AN ASSESSMENT OF THE ROLE OF BUILDING CONSTRUCTION SECTOR IN NIGERIA ECONOMIC GROWTH: THE COVID19 EXPERIENCE

(*A Case Study of Some Selected building Construction Companies in Benin City, Edo State*)

BY

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CERTIFICATION

This to certify that this project work titled "An Assessment of the Role of Building Construction Sector in Nigeria Economic Growth: The Covid19 Experience (A case study of some selected Building Construction Companies in Benin City, Edo State)" was carried out by **IDEDIA OSEWE KELVIN** with Matriculation Number; **ENV/2032070003** in the Department of Building Technology, School of Environmental Studies, Auchi Polytechnic, Auchi, Edo State.

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DEDICATION

This project work is dedicated to God Almighty for his preservation, protection and kindness throughout the completion of my programme in Auchi Polytechnic, Auchi.

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Research like this could not have been completed without the immense contribution of some persons that i will not fail to acknowledge.

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TABLE OF CONTENTS

ABSTRACT

This work was carried out to access the role of building construction sector in Nigeria using some selected building construction companies in Benin City, Edo State as a case study. To achieve this goal, descriptive survey method was used. Consequently, a questionnaire was constructed and validated using test and retest method. Hence, since the population of the study is relatively large, Yamane (1967) formula was used to determine 175 as the sample for the study, Therefore, the constructed questionnaire was then served on five (5) selected building construction companies located in Benin City. The data gathered was subjected to statistical tables, sample percentage and chi-square test. The results of the analyses show amongst other things that construction industry has a significant impact on economic development of Nigeria. The researcher concluded that construction industry is a driver of growth in other sectors due to its heavy reliance on an extended and varied supply chain. Based on the findings and conclusion, the researcher recommended amongst others that there should be a review of existing construction industry tertiary education and professional certification curricular to include digital transformation and digital technologies so as to cope with future pandemic.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Like in other nations, the Nigerian construction industry engages in a wide range of loosely integrated organizations that collectively construct, alter and repair a wide range of different buildings and civil engineering projects (Akanni *et al.,* 2014). In most nations, the industry contributes significantly to the Gross Domestic Product (GDP). Construction sector and construction activities are considered to be one of the major sources of economic growth, development and economic activities. Construction industry plays an important role in the economic uplift and development of the country. It can be regarded as a mechanism of generating the employment and offering job opportunities to millions of unskilled, semi-skilled and skilled work force. It also plays key role in generating income in both formal and informal sector. It supplements the foreign exchange earnings derived from trade in construction material and engineering services. For instance, in Nigeria, in thefirst quarter of 2016, the construction industry contributed about 4.13% to the total GDP (National Bureau of Statistics, NBS, 2016). Both in the areas of job creation and socio- economic development of the nation globally, the industry has fared well. For decades, although, stakeholders have called to question the performance of construction projects in Nigeria, however, the advent of coronavirus in 2019 (COVID-19), and the consequent activitylockdown have further exacerbated the crisis.

The Corona virus disease otherwise known as Covid-19 is a novel virus that is highly contagious and spreads very quickly; different from Influenza or SARS. It has proven to be capable of causing great health challenges which can cause great economic and societal disruptions. As at 11th July, 2020, according to Nigerian Centre for Disease Control (NCDC), Nigeria had the third highest number of infected persons after South Africa and Egypt.

This Covid-19 virus that belongs to the family of Corona viridian derived its name from Corona which represents crown-like spikes on the outer surface of the virus. Corona viruses (CoVs) basically cause enzootic infections in birds and mammals but in recent times, have shown the capability of infecting human beings as well. The outbreak of severe acute respiratory syndrome

Corona virus (SARS-CoV) in 2003, H5N1 influenza A, HINI 2009 and more recently Middle East respiratory syndrome (MERS-CoV) have exhibited the deadly nature of Corona viruses when they infect humans. They cause both mild infection in the upper respiratory tract and also more serious lower respiratory tract infections.

According to the report of the WHO-China Joint mission on the corona virus (Covid-19) disease, the virus disease outbreak was confirmed in a city in the Hubei province of China called Wuhan. It started in December, 2019. Bats according to studies appear to be the reservoir of the virus though the intermediate host(s) are yet unknown. Just like SARS AND MERS – CoV, the mode of transmission is by spreading respiratory droplets produced by coughing, sneezing, talking or breathing. The key symptoms are dry cough, fever and diarrhea.

1.2 Statement of the Problem

According to PwC (2020), construction sector is experiencing supply chain bottlenecks of equipment and materials, construction projects have been delayed, and some cancelled, as a result of the impacts of COVID-19 on the companies and governments that commissioned such projects. Beyond the tragic health hazards and human consequences of the COVID-19 pandemic, the economic uncertainties, and disruptions that have resulted come at a significant cost to the global economy (Akanni & Gabriel, 2020), the situation is changing quickly, with widespread impacts (PwC, 2020) and the disruptions are affecting the workforce across sectors.

Construction and property development activities promote circular flow of income, and contribute profoundly to the Gross Domestic Product (GDP); hence influencing significantly the national economy by implication of the position of the construction industry in a national economy. Thus, any condition that affects the general economy wouldhave affected the activities of the construction industry.

As with most other economies around the world, the sharp drop in Nigeria's GDP growth is largely down to the slowdown in economic activity after the country resorted to a lockdown during the pandmic to curb the spread of the virus, which has forced force some of the Engineering and Construction companies to streamline debt, consider means of funding or risk bankruptcy. Looking ahead, Engineering and Construction companies will encounter a new dispensation which will include a change in the marketplace, investment in infrastructure by some of the "national government" to kick-start their recovery. It is inlight with the above problems that the research deemed it fit to access the role of building construction sector in Nigeria, in reference with the covid19 experience. More so, the impact of the role of building construction section in Nigeria with reference to covid19 is not carried out earlier.

1.3 Aims and Objectives of the Study

The major aim of this work is to access the role of building construction section in Nigeria. Its specific objective is:

i. To examine the Impacts of building construction industry on the economic development of Nigeria
ii. To evaluate the impact of the Covid-19 pandemic in the construction sector in Nigeria
iii. To determine the extent to which construction industry adopted Digital technology on its operation during the Pandemic

1.4 Research Questions

To this end, this study shall attempt to provide answers for the following research questions:

i. What are the impacts of construction industry on the economic development of Nigeria?

ii. What are the impact of the Covid-19 pandemic in the construction sector in Nigeria?

iii. To what extent has construction industry adopted Digital technology on its operation during the Pandemic ?

1.5 Research Hypotheses

In addition to the research questions above, the following hypotheses stated in null and alternate guided the study.

Hypothesis I

Ho: Construction industry has no significant impact on economic development of Nigeria

Hi: Construction industry has a significant impact on economic development of Nigeria

Hypothesis II

Ho: The Covid-19 pandemic has no significant impact on the construction sector in Nigeria

Hi: The Covid-19 pandemic has a significant impact on the construction sector in Nigeria

Hypothesis III

Ho: Construction industry did not adopt digital technology on its operation during the Pandemic

Hi: Construction industry adopted digital technology on its operation during the Pandemic

1.6 Scope of Study

The study accessed the role of building construction section in Nigeria. Dues to time, resources incurred for the study, it will be limited to some selected building construction companies located in Benin City, Edo state.

1.7 Significance of the Study

The outcome of this study will be beneficial in many ways. First and foremost, it will be of great value to the researcher. It will also be of great value to the construction companies. The study will add to knowledge and existing literature (similar literature)

It is also hope that the study will enable construction industries and the government plan for future spread of covid19 and similar diseases.

It is hope to create awareness on the damage that a pandemic can have on the global and national economy.

Finally, the findings will also be useful to the government on the need to gear up their readiness and preparedness in responses to covid19 and similar pandemic.

1.8 Limitation for the study

In carrying out an academic research of this nature, there will be a lot of factors militating against this it. Among many others is financial constraint, the cost involved in searching and browsing for the materials as well as typesetting the project work.=

1.9 Operational Definitions of Terms

Construction Contract: Construction Contract means a written or oral agreement relating to the construction, alteration, repair, maintenance, moving or demolition of any building, structure or improvement or relating to the excavation of or other development or improvement to land**.**

Pandemic : A pandemic is an epidemic of an infectious disease that has spread across a large region, for instance multiple continents or worldwide, affecting a substantial number of individuals. A widespread endemic disease with a stable number of infected individuals is not a pandemic

Coronavirus disease: Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment.

Digitization: Digitization is the process of converting information into a digital (i.e. computer-readable) format.The result is the representation of an object, image, sound, document or signal (usually an analog signal) obtained by generating a series of numbers that describe a discrete set of points or samples

Construction: construction, also called building construction, the techniques and industry involved in the assembly and erection of structures, primarily those used to provide shelter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Nature of Nigerian Building Construction Industry

The construction industry in any economy around the world exhibits virtually the same features in varying degrees. The industry is a paradox in many respects. The extremes of situations or attributes which ordinarily would appear to be opposing or parallel forces tend to co-exist or rationalize in the industry. The construction industry is perhaps the largest employer of labour among the other industries and it is the oldest industry with history dated back to the beginning of civilization (Falemu, 2013).

In the formal or informal human economic activity and at the boardrooms of national economic planning, the construction industry is shared, spilt or dispersed under the other sub-sectors of the economy with the convenient pseudonym of capital expenditures. Consequently, the industry suffers loss of weight and voice as a single sub-sector of the economy when compared with the other sub-sectors. The industry is seen and used as a convenient tool for regulating the economy (Falemu, 2013). As a regulator of an economy, the industry is expected to possess the qualities that can cool an overheating economy and equally be able to warm up a freezing economy.

Historically, the industry has done the most and the best in preserving the treasures and evidence of centuries old civilizations as far as the politics, religions and social activities of those eras were concerned.

The construction industry has some characteristics that distinguish it from all other industries

- The physical nature of the product
- The product is normally manufactured on the client's premises
- Many construction projects are one-off designs and lack available prototype models
- Adversarial culture of the industry i.e. culture of blame

- It is a fragmented industry with design and production under different management umbrella
- The construction industry is the only industry with mobile factory. The men, machine, material, management and other resources are moved from one site to another.
- The organization of the construction process i.e. irrespective of the technological progress so far made in the methodologies adopted for construction processes project execution often remain exposed to the uncertainties of the elements of weather and geological condition.
- The employment characteristics of the industry i.e. it has the large number of self-employed workers. and
- The methods used for price determination. (The industry where the normal rule of 'see and buy' does not operate most of the time rather it is buys and sees later i.e. the client pays in advances for the product for what he does not see).

The construction industry is divided into three major segments according to the type of contractors.

1. Construction of building contractors, or general contractors who build residential, industrial commercial and other buildings.
2. Heavy and civil engineering construction contractors who build sewers, road, highways, bridges, tunnels, sub-way and other projects.
3. Special trade contractors who engage in specialized activities such as carpentry, painting, plumbing and electrical works.

The activities of the industry include work on new structures as well as additions, alterations, and repairs to existing ones. The construction is usually done or coordinated by general contractors who specialize in one typed of construction or the other. The general

contractor usually takes full responsibility for the complete job except for specified portions of the work that may be omitted from the general contract.

Although, general contractors many do a portion of the work with their own men workers, they often subcontract most of the work to heavy construction or specialty trade contractors, the specialty trade contractors usually do the work of only one trade, such as painting, carpentry or electrical work, or two or more closely related trades such as plumbing and heating/ventilating. Beyond fitting, their work in relation to that of other trades, specialty trade contractors have no responsibility for the structure as a whole. They obtain orders for their work from the general contractors, architects or property owners. Generally a significant number of people are employed by these three categories of contractors as workers in the construction industry.

2.2 Current Scenario of Global Construction

Construction firms in the UK can breathe amid COVID-19 as the government announced the 'reverse charge' for Value added tax (VAT) payment for construction services pushed back to March 2021 from October 2020. The public construction sector is one of the few industries that have been maintained (to some extent) in this COVID-19 pandemic. In the short term, activity is expected to continue (Kale, 2020).

Can COVID-19 be considered a risk? For this study, risk defined by PMBOK Guide cited by Eldosouky et al. (2014, p. 863) as an "uncertain event or condition that if it occurs, has a positive or negative effect on a project's objectives" was adopted. The authors further emphasized that risk in projects include threats known as adverse risk or downside events and opportunities known as beneficial or upside risk events. Abd El Khalek *et al.* (2016) furthermore concluded that the majority of construction companies are eager to penetrate the international markets to maximise their income and grow potential benefits. A construction firm's decision of penetrating the global markets must be grounded on a proper

knowledge of the threats and the opportunities. However, can it be stated that the emergence of COVID-19 enabled the appropriate understanding of risks and opportunities to the construction industry?

The survey conducted by Build UK on behalf of Construction Leadership Council reveals that 43% of respondents of the "*Retaining Talent in Construction"* survey expected over longer-term to make redundancies (Construction Manager, 2020). From September 2020, about 6.7% of apprentices are likely to lose jobs, while 20% of the workforce will be affected. Construction company projects a 7.7% reduction of the workforce directly employed while the industry anticipates a 26.7% decrease in the agency workers and self-employed. The combination of the reduction of the self-employed and workers and the directly applied accounted for the reduction of workers expected in 2020. As of June 2020, averages of about 32% directly applied are already furloughed at the time of the survey (Lexology, 2020). Okonmah et al. (2020) recorded the case of COVID-19 in Nigeria. The Department of Petroleum Resources (DPR) directed the demobilisation of all non- crucial staff at the offshore site while imposing health and safety rationale to limit the spread of the COVID-19 on projects and site. The oil and gas sector declared the situation force majeure, which brings strong justification in support of the party who seeks to apply force majeure. This may, however, be not conclusive as a tribunal or court may consider all circumstances in a contractual context to warrant such claims. Can there be contingency consideration for such a situation as this, Otali and Odesola (2014, p. 589) defined contingency from PMI as "the amount of money needed above the estimate to reduce the risk overruns of project objectives to a level acceptable to the organisation". They concluded in the study that the three highly essential aspects that affect the percentage or sum to be permitted as a contingency in projects are the estimator's experience, projects complexity and projects location. However, consideration was not given to unforeseen circumstances or risk such as

COVID-19. The authors also defined risk as "events within the defined project scope that are unforeseen, unknown, unexpected, unidentified or undefined" (Otali and Odesola, 2014, p. 589).

In rescuing the unprecedented situation, the Construction Leadership Council (CLC) assumed an intermediary role between the government and construction industry in identifying and delivering actions to support UK construction in fostering better efficiency. The council published its plan in three stages: *Restart, Reset, Reinvent*. The COVID-19 under the CLC produced the two–year scheme to ensure a stable for all parts of the sector in the future and also to boost productivity (CIOB, 2020a). The fallout in the global economy caused by the pandemic is compelling governments to derive policies for invigorating the economy. The tried-and-true method is being considered by many governments to boost the economy in the short-term which will, in turn, provide "societal benefit" in the long-term, which is an investment in infrastructure (Davisson & Losavio, 2020).

A typical effective change management system at this unprecedented time is the introduction of Site Operating Procedures (SOPs) by the Construction Leadership Council (2020) in the UK. All necessary measures to take which includes "when to travel to work, toilet facilities, First Aid and Emergency Service Response and cleaning are all stated. A letter from Minister for Local Government, Housing and Planning to Construction Scotland indicates movement to phase 1 on 28 May 2020 out of the 5 phases earmarked. Phase 1 facilitated the "physical distancing and enhanced hygiene," installation or expansion of existing toilet facilities and site welfare. The entire phases are listed below:

- Phase 0: Planning
- Phase 1: COVID-19 pre-start site preparation
- Phase 2: "Soft start" to site works (only where physical distancing can be maintained)
- Phase 3: Steady state operation (only where physical

distancing can be maintained)

- Phase 4: Steady state operation (where physical distancing can be maintained and/or with PPE use)
- Phase 5: Increasing density/productivity with experience (Construction Leadership Council, 2020)

2.3 Economic Development in Nigeria

Nigeria's economic performance, since independence in 1960, has been decidedly unimpressive. It is estimated that Nigeria received over US$228 billion from oil exports between 1981 and 1999 (Udeh, 2000), and yet the number of Nigerians living in abject poverty – subsisting on less than $1 a day – more than doubled between 1970 and 2000, and the proportion of the population living in poverty rose from 36% to 70% over the same period. At official exchange rates, Nigeria's per capita income of US$260 in 2000 was precisely one-third of its level in 1980 according to Iyoha (2007). Meanwhile, during this period, Nigeria's external debt rose almost continuously, as did the share of its GDP owed annually in debt service.

Macroeconomic developments in recent years in Nigeria as noted by AfDB/OECD (2006) have been encouraging, with GDP growth averaging 6 per cent from 2000 through 2005. After reaching peak value of 10.2% in 2003, growth took downward trend to 6.1 per cent in 2004. Growth in 2005, estimated at 4.4 per cent, a much lower rate than the government's figure, was broadly based, with the oil, agriculture, construction and telecommunications sectors performing particularly well. High world oil prices have provided a big boost to the oil sector in recent years. In 2005, agricultural output increased by 7 per cent, up from 6.2 per cent in 2004, reflecting both favourable weather conditions and government efforts to increase farmers' access to credit and fertilizers. Construction was estimated by the government to grow by 10 per cent in 2005 as a result of booming real estate development. Nigeria's telecommunications sector grew by 12 per cent following its accelerated liberalization and privatisation, which led to the introduction and rapid spread of

the global system for mobile communications (GSM) services. Growth in the manufacturing sector, at 8 per cent in 2005, is lower than the 10 per cent recorded in 2004.

2.4 Construction Linkages

The importance of the construction industry stems from its strong linkages with other sectors of the economy. Bynoe (2009) affirmed that the construction sector is an important element of many countries' macroeconomic growth strategy. The industry is a major source of employment, and also lays the foundation for economic growth by providing the infrastructural and commercial framework needed for development. Furthermore, as has been shown by Lean (2001), there is evidence of a set of bi-directional causal relationships, which are considered to be important drivers of economic growth, between the construction sector and the other sectors of an economy. In addition the output of the industry is critical in supplying the infrastructure needed for the development of various sectors of a country's economy.

Given the recognized importance of the sector to economic development and growth, construction has been used extensively by policy makers as a tool, and changes to the portion of public spending going towards building activity has been a feature of various governments' fiscal policy measures. Indeed, the importance of the industry to economic growth, especially in the case of developing countries, where evidence suggests that the share of construction output to national output is highest and of greater importance (Ruddock and Lopes, 2006), continues to motivate research into the sector. Hosein and Lewis (2004) suggested that the importance of the industry in particular to a developing country, is due to its size, the fact that it provides investment goods, and the size of government involvement. Bynoe (2009) put forward that in Barbados, construction activity is important because of the role it plays in the investment process and because it can be used as an early indicator of economic trends.

The sectoral composition of output, the linkages between the different sectors and their combined impact on growth and development have been of interest to a variety of theoretical approaches to economic growth (Wild & Schwank, 2008). The concept of linkages in the economy is very important as there is unbalanced growth among supporting sectors of the economy. It is therefore important that an economic activity that has the ability to stimulate and drive others in the growth process should be given greater attention.

2.5 Impact of Covid19 on Construction Industry

COVID-19 pandemic impacted several global economies adversely including loss of sectoral productivity with attendant socio-economic losses. Ozili, (2020) attributed the severity of the pandemic in Nigeria toweak institutions, and a lack of adequate social welfare packages to swiftly cushion the effect of the pandemic (p. 3). Furthermore, the global decline in oil prices also impacted economies and nations adverselyowing to the low demand for oil in the international market (Ozili, 2020, p. 20)

The construction industry like other economic sectors was not spared and as such, suffered its share of the adverse effects of the pandemic. The industry is known for its significant contribution to gross domestic product (GDP) and the employment of a large pool of manpower. Generally, the construction industry has inherent challenges owing to the peculiarities of its operations and processes. Its activities are often complex and dynamic, and this was further threatened by unforeseen risks arising from the pandemic. A major characteristic of the industry is its deployment of nearly all categories of workers in the performance of multifarious activities for effective project delivery. This, unfortunately, became impossible under the new normal due to the pandemic. The most significant consequences of the pandemic on the construction industry included suspension of projects, labour impact and job losses, time overrun, cost overrun, and financial implications, among several others (Gamil and Alhager 2020, p. 127).

Many sectors of the economy were affected negatively; and the construction works and the property development sector was not an exception. Many construction projects in Nigeria and around the world stopped due to various challenges arising from the outbreak of Covid-19. This is evident in the complaint against scarcity of production and property development materials for the manufacturing industries and property development sector respectively as a result of closure of national boarder and related economiccrisis in Nigeria due to Covid-19 outbreakglobally (Gamil and Alhager, 2020).

Nigeria economy in general was largely affected by the outbreak of the pandemic even before the shut-down of business and movement within the country; especially when the international boarders and ports were closed down. Nigeria is known to have higher international transactions and importation business with China. Consequently, business link with china where the virus evolved was cut off hence; affecting grossly the economy of Nigeria as a nation.

According to Arcadis (2020) Covid-19 outbreak significantly disrupted the India construction industry in a variety of ways that spans from materials' supply and pricing to workers availability and project completion scheduling. Although there was already a tough time in the industry before the outbreak of the pandemic, the condition became worst after the toll of the pandemic on building industry in India. The government took a new measure to improve the condition of builders with the critical decisions being advisory to states to recognize covid-19 as a force majeure under real estate (Regulation and Development) Act, 2016 (RERA). Majority of the region in India did so, and extended the project registration of RERA registered projects by up to six months, thus giving builders a considerable breath of relief.

In another dimension according to Bailey, Bouchardie, and Madalena, (2020) the impact of Covid-19 on the infrastructures and construction sectors in India has been

extensive and damaging. Awareness on the existence of particular contractual entitlements on extension of time to completion, and for the payment of additional cost in relation to their projects was created. Since no two projects are exactly the same, he warned that such contractual clauses are likely to be subjected to certain conditions governing their operations; hence making it impossible to provide any generic solution forthose involved in the construction sector.

They discovered that Nigeria and many other governments are offering aids to persons and businesses that are negatively affected by the Covid-19 situation; such that even if one has no legal entitlement to compensation for adverse effect of the pandemic on the project, aid may be available to defray some of the implications. The United Kingdom through the construction leadership council, in responding to the unprecedented situation published a new site operating procedure (SOP); characterized by innovative and diverse use of technology in an exemplary manner which may change the course of construction, even after the extinction of corona virus. Although modern procurement planning, necessity for virtual working and unique decision considerations exist, their study paves way for the development of additional contingency plan and new working strategies to minimize human contact situation at work places (Kalirajan and Babu 2019).

2.6 Effect of Covid-19 Pandemic in the Nigeria Construction Industry through Digitalization of Operations

According to Ogunnusi *et al.,* (2020), the pandemic led to the deployment of technological tools and an increase in off-site working (p. 124). Thus, this study adopts Rouse's definition for digitalization which was described as a 'way of transforming information into a digital format, through the organizing of information into distinct units of data that can be separately addressed' (Rouse 2017, p. 1). Digital transformation in the construction industry is summarily the integration of digital data into the project life-cycle.

The earliest adopters of digital technologies according to (Kalirajan and Babu 2019) have reshaped the entire architecture of project delivery (p. 91). Most industries have undergone a digital transformation and use of digital technologies in their operations. Halim (2010) noted that no industry could effectively overcome its growth challenges unless goals and strategies are driven by digital technology. Technology has transformed our way of living in all ramifications including construction activities (Mentsiev *et al*., 2020, p. 19). Aghimien *et al.*, (2018), identified the most significant benefits derived from digitalization in the construction industry as time-saving in projects delivery, increase productivity, increase speed of work, and simpler working methods (p. 5). Expectedly, the adoption of digitalization in the construction industry is also faced with numerous challenges. Findings from the literature have shown challenges such as consistent fragments, unavailability of skilled labour, lack of adequate or absence of knowledge from one project to another (Livotov *et al.,* 2019, p. 2 and Craveiro *et al.,* 2019, p. 1) among several others have limited the adoption technological opportunities in the engineering and construction sector. Aghimien, (2019) identified the major challenges of digitalization as lack of technical expertise, finances, security, interoperability, fear and resistance. The major drivers of digitalization in the construction industry have been found to be in the area of research, innovation, government support, as well as a public-private partnership (p. 433)

2.7 Major Economic Factors Influencing Construction Activity

2.7.1 Instability of Demand

Construction demand is inherently volatile. Wide fluctuations in construction outputs are common. Studying a number of countries with different income from various parts of the world, the World Bank (2012) indicated that the fluctuation of construction outputs was more than half of the manufacturing sector and the economy as a whole. The construction industry experienced stronger movements of business cycle than other economic sectors. These fluctuations are partly due to the nature of construction demand and partly due to the

nature of construction products. Demand for construction outputs is considered derived demand from other economic activities (Hillebrandt, 2000). Outputs of the construction industry are investment-goods, which are produced to facilitate the creation of other consumption-goods and services. In other words, the construction industry itself cannot create the demand for its outputs. Demand for construction is therefore largely dependent on the business activities of other goods and services that the construction products help create. Following the ups and downs of the economy, the demand for construction can go through the movement of a business cycle earlier and more strongly than other sectors because of the nature of its products. A construction product is immobile and is often constructed only after the client realizes the demand. This nature of construction products makes the industry unable to stock up products for sale. Hence, when there is a sudden increase in demand, the industry cannot respond to the demand quickly. The fluctuations of construction demand can be very large, thus affecting the economy considerably. The immobility and the durability properties also make construction demand geo- graphically dependent. Demand for construction within a geographical area will at some time in the future experience a substantial fall and suffer saturation when much of the demand in the area is met and the existing facilities are still economical to maintain (Hillebrandt, 2000).

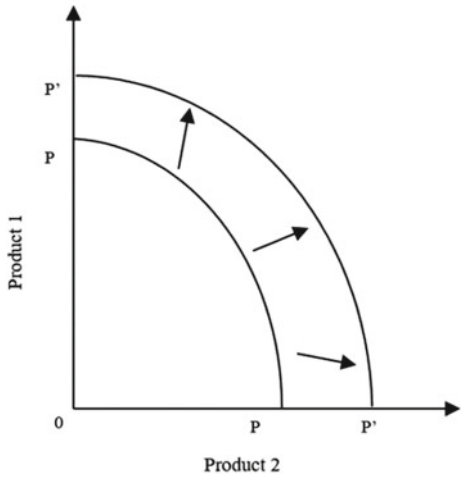
2.8 Construction and Aggregate Output

2.4.1 Capital Formation

The productive capacity of an economy is usually described in terms of the complete utilization of factors of production; that is the full employment of the factors of production (labour and capital). Hence, the productive capacity determines the aggregate supply or national output of an economy in the long run. If there are changes in the total capital stock, the fixed amount of national output will change accordingly. One way for an economy to

expand production or grow is to invest in capital stocks (human and physical resources). The relationship has long been recognized in economic theory.

Fig. 2.1 Effect of increases in capital stock on the production possibility frontier



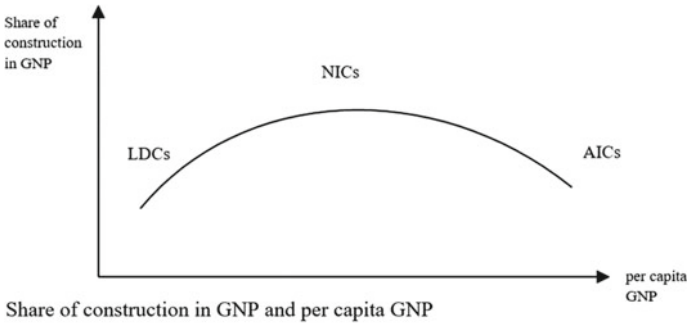
Source: Mogbo, 2000

According to the Harrod-Domar model of economic growth, net investment, which is defined as the change in the capital stock (ΔK), is necessary for the economy to grow. Besides investments in new factories, machinery, equipment, and materials, investments in economic infrastructure—roads, electricity, communication and the like—also increase the physical capital stock of a nation, thus expanding national output level. Investments in economic infrastructure are considered a supplement to other physical capital. For example, a farmer may increase the total output of the crops by an investment in a new tractor, but without adequate transport facilities, this extra product cannot be available in local commercial markets, and thus his investment may not add anything to national food production. As a result, assuming there were only two products, product 1 and product 2, produced by the economy at a given technology level, increases in capital stock (human and physical resources) would make it possible to shift the production possibility curve outward uniformly from PP to P'P' as shown in Fig. 2.1 (Mogbo, 2000).

Infrastructure can also raise productivity of other factors of production. For example, an installation of a new irrigation system can improve the quality of farm land, thus raising productivity per hectare and shifting the production possibility curve out- ward (Mogbo, 2000). The higher productivity in turn attracts more resources (private investments) into production, which further contribute to higher levels of out- put, profitability of production, income and employment in these sectors. The process of investing in the physical capital stocks of an economy, including infrastructure is measured by the gross fixed capital formation (GFCF).

2.5 National Income

Construction like any other economic activities can contribute to national income by creating income or value adds. Based on the definition by the United Nations, Ofori (1990) explained that value added in construction is the gross output value at producer's prices less the value of all industry's current purchases from other enterprises. It is important to note that according to the narrowly defined scope of the construction industry, all industry's current purchases from other enterprises are excluded, which are the value of input materials and components, costs of hiring plant, costs of goods sold in the same conditions as purchased, legal and other professional fees, and payments made for repair and maintenance undertaken by others on the construction firm's own assets. Value added therefore is actually the sum of salaries and wages of employees, interest on borrowed capital, net rent, profit and allowance for depreciation. The value added-to-output ratios of the construction industry in most developing countries were higher than that of manufacturing over the period of 1970–1980. In some countries, the ratios of the construction industry could be as high as 60% (Bon, 2000).



Share of construction in GNP and per capita GNP

Legend:
LDCs: Less developing countries;
NICs: Newly industrialized countries; and
AICs: Advanced industrial countries.

Fig. 2.2 *Share of construction in GNP and per capita GNP*

U-shape. That is, in the initial development stages, the share of construction output in GNP increases, but starts to decline in the more mature stages. Thus in the long run, the volume of construction output will decline accordingly. The contribution of the construction industry to economic growth is therefore not indefinite (non- linear relationship). Bon (2000) observed that there is a point at which the basic major infrastructure is put in place and the need for new construction gradually becomes less. However, Ruddock and Lopes (2006) argued that in the more mature stages of development, construction output declines only in relative terms, not in absolute terms. That is, in the more developed countries, construction still grow but at slower rates than the economy. The inverted U-shaped relationship between the share of construction in GNP and GNP per capita proposed by Bon (2000) (as shown in Fig. 2.2) was further confirmed by Crosthwaite (2000) These observations implied that capacity expansion in construction is more important for the developing countries than for the developed countries. The feature of the activity in the industry is also different between the developing and developed countries. Repair and maintenance capacity become important in the developed countries, whereas the industry's capacity for new build as well as the development of capacity for repair and maintenance is a major focus of the developing countries (Bon & Crosthwaite, 2000).

As a result, policy implications within the literature have focused on the measures to expand the capacity of the construction industry in the developing countries. The development strategies for the construction industry are consequently centered on the schemes to remove the constraints of the industry's production factors such as labour, materials, capital and technology. By building up an adequate domestic capacity, the construction industry is expected to drive economic growth. The policy recommendations also include creating an institutional environment that facilitates a competitive business environment for an efficient construction industry.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methods and procedure to be adopted in collecting and analyzing data for the study. The chapter covers research design, population, sample and sampling techniques, sources of data, validity of instrument used, method of data collection and method of data analysis.

3.2 Research Design

This is basically exploratory study inquiring into the role of building construction sector in Nigeria Economic growth: the Covid19 experience. The research is designed to enable the researcher obtain data validly, accurately and objectively. It will employ survey research method for collecting the primary data. This mode of research will be used in view of the nature of the study. It should be noted that this research is purely a descriptive study.

3.3 Population for the Study

The study will concentrate on five (5) selected Building construction companies located in Benin City. The members of staff include are total of three hundred and twelve (312). They will constitute the population for this study. Table 3.1 below shows the population distribution.

3.1 Population Distribution

S/N	Building Construction Companies	Population
1	**Beracah Works Limited** by slope, 144 Akpakpava St, opposite unity park, Avbiama 300104, Benin City	62
2	**Landsmith Constructions limited** Hamilton Plaza, KM 10 Benin Sapele Rd, opp. Rock of Ages, Oka 300105, Benin City	53
3	**Pekuric Limited** 1 Immaghodor Street, Off Oba-Eweka street, Ihama Rd, GRA, Benin City	70
4	**Airos Synergy Nigeria Limited** G.R.A, 4b, Aghayubini Cresent, off Upper Adesuwa Grammar School Rd, Benin City	68
5	**Tapeema Nigeria Limited** No. 144, Benin Auchi Road, Opposite Big Joe Motor Park, Aduwawa, Benin City	59
	Total	**312**

Source: Field survey, 2022

3.4 Sample Size and Sampling Technique

Since the sample size in the study is relatively large, the researchers determined the sample used for the study with the Yamane (1967) formula. Hence, Sample size determination involves showing how the representative of that population was selected. According to Karla (2011), sample is a group of items taken from the population for examination. It is simply a smaller part of the population. The outcome of the sample determination will determine what sample size to be used in regard to the respondents' participation on access the role of building construction section in Nigeria, with reference to selected respondents.

Sample Determination

Yamane (1967) statistical formula will be adopted for this research work.

This formula is thus:

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

Where, N= population of study

n= sample size

e= level of significance or margin of error I=

unit (a constant)

Therefore,

N= 312

e= 0.05

n=?

(The choice of 0.05 level of significance is purely an exclusive decision of researcher).

Replacing the values above with the above formulae,

We have $n = \frac{312}{1+312(0.05)^2}$

$$n = \frac{312}{1 + 0.78}$$

$$n = \frac{312}{1.78} = 175$$

n = 175 sample size

While sample size is 175 the researcher will divide the questionnaire equally and distribute the 175 questionnaires to the respondents. Therefore analysis of data will be based on the response of the 175 respondents.

3.5 Sources of Data Collection

This study made use of primary and secondary sources of data. With the questionnaire, personal interview will be conducted to supplement its data. A successful and detailed completion of work will relied on the questionnaire which will be distributed to the respondents. Also the oral interview added to the work greatly enhanced the validity.

Questionnaire Procedure

A well carefully designed questionnaire will be used to carry out the work. The questionnaire was designed in the form of five point likert scale in order to elicit genuine responses from the respondent.

The five point likert scale questions will enable the respondents to further give their detailed opinion on the questions.

3.6 Validity of Instrument Used

The research will ensure that the instrument sampled a significant aspect on the variable being investigated in an unambiguous way. Infact, all types of validity including content, concurrent fact, construct and prediction validities were observed in the construction of the questions. The questionnaire will properly be scrutinized and modified to ensure that the instrument measured what it claimed to measure and also improve the fact of the validity. The questionnaires will also be validated by this project supervisor who will vet it and make some corrections/modifications.

3.7 Method of Data Collection

The method of data presentation will be based on how the researcher collected his data. The questionnaire will be administered by the researcher on face to face approach supplement with interview with the respondents. The data collection with aid of questionnaire will be arranged, itemized and presented in table in accordance with the response sought in the questions.

3.8 Method of Data Analysis.

Frequency table and simple percentage was a major tool used to gather the data for this study and chi-square statistics were used to analyze the hypotheses . The data collected were first of all aggregated in frequency table before simple percentage and chi-square was applied. The formula for simple percentage is given below:

$$\text{Simple percentage} = \frac{\text{No of Responses}}{\text{No of Respondents}} \times \frac{100}{1}$$

And the formula for Chi-square (x^2) is $= \frac{(o-e)^2}{e}$

Where 0 = Observed value

e = Expected value

Therefore level of significance = 5% degree of freedom = (R-1) (C-1) where r = row C= Column.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter is aimed at analyzing the health and safety practices in building construction sites. It deals with the analysis of data generated from the retrieved questionnaire. A total of 175 questionnaires were administered on five (5) selected building construction companies located in Benin City. Two (2) was filled wrongly and three (3) was not returned.

4.2 Data Presentation

This presents the responses obtained from the completed questionnaire. A total number of 175 questionnaire were distributed but one hundred and seventy (170) were completely retrieved which represents the response rate of 97% .

Table 4.1: Distribution of Respondents According to Sex

Sex	No. of respondents	Percentage
Male	90	53
Female	80	47
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that there are 90 respondents representing 53% were males, while 80 respondents are representing 47% were females. We can conclude that Males are more in the population of study.

Table 4.2: Distribution of Respondents According to Marital Status

Marital Status	No. of respondents	Percentage
Married	86	51
Singles	84	49
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.2 above shows that 86 respondents are representing 51% married while 84% respondent are representing 49% single.

Table 4.3: Level of Education of Respondents

Certificate	No. of respondents	Percentage
Olevel	48	28
HND/BSc	79	46
Masters/PhD	20	12
Others	23	14
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.3 above shows that 48 respondents are representing 28% possess Olevel certificate, 79 respondents are representing 46% possess HND/BSc as their highest qualification while 20 respondents represented by 12% possess Masters/PhD degrees. We can conclude that the respondents who possess HND/BSc were more in the population.

Table 4.4: Age Distribution of Respondent

Age	No. of respondents	Percentage
21-30	58	34
31-40	50	29
41-50	43	25
51 and above	19	11
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that 58 respondents are representing 34% who are between the age 21 – 30, 50 respondents are representing 29% who are between the age of 31 – 40, 43 respondents who are between the age bracket of 41-50 are representing 26%. And the remaining 19 respondents representing 11% were 50 years and above. This is to say that respondents within the age bracket of 21-30 are the majority in the population.

Table 4.5 Job Title

Title	No. of respondents	Percentage
Builder	66	39
Architect	48	28
Civil engineer	33	19
Quantity surveyor	20	14
others	3	2
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that 66 respondents are representing 39% were builders, 48 respondents representing 28% were architect, 33 respondents representing 19% were civil engineers, and 20 respondents representing 14% were quantity surveyor while the remaining 3 representing 2% where from other job titles. This is to say that builders are more in the population,

4.3 QUESTIONS REGARDING IMPACTS OF BUILDING CONSTRUCTION INDUSTRY ON THE ECONOMIC DEVELOPMENT OF NIGERIA

Table 4.6: The construction industry serves as a means for tax and revenue generation

Response	No. of respondents	Percentage
Agree	86	51
Strongly agree	17	10
Neutral	04	2
Disagree	40	24
Strongly Disagree	23	13
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that 103 respondents represented by 61% agreed that the construction industry serves as a means for tax and revenue generation. 4 respondents were neutral while 63 respondents represented by 37%.

It is agreeable that the construction industry serves as a means for tax and revenue generation

Table 4.7:. The construction utilizes natural resources that abounds in the country for various construction Materials.

Response	No. of respondents	Percentage
Agree	60	7
Strongly agree	56	18
Neutral	12	7
Disagree	12	35
Strongly Disagree	30	33
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that a total of 116 respondents represented by 68% agreed that the construction utilize natural resources that abounds in the country for various

construction Materials. 12 respondents were Neutral, while a total 42 respondents represented by 25% disagreed that the construction utilize natural resources that abounds in the country for various construction materials. We can conclude that the construction utilize natural resources that abounds in the country for various construction Materials

Table 4.8: An increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities.

Response	No. of respondents	Percentage
Agree	71	42
Strongly agree	23	14
Neutral	0	0
Disagree	45	26
Strongly Disagree	31	18
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that a total of 94 respondents represented by 56% agreed that an increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities. While a total 76 respondents represented by 44% disagreed that an increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities. We can conclude that an increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities.

Table 4.9. Buildings, bridges and roads are the product of the construction industry, leading to exportation of finished goods to neighboring countries

Response	No. of respondents	Percentage
Agree	56	33
Strongly agree	33	19
Neutral	0	0
Disagree	45	26
Strongly Disagree	36	18
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that a total of 89 respondents represented by 52% agreed that buildings, bridges and roads are the product of the construction industry, leading to exportation of finished goods to neighboring countries. While a total 81 respondents

represented by 44% disagreed that buildings, bridges and roads are the product of the construction industry, leading to exportation of finished goods to neighboring countries. We can conclude that buildings, bridges and roads are the product of the construction industry, leading to exportation of finished goods to neighboring countries

Table 4.10: The growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour

Response	No. of respondents	Percentage
Agree	60	14
Strongly agree	74	8
Neutral	0	0
Disagree	23	35
Strongly Disagree	13	44
Total	**170**	**100%**

Source: Field Survey (2022)

The table above shows that a total of 134 respondents represented by 79% agreed that the growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour. While a total 36 respondents represented by 22% disagreed that the growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour. We can conclude that the growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour

4.4 QUESTIONS REGARDING THE IMPACT OF THE COVID-19 PANDEMIC IN THE CONSTRUCTION SECTOR IN NIGERIA

Table 4.11: The pandemic led to the shortage of distribution of raw material for building projects.

Response	No. of respondents	Percentage
Agree	56	14
Strongly agree	50	8
Neutral	0	0
Disagree	34	35
Strongly Disagree	30	44
Total	**170**	**100**

Source: Field Survey (2022)

The table above shows that a total of 106 respondents represented by 79% agreed that the pandemic led to the shortage of distribution of raw material for building projects.. While a

total 64 respondents represented by 22% disagreed. We can conclude that the pandemic led to the shortage of distribution of raw material for building projects.

Table 4.12: Builders have reported delays and increasing costs for imported raw materials during the pandemic

Response	No. of respondents	Percentage
Agree	46	24
Strongly agree	54	18
Neutral	0	0
Disagree	40	27
Strongly Disagree	30	32
Total	170	100

Source: Field Survey (2022)

The table above shows that a total of 100 respondents represented by 59% agreed that builders have reported delays and increasing costs for imported raw materials during the pandemic. While a total 70 respondents represented by 22% disagreed. We can conclude that builders have reported delays and increasing costs for imported raw materials during the pandemic

Table 4.13: Limited transportation and travel bans have slowed project delivery, and equipment Manufacturers.

Response	No. of respondents	Percentage
Agree	71	42
Strongly agree	28	16
Neutral	0	0
Disagree	40	24
Strongly Disagree	31	18
Total	170	100

Source: Field Survey (2022)

The table 4.13 above shows that a total of 99 respondents represented by 58% agreed that limited transportation and travel bans have slowed project delivery, and equipment Manufacturers.. While a total 71 respondents represented by 42% disagreed. We can say that limited transportation and travel bans have slowed project delivery.

Table 4.14: Many projects were delayed or entirely frozen as public agencies across the world closed their doors and suspended granting construction permits or providing on-site supervision to ongoing building projects

Response	No. of respondents	Percentage
Agree	69	12
Strongly agree	53	16
Neutral	0	0
Disagree	20	41
Strongly Disagree	28	31
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.14 above shows that a total of 122 respondents represented by 72% disagreed that many projects were delayed or entirely frozen as public agencies across the world closed their doors and suspended granting construction permits or providing on-site supervision to ongoing building projects. While a total 48 respondents represented by 28% agreed. Therefore we can conclude that many projects were delayed or entirely frozen as public agencies across the world closed their doors and suspended granting construction permits or providing on-site supervision to ongoing building projects

Table 4.15: Reduced spending and consumption capacity, operating restrictions and fear of contagion have all contributed to liquidity problems

Response	No. of respondents	Percentage
Agree	**110**	**19**
Strongly agree	**28**	**5**
Neutral	**0**	**0**
Disagree	**32**	**41**
Strongly Disagree	**9**	**31**
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.15 above shows that a total of 138 respondents represented by 72% agreed that reduced spending and consumption capacity, operating restrictions and fear of contagion have all contributed to liquidity problems. While a total 41 respondents represented by 28% disagreed. The researcher concluded that reduced spending and consumption capacity, operating restrictions and fear of contagion have all contributed to liquidity problems

4.5 QUESTION REGARDING THE EXTENT TO WHICH CONSTRUCTION INDUSTRY ADOPTED DIGITAL TECHNOLOGY ON ITS OPERATION DURING THE PANDEMIC

Table 4.16: Construction engineer use CCTV and drones to inspect construction sites during the pandemic

Response	No. of respondents	Percentage
Agree	45	26
Strongly agree	67	39
Neutral	0	0
Disagree	36	21
Strongly Disagree	22	13
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.16 above shows that a total of 112 respondents represented by 65% agreed that construction engineer use CCTV and drones to inspect construction sites during the pandemic.. While a total 58 respondents represented by 35% disagreed. We can say that construction engineer used CCTV and drones to inspect construction sites during the pandemic.

Table 4.17: There were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials.

Response	No. of respondents	Percentage
Agree	45	27
Strongly agree	56	33
Neutral	0	0
Disagree	36	21
Strongly Disagree	33	19
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.17 above shows that a total of 101 respondents represented by 60% agreed that there were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials. While a total 69 respondents represented by 40% disagreed. We can say that there were virtual inspections of construction sites through either a Zoom or Microsoft Teams video calls between engineers on site and building control officials.

Table 4.18: Construction engineers replace in-person inspections with the submission of photos and videos for verification during the pandemic.

Response	No. of respondents	Percentage
Agree	67	27
Strongly agree	48	6
Neutral	0	0
Disagree	45	39
Strongly Disagree	10	28
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.18 above shows that a total of 115 respondents represented by 67% agreed that construction engineers replace in-person inspections with the submission of photos and videos for verification during the pandemic. While a total 55 respondents represented by 33% disagreed. We can say that construction engineers replace in-person inspections with the submission of photos and videos for verification during the pandemic.

Table 4.19: Construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery

Response	No. of respondents	Percentage
Agree	64	37
Strongly agree	42	25
Neutral	0	0
Disagree	34	20
Strongly Disagree	30	18
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.19 above shows that a total of 106 respondents represented by 62% agreed that construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery. While a total 64 respondents represented by 38% disagreed.

Therefore we can conclude that construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery.

Table 4.20: Construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic

Response	No. of respondents	Percentage
Agree	-	-
Strongly agree	-	-
Neutral	-	-
Disagree	141	83
Strongly Disagree	29	17
Total	**170**	**100**

Source: Field Survey (2022)

The table 4.20 above shows that all the 170 respondents represented by 100% disagreed that construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic. Therefore we can that construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic

4.6 Test of Hypotheses and Interpretation

The main purpose of hypothesis testing is to examine the reasonableness of a statement of hypothesis, specify the parameters of a population on the basis of a sample from the population on the basis of a sample from the population; the hypothesis is either accepted or rejected.

The formula for chi-square is given as

$$\chi^2 = \sum_{t-1} \frac{(oi-ei)^2}{ei}$$

Where oi = observed frequency

ei = expected frequency

$\sum$ = Chi-square summation

Hypothesis I

Ho: Construction industry has no significant impact on economic development of Nigeria

Hi: Construction industry has a significant impact on economic development of Nigeria

Table 4.6, 4.7, 4.8, 4.9 and 4.10 will be used in testing hypothesis 1.

Table 4.21

Option		**No of responses**				
Question	1	2	3	4	5	**Total**
Agree	86	60	71	56	60	333
Strongly Agree	17	56	23	33	74	203
Neutral	04	12	0	0	0	16
Disagree	40	12	45	45	23	165
Strongly disagree	23	30	31	36	13	133
Total	**170**	**170**	**170**	**170**	**170**	**850**

Source: field survey 2022

Expected frequency = $\frac{\text{(column total) Row total}}{\text{Grand total}}$

The expected frequencies are obtained as follows

$R_1C_1 = \frac{170x333}{850} = 66.6$

$R_2C_1 = \frac{170x\ 203}{850} = 40.6$

$R_3C_1 = \frac{170x16}{850} = 3.2$

$R_4C_1 = \frac{170x165}{850} = 33$

$R_5C_1 = \frac{170\ x133}{850} = 26.6$

Table 4.22: ***Computation of Chi-square (2^2)***

Oi	**Ei**	**(oi-ei)**	**$(oi-ei)^2$**	**$\frac{(oi-ei)^2}{Ei}$**
86	66.6	19.4	376.36	5.651051
60	66.6	-6.599	43.56	0.654054
71	66.6	4.400	19.36	0.290691
56	66.6	-10.6	112.36	1.687087
60	66.6	-6.599	43.56	0.654054
17	40.6	-23.6	556.96	13.71823
56	40.6	15.4	237.16	5.841379
23	40.6	-17.6	309.76	7.629557
33	40.6	-7.6	57.76	1.42266
74	40.6	33.4	1115.56	27.47685
04	3.2	0.8	0.64	0
12	3.2	8.8	77.44	0
0	3.2	-3.2	10.24	0
0	3.2	-3.2	10.24	0
0	3.2	-3.2	10.24	0

40	33	7	49	1.484848
12	33	-21	441	13.36364
45	33	12	144	4.363636
45	33	12	144	4.363636
23	33	-10	100	3.030303
23	26.6	-3.6	12.96	0.487218
30	26.6	3.4	11.56	0.434586
31	26.6	4.4	19.36	0.72782
36	26.6	9.4	88.36	3.321805
13	26.6	-13.6	184.96	6.953383
TOTAL				**103.5565**

Source: field survey 2022

The degree of freedom is determine from the contingency table

df= (R-1)(C-1)

df= (5-1) (5-1) = 16 degree of freedom

= 4x4= 16

The test of significance is conducted at 5% level.

Decision

From the Chi-square the critical value at 16 degree of freedom and 5% of significance 26.30

The computed value is 103.557 which are greater than critical value of 26.30. Therefore the null hypotheses are rejected while the alternate hypothesis is accepted. It is therefore concluded that construction industry has a significant impact on economic development of Nigeria

Hypothesis Two

Ho: The Covid-19 pandemic has no significant impact on the construction sector in Nigeria

Hi: The Covid-19 pandemic has a significant impact on the construction sector in Nigeria

Table 4.11, 4.12, 4.13, 4.14 and 4.15 will be used in testing hypothesis II.

Table 4.23

Option		No of responses				
Question	**1**	**2**	**3**	**4**	**5**	Total
Agree	56	46	71	69	110	352
Strongly Agree	50	54	28	53	28	213
Neutral	0	0	0	0	0	0
Disagree	34	40	40	20	32	166
Strongly disagree	30	30	31	28	9	128
Total	**170**	**170**	**170**	**170**	**170**	859

Source: field survey, 2022

Expected frequency = (column total) row total
Grand total

The expected frequencies are obtained as follows

$R_1C_1 = \frac{170x352}{859} = 69.6$

$R_2C_1 = \frac{170x\ 213}{859} = 42.1$

$R_3C_1 = \frac{170x0}{859} = 0$

$R_4C_1 = \frac{170x166}{859} = 32.8$

$R_5C_1 = \frac{170\ x128}{859} = 25.3$

Table 4.24: computation of Chi- square (χ^2)

Oi	**Ei**	**(oi-ei)**	**$(oi-ei)^2$**	**$\frac{(oi-ei)^2}{Ei}$**
56	69.6	-13.6	184.96	2.657471
46	69.6	-23.6	556.96	8.002299
71	69.6	1.400	1.96	0.028161
69	69.6	-0.599	0.36	0.005172
110	69.6	40.4	1632.16	23.45057
50	42.1	7.9	62.41	1.482423
54	42.1	11.9	141.61	3.363658
28	42.1	-14.1	198.81	4.722328
53	42.1	10.9	118.81	2.82209
28	42.1	-14.1	198.81	4.722328
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

0	0	0	0	0
34	32.8	1.2	1.44	0.043902
40	32.8	7.2	51.84	1.580488
40	32.8	7.2	51.84	1.580488
20	32.8	-12.8	163.84	4.995122
32	32.8	-0.7997	0.64	0.019512
30	25.3	4.7	22.09	0.873123
30	25.3	4.7	22.09	0.873123
31	25.3	5.7	32.49	1.28419
28	25.3	2.7	7.29	0.288142
9	25.3	-16.3	265.69	10.50158
TOTAL				73.29618

Source: field survey, 2022.

The degree of freedom is determined from the contingency table.

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

df =(5-1) (5-1) 16 degree of freedom

= 4x4=16

The test of significance is conducted at 5% level.

Decision

From the chi-square the critical value at 16 degree of freedom and 5% level of significance 26.30

The computed value is 73.29618 which is greater than critical value of 26.30. Therefore the null hypothesis is rejected while the alternative hypothesis is accepted. It will be therefore concluded that Covid-19 pandemic has a significant impact on the construction sector in Nigeria

Hypothesis III

Ho: Construction industry did not adopt digital technology on its operation during the Pandemic

Hi: Construction industry adopted digital technology on its operation during the Pandemic

Table 4.16, 4.17, 4.18, 4.19 and 4.20 will be used in testing hypothesis III.

Table 4.25

Option		**No of responses**				
Question	1	2	3	4	5	**Total**
Agree	45	45	67	64	-	221
Strongly Agree	67	56	48	42	-	213
Neutral	0	0	0	0	-	0
Disagree	36	36	45	34	141	292
Strongly disagree	22	33	10	30	29	124
Total	**170**	**170**	**170**	**170**	**170**	850

Source: field survey 2022

Expected frequency = $\frac{\text{(column total) Row total}}{\text{Grand total}}$

The expected frequencies are obtained as follows

$R_1C_1 = \frac{170x221}{850} = 44.2$

$R_2C_1 = \frac{170x\ 213}{850} = 42.6$

$R_3C_1 = \frac{170x0}{850} = 0$

$R_4C_1 = \frac{170x292}{850} = 58.4$

$R_5C_1 = \frac{170\ x124}{850} = 24.8$

Table 4.26: ***Computation of Chi-square (2^2)***

Oi	**Ei**	**(oi-ei)**	**$(oi-ei)^2$**	**$\frac{(oi-ei)^2}{Ei}$**
45	44.2	0.799997	0.639998	0.01448
45	44.2	0.999997	0.799998	0.018099
67	44.2	22.8	519.84	11.76109
64	44.2	19.8	392.04	8.869683
0	44.2	-44.2	1953.64	44.2
67	42.6	24.4	595.36	13.97559
56	42.6	13.4	179.56	4.215023
48	42.6	5.4	29.16	0.684507
42	42.6	-0.60001	0.360006	0.008451
0	42.6	-42.6	1814.76	42.6
0	0	0	0	
0	0	0	0	
0	0	0	0	
0	0	0	0	
0	0	0	0	

36	58.4	-22.4	501.76	8.591781
36	58.4	-22.4	501.76	8.591781
45	58.4	-13.4	179.56	3.074658
34	58.4	-24.4	595.36	10.19452
141	58.4	82.6	6822.76	116.8281
22	24.8	-2.8	7.84	0.316129
33	24.8	8.2	67.24	2.71129
10	24.8	-14.8	219.04	8.832258
30	24.8	5.2	27.04	1.090323
29	24.8	4.2	17.64	0.71129
TOTAL				**287.289**

Source: field survey 2022.

The degree of freedom is determine from the contingency table

df= (R-1)(C-1)

df= (5-1) (5-1) = 16 degree of freedom

= 4x4= 16

The test of significance is conducted at 5% level.

Decision

From the Chi-square the critical value at 16 degree of freedom and 5% of significance 26.30

The computed value is 287.289, which are greater than critical value of 26.30. Therefore the null hypotheses are rejected while the alternate hypothesis is accepted. It is therefore concluded that construction industry adopted digital technology on its operation during the Pandemic.

Table 4.27 the respondents were asked to rate the impacts of construction industry on the economic development of Nigeria and this was carried out in Likert scale. The result was analyzed with the use of SPSS, the analysis is presented in table 4.25

Table 4.27 Impacts Of Construction Industry On The Economic Development Of Nigeria

S/N	**Impacts of Construction Industry On The Economic Development Of Nigeria**	Mean	Rank
1	The utilize natural resources for various construction materials.	4.25	1st
2	A massive and continued urbanization and extension of basic amenities as a result of increase in Building	4.13	2nd
3	The construction industry serves as a means for tax and revenue generation	4.6	3rd
4	Increase in infrastructure leads to exportation of finished goods to neighboring countries	3.82	4th
5	The growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour	3.50	5th

From the ranking in table 4.27, the most frequent or the highest rank regarding the impacts of construction industry on the economic development of Nigeria is utilization of natural resources for various construction materials with a mean score factor of 4.25 followed by urbanization and extension of basic amenities as a result of increase in Building with a mean score factor of 4.13, this was flowered by construction industry serves as a means for tax and revenue generation with a mean score factor of 4.6. The least score factors are increase in infrastructure leads to exportation of finished goods to neighboring countries with a mean score factors of 3.82 and increased protection of human rights of labour as a result of growth of the construction industry in Nigeria with a mean score factors of 3.50.

Table 4.28 the respondents were asked to rate the extent construction industry adopted Digital technology on its operation during the Pandemic and this was carried out in Likert scale. The result was analyzed with the use of SPSS, the analysis is presented in table 4.25

Table 4.28 The extent construction industry adopted Digital technology on its operation during the Pandemic

S/N	**The extent construction industry adopted Digital technology on its operation during the Pandemic**	Mean	Rank
1	There were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials.	4.45	1st
2	Construction engineer use CCTV and drones to inspect construction sites during the pandemic	4.31	2nd
3	Construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic	4.19	3rd
4	Construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery	3.91	4th
5	Construction engineers replace in-person inspections with the submission of photos and videos for verification during the pandemic.	3.60	5

From the ranking in table 4.28, the most frequent or the highest rank regarding the extent to which building construction industry has adopted digital technology on its operation during the pandemic is virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls with a mean score factor of 4.45 followed by the use CCTV and drones to inspect construction sites with a mean score factor of 4.31, this was flowered by the use of online conferencing as against onsite meetings with a mean score factor of 4.19. The least score factors are the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery and in-person inspections with the submission of projects, with a mean score factors of 4.19 and 3.19 respectively.

4.7. Discussion of Findings

4.7.1 Impacts of construction industry on the economic development of Nigeria

The results of the study indicates that construction industry serves as a means for tax and revenue generation as seen in table 4.27. it was also discovered that the construction utilize natural resources that abounds in the country for various construction materials. This has led to increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities. Infrastructures like buildings, bridges and roads are the product of the construction industry, has led to exportation of finished goods to neighboring countries. And lastly the growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour

4.7.2 The impact of the Covid-19 pandemic in the construction sector in Nigeria

The results of the study show that the pandemic led to the shortage of distribution of raw material for building projects. As seen in table 4.11 to 4.15, builders have reported delays and increasing costs for imported raw materials during the pandemic, there was limited transportation and travel bans have slowed project delivery, and equipment manufacturers. This has caused delays or entirely frozen as public agencies across the world closed their doors and suspended granting construction permits or providing on-site supervision to ongoing building projects. Lastly there was reduced spending and consumption capacity, operating restrictions and fear of contagion have all contributed to liquidity problems

4.7.2 The extent has construction industry adopted Digital technology on its operation during the Pandemic

The results analyzed questionnaire shows that construction engineer use CCTV and drones to inspect construction sites during the pandemic, there were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials, they also replace in-person inspections with the submission of

photos and videos for verification during the pandemic and construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery. Lastly, construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic.

4.7.3 Summary of Hypothesis

The test hypothesis was carried out using the chi-square technique with the significance level of 0.05. three hypothesis was test for. And from the analysis of hypothesis one, the alternative was accepted and this revealed that Construction industry has a significant impact on economic development of Nigeria. From hypothesis two, the alternative hypothesis was accepted and it revealed that the Covid-19 pandemic has a significant impact on the construction sector in Nigeria. And lastly, from hypothesis the alternative hypothesis was accepted and this shows that construction industry adopted digital technology on its operation during the Pandemic.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The construction industry serves as a means for tax and revenue generation, they utilize natural resources that abounds in the country for various construction materials. This has led to increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities. Infrastructures like buildings, bridges and roads are the product of the construction industry, has led to exportation of finished goods to neighboring countries. And lastly the growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour

The pandemic has impacted the construction sector negatively, during the pandemic, there was shortage of distribution of raw material for building projects, builders have reported delays and increasing costs for imported raw materials., this delays in material supplies has forced public agencies across the world to closed their doors and suspended granting construction permits or providing on-site supervision to ongoing building projects.

The during pandemic construction engineer improvised by adopted technologies like CCTV and drones to inspect construction sites, there were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials, they also replace in-person inspections with the submission of photos and videos for verification during the pandemic and construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery. Lastly, they also adopted the use of online conferencing as against onsite meetings during the pandemic.

5.2 Conclusion

The study shows that the construction industry is a driver of growth in other sectors due to its heavy reliance on an extended and varied supply chain". All other sectors of the economy like manufacturing, agriculture, entertainment, transportation, education, health, sports, etc depend on construction industry as well as the construction industry relying on them for performance. The construction industry has ability to impact on other sectors because of its nature of being infrastructure provider. There is no sector that does not depend on physical infrastructure produce by the construction industry for its production

5.3 Recommendations

In line with the study, it is therefore recommends that;

i. There should be a review of existing construction industry tertiary education and professional certification curricular to include digital transformation and digital technologies so as to cope with future pandemic.

ii. Retraining of construction personnel through workshops, seminars, and conferences about ways to work during the pandemics

iii. Building department in tertiary institutions should introduce courses that will enhance an understanding of the disruptions and responses in the construction sector amid COVID-19 threat this would inform the industry inpreparation for future.

REFERENCES

Abd El Khalek, H., Aziz, R. F., & Kamel, H. (2016). Uncertainty and risk factors assessment for cross-country pipelines projects using AHP. *American Journal of Civil Engineering, 4*(1), 12-23.

AfDB/OECD. (2006). *Nigeria in African Economic Outlook 2005-2006.* Retrieved May 12, 2010, from www.oecd.org/dev/publications/africanoutlook.

Aghimien, D (2019). Digitalization as a Veritable Option for Construction Organizations to Achieve Competitive Advantage. *Proceedings of the International Conference on Innovation, Technology, Enterprise and Entrepreneurship – ICITEE 2019 Kingdom of Bahrain*, 429-436

Aghimien, D., Aigbavbao, C., Oke, A. & Koloko, N. (2018). Digitalization in the construction industry: Construction professionals' perspective. *Proceedings of the Fourth Australasia and South-East Asia Structural Engineering and Construction Conference Brisbane, Queensland, Australia, December 3-5, CON-14, 1-6*

Akanni, P. O., Oke, A. E., & Omotilewa, O. J. (2014). Implications of rising cost of building materials in Lagos State Nigeria. *SAGE Open*, *4*(4).

Arcadis. (2020). Arcadis global construction disputes report 2020: Collaborating to achieve project excellence. Retrieved from https://www.arcadis.com/en/middle- east/our-perspectives/2020/06/arcadis-global-construction-disputes-report-2020/.

Arcadis. (2020). Arcadis global construction disputes report 2020: Collaborating to achieve project excellence. Retrieved from https://www.arcadis.com/en/middle- east/our-perspectives/2020/06/arcadis-global-construction-disputes-report-2020/.

Bon, R. and Crosthwaite, D. (2000). The Future of International Construction. London: Thomas Telford.

Bynoe, R. (2009). *Construction sector linkages in barbados*. Paper presented at the annual review seminar research department Central Bank of Barbados

Chartered Institute of Building (CIOB). (2020a, June 1). CIOB welcomes "Roadmap to Recovery" for the construction industry.
Retrieved from https://www.ciob.org/media-centre/news/ciob-welcomes-roadmap-recovery-construction-industry.

Construction Leadership Council. (2020). Construction sector - Site operating procedures. Protecting your workforce during coronavirus (Covid-19). Retrieved from https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2020/07/Site-Operating-Procedures-Version-5.pdf.

Construction Manager.(2020a). Construction expected to shed 10% of workforce by September. Retrieved from

https://www.constructionmanagermagazine.com/construction-expected-to-shed-10-of-workforce-by-september/.

Craveiro, F., Duarte, J.P., Bartolo, H., & Bartolo, P.J. (2019) Additive Manufacturing as an Enabling Technology For Construction Manager. (2020b, June 23). Covid-19 causing extra 15% productivity loss on UK sites. Retrieved from https://www.constructionmanagermagazine.com/covid-19-causing-extra-15-productivity-loss-on-uk- sites/. Accessed 2/January, 2021

Dantata, S. (2008). General overview of the Nigerian construction industry. Retrieved April 2, 2011, from www.dspace.mit.edu.

Davisson, K.,& Losavio, J. (2020). How sustainable infrastructure can aid the post-COVID recovery. Retrieved from https://www.weforum.org/agenda/2020/04/coronavirus-covid-19-sustainable-infrastructure-investments-aid-recovery/.

Falemu, A. J. (2013), Human Resource Management in construction. Unpublished lecture note, Federal University of Technology, Owerri.

Gamil, Y., & Alhagar, A. (2020). The Impact of Pandemic Crisis on the Survival of Construction Industry: A Case of COVID-19. *Mediterranean Journal of Social Sciences*. 11(4), 122-128

Hillebrandt, P. M. (2000). Economic Theory and the Construction Industry, Third Edition. Basingstoke, UK: MacMillan Press Limited.

Hosein R. and Lewis, T.M. (2004). Quantifying the relationship between Aggregate GDP and construction value added in a small petroleum rich economy – A case study of Trinidad and Tobago. *Construction Management and Economics 23*, 185 – 197.

ILO. (2000). *Yearbook of Labour Statistics*, International Labour Organization, Geneva

Kale, A. R. (2020). Impact of Covid-19 on infrastructure and environment. *Purakala*, *31*(37), 98-105.

Kale, A. R. (2020). Impact of Covid-19 on infrastructure and environment. *Purakala*, *31*(37), 98-105.

Kalirajan, S., & Babu, M. S. (2019). Digitalization in Construction. Smart Materials and Techniques for Sustainable Development (SMTS-19). Available online: https://www.researchgate.net/publication/333746431 [Accessed 25/01/2021], 91-105

Lean, C.H. (2001). Empirical tests to discern linkages between construction and other economic sectors in Singapore. *Construction Management and Economics, 19*(4),355 – 363.

Lexology. (2020). COVID-19 weekly round-up. Retrieved from https://www.lexology.com/library/detail.aspx?g=965bd525-c837-4663-8e0f-c63b7362bd0f.

Livotov, P.; Sekaran, A.P.C.; Law, R.; Reay, D.; Sarsenova, A., & Sayyareh, S. (2019). Eco-Innovation in Process Engineering: Contradictions, Inventive Principles and Methods; Elsevier Ltd.: Amsterdam, The Netherlands, Volume 9.

Livotov, P.; Sekaran, A.P.C.; Law, R.; Reay, D.; Sarsenova, A., & Sayyareh, S. (2019). Eco-Innovation in Process Engineering: Contradictions, Inventive Principles and Methods; Elsevier Ltd.: Amsterdam, The Netherlands, Volume 9.

Mentsiev, A U., Engel, M V., Tsamaev, A M., Abubakarov, M V., & Yushaeva, R S-E. (2020). The Concept of Digitalization and Its Impact on the Modern Economy. International Scientific Conference "Far East Con" (ISCFEC 2020). *Advances in Economics, Business and Management Research*, volume 128, 2960-2964

Mogbo, T.C. (2000), *Civil/Highway Projects*: Implications on the Quantity Surveyingin Nigeria. Nineteenth Biennial Conference of the NIQS. Kaduna

Ofori, G. (1990). *The Construction Industry: Aspects of its Economics and Management.* Singapore: Singapore University Press

Ogunnusi, M., Hamma-adama, M., Salman, K., & Kouider, T. (2020). Covid-19 Pandemic: The effect and prospect in the construction industry, *International Journal of real estate studies*. Vol. 14, 120-128

Okonmah, N.-M., Abdulkareem, H., & Fagbohunlu, B. (2020, May). COVID-19: Nigerian construction and infrastructure industry. Retrieved from https://www.aluko-oyebode.com/insights/covid-19-nigerian-construction-and-infrastructure-industry/#.

Ozili, P. K. (2020). COVID-19 pandemic and economic crisis: the Nigerian experience and structural causes. *Journal of Economic and Administrative Sciences,* 1-30.

PwC United States (2020). COVID-19: What it Means for Engineering and Construction.

Rouse, M. (2017). Mean of Digitalization. Available at: https://www.pwc.com/us/en/library/covid-19/coronavirus-http://whatis.techtarget.com/definition/digitization (accessed on11 August 2020

Udeh, J. (2000). "*Petroleum revenue management: The Nigerian perspective*." Paper presented at World Bank/IFC Petroleum Revenue Management Workshop, Washington, D.C., U.S.A.

Wild, M. and Schwank, O. (2008). *Testing for Linkages in Sectoral Development: An SVAR-Approach to South Africa*. London: William Heinman.

World Bank report (2012). Doing Business in Nigeria. Washington D. C.: World Bank Press.

APPENDIX

Department of Building Technology
Auchi Polytechnic,
P. M. B. 13, Auchi
Edo State

20th November, 2022.

Dear Respondent,

LETTER OF INTRODUCTION

I am a final year student of the above named Department and I am currently carrying out a project research on the topic "The role of building construction sector in Nigeria (A Case Study of Some Selected Building construction companies in Benin City)". This is in partial fulfillment of the award of Higher National Diploma (HND) in Building Technology

I shall be most grateful if you could assist me in completing the attached questionnaire to enable me clear my research questions and objectives raised in the study. Please be assured that any information given shall be used solely for this academic purpose and will be treated with absolute confidentiality.

Thank you for your anticipated cooperation.

Yours Faithfully,

IDEDIA OSEWE KELVIN
(RESEARCHER)

QUESTIONNAIRE

Note: Please read carefully tick the appropriate ones

SECTION A: Background Information of Respondents

1]. Age of Respondent 21-30 [ ] 31-40 [ ] 41-50 [ ] 51 and above [ ]

2]. Sex: Male [ ] Female [ ]

3]. Marital Status: Single [ ] Married [ ]

4]. Educational Qualification: No. Qualification [ ] O'level [ ] B.Sc/HND [ ] Masters/Ph.D [ ]

5. Job Title (a) Builder [ ] (b) Architect [ ] (c) Civil engineer [ ] (d) Quantity surveyor [ ]

(e) others [ ] specify _____

6]. GSM:_____

SECTION B: INVESTIGATE THE IMPACTS OF CONSTRUCTION INDUSTRY ON THE ECONOMIC DEVELOPMENT OF NIGERIA

Kindly rate your opinion by ticking (x) each of the following health and safety measures in construction sites.

5-strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1 – Strongly Disagree

S/N			**Rating**			
	Impacts Of Construction Industry On The Economic Development Of Nigeria	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	The construction industry serves as a means for tax and revenue generation					
2	The construction utilize natural resources that abounds in the country for various construction Materials.					
3	An increase in buildings and infrastructural components, leading to massive and continued urbanization and extension of basic amenities.					
4	buildings, bridges and roads are					

	the product of the construction industry, leading to exportation of finished goods to neighboring countries					
5	The growth of the construction industry in Nigeria has gave way for increased protection of human rights of labour					

SECTION C: EXAMINE THE IMPACT OF THE COVID-19 PANDEMIC IN THE CONSTRUCTION SECTOR IN NIGERIA

Kindly rate your opinion by ticking (x) each of the following health and safety measures in construction sites.

5-strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1 – Strongly Disagree

S/N			**Rating**			
	Impact of the Covid-19 pandemic in the construction sector in Nigeria	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	The pandemic led to the shortage of distribution of raw material for building projects.					
2	Builders have reported delays and increasing costs for imported raw materials during the pandemic					
3	Limited transportation and travel bans have slowed project delivery, and equipment Manufacturers.					
4	Many projects were delayed or entirely frozen as public agencies across the world closed their doors and suspended granting construction					

	permits or providing on-site supervision to ongoing building projects					
5	Reduced spending and consumption capacity, operating restrictions and fear of contagion have all contributed to liquidity problems					

SECTION D: TO INVESTIGATE THE EXTENT HAS CONSTRUCTION INDUSTRY ADOPTED DIGITAL TECHNOLOGY ON ITS OPERATION DURING THE PANDEMIC

Kindly rate your opinion by ticking (x) each of the following health and safety measures in construction sites.

5-strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1 – Strongly Disagree

S/N			**Rating**			
	The Extent Has Construction Industry Adopted Digital Technology On Its Operation During The Pandemic	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Construction engineer use CCTV and drones to inspect construction sites during the pandemic					
2	There were virtual inspections of construction sites through either a Zoom or a Microsoft Teams video calls between engineers on site and building control officials.					
3	Construction engineers replace in-person inspections with the submission of photos and videos for verification during the pandemic.					

4	Construction engineers adopted the use of Radio Frequency Identification (RFID) technology which allows for automated tracking of equipment and materials in storage or during delivery					
	Construction engineers adopt the use of online conferencing as against onsite meetings during the pandemic					