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ASSESSMENT OF SKILLED WORKERS SHORTAGES IN THE CONSTRUCTION INDUSTRY IN FEDERAL CAPITAL TERRITORY (FCT), ABUJA

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ABSTRACT

This study on Assessment of Skilled Workers Shortages in the Construction Industry in Federal Capital Territory (FCT), Abuja was guided by four research objectives, three research questions and three research hypotheses. Descriptive survey research design was adopted for the study. The study had a total population of 934 respondents drawn from professional and skilled workers in the construction industry. Proportionate Stratified random sampling technique was adopted for the study. A total of 282 respondents were sampled using Krejcie and Morgan sample size determination table. The instrument used for gathering data for the study was a structured questionnaire. The instrument was validated by three experts. The reliability of the instrument was established using Cronbach Alpha statistical tool to determine the reliability index of 0.83. A total of 282 copies of the instrument were administered to the respondents, however, 264 copies were returned filled. This brings the percentage return rate to 93.62%. Mean and standard deviation statistical tools were employed to analyze the four research questions. While t-test statistical tool was used to test the null hypotheses at 0.05 level of significance. The findings of the study revealed among others that skilled workers are insufficient in the construction industry in FCT, Abuja. It was therefore, recommended that Construction firms and other associated ones from both public and private sectors should invest in training, research and development of their employees cutting across various skill needs of the construction industry for effective project delivery in Abuja and the country at large.

KEYWORDS: Skill, Skilled Worker, Shortage and Construction Industry.

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I. INTRODUCTION

Nations are rated base on their infrastructural development and the power of their income. Construction industries provides houses to accommodate human being with their properties, roads to easy movement, Dams to store conserve water for power generation or for agricultural irrigation for food production etc. All these infrastructures require the use of skilled workers by the construction industries to effectively provides all these services.The continuous development of the construction firms and their products is an important factor for the provision of employment and reduction of poverty in Nigeria. However, for such to occur, necessary skills in term of professional, business and managerial skills are required not only to improve productivity of workforce but also for overall performance of construction projects (Construction Industry Development Board, 2021). Construction Industryis a company that specialized in the construction of houses, roads, bridges, dams and infrastructural facilities for the comfort of mankind. In other word according to CURT, (2014) define construction Industry as an industry involves all activities in the construction of buildings, roads, bridges, railways etc. and maintenance and repairs of the same. Construction industry from time immemorial, is a sector that provides infrastructural facilities for the services and comfort of mankind. It also contributes about 5% of Nigerian Gross Domestic Product (Olaloku, 2024).

In a survey study by Windapo, (2021) in which employers of labor were asked about the possible effect of skills shortages on their organizations, 82% concluded that it would reduce their competitiveness and productivity, while 75% agreed that it would drastically reduce their ability to provide necessary services for their clients. The inadequate and lack of basic skills in the construction industry is threatening the future of the industry and will continue to do so especially when there is increase demand for construction products (Creamer, 2023). As the demand for construction products and services are increasing, the problem of skills shortages is growing due to high number of senior employees with adequate skills, and low number of younger ones to take over from them. There is a need for technical, business, managerial and other forms of skills for Artisans, Craftsmen, Technicians, Technologist and Professionals for the construction industry to be successful. Nigeria as a developing country with rapid growing population and various infrastructural development, requires skilled workers to carry out various task in a construction site for efficient and effective project delivery. Skilled workers are any individual who has special knowledge and experience to practically carry out specific task in the construction industry. Musa, (2021) define skilled workers as a person with a requisite practical knowledge to undertake task or assignment given to him/her in the construction industry. In the construction industry, skilled workers such as Block/bricklayer, Carpenters, Painters, Electricians, Welders, Plumbers, Plant operator among others form a large part of the site labour force whose input determine to a great extend the quality and success of the industry’s product (Akinluyi & Adeleye, 2020).

At present time, there is a decline in the performance of skilled workforce in construction project sites, whereby the old age method of locally organized apprenticeship scheme is becoming outdated (Awasthi, 2021). The aged and retiring site operatives are not wishing that their children take to their trades, rather, their goals are for their children and wards to become consultants such as project managers, architects, quantity surveyors and engineers (Ireland, 2020). Need for having skilled workers to execute quality project in the construction industry cannot be overemphasis due to the fact that no construction industry exists without the services of a skilled workers who are capable to carry out task for the success of the construction industry. Therefore, need to have sufficient trained skilled

workers to handle task in the construction industries is paramount for the overall sustainability of the industries. The desire for sustainable construction challenges has been on the increase and one of the major challenges identified is the inadequacy of skilled workforce to understand and execute projects in line with sustainable goals (Ayodejioke, Clinton, & Tshinakaho, 2018). It is pertinent to ask the question, "Why this challenge still continues?" despite the numerous complaints in the industry regarding the shortage of skilled labor, projects continue to be built. The skills shortage however is not only high in the business sector, there are also shortages in the technical sector such as engineering, architecture and construction skills, which are necessary at both pre-construction, construction and post-construction phases of infrastructural projects.

It becomes clear that action is required when one considers that the shortage persists despite all of the resources invested in scores of different programs over the last two decades in an effort to improve recruitment, training, and retention in the construction industry (Borcherding, Glover, Haas & Tucker. 2019). The construction industry consists of complex organizations experiencing swift changes, with diversified offerings, that are widely distributed and require a variety of skilled workers. One of the major challenges in the construction industry includes recruiting and passing critical knowledge to the next generations (Sowers & Wooddy, 2018). There have been multiple reasons for worker shortages in the industry, including retirement and workers moving out of the industry. There are existing initiatives to reduce the impact of skilled worker shortages, but most of the research has focused on increasing the skill levels of the existing workforce through training (Albattah, Goodrum, & Taylor, 2019). Therefore, this research work focuses on exploring and reporting strategies for reducing skilled workers shortages in the construction industry. Specifically, the study looked into construction industries in Federal Capital Territory Abuja been the hub of construction with diverse infrastructural development as the fastest growing city in Nigeria to find out possible strategies to mitigate skilled workers shortages in the construction industry.

Statement of the Problem

Construction industries plays a vital role in overall development of a Nation. It requires trained skilled workers to execute construction project. The industry is witnessing a great deal of skilled workers shortages thereby slowing down construction work and or project delivery at the stipulated time. What could be responsible for these inadequacies in the construction industries? Skilled workers are the bedrock of any construction industry as they are trained in different field of the industry ranging from Bricklayers/Masonry, Carpentry/joinery skill workers, Iron benders, Painters, Electricians, Plumbers, Machine operators etc. Are these skilled workers sufficient for the construction industries? Okuntade, (2020) observed that no accurate statistics of trade skill-gap in the construction industry, however, the poor quality of projects deliveries can be attributed to the dwindling stock of competent skilled construction workers and the influx of unskilled, inefficient and dissatisfied workers who see the sector as a last resort.

Nigerian construction industry requires skilled workers such as bricklayers, carpenters, painters, electricians, welders, plumbers, plant operators among others, which form a larger part of the site labour force whose input determine to a great extent, the quality of the industry's products (Akinluyi & Adeleye, 2020). Nigeria as a developing country with rapid growing population and various housing scheme programme such as; National Housing Policy of Nigeria, Report of the Vision 2020 National Technical Working Group on Housing, as well as publications from UN-Habitat, Musa *et al.* (2021) asserted that, these programmes

require the services of skilled workers on construction sites for an efficient and effective projects delivery.

Federal capital Territory Abuja been the fastest growing city with diverse infrastructural development, requires the services of skilled workers to execute and deliver quality project. The desire for sustainable construction challenges has been on the increase and one of the major challenges identified is the inadequacy of skilled workforce to understand and execute projects in line with sustainable goals (Ayodejioke, Clinton, & Tshinakaho, 2018). On the other hand, contractors are generally not satisfied with the level of construction productivity due to apparent poor performance of skilled workers (Forcada, Macarulla, Fuertes, Casals, Gangolells, & Roca, 2019). It is pertinent to ask the question, "Why is it that this challenge has not been overcome till date? Albattah, Goodrum, and Taylor, (2020) observed that there are existing initiatives to mitigate the impact of skilled worker shortages, but most of the research has focused on increasing the skill levels of the existing workforce through training. It is against this backdrop therefore, that this research work sought to look into the causes and possible strategies to mitigate the impact of skilled workers shortages in the construction industries in the Federal capital Territory (FCT), Abuja been the hub for construction industry in Nigeria.

The aim of this study is to assess the Skilled Workers Shortages in the Construction Industries in Federal Capital Territory (FCT), Abuja, Nigeria. Specifically, the study sought to;

1. Determine the areas of skilled workers' shortages in the construction industries in FCT Abuja, Nigeria.
2. Identify causes of skilled workers shortages in the construction industries in FCT Abuja, Nigeria.
3. Identify strategies to mitigate skilled workers' shortages in the construction industries in FCT Abuja, Nigeria.

Research Questions

The following research questions were developed to guide the study:

i. What are the areas of skilled workers' shortages in the construction industries in FCT Abuja, Nigeria?
ii. What are the causes of skilled workers shortages in the construction industries in FCT Abuja, Nigeria?
iii. What are the strategies to mitigate the impact of skilled workers' shortages in the construction industries in FCT Abuja, Nigeria?

Significance of the Study

The result of this study will be beneficial to professionals and skilled workers (Artisans, Craftsmen,Technicians and Technologist) in the construction industry, curriculum planners, researchers and policy makers in the following ways: -

This study will help artisans, craftsmen, technicians and technologist to identify the various employable skilled shortages in the construction industry, thereby creating an opportunity for the artisans, technicians and technologist to acquire the necessary skills needed for gainful employment and/or be self-reliance by creating jobs for self and others thereby reducing unemployment rate in the country.

Construction industry will derive benefit from the study in the area of monitoring, supervising and supporting the training of skilled workers in an effort to improve the training

of skilled workers in line with the construction industry's needs. The study will help curriculum planners to identify and incorporate the training needs require by the industry to effectively solve the problem of skilled worker's shortages in the construction industry through curriculum review of vocational, technical and skill acquisition centers in the country.

The study will be of benefit to researchers in education industry towards finding a lasting solution to the problem of skilled workers shortages in the construction industry. Thus, providing more sources of literature for educational researchers, if the study is published in journals and other research books. Policy makers and Nigeria at large will also derive benefits from the study by way of creating job opportunities for the citizenry and reducing the rate of unemployment which will in turn reduce the rate of crime and also improve the country gross domestic product (GDP).

Scope of the Study

The area of coverage for this research work is delimited to construction industries in the Federal Capital Territory, Abuja. The study covered six selected construction industry in Abuja. The trades selected for this study were Block/Bricklaying/Masonry, Carpentry/Joinery, equipment Operator; Iron workers, painting, Electrification, Tiling and Plumbing. These trades were selected because of their level of dominance in the building construction works. The construction industry that was used for the study include: Julius Berger Nigeria Plc, Plot 1179, Cadastral Zone B6, Mabushi, Dumez Nigeria Plc, Plot 3120 Rima Street, Maitama, Rome Construction Company Limited, Suite 24 Crown Plaza, Eke Ayesufu Close, Utako, Dantata & Sawoe Construction Nnamdi Azikiwe way, Garki, Setraco Building, Plot 526, Shehu Yar'Adua way, Kado, and R.C.C (Nigeria) Limited, Plot 741, Cadastral Zone B4, Obafemi Awolowo Way, Garki, Jabi, all in Abuja, FCT, Nigeria.

II. **LITERATURE REVIEW**

This chapter reviewed related literature to this study. They are reviewed under the following subheadings:

Theoretical Framework of the Study.
Extent of Skilled Workers Shortage in the Construction Industry in Nigeria.
Causes of Skilled Workers Shortage in the Construction Industry.
Areas of Skilled Workers Shortages in the Construction Industry.
Strategies to Mitigate Skilled Workers Shortages in Construction Industry.
Review of Related Empirical Studies

Theoretical Framework

The theoretical framework of this study was based on Sternberg's Theory of Practical Intelligence (2012) which stated that job creation in a firm should depend on the availability of workers (unemployment) and on the number of job openings in other firms (Congestion). The theory of practical intelligence is suitable for this research work, therefore, the review of literature for this study will be based on this theory. Sternberg, (2012), in the theory of practical intelligence, defined intelligence as the ability to achieve success in life based on one's personal standard and within one's socio-cultural context. The ability to achieve success depends on the ability to capitalize on one's strength and correct or compensate for one's weaknesses, success is attained through a balance of analytical, creative, and practical abilities, a balance that is achieved in order to adapt to shape and select environment. The theory of practical intelligence is presented in Figure 1.

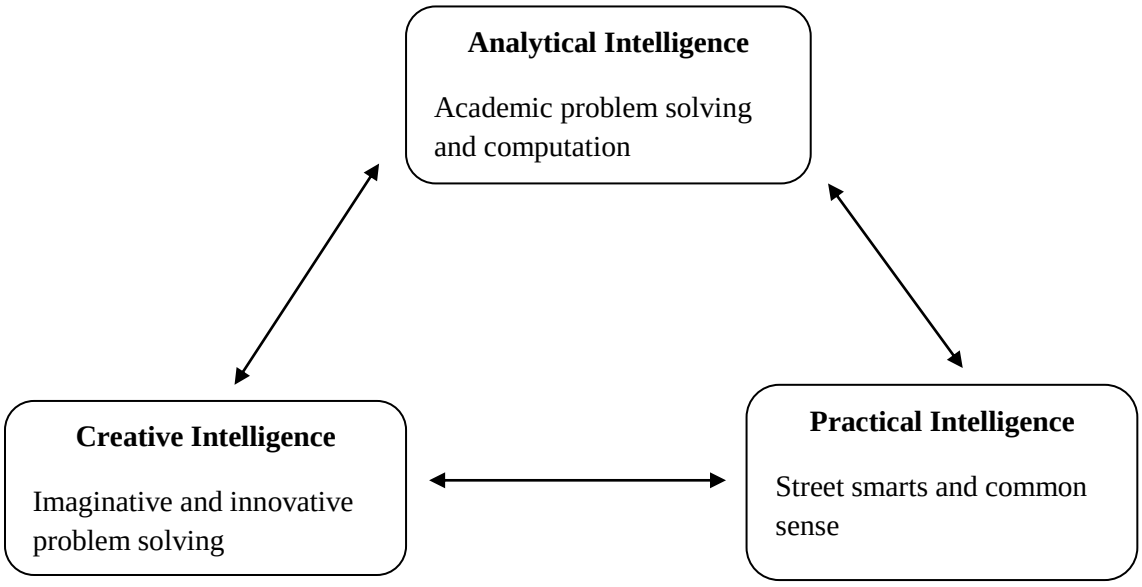


Figure 1*: Berg's Theory of Practical Intelligence (2012)*

Skills needed by employers are necessary precondition for avoiding skill shortages. One possible explanation of the existence of skill shortages is that they are consequences of poor understanding of skills need. Alternatively, skill needs may be self-evident, implying that skill shortages must either be a reflection of a supply-side failure, or that they reflect difficulties in matching supply to demand (or of course some combinations of these explanations) (Watson, Webb & Johnson, 2016).

Sternberg's theory of Practical intelligence has a direct application to this study in such a way that it lay emphasis on skill shortage as a reflection of difficulties in matching supply to demand which invariable affect the end product. He further stressed that in simple models, economists will talk of labour and capital being the two factors of production that are used to generate output for the purposes of profit maximization by the firm, with the implication that labour demand is derived from the demand for goods, subject to a given set of technologies. This can be seen in most construction industries that fail to equate skills needs and the end product find it difficult to deliver quality project.

The Theory of Performance (TOP) develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements (Auma, 2014). To perform is to produce a result with either a positive or negative outcome; a performer can be an individual or a group of people engaging in a collaborative effort to achieve certain goal (Aje et al., 2019). Developing performance according to Golini et al. (2018) is a journey, whereby level of performance describes location in the journey. According to Romero et al. (2014), current level of performance depends holistically on six (6) components which include; context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. These levels of performance are proposed for effective performance improvements through a performer's mindset, immersion in an enriching environment, and engagement in reflective practice.

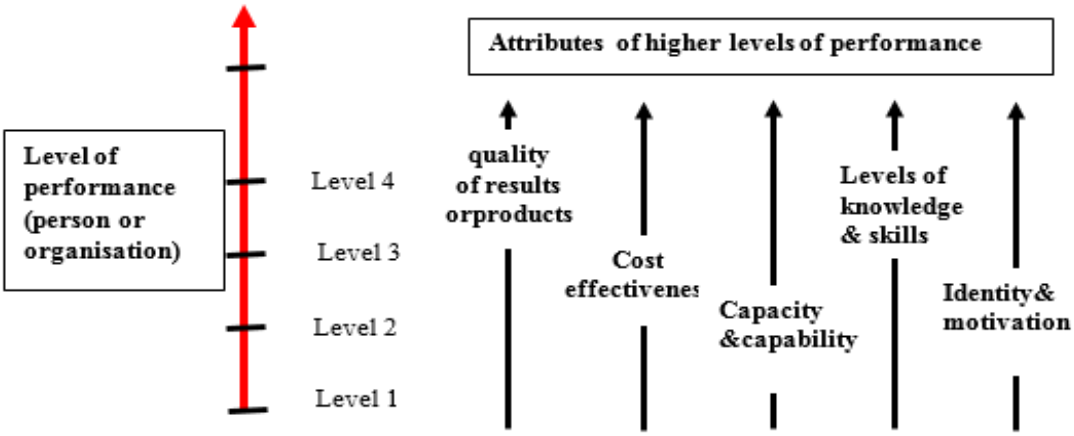


Figure 2:*Performance Advancing Through Levels*

Skilled Workers in the Construction Industry in Nigeria

The construction industry occupies a focal position in a nation's economy. It is an essential contribution to the process of development (Oseghale & Ata, 2018). The construction industry is a global industry known for its generation of jobs at different skill and professional levels. In terms of value of its output, its global market is reported to be around $1.5 Trillion as of today (The Ambekar Institute for Labor Studies, 2019). The construction industry contributes about 5 percent to the Gross Domestic product GDP in Nigeria (Olaloku, 2010). Kazier, (2011), affirmed that it contributes about 50% percent of Nigerian government expenditure. It therefore shows that the construction industry is crucial in National development. Modern construction is a complex, highly organized process. Not only is it a science and a commercial business, but it is a creative art. For the newest recruit to the mature craftsman of many years' experiences, it is a rewarding, often tough and demanding discipline. Every person employed within the construction process makes a direct contribution not only to the community in general but also to the nation at large (Ward, 2011**)**. In world labour market, construction workers are said to be over 100 million, constituting 6-7 % of the world labour force (The Ambekar Institute for Labor Studies, 2017).

In the construction industry employment is characterized by relatively high rates of attrition among subcontractors as well as waged workers, and this is manifested in periodic labour shortages Tucker, Bennett and Eickmann, (2001); Chan, Clarke, and Dainty, (2011); Erlich and Grabelsky, (2005); McGrath-Champ, Rosewarne, and Rittau, (2011). The findings of the Chartered Institute of Building, (2008) survey indicate that a shortage of Skills Labour continues to be a challenge for the construction industry. CIOB, (2008), predicted that this issue is likely to worsen as the demand for construction increases. The CIOB research findings indicate that people possessing crafts/trades and senior/middle Management skills are highly sought after. From time-to-time employers in a number of countries refer to the difficulties they have in recruiting labour of the requisite quality, even on occasion when the labour market is relatively slack. Yet academic work on this issue is relatively sparse and in particular little is known of the consequences of such situations. Despite the perceived importance of skill shortages in Nigeria, the literature addressing these issues is limited.

According to the Institute of Management and Administration cited in Olsen, Tatum and Defnall, (2022) the skilled craft shortage is not a shortage of workers rather it is a

shortage of adequately trained skilled and productive workers available for certain jobs. With the construction industry requiring some of the most highly skilled workforce to do some of the most dangerous jobs, replacement and recruitment proves to be difficult. Reasons that have been given for the skilled labour shortage include lack of training, an aging workforce, poor image of the workers, and an industry that does not appeal to many youths Slim, (2022); Dainty, Ison and Root, (2021); Tarnoki, (2022);Lill, (2020); Olsen, Tatum and Defnall, (2022). Healy, Mavromaras, and Sloane, (2021) opined that skill shortages are a complex labour market Phenomenon, and are related to business performance. They went further to state that Skill shortages are often portrayed as a major problem for the economies of many countries

Causes of Skilled Workers Shortage in Construction Industry

The challenge of skilled workforce shortage is a critical threat to the economic health of many nations around the globe. Medugu, Majid, Bustani, Bala, Abdullahi and Mbamali, (2021) mentioned that skilled labour shortage impact different areas of construction activities and impact on time, cost and quality of work. He opined that this may also endanger the achievement of financial prosperity for which such projects are conceived. Nigeria as a country undergoing economic reform needs a productive, competent, and flexible workforce to further her economic growth. Dantong, Lekjeb and Dessah, (2021). However, uncovered those skilled craftsmen shortage is not a shortage of workers rather it is a shortage of adequately trained, skilled, and productive workers available for certain jobs. Attar, Gupta and Desai, (2022) pointed out some reasons for such shortage as lack of training and retraining, an aging workforce, and the construction industry that does not appeal to young, potentially qualified manpower. Furthermore, an increasingly poor image over the last couple of decades has discouraged young people from seeing the construction industry as a viable career path. Ankrah, (2007) sees this as the most pressing issue in the nation's construction sector which is already having serious implications for both businesses and the economy generally.

In view of these, there is an urgent need of up-skilling construction skilled craftsmen in order to address the issues of poor workmanship. According to Bustani, (2021), the quality and availability of skilled workforce is considered an important factor towards the effectiveness of the construction sector. However, various reports have indicated the existence of shortages and poor quality of craftsmen in the Nigerian construction industry (Dantong, Lekjeb & Dessah, 2021; Long, Ajagbe, Khalil, & Suleiman, 2022a: Long, Perumal, & Ajagbe, 2022). Some reasons attributed for such shortages includes; aging of skilled craft workers in the industry, decline in the number of new entrants into skilled trades, poor funding and ineffective state of vocational education and training / retraining system in the country. Others include: poor image associated with construction labour as work done by less intelligent people, lack of commitment by government and the construction industry towards skills training. In addition, the development, introduction of new technologies and materials requiring higher skills among others (Awe, 2010; Bokinni, 2021; Darren, Mark & Christopher, 2022).

Lack of Organization Training and Retraining of Skilled Craftsmen

Training for capacity building is central to sustain economic growth and development because human capital is the greatest asset of any organization (Long et al., 2017a: Long et al., 2017b). Surprisingly, most construction firms in Nigeria are very narrow, because they seem to focus on the financial gains forgetting the people that make the job and money. Dantong (20) posit that these are among the multiple problems of craftsmen training as most

construction firms in Nigeria hardly discuss about how to improve the workforce but on how the workforce will improve them. Onuka, Ajayi and Kassim, (2022). portends that the absence of craftsmen training and retraining programme in an organization often manifests tripartite problems if incompetence, inefficiencies and ineffectiveness. Therefore, without a training policy provided by an organization the tripartite problems earlier mentioned will be imminent. Training and development should be viewed as veritable tools that help to improve the outdated nature of the construction industry in to a modern construction industry through updating of staffs and manpower development.

Aging of Skilled Workforce in the Industry

This is one of the greatest challenges currently facing the construction industry, as the current average age in trained craftsmen and artisans in the sector is between 45-50 years and fewer skilled workers are available to replace the aging workforce. Dantong, Lekjeb and Dessah, (2021) believes that if this trend is not checked, in the nearest future craftsmen and artisans that really worth their onion would have gone into extinction.

Rapid Change in Technology

The construction industry all over the world is experiencing rapid changes in technology. Dubem, Stephen and Oluwaseyi, (2022) views this reason is not far-fetched because of the ever-increasing sophistication in this age of computer technology which has made it compulsory for organization to meet changing situations with globalization in the construction industry and client demand. Okuntade (2020) highlighted that the construction industry all over the world have been adapting to the sporadic change in technology with skills acquisition programme to meet demands. Despite this change most construction companies in Nigeria are yet to adapt to this trend. This however, hast these has great constraints and influence on the workforce (Dubem, Stephen & Oluwaseyi, 2022). For the construction industry to be able to service the economy, it has to parade competent hands in its operation, which includes credible consultants and contractors with qualified and competent craftsmen (Dantong, Lekjeb & Dessah, 2021).

Poor Remuneration of Skilled Craftsmen

This is a major reason the construction industry is having problems of attracting and retaining skilled workforce. In Nigeria, there is no regulation guiding minimum wage for construction workers. Fagbenle, (2019) put forward those different wages are paid in across the country. This issue prompt construction worker to pursue another career or migrate to where they will be better remunerated. The nature of the construction industry is a contributing factor that makes it difficult for construction workers to join trade union. This informs the reason wages cannot be jointly negotiated, as it is in the case in government establishment. The workers in turn do not work with full loyalty in this respect (Fagbenle, 2019).

Lack of Motivation of Skilled Craftsmen

Human potential is boundless but it requires motivation in order to excel (Fagbenle, 2019; Dubem, Stephen, & Oluwaseyi, 2019). Motivation is an art of inspiring someone to work (Solomon et al., 2022). Ironically, majority of construction firms in Nigeria do not motivate their skilled workforce for improved productivity. Since lack of motivation has always resulted to high staff turnover in the industry. Fagbenle (2019) opine that motivation of skilled workforce can be achieved in many ways, but whatever method is adopted, it must

be realized that economic rewards must be among the chief consideration. It is therefore necessary that a sound wage policy is laid down with well-structured incentive and bonus plan. Ugheru, (2019) finds that other considerations to aid motivation include: financial incentives, promotion, job security, welfare package, and participation in decision making and among others.

Lack of Appeal to Young, Potentially Skilled Workers

The construction industry lacks appeal to young, potentially skilled workers which increasingly give poor image associated with construction labour as work done by less intelligent craftsmen (incompetent craftsmen). Darren, and Mark, (2021*)* thinks this is due to the inefficiencies which lead to poor workmanship that result to rework that brings about cost and time overrun. Poor image and career paths over the last couple of years has discouraged young people from seeing the construction industry as a viable career path. According to Awe (2019) the Nigerians youth no longer show interest in skill acquisition unlike the case in developed countries such as the UK where reports indicate that demand from young people for apprenticeships is outstripping the number of training places available in the industry.

2.3.7 Implications of Skill Shortages on Construction Industry

Rasool and Botha, (2011) opined that Construction industries currently are experiencing a drastic problem of shortage in skilled workers; this in turn has been a threat to the country's economy and her international participation. Shortage of skills has a significant effect on the socioeconomic growth and development of a country (Tshele, 2019).

In a study by Windapo, (2021) employers of labor were asked about the possible effect of skills shortages on their organizations, 82% concluded that it would reduce their competitiveness and productivity, while 75% agreed that it would drastically reduce their ability to provide necessary services for their clients. The inadequate and lack of basic skills in the construction industry is threatening the future of the industry and will continue to do so especially when there is increase demand for construction products (Creamer, 2023). As the demand for construction products and services are increasing, the problem of skills shortages is getting due to high number of senior employees with adequate skills, and low number of younger ones to take over from them. There is a need for technical, business, managerial and other forms of skills for artisans and professionals for the construction industry to be successful. For construction firms and contractors to attract skilled artisans and professionals, there is a need to improve on their welfare, increase their salaries and wages as well as improve on their total compensation (Tshele, 2019).

The construction industry is facing many risks ranging from tight delivery schedule imposed by clients, capacity constraints, financing related issues, among others. These and other projects' performance indices are affected by shortage of necessary skills (Utting, 2009), which affects the image of the industry and hinders the development of infrastructure in the country. The lack of adequate skills in the construction industry negatively affects the growth and development of Small Medium and Micro Enterprises (SMMEs). For emerging construction firms to be sustainable and develop in accordance to Construction Industry Development Board (CIDB)'s grading, adequate skills are required from their employees. However, the issue of skills shortages has resulted in high failure of emerging construction firms. Thwala and Phaladi (2019) stated that lack of skills leads to ineffective management strategies at the beginning or early stages of a project, which eventually lead to failure of construction projects.

It was further mentioned that owners face the challenge of good record keeping, poor contract documenting skills, and they lack the ability to employ workers with adequate skills. Some effects of selecting and using unskilled workforce in the construction industry have been identified by previous studies (Tshele 2019, Bokinni, 2021 & Bilauetal, 2019). Contractors often experience cost over runs and delays in of construction projects and where such projects are completed to time and cost, the issue of poor quality is a major concern. Makhene and Thwala, (2015) noted that construction industry often experiences workforce shortages, which in turn cost both contractors and other stakeholder's resources relating to time and money. It was further noted that after the completion of such projects, the final product is not of good quality. Furthermore, the productivity of work is deteriorated when working with unskilled workforce (Bilau, Ajagbe, Kigbu & Sholanke, 2019).

Increases in infrastructure spending since 2003 have seen a steady increase in the number of jobs as well as skills shortages that accompany such increases (Kraak, 2018). Mores so, it usually takes a longer time to complete a project than the estimated time when the workforce has inadequate skills necessary to perform the work. This implies that the more unskilled workers are involved in the project, the more time it takes to complete such project. It has been opined that contractor experiencing a shortage of skills in artisans suffer dramatically from time overruns and project delay (Tshele, 2019). The problem of skills shortage in the construction industry has affected the quality and productivity of construction projects over the years (Windapo, 2018). More so, Utting, (2019) explained that the shortage of skills has put pressure on the construction industry and as a result, the industry is struggling to meet the service demands that are drastically increasing.

The boom in project demand by clients is putting pressure on the construction industry and the industry is struggling to meet increasing demand for its services (Creamer, 2023). Rework is another effect of adopting unskilled workforce in the construction industry, and it is because of poor quality of workmanship and low productivity. Skills shortage can lead to rework as a result of inadequate supervisors, foremen and tradesmen ratios, low skilled level of labors, unclear instructions from supervisors, non-compliance with given specifications and poor co-ordination of resources (Mbeki,2021 & Herrington, 2022). Enterprise failure, which is common in emerging construction firms, is another result of skills shortage. Small Medium and Micro Enterprises (SMMEs) experience high failure when there are inadequate managerial, business and technical skills by managers and employees.

Herrington, Kew, & Kew, (2019) opined that lack of training and education has led to the reduction of management capacity in emerging firms in the country. However, lack of managerial skills and adequate training are major causes of enterprise failure (Rasool, 2019). This is one of the reasons for low level of entrepreneurial conception and the high failure rate of new emerging construction firms in Nigeria. Skills shortage reduce the profits and organizational competitiveness of construction companies (Tshele, 2019), this is because the current workforce with the adequate skills in the industry begins to have higher expectations and demand higher salaries, wages, recognition, compensation and organizational costs (Utting, 2019).

Construction industry is a people oriented one with the presence of various forms of skilled to unskilled labor. These people are multidisciplinary but their focus is to deliver their services to enhance sustainable project performance for the satisfaction of clients and other stakeholders. The shortage of necessary skills in the industry has been on the increase as observed from reviewed literature materials, which prompt this study to examine the strategies of the phenomenon on sustainability of construction project and the industry at large. Skills shortage in the construction industry leads to such issues as project cost increase,

project delay, reduction in quality, and increase in number of accidents on site, rework and low productivity of workforce. Other effects include reduction in organization's competitiveness, complete failure of the enterprise failure, rise in construction workers' pay and decrease in the number and size of building and construction labor sector. The availability of necessary construction skills affects the success of project in terms of sustainability, quality, cost, time, health and safety as well as satisfaction of stakeholders.

Labour is a major component of construction work in Nigeria. Unlike in developed economies such as the UK, USA and Germany where operations on construction sites are highly mechanized. Construction work in Nigeria is low tech and labour intensive. Solomon, Hashim, Mehdi, and Ajagbe, (2022) defined productivity as the number of products or services produced compared to the amount of goods or labour used to produce them. In construction, labour productivity is better known as labour output and is measured as the amount of work done over a period of time. Olomolaiye and Ogunlana (2000) observed that production outputs in key building companies in Nigeria were lower than they ought to be. Reasons for this were linked to inefficient methods, lack of appropriate tools and poor supervision. This agrees with a study carried out by Alinaitwe, Mwakali, and Hansson, (2017) which ranked incompetent supervisors and lack of skills of the workers as the two most significant causes of low productivity of construction workers in developing countries.

Poor Workmanship

Several authors including (Aniekwu & Okpala, 2018; Kolawole & Frank, 2099; Medugu et al, 2021; Dantongetal, 2021; Bilau et al. 2019) agrees that poor workmanship is one of the problems that the Nigeria construction industries are facing as the use of incompetent craftsmen lead to poor workmanship. Poor workmanship could result to rework due to incompetent craftsmen, though there are many factors that leads to poor workmanship, but that would not be discussed, only rework which result to cost and time overruns in project delivery process and has become a cankerworm within the Nigeria construction industry.

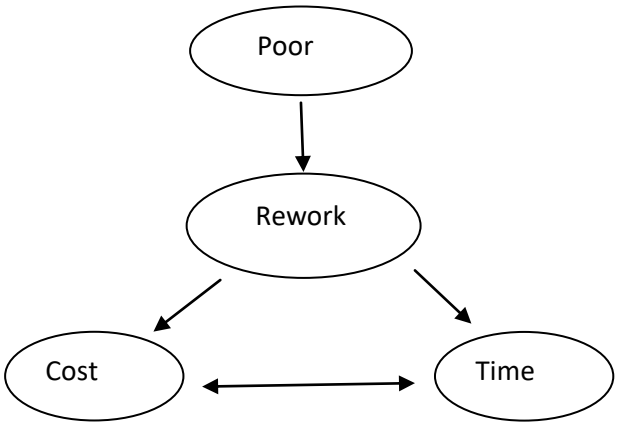


Figure 3**:** *Effect of Poor Workmanship*

Rework in Construction Project

Rework in construction projects is referred to as the unnecessary effort of redoing a process or activity that was incorrectly implemented in the first instance (Ekambaram, 2016; Abdullah, Bilau, Enegbuma., Ajagbe, Ali, & Bustani, 2012). In construction projects, rework which lead to cost and time overruns can result from an array of factors such as poor workmanship by incompetent craftsmen, errors, omissions, failures, changes, poor communication and poor coordination. To some extent, the level of rework in construction projects would be depend on external factors such as excessive workload, market conditions for instance, increased defects and from limitations on the availability of competent

subcontractors (Adamu, Dzasu, Haruna, & Balla, 2019; Dai, Goodrum, Maloney, & Srinivasan, 2019; Enshassi, Mohamed Mustafa, & Mayer, 2018).Rework and wastages are considered as non-value adding endemic symptoms that could adversely affect the performance, productivity and ultimately profit margins (Ekambaram, 2016; Abdullah, Bilau, Enegbuma., Ajagbe, Ali, & Bustani, 2019). Some Previous studies indicated that the costs of rework in poorly managed projects can be as high as 25% of contract value and l0% of the total project costs (Abdullah, Bilau, Enegbuma., Ajagbe, Ali & Bustani, (2019).

Significance of Reducing Rework

Durdyev and Mbachu (2021) posit that project rework occurrences adversely impact project performance in such areas as costs, time and stakeholder satisfaction. Hanna, Chang, Sullivan, & Lackney, (2021) finds that the direct impact of rework on project management transactions include (a) additional time to rework (b) additional costs for covering rework occurrences (c) additional materials for rework and subsequent wastage handling (d) additional labour for rework and related extensions of supervision.

2.3.7.4 Time overruns

Ijigah, Ogunbode and Ibrahim, (2019) opined that time overrun is one of the causes resulting from rework which adversely affect performance, productivity and ultimately profit margins. The problem of project time overrun is of international concern. As numerous studies related to causes of time or cost overruns have been conducted worldwide and mostly in developed countries (Ijigah, Ogunbode, & Ibrahim, 2019). According to Hewage and Ruwanpura, (2019), Ibeanu (2020) and Kazaz et al. (2020) time overrun is the extension of time beyond planned completion dates usually traceable to contractors. Ugwuja, (2021) defined it as the time lapse between the agreed estimation or completion date and the actual date of completion. Odesola and Idoro, *(*2021*)* describe time overrun as the time during which some part of construction project is completed beyond the project completion date or not performed as planned due to an unanticipated circumstance. Time overrun affects the project owners, contractors and other project participants. Project owners may be affected through lost benefits that could have accrued from the completed facility, while contractors may have to spend more on labour and plant, pay penalties as per the contract or even lose other profitable contracts because resources for the next job are tied up on delayed projects (Lawal,2018; Odesola & Idoro, 2019; Olatunji, 2020).

Cost Overrun

Odesola, and Idoro, (2019) and Ijigah, Ogunbode and Ibrahim, (2018) posit that cost overrun is also one of the causes resulting from rework which adversely affect the performance, productivity and ultimately the profit margins of the construction work. Awe, Stephenson& Griffith, (2021) contributed that rework also triggers claims for extra costs and time wasted in redoing or repairing defects by direct impacts of rework on project management transactions which include (a) additional time to rework (b) additional costs for covering rework occurrences (c) additional materials for rework and subsequent wastage handling (d) additional labour for rework and related extensions of supervision manpower (Oyelere, 2019; Wang, 2020; Awe, 2021).

To manage the situation, there is a need for absorbing and training of more skilled workforce in the construction industry, that is, artisans and professionals, to enhance performance of construction projects as opined by Bilau, Bustani, Sani, and Ijigah, (2019) that training offers the craftsmen the ability to perform their work effectively and efficiently

and these qualities are recipe for workers' productivity. Therefore, construction craftsmen when employed must be trained to the industries standards while those already employed must be constantly trained and retrained in order to improve on their productivity. In view of this, construction firms another associated one from both public and private sectors should invest in training, organization. There is also a need for government agencies to invest in Vocational Training Centre, Skill acquisition Centre and Technical Schools with a view to introducing youths to construction related disciplines at early stages of their education.

Areas of Skilled Workers Shortages in the Construction Industry

According to Griggs *et al.* (2016), the structure of labour force in the construction industry is categorized into skilled and unskilled workers. The labour force under the skilled workers is of varying abilities ranging from apprentices to trades foremen or supervisors (Liepmann, 2018). The apprentice can be described a beginner who is willing and interested in learning a certain trade in the construction industry. The three possible avenues for training skilled workers are; schools, vocational training centers, workshops and on sites (Husseini, 2008). According to Bheemaiah and Smith (2015), skilled worker is a segment of the work force with a high skill level that creates significant economic value through the work performed.

Skilled worker is generally characterized by high experience and expertise level and involves complicated tasks that require specific skill sets, education, training and experience, and may involve abstract thinking. Sweet and Meiksins (2016) asset that, a skilled worker requires some form of professionalism and training which does not require a college degree or the like. Common skilled workers include electrician, plumber, painter, carpenter and mason, bar bender, tiller, plant operator, welder, mechanics, and steel fixer (Uchitelle, 2009). Skilled workers not only work with their hands to build, fix, or install something, there is also a significant amount of brainpower required to do most jobs. Griffith and Macartney (2014) viewed that, with the present trend of technology, skilled workers must be computer literate as many machines use computer programs to operate in projects, and they must also have good math and reading skills in order to calculate, measure and read blueprints accurately.

In addition, innovations and advances in technology have enabled skilled workers to engage in the use of robotics and lasers based of their respective trades (Scarbrough& Corbett, 2018). The unskilled workers on the other hand are a category of workers that require special skills and it is defined as any way of making a living with little or no degree of security of income and employment and they require little or no training to make them perform (Wahab, 2021). Unskilled workers are able-bodied men and women that perform manual duties, and their major asset therefore lies in their strength and healthy body which requires no special training (Goswami *et al.*, 2016). Therefore, skilled workers are persons that have served an apprenticeship, practice the trade learned activity, and by reason of their knowledge and vocational capacity are given tasks which are particularly difficult and need lot of experience that involves different trades of specialization (Vollenhoven, 2016).

Categories of skilled workers in the Nigerian construction industry

According to Ogochukwu (2021), the Industrial Training Fund (ITF) in Nigeria enumerated the followings as recognized skilled workers in the construction industry, namely; masons, steel fixers, electricians, carpenters, plumbers and welders. Uchitelle, (2009) asserts that, common skilled workers include electricians, plumbers, painters, carpenters and bricklayers, bar benders, tile fixers, plant operators, welders, mechanics, and steel fixers. Offei-Nyako *et al.* (2019) stressed that, skilled workers vary from mason, carpenter, tile

worker, steel worker, painter, electrician and plumber. Ameh and Shokumbi (2018) viewed that, skilled workers in the construction industry include; iron bender, carpenter, bricklayer, painter, electrician, welding worker, plumber and tiller.

However, Adewale *et al.* (2021) listed categories of skilled workers which include; carpenter, bricklayer, painter, iron bender and plumber. Oseghale *et al.,* (2019) assets that, frequent used skilled workers in the construction industry include; carpenters, bricklayers, bar bender, plumbers and painters where their services are required most in construction projects. Sherekar and Tatikonda (2018) identified the major categories of skilled workers in the construction industry as; mason, painter, steel fitter and plasterer. Therefore, from the various categories of skilled workers mentioned by various researchers, there are significant similarities among the researchers on the different trade specializations of skilled workers in the construction industry. The various categories of skilled workers in the construction industry consist of the following:

Table 1: Skill Workers Categories in Nigeria

CATEGORY	TRADES
Structural Workers	Mason/bricklayers, joiners/carpenters, equipment operators, iron benders, fabricators, welders, roofers, scaffolding specialist
Finishing Workers	Painter, Plasterers, glaziers, suspended ceiling specialist, tile fixers, terrazzo workers, asphalt/tar sprayers
Service Workers	Plumber, pipe fitters/layers, electricians, air conditioners, refrigeration installers, insulating specialist

Source: Nigerian construction organizations (2019)

Strategies to Mitigate Skilled Workers Shortages in the Construction Industry

The quality and availability of skilled workers are considered an essential driver towards the effectiveness and efficiency of the construction organizations. Al-mustapha, (2020), observed that skilled workers had become the only sources of rapid growth and long-term competitive advantage in the construction organizations deliver products and services that can meet with client's needs and satisfaction. This is because skilled workers are directly involved in the technical aspects and speedy realization of construction projects. Ameh and Daniel, (2017), Windapo (2021). Ekong and Ekong, (2019), affirmed that the National Directorate of Employment (NDE) in Nigeria enumerated the followings as recognized skilled workers in the construction industry, namely; masons, steel fixers, electricians, carpenters, plumbers and welders. Oseghale, (2019), asserted that conventional skilled workers include electricians, plumbers, painters, carpenters, bricklayers, bar benders, tile fixers, plant operators, welders, mechanics, and steel fixers. Akinluyi and Adeleye, (2020), stressed that skilled workers vary from mason, carpenter, tile worker, steelworker, painter, electrician and plumber.

The study of Musa, Awolesi and Okafor, (2021) viewed those skilled workers in the construction organizations include; iron bender, carpenter, bricklayer, and painter, electrician, welding worker, plumber and tiller. However, Adewale, Siyanbola, and Siyanbola. (2021) listed categories of skilled workers which include; carpenter, bricklayer, painter, iron bender and plumber. Zannah, Latiffi, Raji, Waziri and Mohammed, (2020), stated that frequent used

skilled workers in the construction organizations include; carpenters, bricklayers, bar bender, plumbers and painters as their services are required most in the construction projects. Al-mustapha, (2019) (identified mason, painter, steel fitter and plasterer as the major categories of skilled workers in small construction projects.

In large and complex construction projects, Ameh and Daniel, (2020), identified masons/bricklayers, carpenters, roofers, equipment operators, glaziers, painters, plasterers, iron benders, fabricators, scaffolding specialist, tile fixers, suspended ceiling specialist, plumbers, pipefitters/layers, electricians, air conditioners, terrazzo workers, asphalt/tar sprayers, insulation workers, and refrigeration installers as the major categories of skilled workers. However, in the last decade, increasing demand for skilled workers in most developing countries could be observed (Windapo, 2021). These demands have been associated with the development of increasingly integrated labour markets for an improved performance and productivity, and the appearance of skill-biased technological change which is often ascribed to the acceleration of technological developments (Steve, 2021).

In Nigeria, the key drivers of demand of skilled workers in the short-term (3-5 years) are the expected projects for the government infrastructural development programmes and extraordinary demand for buildings from corner to corner of all sectors of the economy (Waziri & Bala, 2020). The former, which is the planned government spending (planned expenditure of $4.46 billion from 2015-2018) is calculated to be the most significant investment in the Nigerian construction sector, obscuring even the budget for other sectors programmes (National Bureau of Statistics, 2019). The latter (extraordinary demand for buildings from corner to corner of all sectors of the economy) is expected to bring about an estimated$2.35 billion building projects (Central Banks of Nigeria, 2018). Though, various reports have indicated the existence of shortages of skilled workers in the Nigerian construction organizations Bilau, Ajagbe, Kigbu & Sholanke, (2019), Oseghale, (2019). Aroge, (2012), Musa, Awolesi and Okafor, (2021) question the skills taught in the various training programmes and posited that these skills do not make a significant contribution to the specialized skills required by the construction industry. They emphasized that specialized vocational programmes must prepare workers for complex construction projects which are essential for socio-economic development in the country (Adewale, Siyanbola, & Siyanbola, 2019). Apparently, taking into account the relative shortage of skilled trades required by construction organizations has been an under-utilized practice, especially in Nigeria. Hence, it is this gap of identifying these skilled workers that is the primary stimulus for this research.

Quickly identifiable problems in the recruitment of skilled craftspeople include low wages, no clear-cut career path, and a continuing diminishing craftsperson skilled training programme. Low wages are a major reason the construction industry is having problems retaining skilled laborers. There seems to be a lack of image and well-defined career path in the construction industry. In a recent survey of high school student by the national business employment weekly, 'Construction Worker' came in number 247 out of a possible 250 as an attractive career option. (Elias & McKnight, 2021) Today's young people see construction work as uninteresting work and unattractive for variety of reasons, not limited to being dirty, physical challenging, moving around to work and often dangerous resulting in many young people opting to pursue other careers. Once a worker reaches journeyman status, which is normally around age 30, he has his salary set for life. For an example, a skilled welder with ten years of experience typically makes about $ 17 to $ 18 per hour. So, attrition from the industry usually begins around age 35. They drop out and do something different (Tucker, 2020).

There has also been a decrease in training by the unions. The unions have moved their efforts from improving their training programs and identifying the difference in performance to having owners specify labour agreements where craftspeople used by contractors are union trained. Job training has been traditionally handled by the trade unions in the construction industry. Several solutions have been used to alleviate the problem of skilled labour shortages in construction industry. These include increased wages and other incentives such as guaranteed overtime, implementation of training incentives, employing foreign labour or even outsourcing construction work to foreign sources, and reduction of demand through automation and technology (Pappas 2018). However, such measures are difficult to sustain unless backed up by long-term strategy to support them. Other studies focused on the apprenticeships and new approach to learning that could address skills shortages and also transforming corporate performance or productivity.

Apprenticeships

By definition, an apprenticeship represents a combination of on-the-job training and related instruction in which workers learn the practical and theoretical aspects of a highly skilled occupation (Allardyce & McNamara, 2018). The Office of Apprenticeship Training, Employer and Labour Services (OATELS) set quality standards for all apprenticeship programs registered with the federal government. It requires that all registered apprenticeships include at least one year (2,000 work hours) of on-the-job training and at least 144 hours of formal instruction. Apprentices completing the apprenticeship programs registered with federal and/or state governments will receive a certificate upon the completion of training. A federally registered apprenticeship is recognized across the nation and can be used in getting a journeyman’s card in any participating state.

Construction apprenticeships generally take two to five years to complete, depending on the occupation. The apprenticeship requires five years for electricians, four years for carpenters, sheet metal workers and millwright workers, and three years for painters, drywall tapers, and bricklayers. For a general construction laborer, the apprenticeships generally require only two years to fulfill the requirements. Furthermore, if the apprentice receives a certificate for completing the training, he or she can also receive a journeyman card from their respective national union organizations. With a journeyman's card, a worker can find work anywhere in the nation in that particular occupation. Though many apprenticeship programs have adopted a philosophy of 100 percent acceptance to the programs, they still must place some minimum requirements on eligible applicants to ensure people are truly interested in construction trades. In general, the minimum requirement for acceptance into an apprenticeship requires that an applicant:

- Be at least 17 or 18 years old,
- Have a valid driver's license,
- Have a high school diploma or GED certificate.

Some training providers set stricter requirements by asking applicants to provide proof of eligibility of work or requiring applicants to take an entrance examination on their reading or math skills. Several providers enforce zero-tolerance drug policies by requiring applicants to pass a drug test and by conducting periodic drug testing to ensure the safety and health of apprentices for their member contractors.

For union-organized apprentice training, the policies can be slightly more stringent Allardyce and McNamara, (2018). Often time applicants are brought into the apprenticeship program on "as needed" basis. The number of applicants brought in depends on the work

available at the time. Some training providers adopt a policy of "pre -apprenticeship" to ensure that applicants are suitable for construction careers. Of course, workers enter many construction jobs with no formal classroom training after high school. Workers starting immediately after high school can enter the construction trades occupations as laborers, helpers or apprentices. For those who come with the background of technical or vocational schools, they typically progress at a somewhat faster pace than workers who have only a high school degree because the technical or vocational program graduates already have had some of the necessary courses in mathematics or mechanical drawing that help them succeed in higher skill trades occupations. Through the apprenticeship or employer-provided training, entry-level workers can enhance their skills by working with more experienced workers and moving on to perform more highly skilled occupations. These apprenticeships and other training also typically require classroom training in math and drafting. With additional education and training, skilled craft workers can also advance to supervisor or superintendent positions through more advanced training and apprenticeship programs. Participating in apprentice training allows young people who have no experiences in construction to learn the specific trade skills. The benefit to the firm, industry, and customers is that these workers have the credentials and capability to complete quality construction work.

Union apprenticeship programs provide a wide range of construction trades and safety training for electrical work, carpentry, boiler making, general construction, drywall installation, bricklaying, painting, plumbing, pipefitting and refrigeration, sheet metal, and other trades. Apprentice participation in the union apprenticeship programs is limited to contractors who are union members. The second type of apprentice training program is provided by non-union, or "non-bargain," "nonpoint," or "open-shop" organizations. These non-union apprenticeship programs are governed unilaterally with individual employers or contractor associations controlling and administering the apprentice training.

The electrical, plumbing and carpentry trades are the most common crafts offered through the nonunion apprenticeship program providers. For some association apprenticeships, contractors must be members of that specific trade association. Apprentices who participate in this type of training are frequently limited because firms must first recruit a worker to participate and then sponsor their enrolment. The other type of non-union apprenticeship program is frequently offered through private individual employers in which the firms train their own employees by designating experienced workers to mentor those new employees with specialized skills to meet the company's needs. Companies that provide their own apprenticeships are primarily large contractors that are in the business of building construction, highway and tunnel construction, and specialty trades in carpentry, plumbing and electrical work. In addition to apprentice training, local community colleges and vocational schools also provide other venues for people who are interested in entering construction or upgrading their skills by taking courses related to building and construction trades. Several community colleges within the state offer apprentice training, mostly working with union or nonunion training providers to allow their students to gain on-the-job training to complement formal classroom instruction. In these cases, the community colleges provide classroom-related training, either on or off campus while the trade unions or contractor associations conduct on the-job training as well as tracking the working hours completed by apprentices for certification.

Productivity

Construction is generally labor-intensive and this is particularly the case in countries such as South Africa (CIDB, 2021). Historically, the construction industry has largely relied

on a core of highly skilled staff (generally white and often expatriate) to supervise a largely semi-skilled and unskilled workforce (generally black). The decline in demand for construction products over the past decades, and associated uncertainty, has seen a reduction in skills training since the 1980s, and the closing down of industry training institutions in the 1990s. It has been reported that only about 70 percent of the available training capacity is currently being utilized. A high standard of quality in major engineering and commercial projects is largely reliant on an ageing skills base. Much of the industry's activity however relies on a semi-skilled workforce, with increasingly less able supervision. This often manifests in slow delivery, significant rework to rectify defects, and associated materials waste that is built into the tendering and project costs.

According to Coulson, (2019), companies or firms should adopt new ways of developing key workgroups. "A change of direction is urgently required. New ways of harnessing human potential and enabling excellence can deliver both commercial success and personal fulfillment." Professor believes: "Skill challenges faced by companies or firms can be addressed. Critical success factors have been identified in key areas and winning ways of undertaking activities vital for corporate success. Pioneering companies build the critical success factors into how people work, make it easier for them to undertake complex tasks, and enable them to emulate the approaches of high performance.' According to Professor, "The right support can build confidence, increase skills and transform performance. The implications for a wide range of organizations are profound. If the winning ways of high performers can be captured and emulated by others developing and retaining superstars becomes hugely important." He argued for a switch of priorities that "Training and development is focused upon bringing poor performers up to speed in marginal areas. The emphasis should be upon encouraging people to build upon natural strengths and excel at what they do best and most enjoy. Educationalists are too often focused upon the disruptive and a social engineering agenda rather than the pursuit of excellence and the encouragement of superstars whose superior approaches and discoveries could benefit everyone."

Motivation, Incentives and Rewards

Wages provide a marginal measure of the productive ability of workers, which is the value placed on a worker’s ability to convert mental or physical effort into productive output. The relative wage rise provides an incentive for workers to enter or re -enter the occupation. If the relative wage differential is maintained, for longer term, it will provide encouragement for students to train in the area and enter the occupation. Incentives are usually defined as tangible rewards that are given to those who perform at a given level. Such rewards may be available to workers, supervisors, or to top managers. Whether the incentive is linked directly to such items as safety, quality, the reward follows successful performance. Many companies feel that pocket money is no longer a good motivator. Some companies' merely reward good workers with an extra day -off with pay. Others concerns reward top performers with better working conditions. Companies must have an innovative retention and reward strategy that goes beyond the usual pay-based schemes. Good pay is important, but not the answer to itself. There is a new workplace currency that motivates people to stay and it involves everything but pay, (Harraway, 2018). Good retention strategies go much deeper into the human psyche and involve actions and attitudes that make employees feel successful, secure and appreciated. "Globally, the best companies to work for do not pay the best salaries," "It is little things that count." Values are changing and a balanced life is becoming just as important as a fat salary. People want to be challenged on daily basis and they want to learn and grow. Yet different things motivate individuals, depending on their age, status and career goals. So, reward strategies must be tailored to the employee. Overall, the reward should address compensation, benefits, recognition and appreciation. A "total reward package"

blends monetary rewards (such as base salary, short-and long-term incentives, cash and health, welfare and retirement benefits) with non-monetary rewards (such as non-monetary recognition, a good working environment, and training and development).

Remuneration and performance management are business issues, not only human resources issues. "Decision regarding remuneration and performance management will have a direct effect on business profitability, operational expenditure, company culture and employee behavior."

An effective strategy incorporates:

- Clearly defined goals and a well-defined link to business objectives;
- Well designed, consistent pay and reward programmes, tailored to the needs of the organization and its people; and
- Effective, supportive reward processes.

Harraway, (2018) warned that the communication of a rewards strategy is as important as its design. "A poor benefit plan communicated well is better than the best strategy communicated poorly." As a retention mechanism and a performance driver, long-term incentive schemes form a key component of executive pay. But share options are very poor motivators because of the unpredictable nature of the stock market, so staffs prefer shot-term incentives.

Globally, research shows that shortages are the biggest constraint on construction growth with project and contract managers, tradesman and engineers cited as the scarcest of all skills. It has been reported that the skilled labour shortages resulted in increased cost, schedule delays and project cancellations and that the impact has been significant (Construction User Round Table CURT 2001). The construction industry is unattractive for variety of reasons, not limited to being dirty, physical challenging, and often dangerous resulting in many people opting to pursue other careers. Low wages are also a major reason the construction industry is having problems retaining skilled laborers.

Establishing Skill Acquisition Centers

The cornerstones of a policy framework for developing a suitably skilled workforce are: broad availability of good-quality education as a foundation for future training; a close matching of skills supply to the needs of enterprises and labour markets; enabling workers and enterprises to adjust to changes in technology and markets; and anticipating and repairing for the skills needs of the future. When applied successfully, this approach nurtures a virtuous circle in which more and better education and training fuels innovation, investment, economic diversification and competitiveness, as well as social and occupational mobility and thus the creation of more but also more productive and more rewarding jobs. Good-quality primary and secondary education, complemented by relevant vocational training and skills development opportunities, prepare future generations for their productive lives, endowing them with the core skills that enable them to continue learning.Young women and men looking for their first jobs are better prepared for a smooth transition from school to work when they are given adequate vocational education and training opportunities, including in-work apprenticeships and on-the-job experience. Working women and men periodically need opportunities to update their skills and learn new ones. Lifelong learning for lifelong employability captures the guiding policy principle here.

Support Recruiting and Training Partners of Skilled Workers

Robust training policies and systems are grounded in the characteristics and institutions of each country. Nevertheless, a number of common building blocks can be

identified. A good skills development system will be able to: anticipate skill needs; engage employers and workers in decisions about training provision, including in specific sectors; maintain the quality and relevance of training; make training accessible to all sectors of society; ensure viable and equitable financing mechanisms; and continuously evaluate the economic and social outcomes of training. To keep training relevant, institutional and financial arrangements must build solid bridges between the world of learning and the world of work. Bringing together business and labour, government and training providers, at the local, industry and national levels, is an effective means of securing the relevance of training to the changing needs of enterprises and labour markets. Institutions to sustain the involvement of employers and workers and their representative organizations are critical to keeping training relevant and ensuring that training costs and the gains of productivity improvement are shared equitably. Maintaining a close connection between training policies and employment policies creates an effective bridge between the worlds of learning and of work. Policies to improve skills combined with policies to sustain growth and investment facilitate job search, and support entry and re-entry into the labour market can lead to more and better jobs. Many benefits derive from making training and skills opportunities broadly accessible to all women and men. Special measures can help overcome the difficulties some groups face in accessing skills – for example, people with disabilities, members of minority groups, those in need of a second chance.

Review of Related Empirical Studies

Several research studies were conducted on skilled worker's shortages in the construction industry, among which are:

Oseghale and Falemu, (2018) conducted a study to evaluates the skilled labour shortages in selected construction firms in Edo state, Nigeria. The study aimed at assessing the current state of the construction industry's skilled workforce, causes and prevalence of skilled labour shortages and the effect of skilled labour shortages in construction project delivery. A survey research design was carried out on 30% of 200 registered construction firms in Edo state which involve construction managers and skilled workers. Method employed for collection of data includes distribution of structured questionnaires. The data collected were analyzed using Frequency tables, percentages, mean response analysis, relative importance index and cross tabulation. The research identified the most severe factors responsible for labour shortage to include; no clear carrier path, high mobility of construction workers and low wages. The study found that construction firms are not sending their skilled workforce for training, and that the skilled workers are unwilling to recommend the profession to their children. The research also revealed that the construction firms were paying extra money for labour, and Schedule delay in their construction programmes as a result of skilled labour shortage. The study found aging workforce in the construction trades sampled, and that the entrance of young people into the construction trades was very low. The review is similar to the current research in the context of skilled labour shortages but differs in the area of study. The reviewed literature is conducted in Edo state assessing the current state of the construction industry's skilled workforce shortages and causes while in this study, the researcher tries to find out the skilled workers shortages in the construction industry and the required strategies to mitigate the impact in Federal Capital Territory (FCT), Abuja.

Aminu, Kunya, Mohammad, Bustani and Hamid, (2018) carried out a study on Strategies for skill development in the construction industry in Nigeria. The aim of the study was to examine the strategies for skill development in construction industries in Nigeria. The objectives are: To identify causes of skills- gap on Building projects in Abuja, Nigeria, and to

examine strategies that will bridge the identified skills- gap. Basic literature on construction practice left no doubts that the successful realization of construction projects requires the committed action of professionals and vocational trade operatives. A survey research design was used construction workers within Abuja using a clustered sampling technique. The existence of a functional team is the number one rule for a successful construction process. Furthermore, it exposes issues on training and vocational skills in the construction Industry. The paper relied extensively on secondary information to establish the indicators and nature of skill gap. Field survey of some Building projects sites in Abuja, Nigeria compliments the secondary information on the existence of skill gap. The study therefore recommend that stakeholders should evolved skill acquisition policies which involve public private partnership and government should develop scheme for the recognition of skills through the assessment and certification of skills with appropriate knowledge. Encourage young men and women to enter apprenticeships to check occupational segregation and provide equitable .and high-quality training for both young men and women in the Construction Industry. The reviewed literature focuses on skill development in the construction industry in FCT Abuja which is similar to the study area. The reviewed literature places emphasis on skill gap in the construction industry in FCT, Abuja.

Mbeki, (2018) the study investigated the causes and impact of the effects of shortages of skilled artisans on contractor productivity. The objectives of the study were to identify causes of shortages of skills during the construction production phases; to define the effects of shortages of skills during the production phase of a project; to examine how to deal with shortages of skills when they happen; to determine ways in which the shortage of skills may be reduced; and to determine whether shortages of skills cause poor contractor performance. The study was inspired by many international and local studies demonstrating a lack of concern for the impact of shortages of skilled artisans on project performance, and their effects on project time. The research method adopted for study was a survey of construction sites and staff within the NMC group in the Cape Peninsula metropolitan area of the Western Cape Province. The study collected data from 65 participants from 10 different NMC sites. The participants in the survey included Project managers, site managers, quantity surveyors and artisans on sites. The findings of the study revealed that there is lack of formal training of artisans; performance of artisans is not highly regarded and there is lack of motivation, these factors contribute to the shortages of skilled artisans. It is also evident that shortage of skills causes' poor contractor performance and leads to poor quality of work. The researchers also found that, setting out errors occur due to lack of coordination between the main contractor and subcontractors and the lack of skills on the part of the artisans. In addition, inexperience on the side of the leading hand and / or supervisor and trades foremen and their inability to interpret the drawings contributed to rework during construction phase. A reason also given for shortage of artisans is that young people are afraid to get their hands dirty. Young people would rather work with computers than for engineering and its associated professions. It is recommended that to increase the supply of artisans some measures will have to be implemented to encourage young people to become artisans. The review deals with how to handle shortages of skill and ways to reduce the shortages of skilled workers in the construction site in cape peninsula metropolitan area of Western Cape Province which differs from the study area.

Ayodejioke, Aigbavboa, & Khangale, (2018) study investigate the effects of skill shortages in the construction industry with a view to improving the delivery of construction projects. Variables from reviewed literature materials were examined using closed-ended questionnaires administered on professionals and artisans in the industry. Shortage of project managers has the most effect on sustainable construction while the general effects of skill

shortages are cost increase, time overrun, decrease quality, high accidents rate and more rework, which are related to the three elements of sustainable development, that is, economic, social and environment. Agencies shouldered with the responsibilities of managing and regulating skilled workforce in the construction industry will find this study useful in their quest for delivery of sustainable construction projects. The context of the reviewed literature is on effects of skill shortages in construction industry with a view of improving the delivery of the construction project. The review is similar to the research but differs in the area of purpose in which this research work focuses on the skilled workers shortages in the Construction industry and the required strategies to mitigate the impact in Federal Capital territory (FCT), Abuja.

Utting, (2019). The study examined the problems and risks associated with the skills shortage in the construction industry. The various threats are identified in an attempt to evaluate and contain the nature and spread of this phenomenon. The research investigates through literature and internet study other research on skills shortage and the risks involved in the construction industry to assess qualitatively what action has been shown to alleviate the problem elsewhere. The salient findings indicate that the skills shortage is not confined to South Africa, but is exacerbated by some of the recruitment practices in other countries. Solutions proposed elsewhere are not always practical and are yet to be tested and found to work. Unfortunately, no concrete examples of successfully addressing skills shortages in the construction industry could be found. As an industry we need to take responsibility for the plight of the construction industry and address the education and training imbalance that seem peculiar to this country. The review looks at the risk associated with skill shortages in the construction industry in South Africa.

Bilau1, Ajagbe, Kigbu and Sholanke, (2019). The study carries out a detailed review of archival documents aimed at examining the shortage of skilled craftsmen in the construction industry, particularly in small and medium construction firms in Nigeria. This study adds to existing body of knowledge by exposing the reasons for shortage of skilled craftsmen in the construction industry in the perspective of small and medium construction firms (SMCFs) in Nigeria. This literature reviews the archival document which differs with the research study which is centered on skilled workers shortages in the Construction industry and the required strategies to mitigate the impact in Federal Capital territory (FCT), Abuja

Mohammed, Bandi and Abdullah, (2019) in their study, focuses on Supply of Skilled workers towards Performance of Construction Organizations in Nigeria, identify the purpose of the study as to identify the skilled workers towards performance of construction organizations. The objectives of this study include to identify the skilled workers required by the construction organizations and to evaluate the degree of agreement between construction organizations in ranking the skilled workers. Data for this study was collected through a self-administered questionnaire on a stratified sample of construction organizations. 290 validly questionnaires were returned and were analyzed using Relative Importance Index (RII) on a scale range from 1-5 for ranking comparison between construction organizations. Kendall's coefficient of concordance was used to evaluate the degree of agreement between construction organizations related to the ranking of skilled workers. The results of RII indicates that asphalt/tar sprayers were ranked topmost by engineers, while, glaziers were ranked first by quantity surveyors, and equipment operators were ranked first by builders and architects. Accordingly, the results revealed that equipment operators, glaziers, insulating specialist, asphalt/tar sprayers, fabricators, scaffolding specialist, suspended ceiling specialist, plumbers, electricians and roofers are the ten skilled trades required by the construction organizations. The results of Kendall's coefficient of concordance revealed that a high

agreement between construction organizations occurred in the ranking of the skilled workers. The results revealed that the skilled trades that were ranked topmost are highly technical trades which are significant for the performance of construction organizations. Thus, efforts should be geared towards improving the supply of these skilled workers. The review tries to identify the skilled workers required by the construction organizations and to evaluate the degree of agreement between construction organizations in ranking the skilled workers. The method of data collection is the same with this research work but it differs in the area of purpose in which the reviewed literature dwell on Supply of Skilled workers towards performance of construction organizations, this study looks at the skilled workers shortages in the Construction industry and the required strategies to mitigate the impact in Federal Capital territory (FCT), Abuja.

Joshua, Kostas and Peter (2021) in a study Adjusting to Skill Shortages: Complexity and Consequences, attempts to improve our understanding about these issues by using econometric methods to analyze the Business Longitudinal Database, an Australian panel data-set with information about skill shortages in small- and medium-sized businesses during 2004/05. We use this information to: explore the incidence of skill shortages and the business attributes that are associated with them; identify which businesses face more complex skill shortages, as measured by the number of different causes reported simultaneously; and, uniquely, examine how this complexity affects businesses' responses to skill shortages and aspects of their subsequent performance. We show that complex skill shortages are more likely than simpler (single cause) skill shortages to persist and to trigger defensive responses from businesses. We reject the conception of skill shortages as a homogenous phenomenon, and demonstrate the importance of distinguishing between skill shortages according to whether they have simple or complex causes. This review is related to the research but differs in terms of method of data analysis.

Akomah, Ahinaquah and Mustapha, (2020) in a study skilled labour shortage in the building construction industry within the central region, seek to identify areas where there are skilled labour shortages in the building construction industry within the Central Region. A survey research approach was employed to get the study population that consisted of project managers, site engineers, site foremen and engineers working with contactors. Questionnaires were designed based on the research specific objectives and used as the main instrument for data collection. Findings from the study revealed that the shortage of skilled manpower was from painters and decorators, electricians and tile workers. Further findings showed that skilled labour shortage was caused by socio−economic conditions, external forces, job attractiveness, job characteristics, job satisfaction, industry limitations and personal factors. Employees should be encouraged to develop their trade competences and change their attitude to work, while employers should build their manpower base through training. The reviewed literature is relevant to this study in the sense that it gives the research basis to identify areas where there are skilled labour shortages in the building construction industry.

Seamus and Bennett, (2017) in their study, utilizes data from a comprehensive survey of construction firms in Northern Ireland to investigate the extent to which industry level skill shortages arise either as a result of a mismatch between existing industry employment structure and training provision and/or a general failure among training providers to keep pace with technological change within the industry. It was found that while there was some limited evidence linking imbalances in the existing structure of craft training with skill shortages, the incidence of unfilled vacancies was much more heavily related to a failure to keep pace with the increased demand for a more multi-skilled approach to training driven by the rise in prefabricated building techniques within the industry. However, it also found that a

large-scale shift towards multi-skilled training might be costly as it would tend to reduce worker productivity levels. Even thus, the area of study differs, the review is relevant to the extent that it exposes the researcher to the skill shortages mismatch between existing industry employment structure and training provision and/or a general failure among training providers to keep pace with technological change within the industry.

Ayentimi, Burges and Dayaram, (2018) in a study, draws on human capital theory to report on a qualitative study that explores skilled labour challenges within Ghana's training and apprenticeship system through the lens of the demand side of employment perspective. The findings point to a training mismatch, lack of regulations and ineffective apprenticeship programmes, underinvestment in education and training, and outdated training programmes. The bottlenecks in the supply of skilled labour in Ghana are hampering the firms' ability to find skilled labour across industries. We suggest improved social partnership between industries and training institutions, with increased government investment in training and apprenticeship programmes, as a way forward to address the technical and vocational skilled labour supply bottlenecks. Wider implications for the African region which shares similar developing contexts are discussed. The reviewed literature is quantitative in nature but it is relevant and in line with the current study since its focuses on supply of skilled labour in Ghana in which the review helps the researcher to have the knowledge of the issues of skill labour shortages in diasporas.

Most of the empirical studies reviewed on skills shortage in the construction industry focused on causes and effects of skilled worker's shortage in construction industry. In addition, these studies carried out to assess and evaluate the problems associated with skilled worker's shortage in construction industry. Therefore, no attempt to carry out research on the effective strategies to check out the menace of skilled worker's shortages in construction industry. Hence, the interest to carry out further study on the skilled workers shortages in the Construction industry and the required strategies to mitigate the impact in Federal Capital territory (FCT), Abuja.

III RESEARCH METHODOLOGY

This chapter presents the procedures adopted for the study under the following sub-headings: Design of the Study, Area of Study, Population of the Study, Sample and Sampling Techniques, Instrument for Data Collection, Validation and Reliability of the Instrument, Method of Data Collection and Method of Data Analysis.

Research Design

A descriptive survey research design was adopted for the study. Survey research design is quantitative research in which researchers administer a survey instrument to a sample or to the entire population of people or subject to describe the attitudes, opinions, behaviors, or characteristics of the population (Creswell, 2012). Therefore, descriptive survey research design was used for this study because the researcher administered a structured questionnaire to the sample of the study to describe the opinions of the population.

Area of the Study

The study was conducted in Federal Capital Territory (FCT), Abuja. The area is located almost at the geographical center of Nigeria, occupying a total land area of 7,315km² representing about 0.79% of Nigeria's total land mass and lies within latitudes 8 23' and 9 15' North and longitudes 6 35'East (Uwe, 2010). The area is bounded on the west by Niger State, on the north by Niger and Kogi states, on the east by Nasarawa State and on the south

by Niger, Kogi and Nasarawa states. FCT Abuja, has six (6) Area Councils which include: Abaji, Bwari, Gwagwalada, Kuje, Kwali, and Abuja Municipal.

Population of the Study

The population for this study comprises of 934 skilled workers in the construction industry in the study area which includes professionals in the construction industry, artisans, craftsmen, technicians and technologist. The population was therefore, finite. A population is a group of individuals, subjects or organizations who have the same characteristic from which data can be collected and analyzed (Creswell, 2012). A Finite Population is also known as a countable population in which the population can be counted. Table 2 & 3 shows the distribution of the population from the six construction companies selected in FCT Abuja for the study.

Table 2: Population Distribution of Skilled Workers in the Construction Industry.

S/N	COMPANY	Masons	Carpenters	Iron Workers	Painters	Plumbers	Electricians	Equipment operators	Tilers	TOTAL
1	Julius Berger Nigeria Plc	20	21	15	20	18	20	8	13	**135**
2	Dumez Nigeria Plc	15	23	9	10	10	20	12	16	**117**
3	Rome Construction Company Limited	21	18	13	16	21	14	6	11	**120**
4	Dantata & Sawoe Construction Company	20	24	15	15	16	23	11	12	**136**
5	Setraco Building,	14	10	8	6	13	6	10	9	**76**
6	R.C.C (Nigeria) Limited	26	17	5	14	15	10	10	6	**103**
	TOTAL	**116**	**113**	**65**	**81**	**93**	**93**	**57**	**67**	**687**

Source: Construction Companies in Abuja Nigeria, (2020).

Table 3: Population Distribution of Professionals in the Construction Industry.

S/N	COMPANY	Architects	Builders	Quantity Surveyors	Civil Engineers	Estate Surveyors	Electrical Engineers	Structural Engineers	Town Planners	TOTAL
1	Julius Berger Nigeria Plc	5	8	4	3	2	3	4	3	**32**
2	Dumez Nigeria Plc	6	9	4	5	3	2	5	3	**37**
3	Rome Construction Company Limited	8	11	6	5	2	5	3	2	**42**
4	Dantata & Sawoe Construction	4	7	5	6	4	3	5	5	**39**
5	Setraco Building,	6	8	6	5	4	5	6	3	**43**
6	R.C.C (Nigeria) Limited	9	13	7	6	5	6	4	4	**54**
	TOTAL	**38**	**56**	**32**	**30**	**20**	**24**	**27**	**20**	**247**

Source: Construction Companies in Abuja Nigeria, (2020).

Sample and Sampling Technique.

A Proportionate sampling technique was adopted for the study for the selection of the respondents. This minimizes bias and simplifies analysis of results. Krejcie and Morgan (1970) table was used to determine the sample size. A sample of 47 respondents from each construction company were drawn from the six selected construction company making a total of 282 respondents as the sample size.

Instrument for Data Collection

The instrument used to collect data for this study was a structured questionnaire developed by the researcher named "Assessment of Skilled Workers Shortages in the Construction Industry Questionnaire (ASWSCIQ)" using the five-point Likert rating scale (Strongly agreed – 5, Agreed – 4, Undecided – 3, Disagreed – 2 and strongly disagreed – 1).

The instrument contains five sections (A - E) in which section A contain the demographic data of the respondent and the key for the questionnaire options. While section B - E contain the research question one to four with questionnaire items 10, 19, 8 and 18 respectively.This instrument was considered suitable due to the fact that the research work is survey in nature which requires gathering information and the opinion of the respondents. This approach is in line with Check and schutt, (2012) who opined that in survey research, information is collected from a sample of individuals through their responses to questions.

Method of Data Collection

The researcher obtained an introductory letter from the Head of Department of Vocational and Technology Education, Faculty of Technology Education, Abubakar Tafawa Balewa University, Bauchi which was used to obtain permission from the six selected construction companies in FCT, Abuja. This enabled the researcher to access the respondents at the research field. The researcher alongside with two trained research assistants administered and retrieved the research instruments within two days in each of the construction companies. The research assistants were duly trained on some technical aspect of the questionnaire that require interpretation and the procedures to administer and retrieve

the research instrument before proceeding to the research field. Out of the 282-total number of instruments administered, a total of 264 copies of the instruments were retrieved from the respondents. This represents 93.62% return rate of the instrument.

Method of Data Analysis

The data collected for this study was analyzed using Mean ($\bar{x}$) and Standard Deviation (SD) to answer the research questions while t-test statistical tool was used to test the null hypotheses. The Statistical Package for Social Sciences (SPSS) version 23 was employed to analyze the data.

The decision rule for the Mean was based on the class boundary of the five-point rating scales which is 3.00. therefore, any item that attracts a mean score of 3.50 and above was considered to be agreed with, while any mean rating below 3.49 was considered disagreed. While an inferential statistics of independent sample t-test was employed to test the null hypotheses at 0.05 level of significance. Therefore, where p-value (Sig. 2-tailed) was less than 0.05, the null hypothesis was rejected and where p-value (Sig. 2-tailed) was greater than 0.05, the null hypothesis was accepted.

IV. RESULTS AND DISCUSSIONS

This chapter present result and discussion of the data collected for the study. The data were presented and analyzed based on the research questions and hypotheses of the study. The discussion and interpretation of each table was based on the research questions.

Research Question One

To what extent are the skilled workers short in the construction industry in FCT Abuja?

Table 4 shows the result of research question one on the extent ofSkilled Workers shortages in the Construction Industry in FCT, Abuja. The result shows that thereare shortage of skill workers in welding, masonry, carpentry/joinery, iron bending, tiling, plumbing, painting and equipment operators were agreed with mean a score ranging from 2.64 – 4.18 respectively while the following skilled workers such as glazing and electrical installation were considered to be sufficient with a mean score of 2.35 and 2.49 respectively.

From the result on table 4, it therefore, implied that there are insufficient skilled workers in the area of welding, masonry, carpentry/joinery, iron bending, tiling, plumbing, painting and equipment operators in the Construction Industry in FCT, Abuja.

Table 4: Extent of Skilled Workers Shortages in the Construction Industry.

S/N	Items	$\bar{x}_p$	SD_p	$\bar{x}_s$	SD_s	$\bar{x}_g$	Decision
1	Shortage of skilled workers on glazing	2.11	0.54	2.49	1.11	2.35	**Disagreed**
2	Shortage of skilled workers on welding	3.32	1.53	3.48	1.47	3.42	**Agreed**
3	Shortage of skilled workers on masonry	3.67	1.19	3.75	1.43	3.72	**Agreed**
4	Shortage of skilled workers on carpentry	3.89	1.31	3.51	1.61	3.65	**Agreed**
5	Shortage of skilled workers on iron-bending	3.04	1.73	2.71	1.08	2.83	**Agreed**
6	Shortage of skilled workers on electrician	2.80	1.51	2.32	0.98	2.49	**Disagreed**
7	Shortage of skilled workers on tiling	2.58	1.35	2.68	1.14	2.64	**Agreed**
8	Shortage of skilled workers on plumbing	3.43	1.32	2.91	1.71	3.10	**Agreed**
9	Shortage of skilled workers on painting	3.76	1.43	3.11	1.40	3.34	**Agreed**
10	Shortage of skilled workers on equipment operators	4.00	1.33	4.28	1.16	4.18	**Agreed**
	Average Mean					**3.17**	

Source: Field survey 2022

Research Question Two

What are the causes of skilled workers shortages in the construction industry in FCT Abuja?

Table 5 shows the result of research question two on the causes of skilled workers shortages in construction industry in FCT, Abuja. The result shows that there are numerous factors that causes skilled workers shortages in the construction industry in FCT, Abuja which among others are change in skill requirement/new technology, increase demand of skilled works, lack of job security/poor treatment, low number of new entrants, low wages/salary, poor education/training, poor construction image, poor site safety/working environment, skill workers migrate overseas, dirty, difficult and dangerous nature of the profession, special knowledge of the construction and new technology has been the causes of skilled workers shortages in the construction industry with mean score ranging from 2.53 – 4.32 respectively while disagreed with Ageing of the workforce and Unattractive job/lack of worker-oriented career path with a mean score of 2.44 and 2.41 respectively as not been part of the causes of skilled workers shortages in the construction industry.

The outcome of research question two in table 5, implied that, the causes of skilled workers shortages in the construction industry in FCT, Abuja includes: change in skill requirement/new technology, increase demand of skilled works, lack of job security/poor treatment, low number of new entrants, low wages/salary, poor education/training, poor construction image, poor site safety/working environment, skilled workers migrates to overseas, dirty, difficult and dangerous nature of the profession, special knowledge of construction and the emergence of new technology among others are the factors considered to be responsible for skilled workers shortages in the construction industry in FCT, Abuja.

Table 5: Causes of Skilled Workers Shortages in Construction Industries.

S/N	Items	$\bar{x}_p$	SD_p	$\bar{x}_s$	SD_s	$\bar{x}_g$	Decision
11	Ageing of the workforce	2.54	1.47	2.38	1.51	2.44	**Disagreed**
12	Change in skill requirements/new technology	2.57	1.29	2.50	1.29	2.53	**Agreed**
13	Dissatisfaction with labour organization	2.65	1.35	2.66	1.29	2.66	**Agreed**
14	Economy changes	3.17	1.40	2.94	1.43	3.02	**Agreed**
15	Geographic location	3.59	1.33	3.95	1.28	3.82	**Agreed**
16	High education level of skilled worker	4.10	1.27	4.15	1.27	4.13	**Agreed**
17	Increase demand of skilled workers	4.05	1.25	4.10	1.26	4.08	**Agreed**
18	Lack of job security/high mobility/poor treatment	2.93	1.63	2.76	1.56	2.82	**Agreed**
19	Low number of new entrants	3.82	1.30	3.86	1.31	3.85	**Agreed**
20	Low wages/salary	3.52	1.41	3.62	1.46	3.58	**Agreed**
21	Not meeting employer expectation	3.93	1.06	4.01	0.95	3.98	**Agreed**
22	Poor education/training	3.26	1.51	3.48	1.53	3.40	**Agreed**
23	Poor construction industry image	4.31	1.01	4.33	1.03	4.32	**Agreed**
24	Poor site safety/working environment	3.35	1.40	3.60	1.42	3.51	**Agreed**
25	Skill workers migrate overseas	2.94	1.46	2.98	1.35	2.97	**Agreed**
26	Unattractive job/lack of worker-oriented career path	2.38	1.32	2.42	1.34	2.41	**Disagreed**
27	Dirty, difficult and dangerous nature of the profession	3.24	1.51	3.21	1.48	3.22	**Agreed**
28	Specialized knowledge of the construction	2.69	1.60	2.54	1.55	2.59	**Agreed**
29	Emerging new technology	3.18	1.63	3.40	1.63	3.32	**Agreed**
	Average Mean					**3.30**	

Source: Field survey 2022

Research Question Three

What are the areas of skilled workers' shortages in the construction industries in FCT Abuja?

Table 6 presents the results of research question three onareas of the Skilled Workers Shortages in the Construction Industries. The result shows that all the items were agreed with. The mean score for the agreed items ranges from 3.16 – 4.31 respectively. This implied that

all the eight areas of skills enumerated in table 6 are experiencing shortages of skilled workers in the construction industry in the FCT, Abuja.

The results indicated that there are insufficient of skilled workers in the area of Masons/bricklayers, carpentry/joinery, Iron bending, Painting, Plumbing, Electrical installation, Equipment operators and Tiling.

Table 6: Areas of the Skilled Workers Shortages in the Construction Industries

S/N	Items	$\bar{X}_p$	SD_p	$\bar{X}_s$	SD_s	$\bar{X}_g$	Decision
30	Masons/bricklayers	4.08	1.28	4.04	1.34	4.05	**Agreed**
31	Carpentry/joinery	3.98	1.29	3.85	1.42	3.90	**Agreed**
32	Iron workers	3.92	1.34	4.10	1.28	4.03	**Agreed**
33	Painters	4.41	0.75	4.26	0.86	4.31	**Agreed**
34	Plumbers	3.81	1.26	3.90	1.13	3.87	**Agreed**
35	Electricians	3.94	1.33	3.90	1.36	3.91	**Agreed**
36	Equipment operators	3.84	1.12	3.85	1.07	3.85	**Agreed**
37	Tilers	2.96	1.51	3.27	1.49	3.16	**Agreed**
	Average Mean					3.89	

Source: Field survey 2022

Research Question Four

What are the strategies to mitigate the impact of skilled workers' shortages in the construction industry in FCT, Abuja?

Table 7 shows the result of research question four on Strategies to Mitigate Skilled Workers Shortages in the Construction Industry in FCT, Abuja. The result shows that among the 18 items presented in the table as strategies to mitigate skilled workers shortages, 13 were agreed with a mean score ranges from 2.74 – 4.27 respectively while 5 items were disagreed with a mean score ranges from 1.88 – 2.30 respectively.

From the result in table 7, it therefore, implied that formal training of skilled workers, on-site training of skilled worker, o-site training skilled workers, apprenticeship training of skilled workers, increase worker's welfare, training programs for staff to upscale their skills, internal seminars on new development in technology, use innovative approach, recruiting and training of skilled workers, using automate processes in construction, support training partners, encourage youth to be creative and establishing skill acquisition centers are prospective strategies that can be adopted to mitigate the impact of skilled workers shortages in the construction industry. The result implies that recruitment and training of skilled workers was rank as the best strategy to mitigate skilled workers shortages. In other word training on automated construction will also reduce the overdependency on large number of skilled workers.

Table 7: Strategies to Mitigate Skilled Worker's Shortages in the Construction Industries

S/N	Items	$\bar{x}_p$	SD_p	$\bar{x}_s$	SD_s	$\bar{x}_g$	Decision
38	Formal training of skilled workers	2.83	1.63	2.65	1.61	2.72	**Agreed**
39	On-site training of skilled worker	3.20	1.46	2.99	1.51	3.07	**Agreed**
40	Off-site training skilled workers	2.71	1.60	2.75	1.60	2.74	**Agreed**
41	Apprenticeship training of skilled workers	2.94	1.57	2.63	1.57	2.74	**Agreed**
42	Workshops and seminars for skilled workers	1.86	1.25	1.89	1.28	1.88	**Disagreed**
43	Increase worker's welfare	4.17	0.68	4.04	0.93	4.08	**Agreed**
44	Motivation, incentives and rewards of workers	2.11	1.26	2.29	1.33	2.22	**Disagreed**
45	Training programs for staff to upscale their skills	3.75	1.11	3.85	1.13	3.81	**Agreed**
46	Self-learning of individuals	2.19	1.23	2.36	1.31	2.30	**Disagreed**
47	Internal seminars on new development in technology	3.75	1.17	3.81	1.19	3.79	**Agreed**
48	Compulsory entrepreneurial training at early stage of education	2.05	1.13	2.13	1.17	2.10	**Disagreed**
49	Assess risk factors	1.99	1.40	1.96	1.37	1.97	**Disagreed**
50	Use innovative approach	3.68	1.35	3.79	1.30	3.75	**Agreed**
51	Recruiting and training of skilled workers	4.14	1.18	4.34	1.03	4.27	**Agreed**
52	Using automate processes in construction	3.10	1.60	2.98	1.59	3.02	**Agreed**
53	Support training partners	3.58	1.42	3.85	1.22	3.75	**Agreed**
54	Encourage youth to be creative	3.23	1.57	3.39	1.51	3.33	**Agreed**
55	Establishing skill acquisition centers	4.00	1.21	4.02	1.12	4.01	**Agreed**
	Average Mean					3.09	

Source: Field survey 2022

V. HYPOTHESES TESTING

Hypothesis one

There is no significance difference between the mean responses of professionals that of skill workers on the extent of skilled workers shortages in the construction industry in FCT Abuja.

Table 8 showed the mean opinion of Professionals and that of Skilled workers on the extent of Skilled Workers Shortages in the Construction Industry in the study area. The following mean and standard deviation expresses the opinion of the two groups: Professionals ($\bar{x}$ = 3.26, SD = 0.45) and Skilled workers ($\bar{x}$ = 3.13, SD = 0.41), df = 262, and P-value = 0.51, this value is greater than the alpha value of 0.05 level of significant.

From the result as interpreted from table 8, it inferred that the null hypothesis $H0_1$ after careful analysis and its testing found out that the null hypothesis $H0_1$ was accepted. This

implies that there is no significance difference between the opinion of professionals and skilled workers on the areas of skilled workers shortages in the construction industry.

Table 8: t-test results comparing extent of Skilled Workers Shortages in the Construction Industry

Groups	N	$\bar{x}$	Std	df	t	Pvalue	Decision
Professionals	96	3.26	.45				
Skilled Workers	168	3.13	.41	262	2.47	.51	Accepted

Hypothesis two

There is no significance difference between the mean responses of professionals and that of skill workers on the causes of skilled workers shortages in the construction industries in FCT Abuja.

Table 9 showed the mean opinion of Professionals and that of Skilled workers on the causes of skilled workers shortages in the construction industries in the study area. The following mean and standard deviation expresses the opinion of the two groups: Professionals ($\bar{x}$ = 3.27, SD = 0.27) and Skilled workers ($\bar{x}$ = 3.31, SD = 0.27), df = 262, and P-value = 0.85, this value is greater than the alpha value of 0.05 level of significant.

From the result as interpreted from table 9, it inferred that the null hypothesis $H0_2$ after careful analysis and its testing found out that the null hypothesis $H0_2$ was accepted. This implies that there is no significance difference between the opinion of professionals and skilled workers on the areas of skilled workers shortages in the construction industry.

Table 9: t-test results comparing causes of skilled workers shortages in the construction industries.

Groups	N	$\bar{x}$	Std	df	t	Pvalue	Decision
Professionals	96	3.27	.27				
Skilled Workers	168	3.31	.27	262	-1.01	.85	Accepted

Hypothesis three

There is no significance difference between the mean responses of professionals and that of skill workers on the areas of skilled workers' shortages in the construction industries in FCT Abuja.

Table 10 showed the mean opinion of Professionals and Skilled workers on the areas of skilled workers' shortages in the construction industries in the study area. The following mean and standard deviation expresses the opinion of the two groups: Professionals ($\bar{x}$ = 3.87, SD = 0.45) and Skilled workers ($\bar{x}$ = 3.90, SD = 0.44), df = 262, and P-value = 0.68, this value is less than the alpha value of 0.05 level of significant.

From the result as interpreted from table 10, it inferred that the null hypothesis $H0_3$ after careful analysis and its testing found out that the null hypothesis $H0_3$ was accepted. This

implies that there is no significance difference between the opinion of professionals and skilled workers on the areas of skilled workers shortages in the construction industry.

Table 10: t-test results comparing areas of skilled workers' shortages in the construction industries

Groups	N	$\bar{x}$	Std	df	t	Pvalue	Decision
Professionals	96	3.87	.45				
Skilled Workers	168	3.90	.44	262	-.49	.68	Accepted

Hypothesis four

There is no significance difference between the mean responses of professionals in the construction industry and skill workers on strategies to mitigate the impact of killed workers' shortages in the construction industry in FCT Abuja.

Table 11 showed the mean opinion of Professionals and Skilled workers on the areas of skilled workers' shortages in the construction industries in the study area. The following mean and standard deviation expresses the opinion of the two groups: Professionals ($\bar{x}$ = 3.07, SD = 0.24) and Skilled workers ($\bar{x}$ = 3.09, SD = 0.23), df = 262, and P-value = 0.63, this value is greater than the alpha value of 0.05 level of significant.

From the result as interpreted from table 11, it inferred that the null hypothesis $H0_4$ after careful analysis and its testing found out that the null hypothesis $H0_4$ was accepted. This implies that there is no significance difference between the opinion of professionals and skilled workers on the areas of skilled workers shortages in the construction industry.

Table 11: t-test results comparing strategies to mitigate the impact of skilled workers' shortages in the construction industry.

Groups	N	$\bar{x}$	Std	df	t	Pvalue	Decision
Professionals	96	3.07	.24				
Skilled Workers	168	3.09	.23	262	-.76	.63	Accepted

VI. FINDINGS OF THE STUDY

The studyassesses the skilled worker's shortages in the construction industry in Federal Capital Territory (FCT), Abuja. From the analyses, the followings are the findings of the study:

i. The finding of research question one revealed that there are insufficient skilled workers in the area of welding, masonry, carpentry/joinery, iron bending, tiling, plumbing, painting and equipment operators in the Construction Industry in FCT, Abuja.

The corresponding hypothesis $H0_1$ was accepted which implied that there are insufficient skilled workers in the area of welding, masonry, carpentry/joinery, iron bending, tiling, plumbing, painting and equipment operators in the Construction Industry in FCT, Abuja.

ii. The finding of research question two revealed that there are numerous factors that causes skilled workers shortages in the construction industry in FCT, Abuja, these factors among others includes: change in skill requirement/new technology, increase demand of skilled works, lack of job security/poor treatment, low number of new entrants, low wages/salary, poor education/training, poor construction image, poor site safety/working environment, skilled workers migrates to overseas, dirty, difficult and dangerous nature of the profession, special knowledge of construction and the emergence of new technology among others are the factors considered to be responsible for skilled workers shortages in the construction industry in FCT, Abuja.

The corresponding hypothesis $H0_2$ was accepted. This implied that There is no significance difference between the mean responses of professionals in the construction industry and that of skilled workers on the causes of skilled workers shortages in the construction industry in FCT, Abuja.

iii. The finding of research question three revealed that the areas of shortages of skilled workers to include: insufficient of skilled workers in the area of masons/bricklayers, carpentry/joinery, Iron bending, painting, plumbing, electrical installation, equipment operators and tiling in the construction industry in FCT, Abuja.

The corresponding hypothesis $H0_3$ was accepted. This implied that There is no significance difference between the mean responses of professionals in the construction industry and that of skill workers on the areas of skilled workers' shortages in the construction industry in FCT, Abuja.

iv. The finding of research question four revealed that the strategies that can be adopted to mitigate the impact of skilled workers shortages in the construction industry in FCT, Abuja to includes: formal training of skilled workers, on-site training of skilled worker, o-site training skilled workers, apprenticeship training of skilled workers, increase worker's welfare, training programs for staff to upscale their skills, internal seminars on new development in technology, use innovative approach, recruiting and training of skilled workers, using automate processes in construction, support training partners, encourage youth to be creative and establishing skill acquisition centers are prospective strategies that can be adopted to mitigate the impact of skilled workers shortages in the construction industry. This will go a long way to mitigate overdependency on large number of skilled workers.

The corresponding hypothesis $H0_4$ was accepted. This implied that there is no significance difference between the mean responses of professionals in the construction industry and that of skill workers on strategies to mitigate the impact of killed workers' shortages in the construction industry in FCT, Abuja.

Discussion of Findings

The findings of this study therefore, confirms with the Sternberg's theory of Practical Intelligence (2012) which stated that job creation in a firm should depend on the availability of workers (unemployment) and on the number of job openings in other firms (Congestion). The theory lay emphasis on skill shortage as a reflection of difficulties in matching supply to demand which invariable affect the end product. The theory is in line with the finding of the research on skilled workers shortages in construction industry which discover that shortages

of skill is as result of inadequate trained manpower that can be effective in delivering task in the construction industry. Similarly, the study of Olsen, Tatum and Defnall, (2012affirm that skilled craft shortage is not a shortage of workers rather it is a shortage of adequately trained skilled and productive workers available for certain jobs.

The finding of research question one revealed that the extend of skilled workers shortages in the construction industry in the study area includes: insufficient skilled workers in welding, masonry, carpentry/joinery, iron bending, tiling, plumbing, painting and equipment operators in the Construction Industry in FCT, Abuja.

This result agreed with the position of Oseghale, and Falemu, (2019) which rate the condition of construction industries in Nigeria to be 19.40% out of 100% showing the level of skilled workers shortages in construction industries in Nigeria is poor and there is need for improvement. Similarly, the findings of Ambekar Institute for Labor Studies, (2019) conform the extent of skilled workers shortages in which they found out that in the world labour market, construction workers are said to be over 100 million, constituting 6-7 % of the world labour force. The construction industry employment is characterized by relatively high rates of attrition among subcontractors as well as waged workers, and this is manifested in periodic labour shortages.

The outcome of the field test conducted on causes of skilled workers shortages in the construction industry in the study area revealed that change in skill requirement/new technology, increase demand of skilled works, lack of job security/poor treatment, low number of new entrants, low wages/salary, poor education/training, poor construction image, poor site safety/working environment, skilled workers migrates to overseas, dirty, difficult and dangerous nature of the profession, special knowledge of construction and the emergence of new technology among others are the factors considered to be responsible for skilled workers shortages in the construction industry in FCT, Abuja.

The result was supported by several findings of researches conducted in and outside the Nigerian construction industry. These includes: findings of Kurushi, (2018), Ameh and Itodo, (2018) and Darren and Mark, (2021) in their various work indicate that the most significant factor on the causes of skill-gap is the lack of incentive which was rated highest and the ever-changing technology in the construction industries. Similarly, Aminu, kunya, Mohammed, Bustani and Hamid (2018) in their work which indicated that, the most significant factor on the causes of skill-gap is the lack of incentive, lack of training and development as well as poor image of the construction industry as a slavery job.

The areas of insufficient skilled workers identified are masons/bricklayers, carpentry/joinery, Iron bending, painting, plumbing, electrical installation, equipment operators and tiling in the construction industry in FCT, Abuja. The finding conforms with the research finding conducted by Adewale and Siyanbola, (2014) who itemize Machine operators, Iron bender, Plumber, Painter, Electricians, Tilers and Carpentry and joinery as some of the skilled workers shortages in Nigeria. Kurushi, (2018), Ameh and Itodo, (2018) and Darren and Mark, (2022) in their separate writing identify establishing skilled acquisition center, training schools and encouraging apprenticeship are some of the solutions to increase skilled workers supply in the construction industry in Nigeria. Also, the finding conforms with Aluri, (2018) which stated that training and retraining of skilled workers in their various trades will help in reducing skilled workers shortages in construction industry in Nigeria.

The findings of research question four revealed that formal training of skilled workers, on-site training of skilled worker, o-site training skilled workers, apprenticeship

training of skilled workers, increase worker's welfare, training programs for staff to upscale their skills, internal seminars on new development in technology, use innovative approach, recruiting and training of skilled workers, using automate processes in construction, support training partners, encourage youth to be creative and establishing skill acquisition centers are prospective strategies that can be adopted to mitigate the impact of skilled workers shortages in the construction industry. This conforms with the findings of Aluri, (2018) which stated that training and retraining of skilled workers in their various trades will help in reducing skilled workers shortages in Nigeria. Also, Joshua, Kostas, and Peter, (2021) point out training and development as one of the fundamental factors to be considered to increase skilled workers supply in the construction industry in Nigeria. Similarly, Adewale, Siyanbola, and Siyanbola, (2018) question the skills taught in the various training programmes and posited that these skills do not make a significant contribution to the specialized skills required by the construction industry. They emphasized that specialized vocational programmes must prepare workers for complex construction projects which are essential for socio-economic development in the country. Pappas, (2018) in his work, opined that several solutions have been used to alleviate the problem of skilled labour shortages in construction industry among which include: increased wages and other incentives such as guaranteed overtime, implementation of training incentives, employing foreign labour or even outsourcing construction work to foreign sources, but identify training in automated technology is the most suitable strategy in addressing skilled shortage in this era of technological advancement..

Summary

The aim of this study was to examine theSkilled Workers Shortages in the Construction Industry and the Required Strategies to Mitigate the Impact in Federal Capital Territory (FCT), Abuja. Four specific objectives were developed in line with the aim of the study. Four research questions were duly answered in line with the specific objectives and four null hypotheses were also tested in line with the research questions.

The population for the study was 934. It comprises of professionals and Skilled Workers in the Construction Industry. The sample size of the study comprises of 282 respondents. The instrument used for data collection consist of 59 items which was developed by the researcher and validated by three experts. Cronbach Alpha statistical tool was employed to established the reliability of the instrument. The reliability coefficient of the instrument yielded 0.83. The data collected were analyzed using mean and standard deviation to answer the four research questions while t-test statistical tool was used to test null hypotheses at 0.05 level of significance.

The findings of the study therefore, revealed that there are insufficient skilled workers in the Construction Industry in FCT, Abuja. The study further revealed the appropriate strategies that can be adopted to mitigate the impact of skilled workers shortages in the construction industry in FCT, Abuja to includes: formal training of skilled workers, training workers on automated construction equipment such as emerging technology and recruiting and training of skilled workers in the industry. The four null hypotheses of the study were accepted.

Conclusion

Construction industry is a people-oriented industry with the presence of various forms of skilled as well as unskilled labor. The focus of the industry is to deliver quality and affordable buildings to the clients. In order to achieve this laudable goal, it requires skilled workers that are well trained to meet the demands of the clients and the society at large.

However, the findings of the study revealed that there are inadequate skilled workers in some specific areas such as masonry, iron bending, electrical installation, tiling, painting and equipment operators in the Construction Industry in FCT, Abuja. The need to train and as well adopt the emerging technology to cushion the effect of the inadequacy become imperative. These strategies will enhance sustainable project performance for the satisfaction of clients and other stakeholders.

The shortage of necessary skills in the industry has been on the increase as observed from reviewed literature, which prompt this study to examine the Skilled Workers Shortages in the Construction Industry and the Required Strategies to Mitigate the Impact in Federal Capital Territory (FCT), Abuja. Skills shortage in the construction industry leads to such issues as project cost increase, project delay, reduction in quality, and increase in number of accidents on site, rework and low productivity of workforce. Other effects include reduction in organizations' competitiveness, complete failure of the enterprise, rise in construction workers' pay and decrease in the number and size of building and construction labor sector. It is against this backdrop that guided the researcher to make recommendations based on the findings of the study.

VII. RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

i. Construction firms and other stakeholders from both public and private sectors should invest in training, research and development of their employees cutting across various skill needs of the organization in order to mitigate the shortages of skilled workers in the construction industry in FCT, Abuja and the country in general.

ii. Stakeholders in the construction industry both in public and private sectors should invest in technical education with a view to introducing youths to construction related disciplines at early stages of their education with requisite skills, thereby ensuring worthy replacement to the aging skilled workers and also creating avenue that will ensure adequate youthful skill workers for the industry.

iii. Stakeholders in the construction industry should take measures to address the identified areas of skill workers' shortages in FCT, Abuja through the instrumentality of training and retraining of youths in the specific areas of shortages.

iv. Long term investments by Government, private sector and non-governmental organization to establish school to train workers on automated processes of construction and also incorporating incentives/rewarding strategies to encourage and to retain skilled worker from travelling overseas for greener pasture.

5.5 Contribution to Knowledge

The study identify training in automated construction as one of the solutions to skilled workers shortages considering the fact that the world is revolving into the use of higher technology in construction industry. Training needs should be proportional to the skilled required with a proper record keeping to monitor skill demand and supply in the construction industry.

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