 2015).

The expense of construction labor typically makes up approximately 30% to 50% of the overall cost of a construction project in many countries; thus, the productivity of construction labor significantly influences the profitability of nearly all construction projects (El-Gohary and Aziz, 2014).

In the construction industry, labour productivity, commonly referred to as Construction Labour Productivity (CLP) is a technical output–input ratio that compares the proportion of labor outcomes created by workers in a given time period to the labor consumed (Lu, et al., 2021).

Gouett, et al. (2011) identified several common metrics used for CLP assessment, including the productivity factor, which is the ratio of scheduled or planned to actual work hours; the unit rate, which measures the ratio of labor cost to units of output; and labor productivity itself, defined as the ratio of work hours to units of output.

Yi and Chan (2014) emphasized productivity as the power of being productive and the efficiency with which goods are produced.

To have a standard productivity, employers have to get the workers' task to be achieved on track as to achieve the organization objective. By having the work track, employers could be able to supervise their workers and help them to improve their productivity. Therefore, there should be an incentive that would be issued based on the productivity of the workers (Stup 2013). This is to motivate the employees in order to increase their productivity.

Workers productivity depends on the zeal and the openness of the workers on doing their work. By the zeal and openness of the employees in doing their work, it could increase the employees' productivity which also leads to the good performance.

Aynur, Kazaz et al (2018) moreover surveyed 82 firms on factors affecting labour productivity in Turkey and identified the following nine factors as most important to labour efficiency; 1. Quality of site management, 2. Material management, 3. Amount and on payment, 4. Planning, 5. Supervision, 6. Site layout, 7. Work discipline, 8. Occupational education and training, 9. Working at similar activities.

Soekiman et al (2011) explored various factors affecting labour productivity in Indonesia and shortlisted the following as most significant: Lag of materials, Delay in arrival of material, Unclear instruction to labour, Labour strikes, Financial difficulties, Higher absenteeism of labour, No supervision method, Supervisors absenteeism, Lag of equipment and design change. In another study by Attar et al on various factors affecting labour productivity and methods to improve it, Kolhapur and Pune district concludes with the same parameters given by Soekiman et al (2011) as most significant factors affecting labour productivity.

Shashank et al. (2014) grouped factors affecting labour productivity in six different group which are Motivation group, Manpower group, Material/Equipment group, Safety group, Managerial group, Quality group. They said Motivation factor has the highest impact on labour productivity. So they suggested that, the construction company should increase labour satisfaction by paying a

reasonable salary, developing financial reward or recognition program and improving the living condition on site.

Productivity is one of the key components of every company's success and competitiveness in the market. A construction contractor stands to pick up or lose, contingent upon how well company's productivity reacts to competitors. Construction firms may pick up favourable position over their rivals by enhancing productivity to build project at lower expenses; yet, most contractors do not properly address this vital issue or assess its effect on the project benefit (HAMMAD et al., 2011).

Construction industry is labour-intensive, which involves human effort and performance. There are various problems that faced construction industry but the most challenging is labour productivity in construction (SOHAM; RAJIV, 2013). Soham and Rajiv (2013) added that some construction project has some difficulties in terms of materials, money, tools and local contractor's construction cost. Looking at the current scenario of continuous downfall of construction labour productivity, it is necessary to identify these factors.

A study carried out by Alinaitive et al. (2017) rated poor supervision and lack of skills workers as the two most important causes of low productivity of construction workers in developing countries. Ameh and Osegbo (2011) noted that low salary, absence of materials and unpleasant working condition are having key effect on productivity of labour involved in concrete casting in single story building projects in Nigeria.

Thus, Odusami and Unoma (2011) added that the problems of low productivity can be directly linked to poor and inadequate training of construction skilled workers.

Productivity generally describes the relationship between output and related input used in production (Azry & Hamza, 2019). It is one of the crucial problems that must be considered in the construction industry because productivity is used to measure the performance of a construction project. The cost spent on labour is 30% to 50% of the total project costs (Jarkas et al., 2012). The significant influence of construction labour productivity towards the project cost and the profitability of construction companies will ultimately affect the completion of the project. Thus, productivity improvement in the construction industry continues. However, to increase productivity, the construction workforce needs an improvement strategy. One of these strategies is to understand the parameters of both factors and practices that can effectively measure how much influence these factors and practices have on construction labour productivity (Tsehayae & Robinson, 2014). According to Sukumar (2016), Better productivity can be achieved if project management includes the skills of education and training, the work method, personal health, motivational factors, the type of tools, machines, required equipment and materials, personal skills, the workload to be executed, expected work quality, work location, the kind of work to be done, and supervisory personnel. Productivity is the dominating aspect in construction as it encourages cost-saving and effective utilisation of resources. It is the most crucial concern in developed and developing countries (Alagbari, 2017; Tahir, 2015).

Suppose a country's construction sector and economy are so closely linked. In that case, it makes sense to effectively manage the human resources within the industry by improving labour productivity factors and their effect on efficient project delivery. Agumba (2021). However, the

uncertainties inherent in construction projects' environments contribute to the lack of universal consensus on a set of factors and classification of factors that affect construction labour productivity growth (Hughes & Thorpe 2014). Given the peculiarity of these factors across countries, identifying factors affecting construction labour productivity in each region/country is pivotal to productivity growth in these areas.

Construction performance and productivity improvement are the focus areas in construction industry for any nation. Productivity is expressed in many ways but generally as the ratio of output to resources which are consumed to produce that output. Productivity is the average direct labour hours required to install a unit of material. In construction, labour productivity is often expressed as a number of labour hours per unit of work; and or the quantity of work performed by a crew during a standard eight-hour day (Fagbenle, Ogunde and Owolabi, 2011). In a broader sense, it may also measure how much value a worker adds to the economy per unit time. Productivity in the construction industry is of importance to the economic health of a nation. Labor productivity has always been a key issue for project managers to improve their project results and productivity studies are getting special emphasis in developing countries (Musamil and Khurshid, 2014). A primary task in construction is to bring about a climate conducive for management, workforce and resources to combine effectively and efficiently towards raising productivity, which is achieving a given level of output with fewer inputs, while also providing high reward to those involved.

2.4 Work Environmental Factors Influencing Construction Workers' Productivity

The performance of employees in the construction industry is influenced by multiple factors, including their well-being, safety, access to resources, and the overall work environment (Leblebici, 2012; Naharuddin & Sadegi, 2013). A conducive physical workplace encourages consistent and sincere employee engagement, minimizing absenteeism, job delays, and other unfavorable aspects (Chika & Dominic, 2017). Effective communication and motivation strategies also play a crucial role in inspiring employees to be highly committed to their work (Gupta & Shaw, 2014).

The successful completion of construction projects within the agreed-upon timeframe and budget is a key measure of project success. However, the absence of a positive work environment can lead to a decline in employee performance (Chika & Dominic, 2017).

2.4.1 The work environment factors affecting construction skilled workers' performance:

- (a) Lack of free/subsidized transportations for workers
- (b) Lack of motivating vehicles for construction workers
- (c) Lack of free food vouchers for workers
- (d) Lack of free clinical offices for construction workers
- (e) Lack of skill acquisition platforms for workers
- (f) Lack of issuance of preparing certificate for workers
- (g) Poor weather condition
- (h) Obsolete machines for site operations
- (i) Plants and equipment failure

- (j) Major rework due to unpredicted conditions
- (k) Overcrowd of workers on site
- (l) Change in orders during project execution
- (m) Delay in supply of materials to site
- (n) Dispute among workers
- (o) Poor lightning
- (p) Accidents and Injuries

2.5 Project Delivery Productivity Factors

The history of delivery methods started in the 1940s with the design-bid-build approach, which has been the most widely used in the United States for a long time (Scott, Stanford & Molenaar,2020). According to Jackson (2020), due to the design-bid-build method, a segregating process

was created, where the process was directly conducted by one contractor, owner, and architect, nurturing the project from conception to completion. However, this process created multiple cultures, causing issues such as inefficiency, fragmentation and resource waste (Viana, Hadikusumo, Mohammad & Kahvandi, 2020). These issues were partially tackled years later, in the 1960s, with the start of the new delivery method. The construction management method uses an approach that supervises and controls the project teams and information (Hamzeh et al., 2019). Project delivery productivity is a multifaceted concept encompassing various factors influencing a project's success. Project delivery productivity measures how effectively and efficiently a project is delivered and, ultimately, how well it meets its defined objectives (Kwofie, Aigbavboa& Thwala, 2020). It's a multifaceted concept that encompasses various aspects of project

management. Project delivery productivity refers to how effectively and efficiently a project is executed and measured against its predefined objectives. It's a comprehensive evaluation of a project's success, considering various factors beyond the traditional triple constraints of time, cost, and quality.

2.5.1 Traditional productivity factors

Traditional performance factors are the core metrics used to evaluate project success. They have been the cornerstone of project management for decades and are relevant today. These factors primarily focus on the three fundamental elements of project management:

a) Time

This measures how well the project adheres to its planned timeline. It involves monitoring milestones, deadlines, and the overall project schedule. Project managers track significant events or achievements throughout the project's lifecycle (Ibrahim, Zayed & Lafhaj, 2024). These milestones serve as checkpoints to ensure progress is on schedule. Deadlines are specific dates by which particular tasks or deliverables must be completed. Monitoring deadlines helps identify potential delays and take corrective actions. This comprehensive plan outlines the entire project timeline, including start and end dates for different phases and tasks. Adhering to the overall project schedule is essential for timely completion (Ibrahim et al., 2024). Project managers can significantly improve the chances of successful project delivery by effectively monitoring milestones, tracking deadlines, and adhering to the overall project schedule.

b) Cost

Cost is a fundamental factor in project delivery performance. It refers to the financial resources allocated to a project and how effectively they are managed. Monitoring actual costs against the planned budget is crucial to project cost control. It involves tracking the expenses incurred on a project and comparing them to the budgeted amounts (Venkataraman & Pinto, 2023). Develop detailed budget that breaks down the project's costs into various categories like labour, materials, equipment, and overhead and allocate specific amounts to each category based on estimated costs and project scope. By effectively monitoring actual costs against the planned budget, project managers can make informed decisions, control expenses, and ensure the financial success of their projects (Elghaish, Abrishami, Hosseini & Abu-Samra, 2020).

c) Quality

Quality is a critical factor in project delivery performance. It refers to the degree to which a project's deliverables meet specified requirements and customer expectations. Quality in project delivery performance refers to the degree to which a project's final product or service meets the specified requirements and expectations of its stakeholders (Faraji, Rashidi, MeydaniHaji Agha, Rahnamayiezekavat & Samali, 2022). These are the predefined standards, criteria, and conditions that the project's deliverables must meet. They can be technical specifications, functional requirements, or performance benchmarks. These are the project's customers' or clients' implicit or explicit needs and desires. They may include factors like usability, aesthetics, reliability, or timeliness. By prioritizing quality, project managers can deliver successful projects that meet or exceed customer expectations and contribute to the organization's overall success (Faraji et al.,2022).

2.5.2 Emerging productivity factors

In addition to the traditional performance factors of time, cost, and quality, several emerging factors increasingly influence project success. These factors reflect the evolving nature of projects and the changing expectations of stakeholders (Kwapong & Pipaliya, 2022). Here are some key emerging performance factors:

a) Client satisfaction

Client satisfaction is a crucial aspect of project delivery performance. It measures how well a project meets or exceeds the expectations of its clients or stakeholders. Client satisfaction is a critical metric of project delivery productivity (Alshihre, Chinyio, Nzekwe-Excel & Daniel, 2020). It measures how well a project meets or exceeds the expectations of its clients or stakeholders. By prioritising client satisfaction, project teams can improve overall project productivity and build long-lasting client relationships.

b) Risk management

Project risk management is a critical component of successful project delivery. It involves systematically identifying, assessing, and mitigating potential risks impacting the project's objectives (Kerzner, 2022). The first step in risk management is to identify potential risks. This can be done through various techniques, such as a collaborative process where team members brainstorm ideas about possible risks. Once risks have been identified, they must be assessed to determine their potential impact and likelihood of occurrence.

c) Change Management

Change management is a structured approach to transitioning individuals, teams, and organizations from a current state to a desired future state. Project management involves managing changes to a project's scope, timeline, or deliverables (Onubi & Hassan, 2020). Effective change management can minimize project timelines, budgets, and resources disruptions. By involving stakeholders and addressing their concerns, change management can reduce resistance to change.

d) Team performance

Team performance refers to a project team's collective effort and effectiveness in achieving project goals. A high-performing team can significantly impact a project's success by improving productivity, creativity, and problem-solving abilities (Haverila & Twyford, 2021). By focusing on these factors and implementing effective strategies, project managers can improve team performance and increase the likelihood of project success.

e) Communication

Effective communication among stakeholders is to minimize misunderstandings. Effective communication is crucial for successful project delivery. It ensures that all stakeholders are aligned, informed, and engaged. Here are some strategies to minimize misunderstandings. Select the most effective communication channels, such as email, phone calls, video conferencing, or face-to-face meetings (Ardhiansyah, Tjendani & Witjaksana, 2023).

f) Stakeholder Management

Engaging and managing stakeholders to ensure their support and buy-in. Stakeholder management identifies, analyses, and engages stakeholders throughout the project lifecycle (Maqbool, Deng & Rashid, 2020). It involves understanding their needs, expectations, and potential impact on the project. Effective stakeholder management is crucial for project success.

By implementing these strategies, project managers can build strong relationships with stakeholders, mitigate risks, and increase the chances of project success.

g) Innovation and Creativity

Encouraging innovative solutions and approaches to project challenges. Innovation and creativity are essential for project success. They enable teams to think outside the box, develop creative solutions, and adapt to changing circumstances (Engebo, Klakegg, Lohne & Lædre, 2020). By fostering a culture of innovation and creativity, project teams can achieve better results and drive organizational success.

h) Sustainability

Considering environmental and social impacts in project planning and execution. Sustainability in project management refers to considering a project's environmental, social, and economic impacts throughout its lifecycle. It involves making choices that minimize negative impacts and maximize positive contributions to society and the environment (Ansari, Abouraia, El Morsy & Thumiki, 2024). By embracing sustainability principles, project managers can deliver projects that positively impact the planet and society. It's not just about doing the right thing; it's also about creating long-term value and building a more sustainable future.

2.6 Job incentive measures towards skilled worker's productivity

The construction industry is one of the most labour intensive industries and human resources cover a large proportion of the project cost. Particularly, the construction industry in Nigeria has remained largely non-mechanized with heavy reliance on large number of manual workers (Aina and Omoniyi, 2014). Labour is defined as a task that requires the exertion of body and mind or both (Fagbenle, Ogunde and Owolabi, 2011), and remains the most essential and complex resources that the construction manager will have to deal with. The unprecedented rise in construction demand, shortage of skilled construction workers, enervating weather conditions, complexity of the construction process, poor supervision and delays in receiving instruction have been cited as contributing to the decline in labour output in Nigeria construction sector (Fagbenle et, al, 2014), and that of the developing countries (Page and Norman, 2014). Failure by project managers to effectively motivate operatives has been identified to cause productivity to decline.

Those managers that seek to understand human behaviour and apply the principles of motivation theory to motivating the construction workers can and nearly always benefit through improved productivity. The construction manager is expected, among other things, to develop ability to motivate and develop the spirit of teamwork among them as workforce motivation is an important aspect in achieving an environment of good industries relations. Corroborating this assertion, Fagbenle, Ogunde and Owolabi (2011) affirmed that researchers have suggested that in order to have any meaningful improvement in construction workers' performance, contractors must study the peculiarities of their workers and also identify their main motivators. Labour productivity has always been an issue for project managers in order to produce results. Concerns have also been raised about the choices of particular scheme either financial or non-financial, whether incentive

schemes actually raise construction workers output in all circumstances, and the measurement of the actual impact generated (Abdusalam, Faki and Dardau, 2012).

All organizations are concerned with what should be done to achieve sustained high levels of performance through workers. So therefore Olugbenga (2011), defined incentive as a rewards given to an individual or group that cause them to respond with specific behaviours. Stolovitch (2002) defined incentives as something or item valued by an individual or group that is offered in exchange for increased performance. Incentives can be positive or negative, tangible or intangible. According to Olugbenga (2011), incentive may be financial, or non-financial. Such rewards may be available to workers, workers, or top managers. Whether the incentive is linked directly to such items as safety, quality or absenteeism, the reward follows successful performance. Edwinah (2013), defined reward as a powerful human resource management tools for employment, retention, and inspiration for work done. It is a factor that must be considered if organizations want to remain competitive in its industry. What employees expect of their employers is no longer just “a reasonable day’s pay for a reasonable day’s work” but rather a competitive remuneration package with new innovative methods of providing benefits. Incentive provides employees with a tangible reward for their services to the organization. It also provides them with a source of livelihood. Incentive programmes are vital to both organizations and employees. According to Rao (2011), incentive schemes are programmes developed purposely to encourage a specific course of action or stimulate workers to behave in a particular manner. Rao (2011), incentive schemes envisage a basic rate usually on time basis, applicable to all workers and incentive rates payable to the more efficient among workers as extra compensation for their deserved performance in terms of cost, time and quality.

2.6.1 The Various Incentive Program Used in Building Constructions Sites

According to Hovell (2018), Incentive programs can be as simple or as complicated as desired.

Not inclusive, though exemplary of the various types, are the following:

(a) Performance Bonus

A performance bonus is traditionally a lump sum payment made to an employee for performance, controlled in part or entirely by the employee, above some standards. The standards may range from those detailed in one's employment contract to those based on purely subjective evaluation of the supervisor or employer. Performance bonuses are usually paid quarterly, semi-annually or annually. The theory behind performance bonuses is that an incentive to go "above and beyond" will instill an increased motivation for employees to excel beyond their recognized job descriptions and expected duties. After all, they are paid to do their job to at least some minimum standards or risk being fired. The obvious advantage to this plan is that an employer is only paying additional money for increased productivity. Whether there are standards based on a percentage above a stated goal, at which time it is objective, or through a subjective evaluation, the company would pay out a reward only in line with that which it is receiving.

(b) Discretionary Bonus

Like a performance bonus, a discretionary bonus may either be offered as a possibility at employment, be one which develops based on the company's financial position. or additional services which an employee may offer to a firm. Unlike the performance bonus, however, the discretionary bonus, as its name implies, is totally subjective in nature. Where it may be a subjective call by multiple people, it is not based on a set of standards or criteria from which all

are compared. One of the simplest forms consists of a target or budget being provided to a supervisory level of management which then in turn decides how that money is divided among its employees.

(c) Gain Sharing

Gain sharing is closely related to performance bonuses. This type of incentive program is also traditionally paid out in one lump sum but is divided among a work group rather than paid to one individual. The performance criteria are typically more specific than for most performance bonuses and the work group has a direct influence on the results. An example of this may be to look at the work of stone setting. While paid an hourly wage, a gain sharing program may reward both masons and their helpers based on each additional piece of granite facing put in place over a daily or a weekly quota. By making it a team concept, management is able to allow these smaller groups to both police themselves and act as their own encouragement team. Still in all, gain sharing does take some management time, with checks of standards and notation of the overages and subsequent rewards. Additionally, one may have to take into consideration that all may be being rewarded while only a few members of the team actually did the work. As was discussed in the performance bonus, you also fall into the trap of encouraging speed over quality of work and perhaps in some instances even safety.

(d) Profit Sharing

Perhaps one of the better known incentive programs is profit sharing. The concept behind this program is motivating employees to keep the company's interests in mind in whatever they do. To encourage this, employees are made stockholders, either figuratively or actually, or partial owners

of a company, receiving a portion of the company's profits when provided there are any. These monies are divided among eligible employees typically once a year after the company's financial reporting period. The division of these profits is usually based on salary although other factors such as position and tenure many also come into play. Many companies utilize their profit sharing programs as a way of directly influencing employee longevity.

(e) Pay for knowledge

Paying for knowledge, while not the espionage incentive it sounds like, is a very effective way for employers to encourage their laborers to acquire new and often specialized skills. With the work force remaining stable and the increase of opportunities facing potential employees, employers must learn both to attract new employees as well as provide opportunities for current employees to remain enthusiastic about their job and as up to date with regards to new technology as possible. Basing a reward or incentive on these various needed skills is what paying for knowledge entails. To better explain, it would be as if you were to reward an athlete for every sport he or she mastered. So many dollars for each event and then in return you have a well-rounded athlete capable of competing and perhaps excelling in multiple areas. As with the other programs, however, there are drawbacks. What of the employee who comes well-schooled in a variety of areas? Is this unnecessary, for this employee, program one which he or she will view as unfair, offering incentives to co-workers in order to train them to their entering skill level? It is with this in mind that this program is rarely used by itself, but rather in combination with other programs. Additionally, it is often noted as available only at the lower entry levels, as an initial encouragement to employees recently hired, the group which also historically has the highest attrition rate.

(f) Perquisites

Often when one is looking at a new job, they will wonder what perquisites go along with it. In this day and age, salaries and even monetary bonuses are not sole bases considered when looking at a new employer. Hence, welcome to the land of perquisites. Within this category there are a wide variety of types and new ones are being created daily.

(g) Company Car

Providing a company car is perhaps one of the most commonly used by management in a variety of business situations.

(h) Insurance Plan

Who today would not inquire as to the insurance plan of a potential employer? Whether basic health insurance, including both medical and dental, or including such things as long and short term disability, maternity/paternity leave, accidental death -- all have become an important part of our daily lives. Employers have quickly picked up on the need in Nigeria for insurance coverage, and rather than trust employees to maintaining coverage, they have produced company plans which based on company and or employment level you may pay partially into or receive as part of your benefit package.

(i) Education/Tuition Reimbursement

Similar in style to the pay for knowledge program detailed above, the benefit program takes education to its roots. If you, as an employee, wish to further your education -- some companies limit which areas are eligible, others allow any study at approved schools -- you may do so, and based upon your maintaining a specified grade point average,

(j) Vacation

When one recognizes that companies continue to pay employees for work which they cannot be completing due to their being on vacation, it is easy to see that this is in some ways a direct deficit to the company. In reality however, is it? The purpose behind vacation time is not solely for the benefit of the employee, it is rather an opportunity for employees to revitalize their enthusiasm for their job.

(k) Sick Leave

Along the lines of insurance, though often coupled with vacation plans, is the concept of sick leave. Noting that no person can be healthy 365 days a year for years on end, many companies build in a certain number of sick days during which an absence from the office is excused. After one reaches the set number of sick days, however, they are usually penalized vacation days or pay in order not to tax the employer unduly for their absences.

(l) Non-Financial

Perception, or perceived value, is the tool of selling a benefit plan. Should there not be perceived value of an item or an offering, the employer need not to waste whatever resources, including the management of a program, on its inception. Perhaps one which is hardest to define, though often

one of the most public types of incentive plans is termed here non-financial. These are the programs that public relations people love. They include programs such as the selection of an employee of the-month or employee-of - the-year and the payment of the membership fees or annual dues of various professional organizations. There are programs which offer rewards for safety in the form of additional days off and programs which offer discounted purchase prices on company produced items to employees and sometimes their families. An extension on this second concept is the traditional company store.

(v) Rewards might undermine responsiveness and intrinsic motivation. Rao (2010) further highlights the essential processes for implementing an effective incentive plan as follows:

a) ensuring the performance levels are adequate to motivate employees;

b) link the incentive plan to a contract strategy;

c) set an effective standard by calculating their rewards based on their levels of effort in both design and construction; and view the standard as relationship management/a contract with employees. Incentives are generally viewed from the cost-benefit perspective where the costs for incentives are compared to the derived benefits. Kaput (2013) further identified healthy competition as an advantage of incentive plans.

2.6.2 Impact of Incentives in the Construction Industry

The construction industry has strong multiplier linkages with other industries in the economy, for example, mining, transport and manufacturing. Productivity improvements within the construction sector have a significant effect on economic growth and are inextricably interrelated to the economy (ACIL Tasman, 2015). The ability to attract new business and maintain existing business is crucial for any country to maintain a healthy economy. Many organizations use incentives to

induce industry growth through improved performance. A classic example of an economic analysis of incentive structures is supply and demand curves where the economic theory predicts that the market tends to move towards an equilibrium price. Recent economic developments have encouraged many organizations to consider better ways of driving performance within limited compensation budgets. The use of salary increases only has not proven too effective in most organizations. Incentives have become the most powerful tools to improve employees' outputs, to drive performance and to establish a clear link between performance and rewards within an organization (Kochanski, 2013). The major aim of incentive design is to align the interests of all levels of employees with the interests of project stakeholders or clients (Gordon and Kaswin, 2010). An effective incentive design plan must focus on how to increase performance by encouraging the delivery of specific goals and desired behaviours and also to communicate and reinforce messages around corporate aims and personal performance. Gordon and Kaswin (2010) identified four features of an effective incentive plan as:

- (a) top management support
- (b) communication
- (c) performance management
- (d) appropriate rewards.

Regardless of these features, incentive plans may fail to motivate employees due to the following reasons (Rao, 2010):

- (i) Performance pay may impede employees' motivation due to certain factors, such as ambiguous instructions, lack of clear goals, unavailability of tools, and a hostile workforce;
- (ii) When incentive rewards are viewed as punishment, not rewards

(iii) Incentive rewards might rupture work relationships by encouraging individuals to pursue self-interest at the expense of teamwork

(iv) Incentive rewards can have unintended consequences through inspiring employees to concentrate on areas where they are being measured and neglect other areas;

2.6.3 Types of Incentives

Different classifications of incentives have been recognized in literature. The National Productivity Council classified incentives into non-financial, financial and semi-financial.

(i) Financial incentives scheme

Financial incentive scheme is based on cost motives for its operation. Employees are induced to work smarter and harder with the hope of receiving financial compensation over and above their normal pay. Moore (2016) advocated the use of financial incentive programmes to improve construction labour productivity. Ajayi (2017) attributed the level of productivity attained in an organization to financial incentives scheme. Especially in Nigeria where the basic wage is low and irregular, workers may be tempted by the prospect of higher take-home-pay for greater effort. However, Fagbenle, (2014) cautioned that financial scheme may be counterproductive. Types of financial incentives scheme includes Premium Bonus, Profit Sharing, Measured Day Work, Simple Piece Work, Geared Incentive Scheme and Group-Incentive Scheme.

(ii) Non-financial incentive

Incentives of this type rely on increasing an employee's sense of satisfaction in his or her work. It is based on Management's recognition that an employee's work is valuable to the business as a

whole, and providing employees with the feeling that the project undertaken is inherently meaningful (Ogbona, 2018). Generally, workers' success in increasing productivity should be reinforced immediately by rewards, not only in the form of money, but also by improved recognition, involvement in policy formulation and learning factors (Adedokun 2021). Olomolaiye (2017) enumerated the various non-financial incentives as relationships with mates, safety programme, the work itself, participation of work and decision making, good supervision, promotion, more responsibility, challenging task, job security and choosing workmates.

(iii) Semi-financial Incentive

This kind of incentive lies between the two extreme and it has the characteristics of both financial and non-financial incentives. These sorts of benefits are generally offered to salaried staff whose jobs are difficult to measure in crude productive term. They may involve benefits such health scheme, saving scheme, housing, site welfare provision and Pension scheme. It is generally accepted that programmes combining elements of both financial and psychological incentives are those that produce the most consistently satisfactory results. The relative weight of either component within a specific programme will depend on company goals, existing employee attitudes, and managerial capabilities at the time of a program's implementation (Snell, 2018).

2.7 Supervisors Support to Worker's Productivity

In the context of modern organizations, the role of supervision is becoming increasingly important in efforts to improve employee performance (Andang &Hardiyana, 2021). Supervision is not only a supervisory function, but also includes coaching, training, and human resource development. Supervisors function as a bridge between management and employees, who are responsible for

ensuring that organizational goals are achieved through increasing the productivity and quality of individual and team work (Sofyan et al., 2022).

Employee performance is one of the determining factors for the success of an organization. High-performing employees not only contribute to the achievement of company targets, but also create a positive and innovative work environment. Therefore, it is important for organizations to understand how effective supervision can significantly affect employee performance (de Haan & Birch, 2021). Existing literature suggests that a good supervision approach can increase employee motivation, job satisfaction, and engagement. Through proper coaching, constructive feedback, and the creation of a supportive work atmosphere, supervisors can encourage employees to reach their full potential. However, challenges in implementing effective supervision practices still exist, including a lack of communication and support from management (Vinedal et al., 2021).

This article aims to review various studies and literature related to the role of supervision in improving employee performance. By understanding the relationship between supervision and employee performance, it is expected that organizations can formulate better strategies in human resource management, so as to achieve optimal results in their operations. This review will cover aspects such as coaching, motivation, feedback, and the creation of a positive work environment as key factors in supervision effectiveness.

One way that construction supervisors can improve productivity is by determining how to influence worker's attitude, how smooth the work will flow and how much work can be accomplished (ABD-EL-HAMIED, 2014). A good leadership and supervision in construction

projects increased the productivity through decreasing production costs, reducing time required for the operation, improving profit, improving the quality of product and increasing the utilization of resources. Abd-El-Hamied (2014) stated that the cycle for productivity improvement involves four phases: productivity measurement, productivity evaluation, productivity planning and productivity improvement. Supervisors may influence productivity through their decisions after their study and observation for the productivity measurement and evaluation. Construction productivity mostly depends on the performance of construction workers (JERGEAS, 2019). In practice, most supervisory visits may be focused on inspection and fault-finding rather than providing workers the opportunity to improve their performance and solve problems during service delivery. This ‘traditional’ form of supervision may be detrimental to worker’s motivation. Instead, supervisors should encourage discussion of problems, provide immediate feedback and establish goals to assist workers in maximizing performance (FRIMPONG et al., 2011). The labour force plays a very important role in the construction practice. Therefore, improvement in construction productivity needs to be achieved through greater resource allocation, human resource efficiency and supervision increased innovation and technology diffusion (JERGEAS, 2019). However, construction labour productivity improves as construction supervision is provided. The additional supervision has the effect of reducing the construction gang sizes and is usually associated with defined construction packages to be executed (MERROW et al., 2019). Frimpong et al. (2011) stressed that supervision increases worker’s empowerment, time management, fewer complaints and more positive feedback. Supervisors encourage workers to adopt good practices in order to achieve a high level of performance. Such ‘supportive’ supervision is significant and more beneficial to productivity of construction workers. The benefits of supervision on construction workers using limited resources remain uncertain, even though the quality of supervision may be

a key determinant of its impact on productivity (MERROW et al., 2019). Fischer (2019) concluded that the impact of management styles and techniques on workers' productivity is significant. It is through exercising power that leaders (supervisors) are able to influence others, this power can lead to one of the following reactions: commitment, compliance or resistance which affects productivity.

2.8 Theoretical Literature Review

2.8.1 Herzberg's Two-Factor Theory

Herzberg's theory concentrates on the importance of internal job factors as motivating forces for employees. He designed it to increase job enrichment for employees. Herzberg wanted to create the opportunity for employees to take part in planning, performing, and evaluating their work. He suggested to do this by removing some of the control management has over employees and increasing the accountability and responsibility they have over their work, which would in return increase employee autonomy.

- Creating complete and natural work units where it is possible. An example would be allowing employees to create a whole unit or section instead of only allowing them to create part of it.
- Providing regular and continuous feedback on productivity and job performance directly to employees instead of through supervisors.
- Encouraging employees to take on new and challenging tasks and becoming experts at a task

2.8.2 Human Capital Theory

Human capital theory views education, skills, health, and other individual attributes as investments that improve an individual's productivity and earnings, much like a physical capital investment increases a company's output. While Adam Smith first conceptualized it, economists like Gary Becker refined the theory, which posits that people make rational decisions to acquire these attributes to maximize future benefits, such as higher income and better working conditions. The theory assumes individuals invest in themselves to increase their "human capital" and generate more wealth.

Key Components of Human Capital

- **Education:** Formal schooling, degrees, and certifications
- **Skills:** Technical, soft, and professional competencies
- **Knowledge:** Accumulated understanding and expertise
- **Health:** Physical and mental well-being, which impacts productivity
- **Experience:** Practical knowledge gained from work and life

How It Works

1. Investment in Self:

Individuals invest in their own human capital through costly activities like education and training.

2. Rational Decision-Making:

People make choices about these investments by weighing the perceived costs against the expected benefits.

3. Increased Productivity:

Enhanced human capital makes individuals more productive and efficient in the labor market.

4. Higher Returns:

This increased productivity leads to higher earnings, better job opportunities, and improved quality of life for the individual.

Examples and Applications

- **Individual Earnings:**

A person who invests in a master's degree may expect higher lifetime earnings than someone who enters the workforce after a bachelor's degree.

- **Business Growth:**

Companies that invest in their employees' training and development can see improved overall performance and outcomes.

- **Economic Growth:**

A nation's overall human capital is seen as a key driver of its economic success and growth.

Criticisms

- **Rationality Assumption:**

Critics argue that the theory's assumption of perfectly rational human behavior is flawed, as people often make decisions based on emotions, social context, and cognitive biases.

- **Individual vs. Systemic Issues:**

Some sociological critiques suggest that the theory places blame on individuals for systemic problems, ignoring broader conflicts of interest and structural barriers.

- **Signaling vs. Productivity:**

Some research suggests that education might function more as a "signal" of ability to potential employers rather than directly increasing productivity, potentially leading to inefficient investment in education.

2.8.3 The Ergonomics Theory

The Ergonomics Theory, or Human Factors (HF/E), is the scientific discipline focused on understanding and optimizing the interactions between humans and other elements of a system to improve human well-being and overall system performance. It involves applying scientific theory, data, and methods to design systems, workplaces, and products, considering physical, psychological, and cognitive aspects to reduce risks, increase productivity, and enhance job satisfaction.

Key Aspects of Ergonomics Theory

- **Systemic Approach:**

Ergonomics views the human, tools, and environment as parts of an integrated system, requiring a holistic understanding of their interactions.

- **Optimization of Well-being and Performance:**

The core goal is to design for human well-being while simultaneously optimizing performance, emphasizing that these two outcomes are closely related.

- **Scientific Basis:**

It relies on scientific data, principles, and methods from various fields, including engineering, psychology, and anatomy, to inform design decisions.

Branches of Ergonomics

- **Physical Ergonomics:**

Deals with the human anatomy, including posture, repetitive motions, and physical exertion, to prevent work-related musculoskeletal disorders (MSDs).

- **Cognitive Ergonomics:**

Focuses on the mental processes involved in tasks, such as perception, memory, and reasoning, to improve human-computer interactions and complex decision-making.

- **Organizational Ergonomics:**

Examines how social and cultural factors affect interactions within the workplace, including communication, job design, and organizational structures.

Applications of Ergonomics Theory

- **Workplace Design:**

Designing work environments, tools, and workstations to fit human capabilities and needs, reducing physical strain and increasing comfort.

- **Product Design:**

Creating products and interfaces that are intuitive and easy to use, enhancing the user experience.

- **Safety and Risk Reduction:**

Identifying and mitigating ergonomic risk factors like awkward postures and repetitive movements to prevent injuries and improve safety.

2.9 Empirical Review

Empirical studies abound which attempted to link workplace environmental factors to other employee's factors. The study of Tio (2014) used 74 samples with multiple regression analysis to measure the significance of work environment on job satisfaction among staff of a particular organization. The study found that work environment significantly determines job satisfaction. This result corroborates findings of previous research that investigated the connection between variables in workplace environment and workforce or work process (see Nakpodia, 2011; Vikas & Ravis, 2011; Junaida et al., 2010; Taiwo, 2010).

Other research works have been specific on factors inherent in the workplace environment. For instance, Ali, Abdiaziz and Abdiqani (2013) investigated and found that working conditions was significantly related to employee productivities in manufacturing sectors. With particular focus on such variables as comfort level and temperature in the office work, the study of Junaida et al., (2010) investigated the physical work environment on staff productivity. With 150 participants among civil servants in the Ministry of Youth and Sports in Malaysia, the study revealed the same result. This was however on workplace environment and employee productivity.

The study of Demet (2012) also revealed a significant positive relationship between workplace quality and productivity among bank workers while Faridah, Rahmatul & Razidah (2012) deviate a little from the trend in research on workplace environment. They studied organisational environment-behaviour and its influence on safety culture in organisation. In their opinion, as organisation behaves, so does the working environment, and this behaviour determines the level

of safety consciousness among staff. Regardless of which environmental variables were examined, there seem to be a general census among these researchers. It is generally concluded that workplace environmental factors significantly influence such other employee related variables like health, safety, and well-being, (Jain & Kaur, 2014), job satisfaction (Tio, 2014; Saddat, Zarqa, Sajida, Farheen & Malik, 2013), safety culture (Faridah et al.,2012), job performance (Ajayi, Awosusi, Arogundade, Ekundayo & Haastrup, 2011), organizational performance in public sectors (Chandrasekar, 2011) and so forth. What seems unsatisfying is that many of these researches were carried out in other developed countries and are foreign to African context.

Few studies which have attempted studying African workplace environmental factors on staff related variables were done in workplaces other than construction industries in Imo State and those conducted fail to show the empirical link between workplace environmental factors. The dependent variable in the study of Ajayi et al. (2011) was job satisfaction while worker's morale and perceived productivity in industrial organization was the dependent variable in Akintayo's study in 2012. Akinyele (2010) did another study that linked workplace environment to workers' productivity in the oil and gas industry. Yusuf and Metiboba (2012) also linked work environment with worker's attitudes in all organizations in general

2.10 Research Gap

Work environment and productivity of construction skilled workers in Imo State are seriously lacking and begging for empirical probing especially as may be influenced by factors in construction environment. Palpably, the relationship between construction environment and

skilled employee's performance therein is not well established in our framework of knowledge.
How do we fill this gap?

The study aims to assess the impact of work environment on the productivity of construction skilled workers in Imo State Nigeria.

2.11 Summary

This chapter reviewed the theories and concepts relevant to this study. The theories reviewed included the Herzberg's two-factor theory which focuses on the importance of internal job factors as motivating forces for employee. This theory is the most relevant to the construction industry, as it is widely accepted and applied to worker's productivity which guarantee project success. Human capital theory sees education, skills, health and other individual attributes as investment that enhances an individual's productivity. the Ergonomics theory or human factors concentrated on the interactions between humans and other elements of a system to improve human well-being and overall system performance. Ali, Abdiaziz and Abdiqani (2013) investigated and found that working conditions was significantly related to employee productivities in manufacturing sectors.

The Empirical studies links workplace environmental factors to other employee's factors. The study of Tio (2014), measured the significance of work environment on job satisfaction among staff of a particular organization. The study found that work environment significantly determines job satisfaction. All these studies shows that the construction industry should provide a conducive work environment that will enhance employee's productivity.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Preamble

This chapter describes the methods that were used to gather the data for the study. It contains the research design, population, sample size and sampling technique, sampling procedure and explains the method and procedures for data collection, analysis and interpretation of the findings.

3.2 Research Design

According to Kothari, (2004), research design is a plan which shows the method of an inquiry thought appropriate to the research. In this study, descriptive research design was used. This research design describes phenomena the way they exist. It issued to identify and get information on the characteristics of a particular problem. Descriptive research design was used because it has the advantage of obtaining good amount of responses from many of people. This research design also provides a meaningful and correct picture of events and explain people's perception and behavior on the basis of the data collected. The advantage of selecting this design is that it helps to find views as they appear naturally.

3.3 Description of Study Area

Study area is Owerri municipal, Imo State. Imo State is located in the Southeastern region of Nigeria and is one of the 36 states of federation. It lies between latitude 40 45°N and 70 15°N, longitude 60 50°E and 70 25°E, and covers appropriately 2,530square kilometer with a population of 3,927,563 (2006 census) or 5,408,756 (2016 forecast). Imo State is boarded to the north by

Anambra State to the west and South, and Abia State to the east. It takes its name from the Imo river, which flows along the state's eastern border.

The average weather of Imo State is humid, semi-hot equatorial type. The state experiences heavy rainfall, within an average annual rainfall of 1,500-2,200mm/year and an average number of 152 rain/days particularly during the rainy season (April-October) the superficial circulation of rainfall is bimodal, and heavy fall in July and September and two weeks gap in August. The rainy period starts in April till October or early November. Rainfall is always high during the night and at the early morning time. The higher yearly rainfall height and rainfall days makes high volumes of flow with maximum population density and many farming soil has been washed away and much of the natural vegetation has disappeared. Imo State is recorded to have an average annual temperature above 20⁰ C, which creates high humidity, reaching 90% in the rainy season.

The dry season, with the Harmattan wind, occurs between late December and late February.

3.4 Population of the Study

Population is the total of a particular group or class from which a study sample is obtained. Looking at a huge population size, a sampling method was used to select respondents. However, because of result validity and generalization in qualitative research, it is considered that the bigger the size of sample, the bigger the chance of achieving the aim of the study without biased (O'Leary 2013:120).

The population of study is 330 professionals in the construction industry and their information gotten from the directory of different professional bodies in Owerri, Imo State which includes Nigerian Institute of Architects (NIA) 86, Nigerian Society of Engineers (NSE) 120, Nigerian

Institute of Quantity Surveyors (NIQS) 65, and Nigerian Institute of Builders (NIOB) 59 professionals.

3.5 Sampling Techniques and Sample Size

Because of the nature of construction industry and its complexity in operations, geographical circulation and management, it is seen that construction professionals have been very busy; and construction professionals in Imo State Nigeria, were selected using “simple random sampling method and convenience sampling method”. A simple random sampling is a subset of people selected from a larger population for collection of data and result generalization (Biggam 2015:25). Many other authors went ahead to explain that a simple random sample is not a biased surveying method. Taking into account the availability of professionals in the construction industry due to their schedule, the questionnaires were distributed by hand and electronic means to professionals in Imo State construction companies. The simple random sampling technique was used in this stage of questionnaire distribution in order to generalize the findings easily.

The sample size was determined from the population of the construction professionals which includes the architects, quantity surveyors, engineer and builders in Imo State, and calculated using the Slovin’s formula:

$$n = \frac{n^1}{[1+ n^1/ N]}$$

Where:

N = total population

n = sample size from finite population

$n_1 = \text{sample size from infinite population} = S^2/V^2;$

S^2 is the variance of the population elements and

V is the standard error of sampling population. (Using $S = 0.5$ and $V = 0.06$)

Therefore, $n^1 = (0.5)^2 / (0.06)^2 = 69.44$

Thus, the sample sizes of the various professionals are shown below:

Architects

$$n = 69.44 / (1 + 69.44/86) = 38$$

Engineers

$$n = 69.44 / (1 + 69.44/120) = 44$$

Quantity Surveyors

$$n = 69.44 / (1 + 69.44/65) = 36$$

Builders

$$n = 69.44 / (1 + 69.44/59) = 32$$

A breakdown of the sample is presented in Table 3.1

Table 3.1

Sample Size

S/N	Professionals	Population (N)	Sample Size (n)
1	Architects	86	38
2	Engineers	120	44
3	Quantity Surveyors	65	36
4	Builders	59	32
Total		330	150

Research Survey, 2026

3.6 Data Collection

Data collection procedure shows the outline to be followed when administering the research questionnaire. Questionnaire was introduced to respondents by explaining the purpose of the survey. Questionnaires was administered to the professionals in the construction firms in Owerri, Imo state by hand and through electronic mail to collect data for the study. This improved the response rate and increased reliability.

3.6.1 Source of Data

Data for the study is both primary and secondary data. The primary data was emanated from the field survey using well-structured questionnaire.

The secondary data for the study were generated ranging from text books, journals, articles, seminar papers and dissertation.

3.6.2 Instrument for Data Collection

According to Adler & Clark (2017), instrument for data collection is questionnaires which contains questions designed to source information respondents. Flick (2011:40), was of the opinion that research questions may be seen from different ways but have to address issues relevant to the study. The questionnaires consist of two sections. The aim of the first section is to obtain preliminary information about respondents such as names of respondents, age, and academic qualification etc. The second part of the questionnaires is 4-point Liker scale to obtain the opinion of the respondents.

3.7 Reliability and Validity of Instrument

Reliability is the ability of a particular measuring instrument to yield similar result when applied to the same situation at different times (Anyanwu 2011).

The test was carried out to determine the reliability of instrument. Validity is the extent to which a measuring instrument on application performs the function for which it was designed (Onwumere 2010), validity is obtained by the rate of provision of correct response from sample objects by the relevant research design or research instrument. To determine the instrument validation, content validity was used, where the researcher put the instrument to face validity by issuing it to two professionals in construction firms in Imo State who examined the items to ensure they were in line with the study objectives. The questionnaire was structured in the light of their corrections. The research instrument was structured in such a way as to reduce the effect of errors like inconsistency and ambiguity.

3.8 Data Analysis Tool/ Techniques

The quantitative data were analyzed using Statistical Package for Social Science (SPSS) and Microsoft excel software. Information obtained from the respondents were summarized using descriptive statistics such as percentages. Chi-square was used to test the hypothesis. The opinion of the respondents was ascertained using inferential statistics such as relative important index.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS/ INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction/Preamble

This chapter presents the collected data and the presentation of analyzed data and information which were collected in the field during survey, relevant literatures ranging from textbooks, journals, articles, seminar papers and dissertation.

The chapter goes on to present the interpretation and discussion of findings in respect of impact of work environment on construction skilled workers. The data were presented according to the order in which they were arranged in the research questions, simple percentage and pie graphs were used to analyze the demographic information of the respondents while spearman rank correlation was adopted to test the research hypothesis.

4.2 Data Presentation

Data for this research were presented in table 4.1 below which shows the number of questionnaires administered, retrieved and analyzed.

4.3 Data Analysis/ Interpretation

4.3.1 Questionnaire Administration and Response Rate

Table 4.1

Questionnaire Administration and Response Rate

Questionnaires Administered Through Electronic Mail to The Respondents			
Profession of Respondents	No. of questionnaire Administered	No. of questionnaire Returned	No. of questionnaire Analyzed
Architects	20	16	11
Engineers	30	15	9
Quantity Surveyors	22	23	15
Builders	18	10	8
Sub-Total 1	90	64	43
Questionnaires Administered in Person to The Respondents			
Architects	17	7	5
Engineers	18	5	4
Quantity Surveyors	15	8	7
Builders	10	4	3
Sub-Total 2	60	24	19
Grand Total	150	88	62

Research Survey, 2026

The sample of 150 employees was taken and One Hundred and fifty (150) questionnaires were distributed to respondents/employees through electronic mail, and in person by hand for the purpose of collecting data. Ninety (90) questionnaires were administered through electronic mail to the respondents, out of which Sixty-four (64) questionnaires were returned and Fourty-three (43) questionnaires were duly completed, retrieved and analyzed. A total of Sixty (60) questionnaires were administered in person by hand, Twenty-four (24) questionnaires returned and Nineteen (19) questionnaires were completed, retrieved and analyzed. The total of Sixty-two (62) questionnaires were duly completed, retrieved and analyzed.

4.3.2 Analysis of Respondent Characteristics

The respondents that completed the questionnaires were drawn from construction Professionals in Owerri Imo State.

4.4 Bio data of Respondents

Table 4.2

Respondent's Gender

Respondents	Frequency	Percentage(%)
Male	40	65
Female	22	35
Total	62	100

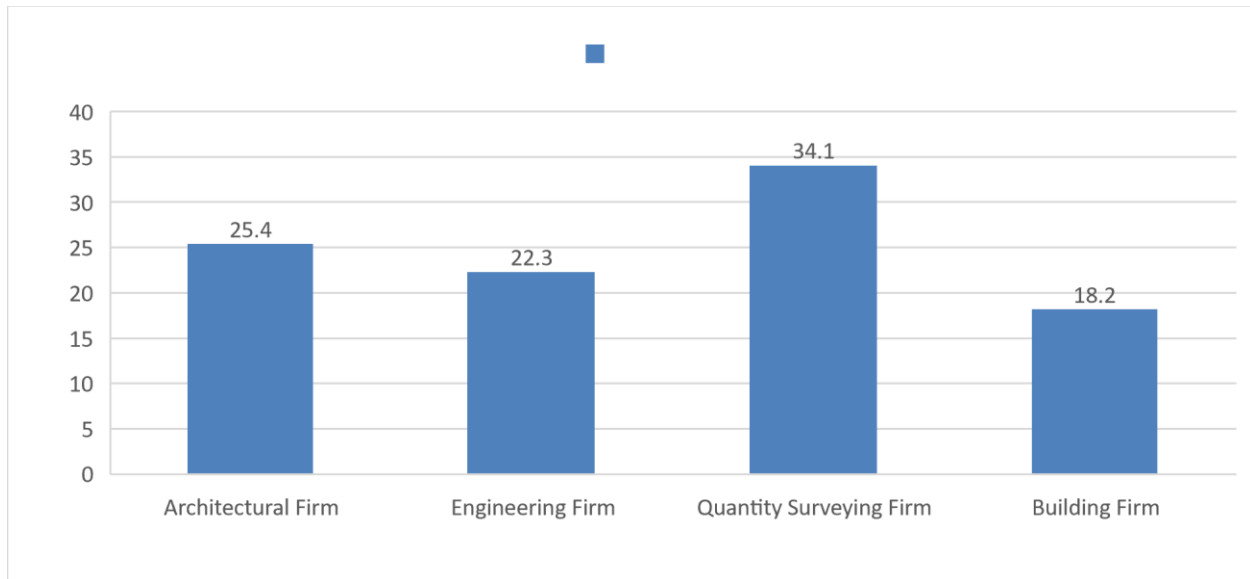
Research Survey, 2026

Table 4.2 above shows the gender distribution of the respondents used for this study.

40 respondents which represent 65% of the population are male while the remaining 22 respondents which represent 35% of the population are female.

Figure 4.1

Participants' firms



Research Survey, 2026

Figure 4.1 shows that, participants' firms include architectural firms (25.4%), engineering firms (22.3%), Quantity Surveying firms (34.1%), Building firms (18.2%). Hence, the respondents were able to provide valid and reliable information based on the knowledge acquired from different firms.

Table 4.3

Respondent's Age Group

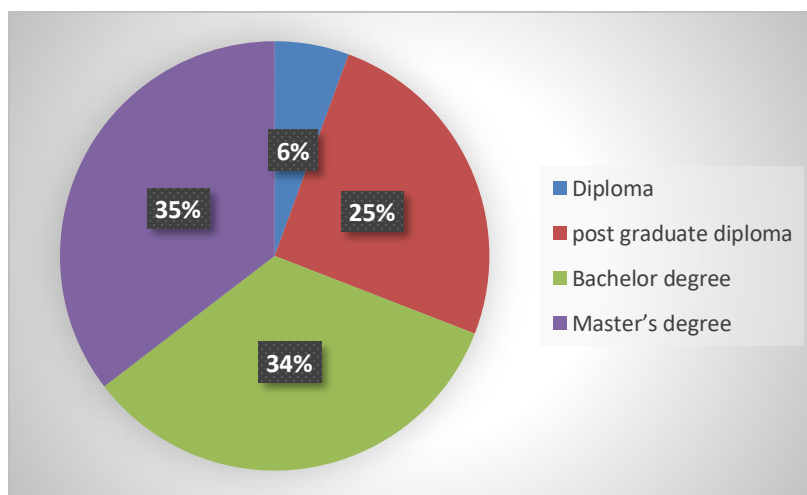
Age group	Frequency	Percentage (%)
20-30 years	10	16.1
31-40 years	12	19.4
41-50years	15	24.2
50 and above	25	40.3
Total	62	100

Research Survey, 2026

The 50 years and above group constituted 40.3% of respondents and was highest number of respondents followed by 41-50 years with 24.2% and then 31-40 years which made up 19.4% of the respondents. The lowest number of respondents was within the 20-30years group which made up of 16.1% of respondents.

Figure 4.2:

Educational Qualifications of the Respondents



Research Survey, 2026

Figure 4.2 presents the educational qualification of the respondents. The study survey shows that 5.6% of the respondents hold Diploma, 25.3% of the respondents hold Post graduate diploma, 33.7% of the respondents holds Bachelor’s degree, and 35.4% of the respondents has Master’s degree. Therefore, the respondents are educated and qualified to provide a reliable fact.

Table 4.4

Experience of respondents in the construction industry

Category	Frequency	Percentage
1 - 5 Years	5	8.1%
6 - 10 Years	10	16.0%
11 - 15 Years	12	19.40%
16 - 20 Years	15	24.2%
20 Years above	20	32.30%
TOTAL	62	100%

Research Survey, 2026

Table 4.4 shows the work experience of respondents in the construction sector. The table presents 8.1% of the respondents have 1- 5 years and less work experience in the construction industry and 16.0% of the respondents have 6-10 years’ work experience in the construction industry, Nonetheless, this inference does not imply that the inputs of the respondents with less than 10 years’ work experience is not significantly reliable for this research study.

Table 4.5**Factors Affecting Construction Skilled Workers Productivity**

Environmental Factors affecting construction Skilled workers productivity	RII	Rank
Dispute among workers	0.789	1 st
Poor weather condition	0.767	2 nd
Plants and equipment failure	0.748	3 rd
Change in orders during project execution	0.707	4 th
Major rework due to unpredicted conditions	0.704	5 th
Obsolete machines for site operations	0.681	6 th
Lack of motivating vehicles for construction workers	0.667	7 th
Poor lightning	0.663	8 th
Lack of free clinical offices for construction workers	0.644	9 th
Accidents and Injuries	0.632	10 th
Lack of skill acquisition platforms for workers	0.620	11 th
Overcrowd of workers on site	0.612	12 th
Delay in supply of materials to site	0.550	13 th

Lack of free/subsidized transportations for workers	0.542	14 th
Lack of issuance of preparing certificate for workers	0.532	15 th
Lack of free food vouchers for workers	0.521	16 th

Research Survey, 2026

From Table 4.5 above, the results of the ranking show that Noise Dispute among workers ranked high with relative important index of 0.789, following by Poor weather condition with relative importance index of 0.767, followed by Plants and equipment failure with relative important index 0.748, the least factor was Lack of free food vouchers for workers which ranked 0.521.

Figure 4.6

Project Delivery Productivity Factors

Project Delivery Productivity Factors	RII	Rank
Time	0.707	1 st
Cost	0.704	2 nd
Quality	0.681	3 rd
Client Satisfaction	0.667	4 th
Risk management	0.663	5 th
Change Management	0.644	6 th
Team performance	0.632	7 th
Communication	0.620	8 th
Stakeholder Management	0.612	9 th

Innovation and Creativity	0.550	10 th
Sustainability	0.542	11 th

Research Survey, 2026

Figure 4.6 shows the responses of respondent on project delivery productivity factors, time rank high with relative important index 0.789, followed by cost with relative important index 0.767 and quality with RII 0.748, the least was Sustainability which ranked 0.542

Table 4.7

Job incentive towards skilled labour’s productivity

Responses	Frequency	Percentage (%)
Strongly agree	20	32.3
Agree	15	24.2
Undecided	12	19.3
Disagree	10	16.1
Strongly disagree	5	8.1
Total	62	100.0

Research Survey, 2026

Table 4.7 shows the responses of respondent that job incentive influence labour productivity. 20 respondents representing 32.3% strongly agree that job incentive influence construction skilled worker’s productivity, 15 respondents representing 24.2% agree that job incentive influence construction skilled worker’s productivity. 12 respondents representing 19.3% were undecided. 10 respondents representing 16.1% disagrees that job incentive influence construction skilled worker’s productivity while the remaining 5 of the respondents representing 8.1% strongly disagree that job incentive influence construction skilled worker’s productivity.

Table 4.8**Contribution of construction supervisors to worker's productivity**

Responses	Frequency	Percentage (%)
Strongly agree	23	37.1
Agree	17	27.4
Undecided	11	17.7
Disagree	7	11.3
Strongly disagree	4	6.5
Total	62	100.0

Research Survey, 2026

Table 4.8 shows the responses of respondent that construction supervisors have impacts on labour productivity. 23 respondents representing 37.1% strongly agree that construction supervisors have impacts on labour productivity, 17 respondents representing 27.4% agree that construction supervisors have impacts on labour productivity. 11 respondents representing 17.7% were undecided. 7 respondents representing 11.3% disagrees that construction supervisors have impacts on labour productivity while the remaining 4 of the respondents representing 6.5% strongly disagree that construction supervisors have impacts on labour productivity.

4.5 Test of Hypothesis

The hypotheses set out in chapter one of this study were tested and validated using the Chi-square (χ^2) test statistic. The frequency table comprises of actual and expected frequencies. The expected frequency is calculated using the method below:

$$E_{ij} = \frac{R_i C_j}{N}$$

Where E_{ij} = expected frequency of the cell in the i th row and j th column.

R_i = marginal frequency of row i

C_j = marginal frequency of column j

N = summation of all the frequencies in columns and rows.

Thus, the Chi – Square (X^2) statistic as computed $X^2 C$

$$= \frac{(O - E)^2}{E}$$

Where O = Observed frequency

E = Expected frequency

The degree of frequency calculated by the formula:

$$Df = (C - 1) (R - 1)$$

Where Df = Degree of freedom

R = Number of rows

C = Number of columns

The test is conducted at 95% confidence limit and 0.05 level of significance.

The hypothesis test is done by specifying the decision criteria. We specify that the analysis of data at 0.05 level of significance is that:

If $X^2 \text{ Cal.} > X^2_{0.05} (df)$

Reject null hypothesis H_0 and accept alternate hypothesis H_a .

Where $X^2 \text{ Cal.}$ represents the calculated Chi-Square value and $X^2_{0.05} (df)$ represents the critical value of the Chi-square obtained by the use of the Chi – Square distribution.

The null hypothesis shall be rejected and the alternate accepted if the calculated value exceeds the critical value.

Hypothesis I

Ho: There is no significant relationship between work environment and worker's productivity

This will be tested, as shown in tables 4.9 below.

Response	Frequency	Percentage
Increase	38	61
Decrease	24	39
Total	62	100

COMPUTATION OF CHI – SQUARE

Response	Observed	Expected	Percentage
Increase	38	31	61
Decrease	24	31	39
Total	62	62	100

$$X^2 = \frac{(O-E)^2}{E}$$

Where O = Observed frequency

E = Expected frequency

X²=chi-square

$$X^2 \text{ cal.} = \frac{(38 - 31)^2}{31} + \frac{(24 - 31)^2}{31}$$

$$\begin{aligned}
 & 62 \quad 62 \\
 & = 0.79 + 0.79 = 1.6
 \end{aligned}$$

The chi square statistic ($\chi^2 = 1.6$), our predetermined alpha level of significance (0.05), and our degrees of freedom ($df = 1$). This is smaller than the conventionally accepted significance level of 0.05, so the null hypothesis is rejected.

Hypothesis 2

Ho: There is no significant relationship between incentive measures and worker's productivity

This will be tested, as shown in tables 4.10 below.

Response	Frequency	Percentage
Increase	38	61
Decrease	24	39
Total	62	100

COMPUTATION OF CHI – SQUARE

Response	Observed	Expected	Percentage
Increase	40	31	65
Decrease	22	31	35
Total	62	62	100

$$\chi^2 = \frac{(O-E)^2}{E}$$

Where O = Observed frequency

E = Expected frequency

X²=chi-square

$$X^2 \text{ cal.} = \frac{(40 - 31)^2}{62} + \frac{(22 - 31)^2}{62}$$

$$= 1.31 + 1.31 = 2.6$$

The chi square statistic ($x^2 = 2.6$), our predetermined alpha level of significance (0.05), and our degrees of freedom (df =1). This is smaller than the conventionally accepted significance level of 0.05, so the null hypothesis is rejected.

The null hypotheses were rejected, indicating that “there are significant relationship between work environment and workers’ productivity”, and also that “there is significant relationship between incentive measures and construction workers’ productivity”.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Preamble

This is the chapter that shows the summary of the research study, this include conclusions, and recommendation of the research as well as the area of further studies.

5.2 Based on the data analysis and interpretation in the previous Chapter, the following are the summaries of findings:

5.2.1 To appraise the construction environmental factors that influence the productivity of construction skilled workers

This objective was achieved through the review of literature, administration of survey questionnaires to construction professionals. The following factors such as noise, dispute among workers, poor weather condition, plants and equipment failure were identified and they have strong effect on the productivity of construction skilled workers. Also, it was discovered that the physical environment of a workplace, such as temperature, lighting, and ergonomics, can have a significant impact on employee well-being and productivity. For example, a poorly lit or excessively hot or cold workplace can lead to discomfort and decreased productivity. The social environment of a workplace, such as the culture, communication, and relationships among employees, can also have a significant impact on employee well-being and productivity. This shows that it is the responsibilities of the organization to provide friendly work environment which will influence employees to work comfortably and perform their duties.

5.2.2 To evaluate project delivery productivity factors in Owerri, Imo State

This second objective was also achieved through the review of literature, a pilot study, administration of survey questionnaires to the respondents. The finding strengthened the proposition made by Kwefie, Aigbavboa & Thwala, (2020) that project delivery productivity is a measurement of how effective and efficient a project is delivered and how well it meets its objectives. this research pointed out the project delivery productivity factors. The following factors were identified: traditional productivity factors such as time, cost and quality, and emerging productivity factors which includes risk management, change management, team performance, communication, stake holder's management, innovation /creativity, and sustainability. Through the findings, these factors strongly affect construction projects delivery.

5.2.3 To assess the impact of incentive measures on skilled Labour's productivity

From the finding, the data presented and analyzed, it was revealed, that incentive programs must be considered if organizations want to remain competitive in its company. The study further discovered that the incentive measures used in the construction project such as performance bonus, discretionary bonus, gain sharing, profit sharing, pay car, insurance plan, education/ tuition reimbursement, vacation, sick leave and non-financial have strong impact on the construction skilled labour's productivity.

5.2.4 To examine the effect of construction supervisors on skilled worker's productivity

The last objective of this study was to find out the effects of construction supervisors on skilled labour productivity. The study discovered that the supervisors support workers to achieve great productivity by coaching, training, and human resource development, constructive feedback, and

the creation of a supportive work atmosphere. Secondly, a good supervision approach increases worker's motivation, job satisfaction, and engagement.

5.3 Conclusion

The findings of this study indicate that several significant factors of work environment influence construction workers' productivity. These factors include dispute among workers, poor weather condition, plants and equipment failure, changes in order during unpredicted execution, and major rework due to unpredicted conditions were identified among others and they have strong effect on the productivity of construction skilled worker's.

Furthermore, the study concluded that monitoring time, helps identify potential delays and take corrective actions, and project managers can significantly improve the chances of successful project delivery by effectively monitoring milestones, tracking deadlines, and adhering to the overall project schedule. In the other hand monitoring the actual cost tracking the expenses incurred on a project and comparing them to the budgeted amounts according to (Venkataraman & Pinto, 2023), have significant effects on project delivery. Quality of work performed is the predefined standards, criteria, and conditions that the project's deliverables must meet.

It was also concluded that incentive schemes used in the construction industry in Nigeria are of wide variety and different compositions. These incentive schemes impact workers differently and thus perform the function of motivating workers differently. Majority of the respondents are of the opinion that different incentive scheme used in construction industry increases employee

productivity. The ability to motivate high-productivity is getting highly important in today's competitive company's work environments.

The study further concluded that 37.1% of the respondent which represent the highest number of the participant were in strong agreement that construction supervisors have great impact on the productivity of construction skilled workers.

The study also revealed that workers will improve their productivity if the problems discovered in the cause of this research are handled by the construction firm's management.

5.4 Recommendations

In order to reduce the effects of work environment on the productivity of construction skilled workers in Imo State, the study recommends that:

1. There should be constant meetings with workers to air their observations to construction management to serve as a motivating factor to workers.
2. Construction firm's workers should also be advised on their relationships with their helpers.
3. The construction firms should have a good program for their workers in order to motivate them.
4. There should be good working condition for workers in order to boost their morale to work hard.

5.5. Areas for further research

The study recommends that further research on Assessment of the impact of work environment on the productivity of construction skilled workers in other States in Nigeria should be carried out.

5.6 Contribution to Knowledge

The research work contributes to knowledge by providing useful information about the work environment and its impact on the construction skilled workers productivity. The study equally provides an insight on how the effects of work environment on skilled workers productivity can be monitored and handled. This therefore, serves as a benchmark from which other researchers can carry out further studies.

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APPENDIX I

Department of Quantity Surveying

Imo State University, Owerri.

P.M.B. 2000

Imo State.

Dear Respondent

REQUEST FOR COMPLETION OF QUESTIONNAIRE

This questionnaire is designed to collect data for research on “**AN ASSESSMENT OF THE IMPACT OF WORK ENVIRONMENT ON THE PRODUCTIVITY OF CONSTRUCTION SKILLED WORKERS** ” and the information so provided are for purely academic research.

You are also assured of the confidentiality of any information provided in regards of this research work

Thanks for your cooperation and assistance rendered

Yours faithfully,

NWACHUKWU AKOBUNDU

(Research Student).

Supervisor: Mrs. Oha, Ezinne Jane – Department of Quantity Surveying Imo State University, Owerri, Imo State.

APPENDIX II

This study focuses on the AN ASSESSMENT OF THE IMPACT OF WORK ENVIRONMENT ON THE PRODUCTIVITY OF CONSTRUCTION SKILLED WORKERS. Please note that your responses are confidential and anonymous as you are not required to indicate your name. The questionnaire will be purely for academic purposes. Kindly answer all questions to the best of your knowledge.

SECTION A: DEMOGRAPHIC INFORMATION

Please tick or fill in the blanks to the question below;

1) What is your gender?

Male Female

2.) What is your firm?

Engineering Firm

Quantity Surveying Firm

Architectural Firm

Building Firm

3) What is your age?

Below 20 years 21-30 years 31-40 years 41-50years 51-60years above 60years

4.) What is the highest Qualification attained?

Diploma Post Graduate Diploma Bachelor Degree Honours Degree

Master's Degree

5) For how long have you worked in the construction industry?

1-5 years 6-10 years 11-15 years 16-20 20 Years above

SECTION B:

PART I: THE VARIOUS FACTORS AFFECTING CONSTRUCTION SKILLED WORKER'S PRODUCTIVITY

Please indicate the extent to which you agree or disagree with each statement by

Placing a tick where appropriate using the following 4-Point Likert scale: In Parts **I,**

II, III and IV

Environmental Factors affecting construction Skilled workers productivity	4	3	2	1
Dispute among workers				
Poor weather condition				
Plants and equipment failure				
Change in orders during project execution				
Major rework due to unpredicted conditions				
Obsolete machines for site operations				
Lack of motivating vehicles for construction workers				
Poor lightning				
Lack of free clinical offices for construction workers				
Accidents and Injuries				
Lack of skill acquisition platforms for workers				
Overcrowd of workers on site				
Delay in supply of materials to site				

Lack of free/subsidized transportations for workers				
Lack of issuance of preparing certificate for workers				
Lack of free food vouchers for workers				

PART II: VARIOUS PROJECT DELIVERY PRODUCTIVITY FACTORS

Please indicate the extent to which you agree or disagree with each statement by placing a tick where appropriate using the following 4-Point Likert scale: In Parts **I, II, III** and **IV**

Project Delivery Productivity Factors	4	3	2	1
Time				
Cost				
Quality				
Client Satisfaction				
Risk management				
Change Management				
Team performance				
Communication				
Stakeholder Management				
Innovation and Creativity				
Sustainability				

PART III: DOES JOB INCENTIVE INFLUENCE SKILLED LABOUR'S PRODUCTIVITY

(a) Strongly Agree [] (b) Agree [] (c) Undecided [] (d) Disagree [] (e) Strongly Disagree

PART IV: DOES CONSTRUCTION SUPERVISOR HAS IMPACT ON WORKER'S PRODUCTIVITY

(a) Strongly Agree [] (b) Agree [] (c) Undecided [] (d) Disagree [] (e) Strongly Disagree

THANK YOU!!!!!!!!!!!!