A Training and Skills Development Conceptual Framework for Construction Technicians in Nigeria

By

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Declaration

STUDENT DECLARATION FORM

The work presented in this thesis entitled **A Training and Skills Development Conceptual Framework for Construction Technicians in Nigeria** is, to the best of my knowledge and belief, original.

I declare that while registered as a candidate for the research degree, I have not been a registered candidate or enrolled student for another award of the University or other academic or professional institution

Type of Award **Doctor of Philosophy**

School **Engineering**

I declare that no material contained in the thesis has been used in any other submission for an academic award and is solely my own work

Signature of Candidate_____

Abstract

A training framework has been developed for immediate use in the construction industry in Nigeria, due to the inadequacy and incompetency of the existing workers' skills. This framework will result in the greater performance concerning the finished products quality, efficient productive time, and optimal costs. The framework will also result in the achievement of the Sustainable Development Goal (SDG) Vision 2030. Such improvements from the framework will be allied with the various achievements made by the construction industry internationally within the developed nations on the economic growth, which attainments are based on workforce skills. Hence, the limited skilled workforces "*masonry, carpentry, plumbing, electrical installation and IT, painting and decoration among others*" will improve and strengthen the construction industry within Nigeria and continuous improvement to the skilled workforce after several construction projects that will have impact on time, cost, and project quality. Obviously, in a vastly competitive market, a suitable tool for skills upgrade is an effective and efficient workforce training. In advanced nations, training for skills upgrading is a top priority and practitioners, academics in successful organisations concede it, which is not different in the case of Nigeria a developing nation. Although technicians' training within the Nigerian perspective seems to be blurred to most employers of the construction organisations.

In achieving this research aim, a mixed research approach covers the quantitative and qualitative methods was chosen for the data collection from the participants through stratified random sampling for the industry survey to gain information. Questionnaires were designed and administered covering important criteria on training and skills upgrade identified from the literature. The questionnaires were sent to a sample of respondents in Nigeria and a net response rate of 76.60% was achieved after followed up by the researcher. To enhance further data collection, an in-depth interview with selected participants within the construction professions was conducted.

Findings of both data analyses indicated the mitigating factors that negate the industry development to include: the stakeholders' ineffective attitudes and poor commitments to workforce training, the negative image portrayed on the profession to the younger generations, insufficient or poor funding, poor technological advancement, ineffective

training models, low accessibility of data and information, corruptions practices and ineffective strategies implementation, deprived infrastructural management. Nigeria's approach to training for construction related apprenticeships has been generic instead of focussing upon specific skills, and different reforms on training have not thrived in addressing the recurrent skills gaps.

The findings from the analyses suggest that effective and efficient workforce training is a key prerequisite for competent organisations to gain an edge over its competitors within the construction market in accomplishing the SDG by 2030. Also, effective guidelines and counselling systems should be offered to foster the youths on important economic prospects in pursuing construction careers as high potentials. Furthermore, educators and practitioners are enlightened on how to improve the proportion of women participation in the construction related profession. Thus, recommendations for future studies should explore on in-depth measures to enhance competency in related organisations. A different approach at the management level to determine the degree and impact of employers' attitudes to technicians' training for more clarity.

Keywords: Construction Industry, Technicians, Training, Skills development, Skill gap, Skill shortages.

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Dedication

To the glory of God almighty, who is the maker of heaven and the earth, the Alpha and Omega, the King of all kings, to him all things are made beautiful in his own time.

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List of Abbreviations

ACIPBs	Allied Construction Industry Professional Bodies
ANTA	Australian National Training Authority
ANTC	Advanced National Technical Certificate
APSEB	Apprenticeship Scheme Examination Board
ARCON	Architect Registration Council of Nigeria
ATS	Apprenticeship Training Scheme
AU	African Union
AVC	Advanced Vocational Certificate
CAP	Capacity Acquisition Programme
CBT	Competency Based Training
CCST	Construction Craft Skills Training
CDP	Credit Delivery Programme
CETA	Construction Education and Training Authority
CGLI	City and Guilds London Institute
CIC	Construction Industry Council
CITA	Construction Industry Training Authority
CITB	Construction Industry Training Board
CORBON	Council of Registered Building of Nigeria
CPD	Continuous Professional Development
CTS	Craftsmen Training Scheme
DMDT	Direct Manpower Development Training
FG	Federal Government
FGN	Federal Government of Nigeria
FGTCs	Federal Government Technical Colleges
FHE	Further and Higher Education
FIRS	Federal Inland Revenue Service
FME	Federal Ministry of Education
FMLP	Federal Ministry of Labour and Productivity
FOCI	Federation of Construction Industry of Nigeria
GDP	Gross Domestic Product
IEIs	Innovation Enterprise Institution

ITF	Industrial Training Funds
ITIs	Industrial Training Institute
JCC	Joint Consultative Committee
JSSC	Junior Secondary School Certificate
JSCE	Junior School Certificate Examination
JSS	Junior Secondary School
KSA	Knowledge, Skills and Attitude
KSCs	Knowledge, Skills and Competencies
LEDs	Local Government Education Boards
LGs	Local Government
LGAs	Local Government Areas
LGEB	Local Government Education Board
MAP	Mandatory Attachment Programme
MCIOB	Member Chartered Institute of Building
MDGs	Millennium Development Goal
MIT	Massachusetts Institute of Technology
NABTEB	National Business and Technical Examination Board
NAOS	National Open Apprenticeship Scheme
NAPEB	National Poverty Eradication Programmes
NBC	National Business Certificate
NBTE	National Board for Technical Education
NCATB	National Construction Apprenticeship Training Board
NCITB	Nigerian Construction Industry Training Board
NDE	National Directorate for employment
NECO	National Examination Council
NEEDs	National Economic Empowerment and Development Strategy
NGOs	Non-Governmental Organisations
NIA	Nigerian Institute of Architects
NIOB	Nigerian Institute of Building
NPE	National Policy on Education
NSE	Nigerian Society of Engineers
NTC	National Technical Certificate

NVC	National Vocational Certificate
NVD	National Vocational Diploma
NVQF	National Vocational Qualification Framework
NVQs	National Vocational Qualification
NVTIs	National Vocational Training Institutes
OCIS	Organized Construction Industry Sector
OECD	Organisation for Economic Cooperation and Development
OICs	Opportunities and Industrialisation Centres
OPS	Organised Private Sectors
PBSTE	Post Basic Science and Technology Education
PPE	Personal Protecting Equipment
QEP	Quality education programme
SDG	Sustainable Development Goals
SEBs	State Government Education Boards
SIWES	Student Industrial Work Experience Scheme
SME	State Ministries of Education
SMLP	State Ministries of Labour and Productivity
SOWS	School on wheels Scheme
TC	Technical colleges
TSDF	Training and Skills Development Framework
TVET	Technical and Vocational Education and Training
UPE	Universal Primary Education
USAID	United States Agency for International Development
VAT	Vocational and Apprentice Training
VEEB	Vocational Education Examination Board
VEIs	Vocational Enterprise Institutes
VTIs	Vocational Training Institutes
YES	Youth Empowerment Scheme

Definitions of terms

The Department of Employment and Workplace Relations makes the following distinctions when considering the extent and nature of a skill shortage:

Skills shortages: This exists in an organisation or industry due to the inability of employers to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that organisation or industry, at current levels of remuneration and conditions of employment, and reasonably accessible location.

Skills gap: This exists in an organisation or industry due to the inability of the existing employees to have the required qualifications, experience and/or specialised skills to meet the firm's skill needs for the profession or the job at hand. This happens due to several factors within the various organisations. The organisations' workforces may not undergo adequate training to be qualified to perform certain tasks or may not have been upskilled to emerging skill requirements.

Recruitment problems: These are attributed based on the industrial characteristics, occupation, or employer, as: relatively low remuneration, poor working conditions, and poor industry image, unsatisfactory working hours, hard location to commute to, inadequate recruitment or firm specific and highly specialised skill needs.

Apprenticeship: Arrangement or training techniques (on-the-job training) that enable the trainee or the learner (an apprentice) to learn by observing and practising from an expert known as the master on a job (Young, 2019; Iyamu and Uwameiye, 2002). This type of training involves agreements between the trainer (master-artisan) who is the master and the apprentice, one in which the apprentice is trained for a specified craft or trade through practical experience under the supervision of the master-artisan.

Artisan: Eneh (2010:38) posits that an artisan is a skilled manual worker who practises some trade or handicraft; a person who does skilled work with his or her own hands. Examples are masons, welders, and plumbers.

Education: The term education is well-defined as an instrument for developing an individual in social, mental, physical, emotional, moral, and psychological aspects. This may be considered as a process that enables people to understand the difference

between good and bad attitudes, right and wrong behaviours. The combination of tools and techniques used to gain empirical knowledge about the useful elements of life and processes of utilising it. As argued by Forbes, "Education's purpose is to replace an empty mind with an open one." According to Armstrong (2003:526) education can be described as exposure to new ideas, concepts, and knowledge in a relatively systematic way. Usually, knowledge increase is its key objective to change attitudes and beliefs.

Technical education: Form of education that leads to skills acquisition, fundamental scientific knowledge, and abilities. An organised programme of courses and training experiences which start with an exposure into career options. It involves essential academic and life skills and enables attainment of high academic standards and preparation for work-related and further education (Maclean and Wilson, 2009:25).

Training: Process of acquisition of knowledge, skills, and abilities (KSA) through the vocational teaching or practical skills knowledge that relates to specific competencies (Buckley and Caple, 2005:45). A technique of learning that concerns the knowledge acquisition, skills upgrades, rules, and modifying attitudes with the goal of enhancing the trainee capacity and performance (Steensma and Groeneveld, 2010).

Vocation: The Merriam-Webster Collegiate Thesaurus (2008:840) defines vocation as a trade, occupation, craft, business, profession, or a calling. It can also mean the regular occupation for which a person is particularly suited or qualified.

Skill Development: The efforts that allow a trainee to do something better than before or new than before, which led to concrete change in their livelihoods (Kakkar, 2014).

Vocational education: Education that effectively prepare trainees for a specific task, that a precise job at hand (trade), as a technician, a professional vacation such as engineering, nursing, medicine, architecture, or law. This method of education has been described as a well-package of educational practise and offered by an institution of learning to help the learner to obtain basic work-related and practical skills (Yulastri and Hidayat, 2017; Oni, 2014; Oharisi, 2007). Vocational Education (VE) plays vital roles in the performance and competitiveness of industries in leading manufacturing countries around the world like Germany (FMER) in Europe that has a renowned dual VET system (Lund and Karlsen, 2020).

Chapter One: Introduction

1.1 Introduction

This chapter provides a general background to the research presented in this thesis and the rationale behind the current investigation. The section of this thesis highlighted the state of Vocational Education and Training (TVET) within the Nigerian context and the general overviews on the Nigerian construction industry. In addition to the areas highlighted is the key research problem statement, which established the study basis and the research questions. The above discussion is followed by the research aims and objectives with the research justification. Furthermore, the chapter discusses an overview on training and skills development of skilled workforce within the context of the African continent, precisely within the Nigerian context and a highlight of the research ethical consideration. Hence, the study contribution and an outline of the thesis and chapter's summary are presented.

1.2 General Background to the study

The Construction Industry makes significant contributions to several nations around the world through boosting the country's economic growth. The industry has been considered as the economic drive of most successful countries of the world, although the analysis of these performances has failed to take this development into a well-defined consideration (Alagidede and Mensah, 2018; Gunduz and Yahya, 2018). Furthermore, it is obvious that the construction industry plays an important role in the economy upgrade of various nations around the world (Naoum, 2016; Böhme et al., 2018; Javed et al., 2018; Alaghbari et al., 2019). This upgrade of economic activities was seen in the case of developed economics like Australia, where the industry is the third biggest/largest organisation after mining and finance, contributing to the nation's gross domestic product (GDP) by nearly 8%. Obviously, the industry's contribution to the nation's economy is encouraging even in the current situation.

Although, the challenges experienced within the industry in the developed nations of the world are less compared to those of the developing nations. This implies that there are great needs for improvement of the workforce within the industry to meet up with global challenges in terms of its competencies and effectiveness.

1.3 Rationale of the study

As a developing country within the African continent that is currently undergoing economic reform, the Nigerian construction industry used to be one of the key contributors to the nation's economic growth for its future development (Oke et al., 2016; Okoye, 2016; Abdullahi and Bala, 2018; Mu'awiya et al., 2018). However, the industry recorded so many setbacks, which affected the industry performances and its effort towards achieving the united nation sustainable development goals (SDG) by 2030. In line with the united nation SDG vision by 2030, the construction industry holds great potentials and responsibilities in achieving these milestones (Gade and Opoku, 2020). However, it is obvious that the industry is yet to realise its full potential due to its low performances and contribution to the nation's economic growth. The decrease in the contribution to the nation's economy is due to several factors that include inadequate workforce training and skills development, workforce motivation and labour relation practices, insufficient funding, recruitment/selection practices, corruption, and inadequate planning (Oseghale et al., 2015; Tunji-Olayeni et al., 2017; Ameh and Daniel, 2017). Furthermore, studies revealed that most employers of the construction industry participation are almost non-existent in terms of the technicians' training and skilled development (Oni, 2014; Bilau et al., 2015; Dixit et al., 2017). This has broadened the quality of the skilled workforce demand and supply of skilled workforce in the industry that reduced drastically in both quality and quantity.

More so, the rate at which buildings are collapsing in Nigeria is increasing daily and these failures in buildings occur during construction work, which need immediate attention (Okolie et al., 2016; Egunjobi et al., 2016). As cited by Okolie et al. (2016), the collapse of these buildings are due to several issues that include; Unethical behaviour and poor guidance on commitment, knowledge, bribery, negligence, dishonesty and unfair practices, which are associated with inadequate training and are prevalent in the Nigerian building industry (Osuizugbo and Ojelabi, 2020; Osuizugbo, 2020; Oyewole and Dada, 2019). Furthermore, studies by Nzau and Trillo (2021), revealed that inclusionary housings were considered as powerful local policy tool, which can address houses affordability and social inclusion issues. These issues are critical that are related to negligence and ignorance of both employers and employees

of the industry within the Nigerian context that may be corrected through effective and efficient workforce training.

However, workforce training and skills development within the Nigerian construction industry seems not to be effective. Hence, the need for effective workforce training is of major concern. This workforce training and skills acquisition problem has led to the current skills gap and has affected performance within the industry, which has led to low and consistently poor productivity over the years. In addition, the quality of workers' skills is another pressing issue in the Nigerian construction industry and is already having serious implications for both the industry and the Nation's economy (Oseghale et al., 2015; Ahmeh and Daniel, 2017). Though there is inadequate study that addresses the impact of skills development on the output of the construction industry, the importance of training and skills upgrading of workers in the industry should be a continuous improvement process. Unskilled workers affect the quality of products and impact on time and projects costs that are undertaken in the country, thus endangering the success of projects executions, which in turns affects the nation's economic growth (Bilau et al.2015; Zannah et al., 2017).

The failure of the construction industry to address skills shortages and skills gaps in terms of quantity and quality has critically influenced the reduction of the nation's economic growth (Rahim et al., 2016; Ekundayo et al., 2013). Training and skills development are key requisites for workforce skills enhancement and performance of construction organisations (Banihashemi et al., 2017; Kassem et al., 2017). However, the importance of workforce training within the industry at the various technicians' levels to enhance their skills cannot be over emphasised. Obviously, understanding the need for workforce training and skills acquisition to improve workers quality skills is essential for construction related organisations (Rashid et al., 2018; Mpofu and Hlatywayo, 2015). Hence, the design and validation of a suitable training and skills development framework for skilled workforces (technicians') is paramount for the Nigerian construction industry. This proposed framework will enhance the workforce skills and the industry performance to gain an edge over its competitors'. Hence, being more competent in the competitive construction market globally.

1.3.1 State of Vocational Education and Training (TVET) within Nigeria

There are indications that most of the developed or industrialised nations around the world involve Technical and Vocational Education and Training (TVET) to facilitate their development needs by integrating and designing it into their educational system (Okoye and Nnajiofor, 2019; Okoye and Okwelle, 2013). This has led to the achievement of the necessary skills and scientific knowledge, which enables them to be more competent and successful in the global construction market. This is more interesting that Nigeria, as a developing nation, has adopted this to improve the quality of its citizens by providing the quality skills within the industry. However, studies have revealed that within the Nigerian context, the earliest moves towards TVET could be traced long ago when one of the existing schools, Yaba Higher College was established in 1936 (Okoye and Nnajiofor, 2019; Awe, 2012). The creation of this institution led to the establishment of that of the Kaduna and Enugu technical institutes in the 1950s and in the 1980s that of Ibadan and Auchi were also established with the aim of improving education quality. The system of education in Nigeria was noted to be more influenced towards the traditional literacy at independence and there was a lack of respect in academic subjects, which resulted in inadequate manual and technical achievement. However, Government of the Federal Republic of Nigeria through the Federal Ministry of Education (FMOE) has made countless efforts to ensure that there should be design program on TVET.

This effort has been achieved through the FMOE with the introduction of a seminar in the year 1962 which was sponsored by an independent agency of the FGN, which was the United States Agency for International Development in Nigeria (USAID). This agency's key responsibility was to administer civilian foreign aid and development assistance. Although, despite the endless efforts made through the FMOE and USAID, not much progress was made in achieving this goal. The struggle for the design and formulation of the programme on TVET continued to be a topmost priority until 1969 when a National curriculum conference took place where additional attention was given to TVET. This effort led to the formulation or design on the first indigenous National Policy on Education (NPE), which was later published in the year 1977. The NPE is attached to the Nigeria's philosophy on education as enunciated through the nation's objectives. Changes have resulted in three revised editions of the national

educational policy in the Federal Republic of Nigeria, which highlight the issues on the disparity of the educational policy and its implementation within the Nigerian context. The NPE has continue to be used and was later revised in 1981 before it was revised again in 1998 and later in 2004 to make education policy relevant to the developing needs of the educational system (Jacob and Samuel, 2020; Omoruan and Bamidele, 2019; Imam, 2012).

The NPE 1977 was geared towards addressing the problems of educational relevance to the needs and aspirations of Nigerians and promoting Nigerian unity, then laying the foundation for national integration. However, not much attention has been given to the TVET on the NPE that was published in 1978 – 79 with the focus on issues relating to the pattern on training of artisans, craftsmen and technicians/technologists, technical education in secondary schools, training of technical teachers, encouraging women into technical education, and a clear path or avenues for advancement from one level to another. The policy introduced the 6-3-3-4 educational system, modelled after the American system of 6 years in primary school, to obtain a Primary leaving school certificate, three (3) years in Junior secondary school (JSS) to obtain Junior school certificate, three (3) years of Senior secondary school (SSS) to obtain Senior school leaving certificate and 4 years at the University education for the undergraduate programme level to obtain a degree certificate (Odukoya et al., 2018; Awe, 2012).

Even though the universal primary education (UPE) was made free for every child in the community, it was not made compulsory for every child. However, the policy wanted to make UPE compulsory for every child when it became practicable as soon as possible. Although, the policy made universal primary education free for every child, it was not made compulsory for the children within the communities.

In line with the National Policy on Education (NPE), introductory technology and integrated science subject were the relevant training provided for the junior section at the secondary level. The introductory and the integrated science subject in the junior secondary school (JSS) is for a duration of three (3) years. This training at the junior section was aimed at equipping learners both academically and vocationally to improve the quality of education. While in the senior secondary school section (SSS), the training is also for a duration of three (3) years. More so, the primary aim of this

development continues with the creation of more technical colleges and polytechnics to increase the number of the basic craft and technicians' graduates within the country.

In 1977, the National Board for Technical Education (NBTE) was established, and its primary aim was to coordinate and advise on all aspects of technical education outside the universities scheme. The NBTE will ensure that technical education is tailored to address the needs of local skills, phased out of the multifarious multiplicity of foreign crafts qualifications, and replaced with National Technical Certificate (NTC) and National Business Certificate (NBC), along with their advanced levels and to which end a special examination body established to achieve this aim. The National Business and Technical Examination Board (NABTEB) was then established in 1995 with the sole aim of administering technical and business examinations. However, the Gray Longed Commission of 1991 (FGN, 1991) argued that all the efforts made by the country towards quality education on technical and vocational education had only been focussed on high-level manpower production, to the impairment or detriment of the production of low and middle level manpower, mostly needed for national development and technological advancement.

1.3.2 State of the Nigerian Construction Industry

The discovery of crude oil within Nigeria in the early seventies has contributed immensely to the downfall of the construction industry. This has led to so many issues experienced within the Nigerian building construction industry in terms of its volume and the industrial complexity of the workforce in different sectors within the industry. This has been a major hindrance to the industry and has led to so many changes or challenges within the Nigerian construction industry for many years and the effect is on the increase daily. Adeniji (1994) and Kabirifar and Mojtahedi (2019) are of the opinion that the construction projects within the industry are executed mostly in large scales and these projects include road construction, buildings, bridges, dams, sewage plants etc. The industry has been experiencing many challenges in its operations in terms of its workforce's skill shortages and skill gap. According to Nwagwu, (2004) and Onjewu (2005), there is clear evidence that construction related work mostly requires skilled workforces due to the nature of the work, in which the activities are mostly manual in nature and the workforce comprises of both local people and those from neighbouring countries (Foreigners). This indicates the need for adequate

training and skilled development and a constant supply of indigenous manpower to improve workforce skills to enhance industrial performance.

Research has shown that most of the developing countries of the world are challenged with so many issues regarding shortages of skilled workforce and skill gap within the construction industry, which has affected the industry's contribution to national GDP. The industry, within the context of the developing countries, could not meet up with the standard of those of developed countries. Thus, shortages in manpower have been experienced in places where unemployment rate is increasing, accompanied by a shortage of relevant skilled craftsmen in the building trades such as bricklayers, block layers, carpenters, plasterers (Afolabi et al., 2018; Aluko et al., 2018; Windapo, 2016; Adewale, 2014; Obiegbu, 2005). Previously, the apprenticeship programmes were all over in each occupation across Nigeria. In addition, there was mutual understanding between both the trainee and the trainers for a period of years. In most cases, trainees usually provided services to trainers and vice-versa. As a result of this mutual understanding, and the interest shown by both the trainers and the trainees, experts of education in the year 1970s planned on how the system could be unified or integrated effectively into formal schooling for the young, yet this remains uncertain, and it was not resolved. The plans to integrate the system would have been the best option which would address most of the issues experienced within the industry of construction. However, the effort to integrate the apprenticeship and vocational training schemes for construction trades was unsuccessful and presently, performance of the system is inadequate, particularly that of the quality and quantity of the skilled workforce (Oladejo, 2019). Hence, an immediate attention towards the technicians' training and skilled development is needed.

In a nutshell, there is evidence that workforce training and skills development within construction industry in Nigeria mostly encountered certain challenges as stated by various studies (Belau et al., 2015; Abdulgafaru, 2003; Awe et al., 2010).

- There is constant movement of the construction workforce which has been trained by the government, which were mostly hired by most of the privately owned organisations that were not ready to be trained or spend money on training.
- There is constant migration for greener pasture by the skilled workforce.

- There are great demands for a skilled workforce in the Nigerian construction industry, particularly the technical personnel shortages that are indigenous.
- Production forces were affected by a shortage of construction personnel. Most of the urban and rural areas need retraining of manpower. Construction resources are fluctuating in supply since the need for personnel functions on a seasonal basis.
- Larger companies owned by foreign nationals do find it difficult to comply with the directives or manpower policy of the country.
- Construction related work is recorded as the most hazardous in terms of safety.
- Trade Unions are disorganised in their attitude to training

Hence, there are great needs for more efforts to be channelled/focussed on addressing these critical challenges on manpower enhancement, specifically on construction site skilled technicians training and education.

1.4 Research Problem Statement

In today's economic growth, the construction industry is considered among the key drivers of the economic development due to its significant role. The industry has played a vital role in the Nigerian economic growth, mainly in the seventies, before recording some setbacks and challenges. These challenges experienced within the industry have led to so many downfalls of the industry and the nation shortfall in its Gross Domestic Products (GDP) for its future development. In general, most industries that contributed to the nations' economy depends mostly on the construction industry for its successful process of operation and future development. For instance, in the case of manufacturing industries within the Nigerian context are mostly in need of suitable buildings for the purpose of manufacturing plants and other purposes. This may also include other structures in the industry, such as road construction, building of offices, construction of dams and so many others. In addition, with the growing population of Nigeria, which has been estimated to be over 400 million by the year 2050 (Jacob et al., 2020). Nigerian construction industry needs the services of effective and efficient skilled workforce for its growing population and its economic growth.

These skilled workforces are mostly the masons or the bricklayers, the carpenters, the electricians, and IT installations, the plumbers, the tilers, iron benders, the painters. These skilled workforces form one of the most significant aspects of the industry due

to their significant roles in the survival of the industry and the nation's economy. This group are the largest part of the site labour workforces of the industry and their inputs determines the quality of the industry productivity and performance (Rangarajan, 2018; Dixit et al., 2017). Most importantly, the industry has recorded a decrease in the quality and quantity of the skilled workforce over the previous years, which has led to skills shortages and skills gaps. Obviously, the persistent neglect of the technicians training to improve the skilled workforce quality by the government and employers has led to drastic falls in the new workforce recruitment. This created a gap between quality and quantity of skilled workforce supply and demand in construction related organisations in Nigeria. Based on the sustainable development goal (SDG) by 2030, to transform Nigeria amongst the world economics nations by 2030, making it a need to improve on the technicians' skills shortages and skills gaps in achieving the SDG (Ufua et al., 2021; Modibbo et al., 2021).

However, the industry's performance has been derailed and the strategies of achieving organisational goals to aid the nation's economy are inadequate. The shortfall of these skilled workforces has affected the construction site operatives through its poor-quality output. This gave rise to many questions on, what training methods and which of the training seems to be more effective, what are challenges of carrying out a better training and its impact on the industry performance for the construction workforces in Nigeria? Hence, Figure 1-1 indicate the schematic structure of the research questions.

1.5 Research Questions

Based on the discussion and the identified knowledge gap relating to skills shortage and development within the construction industry in Nigeria, the following main research questions were established:

Q1. What are the workforce training methods that are most effective within the construction industry in Nigeria?

Q2. What are the obstacles/challenges to carry out effective or better training within the construction industry in Nigeria?

Q3. How can the skills of the construction technicians be enhanced to improve their competency?

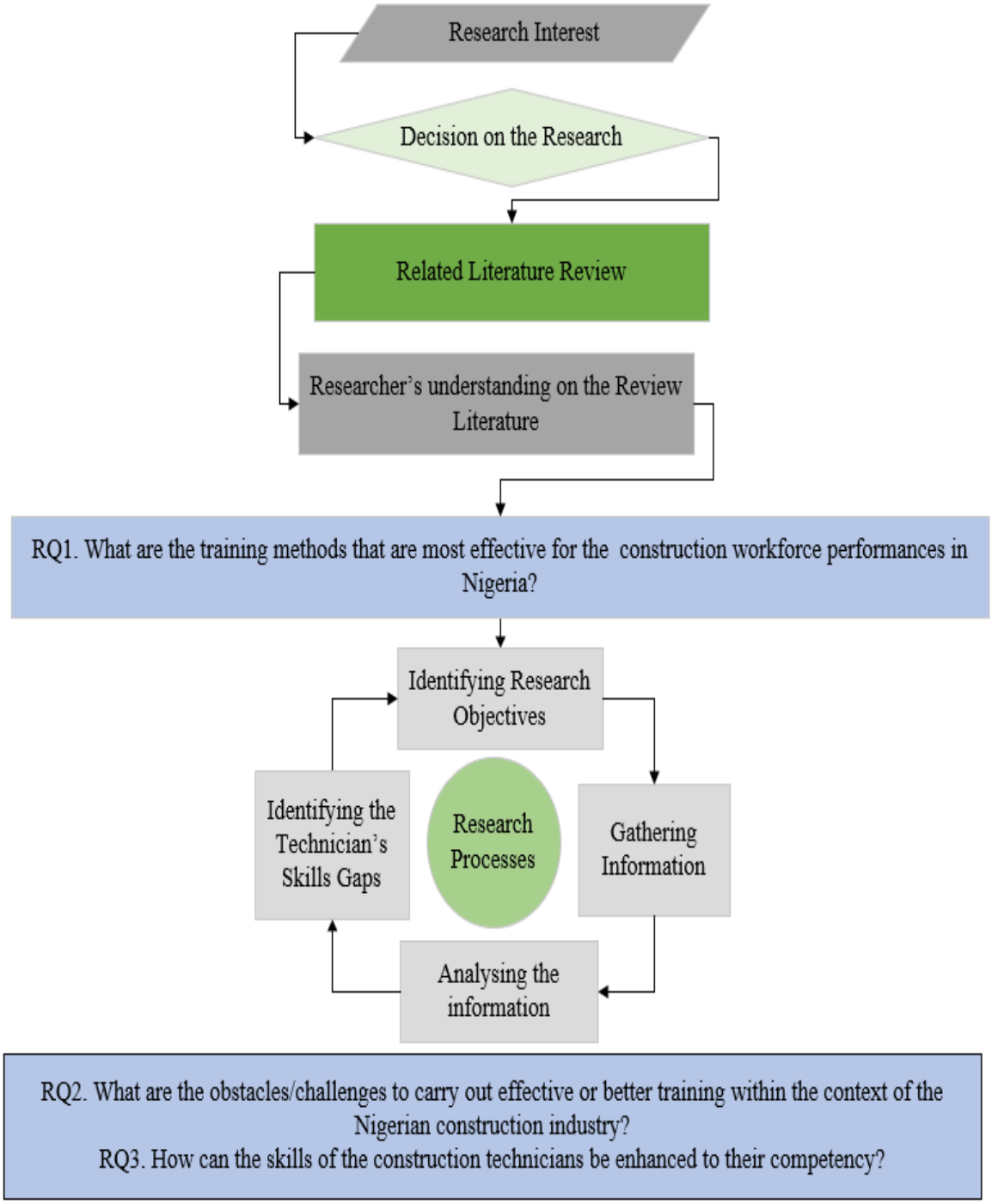

Figure 1-1: Schematic illustration of the research questions

1.6 Research Aim and Objectives

The aim of this current study is the development of a training and skills development conceptual framework for construction technicians to enhance the workforces' skills quality within Nigerian construction industry.

This research aimed was achieved through the following objectives, which were linked to the research questions in Table 1-1 .

- ***To conduct critical reviews of literature on workers' skills acquisition and training within the context of construction industry***. A deeper understanding on the review of the extant literature was gained to determine the current workers' skills acquisition and training needs within the Construction Industry.
- ***To critically assess the current workers' skills acquisition and training in the construction industry in Nigeria.*** This objective provides full knowledge on the concept of the workers' skills, upon which the skills of the workers within the Building Construction Industry in Nigeria has been assessed through the analysis of the previous related studies.

- ***To identify and categorise the factors that negate growth in technicians' skills in the Nigerian construction industry***. After a critical review of the literature on the Construction Industry in Nigeria, the barriers that negate the growth in the workers skill have been analysed and evaluated. A full understanding on the guidelines and protocols that will enhance the workforces' skills within the Nigerian Construction Industry is achieved.
- ***To determine the gaps in the actual technicians' skills and knowledge required to enhance the industry performance.*** The technicians' skills gaps identified is in line with the developed technicians' framework within the Nigerian Context.

- ***To develop a training and skills development framework to improve the quality of technician's skills in the Nigerian Building Construction Industry***. A skills development framework was developed based on the findings of the data analysis and the outcome of the research objectives.
- ***To validate the developed framework using focus group***. The researcher uses experts' judgement during the validation exercise to assess the suitability of the developed framework.

Table 1-1: Link between the research questions and the objectives

Research Questions	Research Objectives
Q1. What are the current training methods used within the context of the Nigerian construction industry and which of these training methods seems to be more effective?	• To conduct critical reviews of literature on workers skills acquisition and training needs within the context of the construction industry. • To critically assess the current workers skills acquisition and training in the Nigerian construction industry.
Q2. What are the obstacles and challenges to carry out an effective or a better training need within the context of the Nigerian construction industry?	• To identify and categorise the challenges and the barriers that negate growth in workforces' skills within the Nigerian building construction industry. • To integrate the gaps within the actual technicians' skills and the knowledge require to enhance performance
Q3. How can the skills of the construction technicians be enhanced to improve their competency?	• To develop a detail training and skills development framework to improve the quality of the technicians' skills within the context of the Nigerian construction industry • To validate the developed framework using focus group

1.7 Scope of the study

This study focussed on the technicians' training and skills development framework for the Nigerian building construction industry. The range of construction related workforce skills needed within the Nigerian construction industry requires immediate attention. This is to ensure that skilled operatives are available to meet up with the industry's demand to overcome its current challenges. Evidence reveals that the major hindrance to the growth and development of construction related works within the construction markets is skill shortages and skills gaps (Healy et al., 2011; Oseghale et al., 2015). More so, CIOB (2008) findings cited in Oseghale et al (2018) and Ayeniyo et al. (2020) stressed that skills shortages and skills gaps are continuous challenges, which may get worse due to the increase in construction demand. Correspondingly, technicians' inadequate training and skills development, which led to skills gaps are a major concern due to skills shortages that affected performance within the country and in the global construction market.

However, there is no clear understanding on the technicians' skills gap and limited studies within the Nigerian construction sector. This research focused on skills gap at the technicians' levels in the Nigerian construction industry through training and skills development. The study reviewed the current workforces' skills training and its impact on performance of the Nigerian construction industry. In addition, a study by Oni (2014) discovered that inadequate craftsperson training negatively impacts upon

Nigerian construction industry performance and its future development. However, the study did not establish the degree and dimension of this impact. Hence, an in-depth study is required to determine the impact of inadequate technicians' skills on the growth of the Nigerian construction industry. This will provide a better understanding on improving technicians' skills within the Nigerian building construction industry for its future development. Moreover, the assessment of training and skills development within the Nigerian context has been carefully studied and the mitigating factors that are responsible for the industry downfalls were properly investigated. Workforce skills training in this current investigation involved the training of an unskilled person to be fully competent in the construction market by acquiring quality skills and in-house construction workforce training, particularly within the technicians' levels.

1.8 Research Justification

This study is based on the interest developed in making the Nigerian construction industry fit to meet up with the global challenges, through better training and skills development of the current and future workforce. The efficient and effective training of workforces and the development of human resources to improve the quality of workforces' skills is paramount. Those Nigerian construction organisations that wants to compete in the global construction market through competency and to enhance the nation's economy need effective and suitable workforce training. The achievement of any successful organisational objectives depends generally on its workforces' quality and is mostly seen within the construction related organisations due to its activities, which are labour intensive.

Nigeria is a developing nation with a population of not less than 186.9 million, which is the largest in Africa and has been estimated to be the largest in Africa and the third largest in the world behind Indian and China by the year 2050 (Jacob et al., 2020; Zakari, et al. 2017). This high rate of population, with a claim of seventeen million housing deficit, has affected the nation's construction sector (Ichendu and Amadi, 2021; Tanko et al., 2017; Helen et al., 2015; Ademiluyi and Raji, 2008). Thus, the construction industry has been amongst the major contributors to the Nigerian economy since its independence. Hence, it is important to improve the knowledge and skills of the workforce, to start reducing this housing deficit and move towards "sustainable development" by introducing massive effective education and training.

There are challenges in the construction industry that include poor performances, time and cost, poor productivity, failed structures, unequitable and unjustified contractors, and consultants, too much reliance on foreign skills and workers (Ameh and Daniel, 2017; Nasir and Hadikusumo, 2019). In addition, there appear to be more challenges within the construction industry that the various literature did not mention.

From the literature reviewed, the Nigerian construction industry is a twofold problem of skills shortages and skills gaps (Abdullahi et al., 2015; Bilau et al., 2015; NIOB, 2018). These have been recognised as a recurrent problem and an important concern within the construction industry, where low investment on training consistently results in increased cost and low productivity. This consistently shows a critical problem for the development of the industry and the Nigerian economy (Sada et al., 2015; Rahim et al., 2015). These critical challenges need to be resolved immediately for the industry development, through better training and skills upgrade of the workforces.

Training and skills development will play an important role in the workforces' skills upgrades in the Nigerian construction industry. Obviously, the Nigerian construction industry is in needs of the managerial and technical skills to compete in the global construction market (Aigbavboa and Aliu, 2017; Juravich, 2017). Ismael et al. (2021) and Gupta (2011) stressed that achieving skills and improving workforces' knowledge in organisations would be successful if the workers are effectively trained.

Thus, it is imperative to assess the current workforces' skills at the technicians' levels to improve its quality in the Nigerian construction industry. In views of this, a training and skills development framework has been developed to better the workforces' skills quality within the industry. The developed framework is expected to establish an effective and efficient training outcome within Nigerian construction industry that has adopted the training needs analysis (TNA), which focuses on analytical techniques.

This study may improve the roles of workforce training through analytical processes within the construction industry in Nigeria, thus identifying those issues affecting or having impact on building construction industry performance. Favara et al. (2015) and Bilau et al. (2015) argue that inadequate training and skills upgrade of workforce and advances in technology are among the challenges within the Nigerian construction industry. There could be no profitable achievement in the industry without adequate

workforces training and education (Opawole, et al., 2017; Adu et al., 2017). For this reason, a proposed framework for workforces' training and skills development in the Nigerian construction industry was developed. This will serve as a guideline for the workforces' skills upgrades to address the prevalent challenges on skilled gaps in the Nigerian construction industry.

1.9 Training and Skills Upgrades in African Countries (Nigeria)

The development of any competent or successful organisations within a country have been determined mainly by the processes in which its forces of production within and outside the economy have been structured or effectively planned in line with the organisational settings. According to Malik (2018) and Kucherov and Manokhina (2017) TNA is an indispensable process for every successful organisation for skills upgrade because it enables the organisation to identify areas that needed improvement during the process. Furthermore, scholars of different views supported this statement that TNA always improved the workforce skills within organisational settings (Ibrahim et al., 2017; Norwani et al., 2017). However, most organisations in Nigeria failed to acknowledge the importance of workforces' training due to several factors.

1.10 Ethical consideration

This study was conducted based on the Ethics committee of the University of Central Lancashire that was approved by the Ethical Committee. A precise ethical procedure of the university was utilised to gain permission for the data collection. Accordingly, a personal letter was given to the respondents and participants of questionnaires and interviews respectively. This clearly stated the research aim and objectives, the time required, interview content, and affirmed confidentiality. The survey participants were informed that their participation was completely voluntarily, and they could withdraw at any time prior to the final report, and consent forms were duly signed prior to the commencement of the interview. Questionnaires were anonymous, and no data was shared with any other parties. Because of the confidentiality to protect the participants' information, the recorder and transcripts of the interview have been wisely handled by the researcher based on the data protection principles and the university approved research protocol. The interview recorder and all the relevant files containing the data will be destroyed from the researcher computer as soon as the study was completed.

1.11 Research Methodology

A mixed method of enquiry, comprising of quantitative and qualitative approach is adopted in achieving this research aim and objectives. The target participants were the group of Projects/Site Managers, Trainers/Educationist and Technicians with a wealth of knowledge within construction organisations. A stratified random sampling was used for the participants selection in the Nigerian construction industry. The industries selection was randomly from the construction industry database and the research data collections were considered in two forms, first through a constructed questionnaire survey and semi structure interview that had gone through first and second piloted studies.

Questionnaires designed were later approved after undergoing a systematic review before administering to the respondents through post-box and received through mailbox. A period of two (2) weeks was given to the respondents to complete the questionnaires and returned questionnaires have undergone data cleaning to ensure that uncompleted data were removed. The data analysis started with descriptive statistics to determine the various trends of the survey data. This analysis stage was based on Zainuddin and Perera (2019) studies, which stressed the need for examining the nature of the raw data collected irrespective of the data for any survey to search for the pattern before the detail analysis. This analysis involved descriptive measures which are the mean value, mid values, standard deviation, and Cronbach Alpha coefficients, to achieve a clear measure that provided an understanding on the subject under study. This descriptive analysis involved central tendency and percentage tables, using a *Statistical Package for Social Sciences* (SPSS).

The interview with the selected participants was the second phase of the data collection for the research in Nigeria. These selected participants are experts with knowledge in construction career in and outside Nigeria. This was due to the emergence of things that came up during the first phase of the data collection. The interview questions designed was based on questionnaire survey findings and some emergent issues that came up during the quantitative method data collection analysis. Hence, the findings of both analyses were used in the developed framework and the schematic of the research methodology is in Figure 1-2 and the research programme in Figure 1-3.

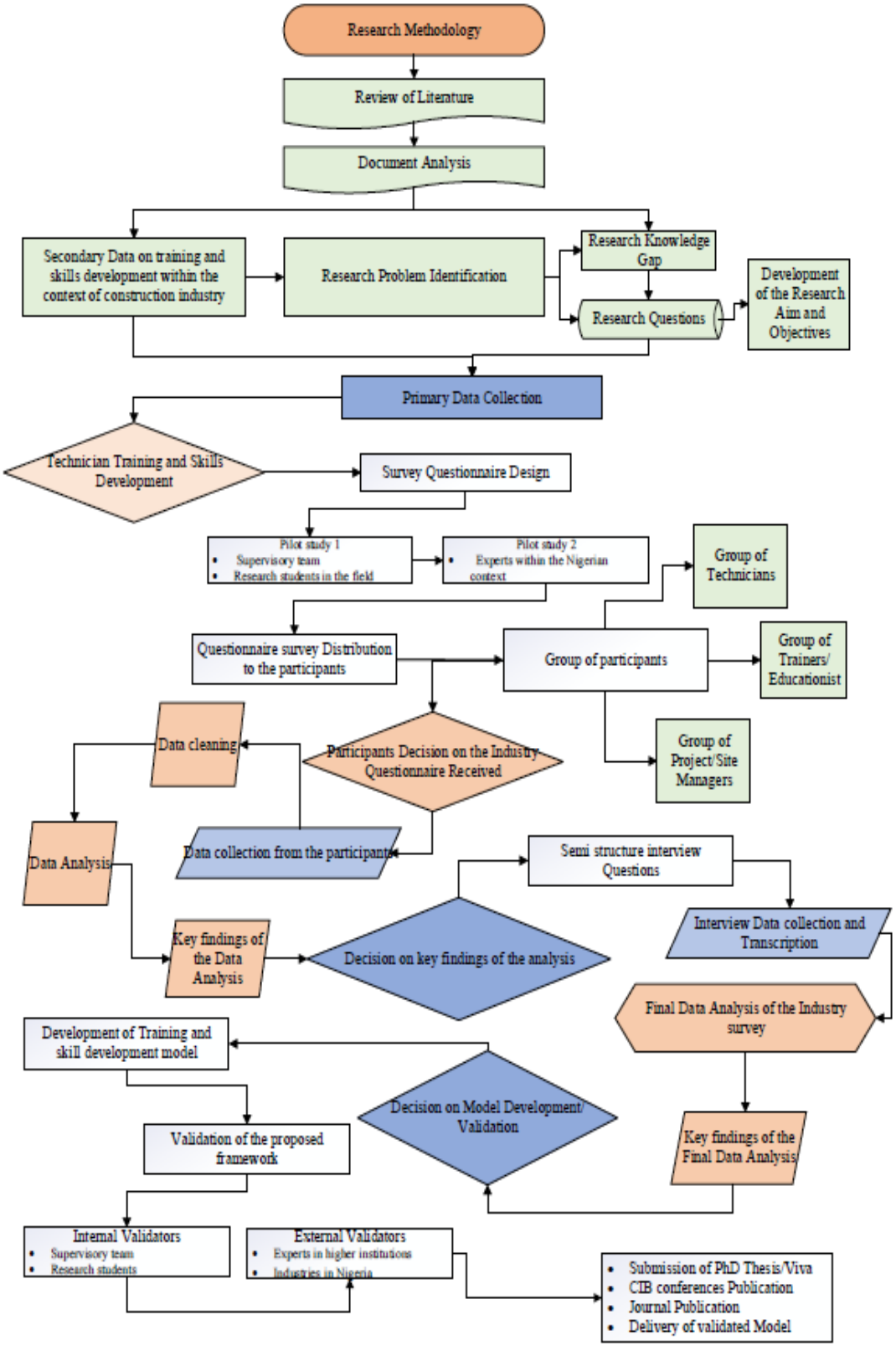

Figure 1-2: Methodology of the research

1.12 Thesis Structure

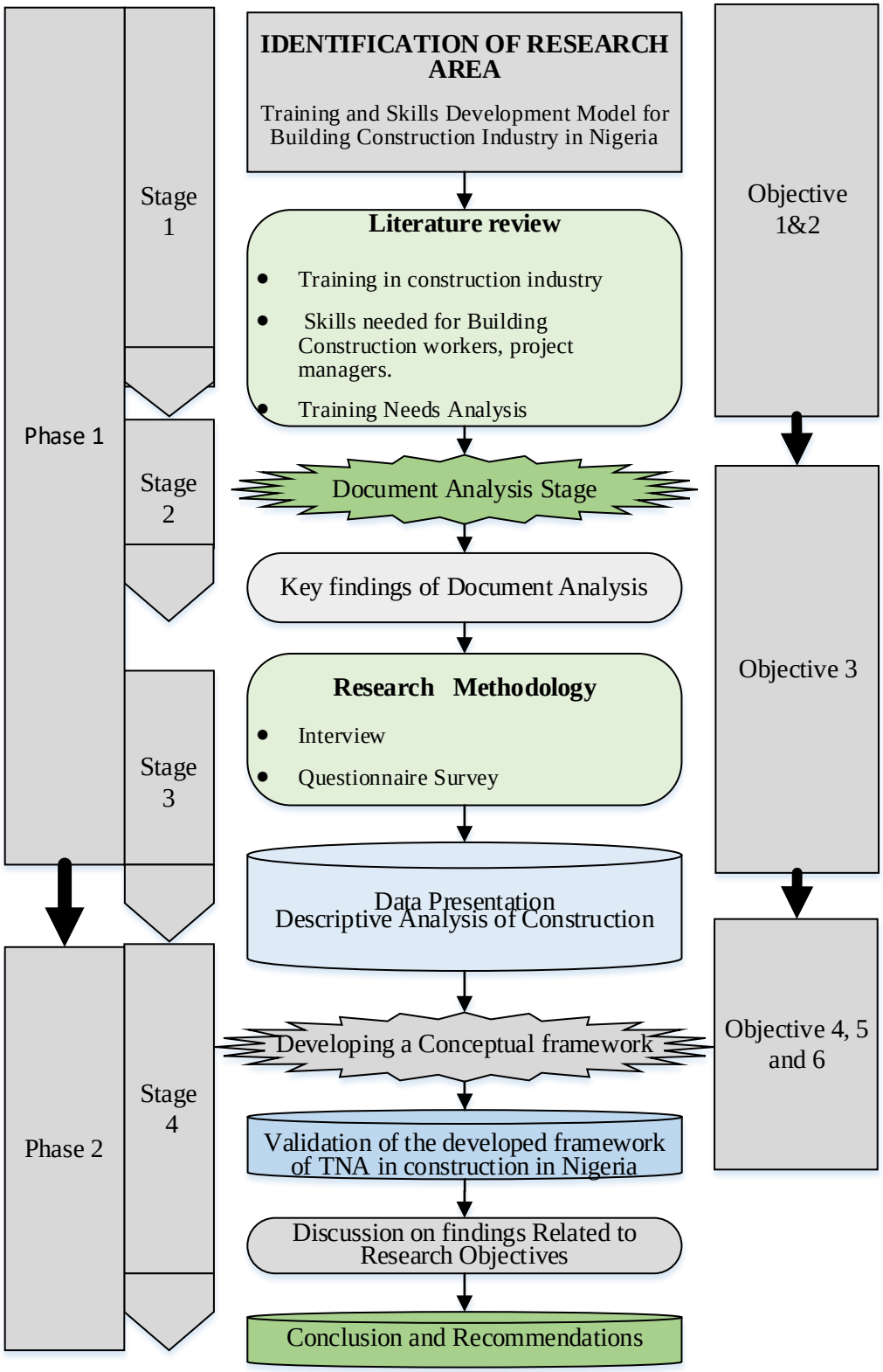

Figure 1-3: Research Programme

1.13 Knowledge Contribution of the Study

This research was conducted due to the interest and passion for the needs and upgrade of the technicians' skills within the Nigerian construction industry. The research has successfully contributed to the knowledge within the field of training and education in the construction career. The research findings have bridged the existing knowledge gaps in the industry primarily, within Nigeria. This has strongly improved the quality of training programmes in the existing literature within the context of construction careers. In addition, the research informed policy makers of the Nigerian construction industry and employees to gain more knowledge, through the developed framework.

The research findings envisaged that learning organisation frameworks have been developed for training so that the skills gaps can be identified and the training areas. This will support the needs of the practitioners' and workforces within the Nigerian construction industry. Furthermore, the framework may serve as a point of reference (benchmark), which will further increase knowledge that will help researchers and policymakers within the Nigerian construction industry. These have been achieved through the research processes on the validation exercise and the whole research processes that have gone through this developed framework from protocol to reality. Finally, to the best of my knowledge, recommendations have been made to serve as a guide for construction professions workforces in Nigeria against future challenges.

1.14 An overview of the thesis structure

This study focused on the skilled workforce within the construction industry in Nigeria and aimed at developing a training and skill development framework for construction technicians in Nigeria, which has been achieved using a mixed method.

Chapter One – Introduction: This chapter introduces and provides the background of the study. An overview on the state of vocational education and training in the Nigerian construction industry, the research problem statement, research questions, the aim, and objectives are provided. Furthermore, the scope and justification, methodology, thesis structure, knowledge contributions and a chapter summary.

Chapter Two – Literature Review: The literature in general viewpoints workforce skills training concept and its implementation in Nigeria, whilst addressing the current

skills issues within the industry provided in detail in this chapter. The key issues that lead to the downgrade of the industry were discussed.

Chapter Three – Research Methodology: The research methodology, philosophical paradigms, approaches, and strategies for achieving the research aim and objectives, were fully discussed. The essential tools required for the data collection and choice of methodology in achieving the research aim and objectives, have been discussed.

Chapter Four – Data Analysis: This chapter provided an in-depth understanding on the data collected for the analysis. The analysis and the participants' views on the workforce training. An insight on the analysis that led to the next chapter discussion.

Chapter Five – Discussion: This chapter provides detailed discussion on the analysis in the previous chapter and identifies the analysis findings. This provides an insight to the next chapter of the study, which is the framework development.

Chapter Six- Framework Development: A training framework has been developed for construction technicians based on the research to achieve the research aim.

Chapter Seven – Developed Framework Validation: An in-depth understanding on the framework validation was gained, using experts' judgement through a focus group discussion during the validation exercise.

Chapter Eight – Conclusion, Recommendation and Contribution: A conclusion of the research and the knowledge contribution was achieved. Recommendations and suggestions for future research in line with the research limitations are also provided.

1.15 Summary of the chapter

This chapter has established the concept and role of the construction industry in terms of economic growth within the Nigerian context. In relation to the nations' economic growth, a skilled workforce plays a vital role in the achievement of this development, which is essential in developing countries where construction works are mostly manual activities. Yet, critical issues regarding skilled workforces' training exist with negative impact on the industry. This chapter ends with a summary and the review of the related literature is presented in the next chapter.

Chapter Two: Literature perspectives on construction workforce

2.1 Introduction

This chapter focuses on the review of the extant literature that is in line with the research problem statement and the research objectives. The chapter explores issues surrounding the technicians' training and skills development within the context of the construction related organisations within Nigeria. The chapter starts with the concepts behind the current workforce training and education, importance of the workforce training, objectives, and training principles of the skilled workforce, which provides the researcher with an intense understanding on the subject under investigation. Furthermore, an overview of the shortages of the skilled workforce and the current skill gap within the context of the Nigerian construction industry is provided

2.2 Concept of training and education within organisations

The achievement of every organisation's objective depends on the performance of its workforce, which is applicable to any successful construction related organisation. As such, a well-trained workforce is one of the key requisites for a sound and successful organisation. This implies that competent organisations should ensure that training and skills development of their workforces are of greatest importance and remain the upmost priority activities for the achievement of their organisational goal settings. These important activities should be carried out regularly, either within or outside the organisation, to add more value to human resources.

Furthermore, Lestari et al. (2020) and Nyateka (2017), states that the "systematic acquisition and development of the knowledge, skills and attitudes required by employees to adequately perform task or job or improve performance in the job environment". In a much similar way, Steensma and Groeneveld (2010) define training as "the systematic acquisition of skills, rules, concepts, or attitudes that should result in improved performance". According to Armstrong (2017); Armstrong et al. (2015) training is defined as the formal and organized or systematic modification of behaviour through learning that occurs due to education, instruction, and development and planned experience. Similarly, Salas et al. (2012), Obisi (2011) and Ericsson et al.

(2018) stress that training is a planned and a continuous process that is designed to meet up with the training needs of today and the future, enhancing organisation performance and productivity through knowledge upgrading and skills development. Therefore, efficient training is to gain competitive advantage for organisations through employees acquiring new knowledge and skills in their chosen professions (Lazzara et al., 2021; Kucherov and Manokhina, 2017; Abomeh and Peace, 2015).

However, from the above presented definitions, training has to do with imparting knowledge, to acquire skills and change in behaviours for a greater job with the best available information and to the best quality required. In this light, the best possible arrangement of methods, techniques, tools, and practices should be assembled in an organised form to achieve such a goal. In other words, training can be defined as a systematic approach (a step-by-step process) of acquiring or impacting knowledge and skills that will bring about a positive change of behavioural attitude of an individual person or group of individuals in an organisational setting with the aim of improving their performance to be competent when confronted with global challenges. This implies that training is a vital activity that must be carried out regularly within any successful organisation and must always be aimed at effective changes that must be positives in the trainees' behaviour. This positive change is important to the training outcome, and these include changes in terms of the knowledge, skills and attitudes of the trainee and the training level of performance improved with a positive outcome in a certain level of productivity within an organisational setting. Training is usually designed, planned for both the existing and the newly employed workforce in the organisational settings ensuring that is a continuous process development (CPD) to improve the current and future individual knowledge and skills. Training requirements must be designed and carried out regularly for the upgrade of workforces' skills to enhance performances of the construction workforce. Workforces are the foundations for getting the work done successfully and competently and serve as key sources of innovation and creativity if properly trained on the task.

For this study, effective training in a competent organisational setting can create an enabling environment through which trainees within the context shall (Lazzara et al., 2021; Brennan et al., 2019; Silas et al., 2012) be able to:

- **Learn the importance of knowledge, skills, and attitude (KSA)**

This should be related to the performance of the job at hand to contribute positively to achieve the organisation objectives. The importance of Knowledge, Skills, and Attitude (KSA) to an organisation is to improve the output quality and effectiveness of the organisation. However, this seems to be ineffective within the context of the Nigerian construction industry.

- **Practice applying the learned knowledge, skill, and attitude**

The trainee's participation by "doing" in the learning process is key in this point. There is a saying which states that "constant practice always makes perfect", which is of paramount important in this aspect. This simply has to do with the application of the training process since practice always makes perfect.

- **Act on feedback to enhance future performance.**

At this stage is the outcome of the trainee's performance within the organisational settings, which is of paramount important. According to the past studies of Biech (2003) and Bajaba et al. (2018), learners/workforces/people tend to improve on their performance only if they are aware of their success or achievement in what they have done so far. This has indicated the relevance of feedback on training conducted for the workforce within the context of an organisational setting for its competency in a certain environment.

2.2.1 States of Training and Development within organisational settings

The roles and importance of training and development within an organisation is to enhance an individual's abilities to satisfy the needs of an organisation through the acquisition of knowledge, change of an individual attitudes and behaviour, shaping of skills, concepts, or rules of the individual in the organisation (Ibrahim et al., 2017; Ladyshewsky, 2017; Bibi et al., 2018; Brahmana et al., 2018). This implies that the importance of training and development within an organisation in the realisation of organisational objectives is paramount. Hence, effective training of workforces remains as key to every successful organisation that wants to be competent in the global construction market. Those Construction related organisations that want to be

successful and competent within construction market need to start regular CPD of its workforces to improve its performance. The importance of training in an organisation is seen in an era of globalisation and hence every sector of the economy perceived its positive impact in terms of its development (Karim et al., 2019; Al Karim, 2019; Machado, 2018; Malik, 2018; Kumar and Siddika, 2017; Sharma, 2014). Evidence shows that business goals of organisations are achieved due to the importance of continuous workforce training and development (CTD) within the organisations (Ramdhani et al., 2017; Fujimoto and Härtel, 2017; Ibrahim et al., 2017; Afsar et al., 2018; Garavan et al., 2008)

Within the Nigerian context (NPE, 2004), vocational training and education has been considered by impartation and insulation of specific vocation or skills and preparation of the individual trainee to render specialised services of economic growth of the nation. If there is an appropriate plan towards the skilled workforce training and education in the Nigerian economy, the present challenge of skills gap and skill shortages within the country would have been less compared to the current challenges.

2.2.2 Scope of workers training within an organisation

Workforce training within an organisation depends on the interest of the workforce that planned to undertake training within the organisation. This involves the interest shown by both the employers and the employees (workers) of the organisation on how to achieve a certain goal that has been planned. However, effective workforce training within any organisational settings, either in a developed or developing country, should be a continuous process for all workers and not only for the newly selected workers to upgrade their skills. The interest shown by both the employers and workforce of the organisations to achieve a certain objective through structure and emphasis on training is also important and must be put into consideration. Workforce training is aimed at improving capabilities and competences in the various places of work. Construction industries are challenged with training their workforce to be competent to meet up with the international standard. These challenges within the construction market are global issues due to the 2008 economic recession and the current outbreak of the health crisis. However, the case of Nigeria is the same and even worse compared with those countries like the United Kingdom (UK), Germany, France, and United State of America (USA), Canada, Australia, Finland, and Singapore.

2.2.3 Key strategy of workforce training within an organisation

The studies of Biech (2003) and Hargie (2018) indicate that people tend to improve on their performances only if they are aware of their achievement in what they have done (previous experience). However, most of the construction workers are not aware of the achievement that can be gained or acquired due to effective training. Furthermore, the workers need to be enlightened and encouraged on the importance of training and the cost of being trained. The workforce also needs to be enlightened on the consequences of the performance on both the industry and the employees due to lack of training. They need to know that there is a clear indication that training is expensive but if it is not conducted or carried out in line with the organisational settings, it may become more expensive. Hence, there are key strategies or prerequisites for effective training within an organisation or outside the organisation for both the new and the existing workforce to enhance productivity or output.

These key strategies are outlined below:

- Training Objectives
- Planned training process
- Outcome from training process

2.2.3.1 Training objectives

The expression that described and measured the real and reliable expected outcome of the learner at the end of training is the training objectives (Wang et al., 2018; Jeelani et al., 2017; Mager, 1984; Davies and Davies, 1998; Awe, 2012). Organisations need to ensure that the expected outcome of the learner needs to be properly measured and applied as appropriate. Training objectives usually lead to a better training outcome, by providing a strong protocol/guideline to develop the training programme within a short period because it focuses mostly on training needs. According to Naukrihub (2007), training objectives can help in planning, informing the trainee on exactly what is expected at the end of the training programme, and it is important from stakeholder's perspectives. However, the importance of training is usually neglected by these stakeholders within the Nigerian context.

In most cases, resources available are always limited and training objectives mostly lead to the design of better training. Training objectives lead to better training outcomes by providing a clear protocol or necessary guidelines to develop the training programme within a short period because it always focusses mainly on training needs. According to Naukrihub (2007), training objectives can help in planning, thus informing the trainee on exactly what is expected at the end of the training program. He further argues that the training objective is of paramount important when viewed from stakeholder's perspectives.

2.2.4 Component of training objectives

These are the explicit things that training participants (trainees) should be able to do to gain a positive training outcome. In line with the studies of Naukrihub (2007) and Awe (2012), the importance of the training objective with respect to workforce skills development in an organisational setting is important for achievement of a successful organisational setting based on the stakeholders' perspectives. The training objective of any successful organisation within a competitive advantage has been determined, which is outlined in a sequential order as shown in Figure 2-1.

Figure 2-1: Components of training objectives

2.2.4.1 Skills or behaviour to performed

The workforce performance in organisational settings forms the greatest expectation in the activities of successful training programme outcomes (Faizan et al., 2018; Hosen et al., 2018). Effectiveness of the training programme has been determined in the context and workforce/learners' skills improvement for the next training programme. Trainers within their organisations will tend to understand if their training program has impacted well on the learner. The workforce performance can be through a careful observation of the learner after the training programme and during the application of what has been learned during the workforce training programme. This objective is key for any organisation that wants to be successful in the construction market.

2.2.4.2 Conditions under which the trainer will perform skills

In line with an organisational training objective, a successful organisation training objective must have a precise condition in achieving the organisational settings within the context (Little et al., 2020; Bernhard-Skala, 2019; Wisshak and Hochholdinger, 2018; Copland, 2010; Holladay and Quiñones, 2008). However, these conditions must be in line with the training needs of the trainee or the learner within the organisation, and the workforce/learner must be aware of these conditions. Regarding organisational settings, conditions under which trainers will perform skills in any training may include time management, training location or environment, available resources which may either be human or financial resources and various circumstances that may occur.

2.2.4.3 Criteria used to measure performance

Successful training within the context of an organisational settings must ensure that learner or workforce training objectives describe all the adequate criteria of the training objectives (Bernhard-Skala, 2019; Narkhede and Gardas, 2018; Aghimien et al., 2018). With regards to skills enhancement within the context, each of the criteria within the training objectives should be known to the learner of the training needs. The criteria descriptions are keys in any organisation training objectives, as skills may be improved easily through a proper understanding of each criterion during training process. These criteria that are used as training objective may include quality, quantity, and time management in terms of performance and measurement respectively.

2.2.5 Training principles

Effective workforces/learners training within an organisational setting mostly depends on the application of some basic and important training principles of the organisation (Holding, 2013). According to Salas et al. (2017), Vong and Kaewurai (2017) and Farmer et al. (2017), that guidance on workforce training development and its implementation based on the research, the principles vary from different strategies for workforce skills upgrades. A plan is completed with the principles of training. Such principles depend on extensive research to identify the training needs and workable methodology of the situation as indicated in Figure 2-2.

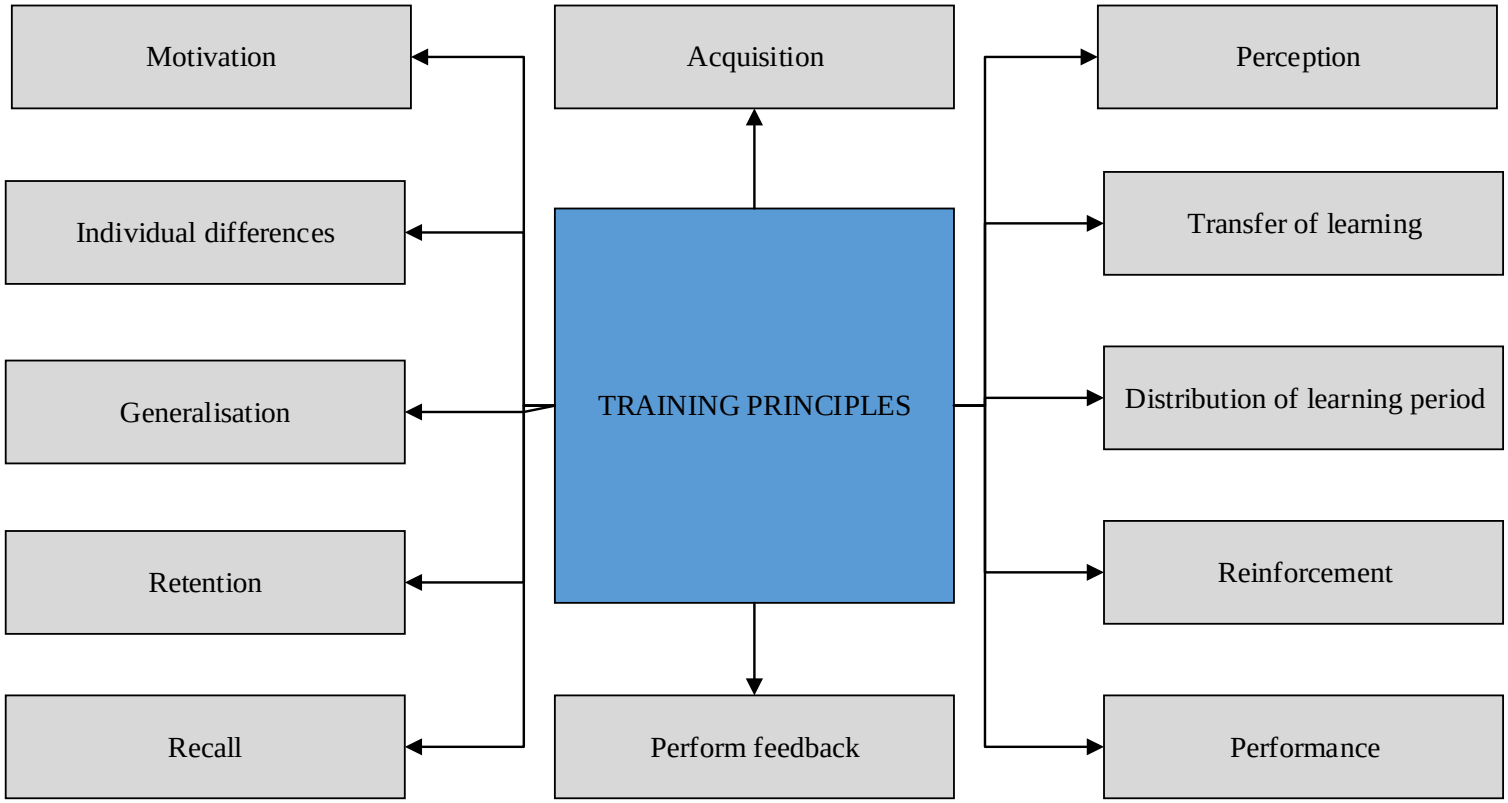

Figure 2-2: Training Principles

2.3 Training methods

Studies by Bilau et al. (2015), Rahim et al. (2016) and Afolabi et al. (2018), explore the shortages of skilled workforces in the Nigerian construction industry and identified numerous approaches for training. These include classroom training methods, trade group, apprenticeship training method, on the-Job-training, Craft Apprenticeship courses, conference/discussion, and Apprenticeship Programmes. These methods are consistent with Craig (1996), who identified four basic techniques of training such as management development training, on the job training, classroom training and vestibule training. On the other hand, Naukrihub (2007), classified training methods into two broad categories of behavioural and cognitive methods. The Behavioural category of training has to do with more of the practical aspect of the trainees training. These include case studies, Equipment Stimulators, Games, and simulation such as behaviour modelling, In-Basket Techniques and Role play. The cognitive category has to do with the theoretical aspect of training the trainee which consists of the lecture, discussion, Computer Based Training (CBT). The CBT includes Intelligent Tutorial System (ITS), Programmed Instruction (PI) and virtual reality. However, Obisi (2011) and Raheja (2015) classify training methods into training on the job and off the job.

2.3.1 On the –Job- Training

On the Job Training (OJT) methods can also be referred to as Job Instruction Training (JIT). It is the most used method of training employees. Awe (2012) suggested that OJT involves training of employees for job tasks which is carried out by allowing the trainee to achieve such responsibilities under the supervision of an expert. This can be in the form of formal or informal methods of imparting knowledge and skills. In most cases, this method of training consists of observation, demonstration and oral written explanations, charts, pictures and so on. In this same method of training, employees traditionally learn their jobs by exposure to experience. In most situations, there is no doubt that bad habits do exist and could be transferred from the trainer to the trainee as well the good habits are passed unto them. However, most of the organisations within developing countries, including Nigeria, do not comply with this assertion. Instead of doing the training program for all the construction workforce based on their areas of specialisation, the training is usually generic, in most cases to save cost.

2.3.1.1 Apprenticeship Training

Zou et al. (2008) and Belau et al. (2015) argued that apprenticeship training is a system of training in which the young worker coming into the industry is permitted to go through instruction and experience, both on and off the job, in the practical and theoretical areas of the work in a skilled trade. The researchers further mention that this training is based on voluntary cooperation between management and labour, industry, government, and the school system, though the training technique is often adopted for low level skilled personnel. This is in line with the study of Long et al., (2013), who describe the training for different categories of jobs which are related to the construction works within a certain organisation as an Apprenticeship programme. This indicates that occupational training of different types of skilled craftsmen in any construction related works within the organisational settings are termed as an apprenticeship programme. They consider that such programmes consist of on-the-job training (OJT) and work experience with related instructions in the theoretical aspects of the apprentice on the job, which improves steadily during the period of a well programmed training (Aluko et al., 2018; Belau et al., 2015; Ibrahim et al., 2013).

2.3.1.2 Internship Training

This is a period of work experience offered mostly by an organisation for a certain period for one person to have a tremendous experience on a job. The internship training is the type of training on the job, which is well-known as clerkship or assistantship, but mostly depends on the type of proficient training. This training is mostly used for a wide range of placements within organisations either by government agencies or non-governmental organisations. The training is mostly undertaken by school graduates trying to gain relevant skills and experience within a specific area or field of their choice. In this training, employers of organisations are mostly the beneficiaries because they save a lot of money and time for the organisation and the employers often recruit employees from their best interns who have known skills. An internship training for professional career is similar, but not as rigorous as apprenticeships for professions, trades, and vocational jobs. The training is usually arranged by a third party and in most cases, it is either paid or unpaid, but it must have a limited period to complete (Ocampo et al., 2020; Zehr and Korte, 2020; Chu, 2020).

2.3.2 Classroom Training

In a classroom, training within the context of any organisational settings is being termed as the training method that the maximum number of the trainees can be handled within a shorter period with a minimum number of trainers or by a single trainer or instructor (Belau et al., 2015; Solomon et al., 2012). It lends itself particularly to instruction in areas where information and instruction can be parted by lectures, demonstrations, films, and other types of audio-visual materials. The classroom training method is a means of continuing professional development (CPD).

2.3.2.1 Conference or discussion method

The conference or discussion group has several uses. Umar (2005) believes that when this technique involves a group of equals, it is primarily a means of sharing and developing ideas, rather than a training device. However, the conference can be transformed into a tool for disseminating information, simply by bringing a group of trainees together with a trainer discussion leader.

2.3.2.2 Vestibule Schools

A Vestibule School is one operated as a specialized endeavour to train for the same type of job as on OJT. The Vestibule School is identical to the work situation, for after training, the trainee is handed back to his supervisor (Ugwuja, 2010; Umar, 2005; Odesola and Idoro, 2014). This training is common and frequently in line with the organisational specific needs on the job required.

2.3.2.3 Lecture method of training

According to the study of Farashahi and Tajeddin (2018) and Finch et al. (2018), this method of training is the most effective way to provide numerous ideas, principles, frameworks and concepts to the trainees or learner. This form of training is one of the oldest forms of training used for the learner's understanding of a topic to change behaviour, attitudes in the form of a printed document or oral for the learners understanding. This form of training has been characterised in different forms by different studies as: experiencing difficulty to find correction and misunderstanding, requires long periods of time and is regarded to be less effective than a knowledge

building exercise which can reach a large number of people within shorter period (Nakato, 2019; Abdelrasoul, 2018).

2.3.2.4 Programmed Instruction

This is a training method that has to do with the presentation of the subject matter to the learners by the trainer through a graded sequence of controlled steps with corresponding activities. The training method is a computer-based learning, which is made up of graphics, multimedia, text which is connected to one another stored in memory (Zendler and Reile, 2018)

2.3.3 Trade Group Training

Solomon et al. (2012) found that when work groups of many employees are added to the site force at the same time, considerable economy can be achieved by carrying out a large part of the training in formal classes. However, Dantong (2007) believes that such a produce has certain benefits on interviews and conferences and makes possible utilization of different forms of training techniques. Instruments used in training include lectures; charts and graphs; group demonstrations; manuals and handbooks; motion picture films; sound slides; written assignment and examinations; analysis of case studies; and group dynamics or role playing.

2.3.4 Management Development

This type of training has to do with the how the management improve their skills for the better or interest of their workforces and this training can either be carried out formally or through informal learning. The skills, competencies, and knowledge acquired in this training method enable the learner to gain more knowledge to enhance his performance within the organisation. In this type of training, the managers are mostly the trainers or the coaches themselves in most cases. In line with the management development training method, the various types of this training method fall in line with the investigation of Naukrihub (2007) cited in Awe (2012) as outlined.

2.3.4.1 Understudy method:

Understudy is a form of management development training method whereby an individual person undergoes a certain training, which assumes that in the future, the

individual person will take over from his superior due to either promotion of his superior to the next level or retirement of its superior or transfer from one sector to another (Vasanthi and Basariya, 2019; Sam-Okere and Agbeniga, 2014). At this stage, the duties, and responsibilities of the superior falls on the individual person. The selection for this training method may be done carefully by the manager of the organisation within a certain number of subordinates, or several individuals within the context of the organisational settings.

2.3.4.2 Job Instruction Technique (JIT)

This is one of the fastest means of workforce/learner training methods within the context of an organisation for doing a job in an effective and safety means. The method is systematic and usually undergoes several stages to realise its key objective or goal. In this type of workforce training within an organisational setting, it usually involves four stages in accordance with the studies of Ahadi and Jacobs (2017) as stated. The studies indicate that JIT key focus within an organisation is on imparting technical skills for trainees with limited skills or experience within the context of the industry.

2.3.4.3 Coaching

In this method of management development training within the context of the organisational settings or learners' environment, usually involves development of management (managerial) skills that has to do with all the processes of managerial thinking and operative skills within the context of the organisation (Milner et al., 2018; Jones et al., 2016; McCarthy and Milner, 2013). In this thinking process, the vital role of an instruction within the context of an organisation is being guided by the individual in charge known as the superior. This type of training method is conducted through phone meeting, emails, on WhatsApp since it is usually a face-to-face, one on one training with any settings. In comparison with the studies of Milner et al. (2020) and Jones et al. (2016), training benefits are outlined as:

- Interrupted response and evaluation are part of the coaching method that led to quick benefits to both trainee and trainer (coach) within organisations.
- This method is authoritative or authoritarian.

2.3.4.4 Learning through Experience

This workforce/learner training method refers to the techniques that involve all the processes of learning by doing within an organisational context through the learners experienced within the context. This method of training involves the application of what has been learned in class, or within the organisation, in the real-life situation within the learning system context. This training method is mostly of experimental learning that starts with learner's experience which is in line with the various past studies of Wong et al., (2017); Tinkler et al., (2019); Hägg and Kurczewska (2020) and Zydney et al., (2020). In this training method, the learners or workforce within the system express their understanding in line with experienced practitioners within the learning state.

2.3.5 Sink - Or Swim Method

This method of training allows employers to place a new and inexperienced employee on a site to work and let him pick up the information that he needs informally as best he can, merely by observing and listening to others who are involved in the work he is expected to do (Datong, 2007; Long et al., 2013b). For the essence of this study, this training method is a general situation or condition in which the workforce/learner within the context can survive all the learning challenges within the context through the application of its efforts. The workforce/learners, within the context in most cases, can survive this training method through constant enquiries from those that have the knowledge on what to learn. This can be further achieved through making of friends and putting extra effort towards gaining the required skills. This method according to Dantong (2007) is the least efficient, most wasteful, and in the long run, most expensive alternative. In line with this statement regarding this training method, it is the most wasteful if the required efforts are not put in place because it is either the workforce is successful or fail in achieving the required skill within the context. The Construction workforce within the Nigerian context is encouraged to learn on its own since the commitment of the management of the various industries towards skilled training is not encouraging.

2.3.6 Time Release Training

The Industrial Training Fund developed this form of training because it is applicable to situations where apprentices who had earlier received basic training are now required to attend training sessions at a centre for a few hours or one day in weeks to advance and/or update their knowledge and skills (Dubem et al., 2012).

2.3.7 Apprenticeship Programmes

Long et al. (2013a) indicates that this tends toward more education on the job training, knowledge, and skill in doing craft or a series of related jobs involved. They argue further that such apprenticeship programmes must be registered with appropriate government authorities. Awogbenle and Iwuamadi (2010) add that these programmes last anywhere from two (2) to five (5) years and are available in craftlike mechanics, electricians, pipe fitters, carpenters. In summary, training methods can be categorised into two forms as shown in Table 2-1.

Table 2-1: Training methods

ON-THE JOB TRAINING METHOD	OFF-THE JOB TRAINING METHOD
Job rotation	Conferences
Coaching/Mentoring	Incident Method
Job Instruction	Role Playing
Committee Assignment	In basket method
Internship training	Grid training
	Lectures
	Simulation
	Management education

2.3.8 Factors Influencing Training and Development methods

In workforce training within the context of any organisational settings, there are influential factors, which determine the choice and needs of training methods. This choice of training must be in line with the context of the organisational settings or

within the context of the various institutions. These influential factors on training are numerous and differ on the institution or organisational setting for the training needs. However, some of the factors influencing the workforce/learner's training as outlined by different studies (Mohanty et al., 2019; Sudhakar and Basariya, 2017; Awe, 2012) include the following:

2.3.8.1 The cost of training (Capital improvement)

The cost of training of workforces within an organisation is usually expensive and it is a key factor influencing training and development methods within an organisational setting. The cost of training determines the number of trainees that will enrol into the training program. This is a critical factor that influences most of the organisations within the context of developing countries, and the number of trainees involved in the training program and the trainers as well may be greatly affected by this factor. The more expensive the training program, the lesser the number of the trainees that may be enrolled in the training program. In line with the studies of Sudhakar and Basariya (2017), these employees are an asset to the various organisational settings. However, most employers are more focussed on reaching deadlines and maximization of profits rather than the development of their employees' skills.

2.3.8.2 Trainees' background

In line with the need for successful training and skill development within any organisational settings, the trainees' background has been considered as one of the factors that influences the need for effective training. This is in line with the critical issues within the context of organisational settings towards workforce, gaining new knowledge required for skills enhancement (Sahoo and Mishra, 2019; Ibrahim et al., 2017). The trainee with a sound educational background on the subject area will only need to highlight on what needs to be done. However, a trainee without any educational background on the subject area will need intensive training to be able to meet up with the global challenges within the context.

2.3.8.3 Learner ability and motivation

To achieve the key objectives of the workforce training needs within the organisation, the learner ability and motivation must be taken into consideration for an effective

transfer of knowledge to occur within the organisational setting. Studies of Partovi and Razavi (2019) state that in every successful academic performance within the context of a learning environment, motivation of a learner plays a vital role and is the key that serves as an inherent phenomenon, which is being influenced by basically four factors (behaviour, purpose, direction, and tools). However, the various studies of Nafukho et al. (2017), stress the need to combine training efficiency and training relevance to encourage trainers to achieve the required knowledge and skills for the required job. More so, within an organisational setting, motivational processes are mostly influenced by the trainee motivation for skills enhancement of the workforce/learner (Sahoo and Mishra, 2019; Roberts et al., 2018).

2.4 Training design

The choice of workforce effective training programmes within organisational settings concerns training designers within the various organisations, who must design the training based on the training needs within the organisation. In a competent organisation, training design involves the application of recent technology to high technology in the learning process (Evmenova, 2018). This is obvious that the design of the training programme within any context is vital and needs proper guidance for the realisation of the organisational needs. Based on the workforce skills development in organisational settings, the criteria used in the selection of the workforce/learners' training is vital. This must be carried out carefully with consideration and must be based with the organisational settings. The selection criteria within the context must be precise to determine the workforce needs for effective training by the organisation.

2.5 Evaluation of Training

Long et al. (2013b) suggest that training and development programmes should always be assessed based on known evaluation approaches that include measuring one or more relevant criterion (such as attitudes or performance). This could be done before and after the training and determining whether the critical element changed. Evaluation measures collected at the end of training are easy to obtain, but actual performance measures collected when the trainee is on the job are more important. Odusami and Ene (2011) report that trainees may say that they enjoyed the training and learned a lot, but the true test is whether their job performance improved after their training. According to Cheung et al. (2009) training is believed to have "worked" if it

accomplishes its objective, since the training objectives are to be derived from the strategic objectives. However, training is only one of dozens of factors that determine if an organization accomplishes its strategic objectives (Solomon et al., 2012), and one that is often far removed in time from the result.

2.5.1 Determination of Training Evaluation

The idea of training evaluation within an organisation is to improve the quality of the workforce that participated in the training needs. The aim of the training evaluation as outlined by Naukrihub (2007) is illustrated in the Figure 2-3.

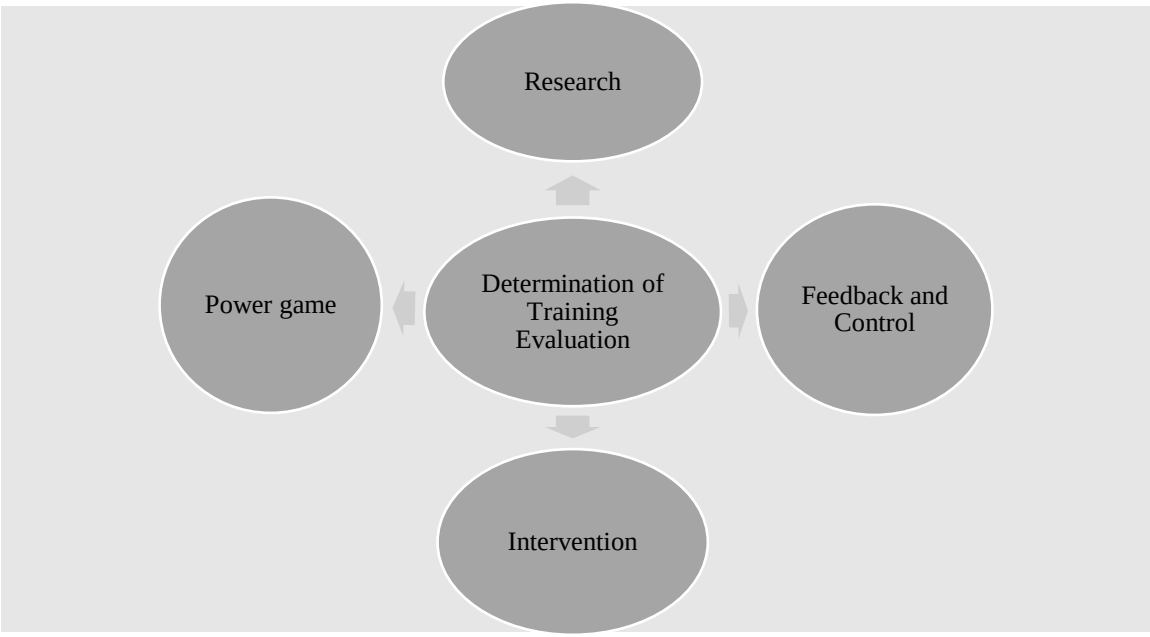

Figure 2-3: Determination of Training Evaluation

2.5.2 Strategy of what training evaluation needs to evaluate

The question of what to evaluate is crucial to the evaluation strategy. A review of the most popular procedures used by US companies to evaluate their training programmes shows that over half (52%) use assessments about participants' satisfaction with the training as the key method. Seventeen per cent assess the applications of the trained skills to the job and 13 per cent evaluate changes in organizational performance following the training. Five per cent test for skill acquisition immediately after training while 13 per cent of American companies carry out no systematic evaluation of their training programmes. Many of these procedures reflect Kirkpatrick's (1998) four criterion levels of reactions, learning, behaviour, and results which will be discussed.

2.5.3 Implementation of training evaluation outcome

The determination of training evaluation within the context of an organisational setting can be implemented within the organisational setting after evaluation.

2.5.4 Advantages of training workforces in construction industry

Most of the construction industries in develop countries around the world today are successful because they trained their workforce to meet up the challenges they undergo within their organisations. As stated by the studies of Matt et al. (2020), Okwakpam (2019) and Wang et al. (2018), competent organisations that are successful have better prospects of attracting skilled workforces, through the provision of training programmes for workers' skills upgrade. In addition, Yuan et al. (2022), Nnaji and Karakhan (2020) state that training benefits are obvious, and the trainees are provided with the skills and knowledge needed to ensure optimal performance outcomes. A reserve of workers qualified to meet the organisation's operational objectives and needs can be developed within the organisation; and training contributes to optimistic morale, individual development, and satisfaction". The advantages of training and other related issues are:

- Improve Efficiency
- Competitiveness
- Skills Update
- National Development
- Customer Demands
- Improvement in Manager Performance

Workforce skills development is vital for the survival of any organisation irrespective of its location, and skills can be achieved through effective training. This may be due to the ambience of the organisation, as well as the leadership of that organisation. Hence, if a framework is developed, it is the usage/implementation of the framework in an ambient environment that will determine its objective.

2.6 The concept of workforce skills within organisations

The term "**Skill**" is defined by many studies in a summary form as the ability to perform a certain task or job which has been assigned with the aim of meeting the target within the context of the task assigned (Uzumcu and Bay, 2021; Van der Velden and Bijlsma, 2019; OECD, 2011; United Kingdom Commission Employer Skills Survey, 2010). However, the concept of skills within an organisation is defined by different studies in different ways based on their understanding and contribution within the organisational setting. According to Tether et al, (2005), skill is defined as the ability to do a certain job which is acquired through formal and informal training.

In construction related organisations, the processes of acquiring quality skills within an organisation is through the activities that must involve workforce knowledge, decision/judgement, accuracy, and mastery that can only be achieved effectively through the process of continuous workforce training and practices within the organisation (Di Gregorio et al., 2019; Awe, 2010).

Workforce skills processes and training needs within the field of construction related organisation is continuously and consistently changing depending on the organisation performance. This was based on the introduction of the recent processes of business and organising production, indicating that through the innovation of technical and vocational education construction workforces are highly needed with quality skills within their various specialities (Johari and Neeraj Jha, 2021; Johari and Jha, 2019; Forde and Mackenzie, 2004; Mackenzie et al, 2000).

2.6.1 Skills categories within the context of construction industry

As stated earlier, skills in the construction organisations are of different forms with different jobs been assigned for a certain goal, although, they are assigned for a certain job but have the same aims in achieving organisational goals. Obviously, each skill assigned for a certain job has the same aim as getting the job done effectively at a suitable time and meeting the demand or a certain objective.

In this study, specific skills are categorised under certain types of skills which will be further discussed. This is due to the overlap of the certain groups of skills within each for the different jobs assigned for the same objectives. However, these classifications

were discussed with the aim of measuring skills within the construction organisations. These are further discussions as;

2.6.2 Generic (Specific skills)

The specific skills which are well-known as generic skills within the context of construction organisations are relevant skills that are basically acquired due to integration of several skills, which deal with problem solving, communications, or teamwork. In this generic skill, the integration of the several skills applicable for use across all the jobs assigned are meant to be used across different disciplines in different circumstances within the context of the functional organisation (Olusola, 2019; Kearns, 2001; Pumphery, 2001). In addition, to the above discussion on the generic or specific skills, this skill is also known with several names as the core skills, key skills, transferable skills, essential skills, key competencies, and employability skills. These skills are equally transferable across work settings. Evidence reveals that these specific or generic skills exist within the context of different works in an organisation which includes the construction industry (König et al., 2020; Williams, 2019; Stasz, 2001).

2.6.3 Technical skills

These are skills that exist within an organisation and this skill is also known as hard skills which are mostly the qualities acquired by using and gaining knowledge in performing physical or digital tasks. Technical skills are being considered within the construction related organisations as key to the development of the industry workforce performance in the global construction market (Azmi, 2018; Mcdonnell and Sikander, 2017). The important of technical skills within construction organisations cannot be overemphasized and varies depending on the type of job assigned with the objectives of getting the job done. Technical skills are further classified into several types, which include technical writing, Project management, and Data analysis. Technical skills are used across professions that are mostly technical in nature that include subjects like mathematics, physics, chemistry, and biology which are academic subjects. However, Sorrel (2017) stresses the need of being coded in certain jobs description and used in standardised measurement for assessment for jobs improvement.

2.6.4 Academic or cognitive skills

This skill needed within construction related organisation is the cognitive skills, which are the academic skills. These skills are the core skills the brain uses to think, read, learn, remember, reason, and give adequate attention. The skills function or work together and enable the learner to take in information and the information is transferred into the knowledge bank used for daily activities, both in a workplace or construction site, and most importantly in the workforce daily. These categories of skills are mandatory for both the trainee and the trainers within the organisation. These skills as the name implies as "academic skills" are needed for the workforce skills upgrade and learners at the various learning institutions, within and outside the organisations. However, Jayaram and Musau (2017) stress that the importance of these skills to the learning institution is vital to the construction related works as the application of these skills are assessed using a standard test within the organisational context.

2.6.5 Employability Skills

These are non-role specific skills, such as communication, interpersonal and social competencies, organisation and problem-solving (Brown, 2002). They are transferable between roles, making their development a significant part of professional growth that enables individuals to be more competent (Detsimas et al., 2016; Hager et al., 2002).

2.6.6 Conceptual skills

This skill has to do with ideas formulation within organisations towards its future performance. This skill is also known as mental abilities tha**t** enable the workers of the organisation to understand the communication that exists between them in other different units of the organisation. Examples of this type of skill include the changes effective in any part of the organisational settings and the process that the organisation is appropriately keen on, known as a supra-system (Shehu and Akintoye, 2008).

2.7 Skills Areas within the construction industry

The industry needs or requires individuals with the basic or necessary skills and knowledge to achieve its goals. In the industry, there are so many businesses operating under it, due to its larger size in terms of the number of the individuals and the larger number of local people who find self-employment within the industry. The industry is

generally regarded as one of the biggest industries across the globe and within the Nigerian context. These trades and professional specialisations within the industry are further elaborated to give a proper understanding of the skills areas. The skilled operatives are needed within the Nigerian Construction industry in those areas, which are mostly occupied by the African neighbouring (foreigners) countries (Adewale et al., 2014; Afolabi et al., 2016). These skilled operatives include administrative staff, operatives, professionals, technicians, technologists, and tradesmen.

As stated clearly by Adewale et al. (2014) and Afolabi et al. (2016) most of the skilled operatives within the context of construction related organisations in Nigeria are mostly from other African countries like Ghana, Benin, Togo, and the Niger Republic. This is sad that, in a country where the unemployment rate is so high, yet the country is being challenged by shortages of skilled workforces. The ineffectiveness of Nigeria to address the skilled workforce issue is strengthened by the interest and migrants from neighbouring countries engaging themselves into the industry. As mentioned by CITB (2008), cited in Awe (2012), identified by Adewale et al. (2014) and Afolabi et al. (2016) classified these workforces in the industry into two broad headings (professions and Job occupations). Furthermore, the CITB (2008) outlined these occupations within the industry, which include Construction/Project Managers, Architects and Building & Civil Engineers. The Skill job classification includes: Roofing occupations, Trowel occupations, Interior occupations, Demolition occupations, Site Technical support, Site Inspector in Table 2-2. These jobs classified further undergone clarifications into each occupation in Table 2-2. The Construction Skills Certification Scheme (CSCS) 2008, cited by Awe (2012), classify the skills within the construction works into three basic groups as shown below:

- **First Group:** Skilled operatives' occupational skills (178).
  Craft and Operative
- **Second Group:** Technical, Supervisory and Management occupational group (63)
  Technical, Supervisory and Management
- **Third Group:** Occupational related group has 436 identified skills.

Construction related occupation

The construction industry needs a highly skilled workforce to achieve its future goals, and this can be achieved when employers of the industry ensure adequate training of the workforce to enhance their skills and knowledge. Within the construction related works, the occupational skills are classified into Craft and Non-craft Careers which are further grouped into 15 basic Crafts as indicated in Figure 2-4.

Based on the classifications of the construction skill workforces in the various literature outlined in Figure 2-4, there is a clear indication that a wide range does exist within the construction industry in terms of the skills areas. These skills areas form the most important group and are the core skilled site operative that carried out the manual activities on site within the industry. These skilled workforces are categorised into different forms as: skill of metal and steel trades: metal work, steel fixers, plumbing, painting, tiling, decorating, and roofing as well as skill of trowel trades: masons, bricklayers, and skill of wood trades: Carpentry, joinery, furniture making, wood machinist.

2.7.1 Selected core Skills Training and Job Definition in the industry

Skills-persons within an organisational setting of the various types usually work under different conditions during any construction related project within the industry. They usually perform different and specific tasks under varied training to meet up with some general and basic physical requirements. Obviously, the nature of work, training, employment, and the perception of the job of some construction skills (Nworu, 2016; BLS, 2007; STC, 2007; CITB, 2008). BLS, CITB, STC outline the trades specialisation indicated in Table 2-2 and Job definition, training nature and basic requirements for core construction trades in Table 2-4.

Table 2-2: Construction related jobs

Wood Occupations	Roofing Occupations	Trowel Occupations	Interiors Occupations	Demolition Occupations	Technical Support
Carpenter and Joiner Wood Machinist Bench Joiner Shop fitter	Single ply roofer Roof Sheeter and Cladder Mastic Asphalted Liquid water-proofing system operative Lead sheeter Built-up roofer	Bricklayer Stonemason Construction operatives	Dry Liner Floor layer Glazier Painter & decorator Partitioned Plasterer Renderer Tiler Plumber	Steel erector Scaffolder Steeple jack	Estimator Architectural technician

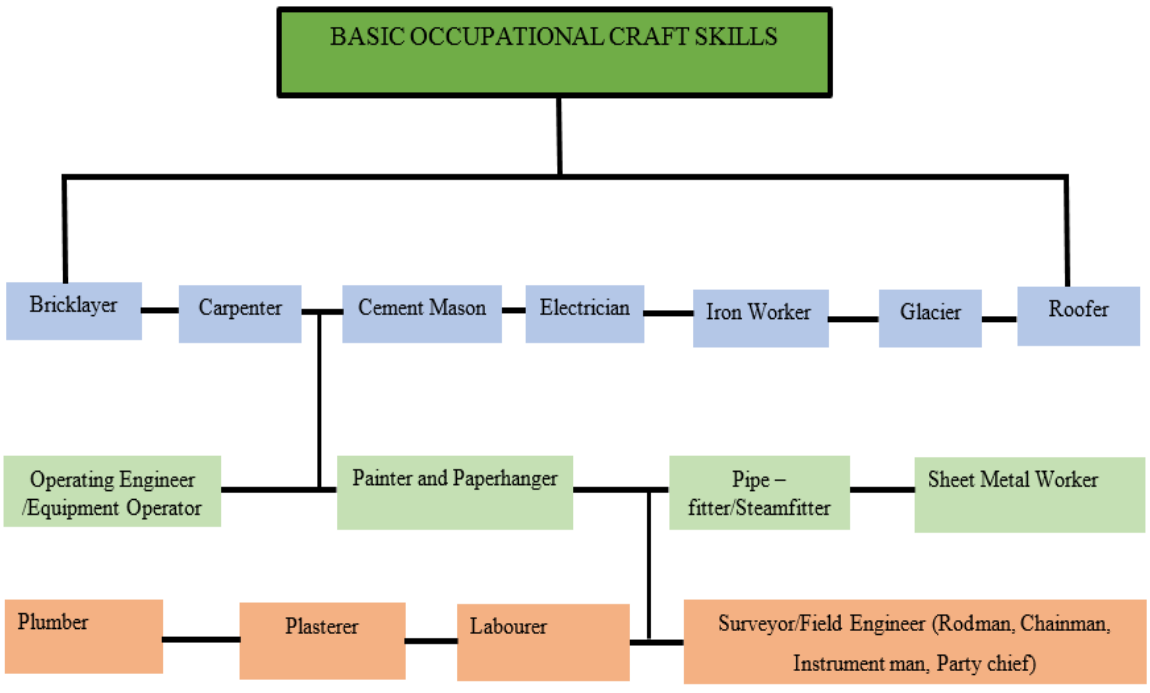

Figure 2-4: Basic occupational craft skills

Table 2-3: Trade specialisation

Training nature	Trade
Formal and informal apprenticeship 2-4yrs training.	Bricklayers, Block layers and Stonemasons
Formal and informal apprenticeship. Training duration: 3-4 years.	Carpenters
Formal and informal apprenticeship. Training duration: 2-3 years.	Roofers
Formal and informal apprenticeship. Training duration: 2-4years.	Painters and Paperhangers
Formal and informal apprenticeship. Training duration: 4-5 years.	Plumbers, Pipe layers, Pipefitters and Steamfitters (may specialize)
Formal and informal apprenticeship. Training duration: 3-4 years.	Plasterers and stucco Masons
Formal and informal apprenticeship. Training duration: 3-4 years.	Sheet Metal Workers

(Adapted from BLS, 2007; STC, 2007; CITB 2008; CSCS, 2008 cited in Awe, 2012)

Table 2-4: Job definition, training nature and basic requirements.

Training nature	Academic Requirement
Formal and informal Apprenticeship. Training duration: 3-4 yrs.	Junior or Senior Secondary Education.
Formal and informal Apprenticeship. Training duration: 2-3 yrs.	Junior or Senior Secondary Education.
Formal and informal Apprenticeship. Training duration: 3-4yrs.	Junior or Senior Secondary Education.
Formal and informal apprenticeship. Training duration: 2-3 yrs.	Junior or Senior Secondary Education.
Mostly informal 'leaming-by-working1; but formal apprenticeship programs provide the most thorough preparation. Training duration:2-4 yrs.	Junior or Senior Secondary Education.

(Adapted from BLS, 2007; STC, 2007; CITB 2008; CSCS, 2008 cited in Awe, 2012)

2.8 Training and Vocational Education within Nigeria

Technical and vocational education and training within the Nigerian context plays a vital role in the economic development of Nigeria. TVET in Nigeria aimed to assist both the federal and state education system for its future development and competency within the construction market. This was through the educational system reforming and expanding skills, vacations, science, and technology based on the socio-economic needs presently.

2.8.1 Historical overview on Nigerian system of Education

Nigeria is an African nation consisting of 774 local government areas, 36 states and 6 geopolitical zones: namely North central, Northwest, North east, South-south, South west, and South east. The country is well-known formally as the Federal Republic of Nigeria with its capital territory in Abuja. Nigeria is within the West African continent, with a coast of Bight of Benin and the Gulf of Guinea. Nigeria is bordered by the republics of Benin, Cameroon, Chad, and the Niger Republic. The Federal Republic of Nigeria has a land mass of almost 923,768 Square kilometres (Akanbi, 2017; Akinsola et al., 2005). The country is the seventh most populous nation in the world and nearly one in four sub-Saharan people reside in the country making it Africa's most populous nation. From an estimated 42.5 million people in 1960 at the time of independence, Nigeria's population has more than quadrupled to 186,988 million people in 2016 (UN projection). The population of Nigeria as Africa's most populous nation is shown by estimates to be 400 million by 2050, making the country the third largest in the world behind Indian and China (Jacob et al., 2020).

Three major tribes within Nigeria are the Hausa in the northern part, Yoruba in the western part and Igbo in the eastern part of the country. However, over 274 different ethnic groups, including the minority groups exist in the country, but the three groups mentioned earlier form the largest tribes in the country. However, evidence has shown that the official language of Nigeria as a country is the English language, which is spoken within the country except for few individuals from the rural areas (Mishina and Iskandar, 2019; Osoba and Alebiosu, 2016; Danladi, 2013).

Evidence has shown that education had been part of Nigeria for a long time before the arrival of the Europeans. The children were thought informally about their culture,

social activities, survival skills and work. All these were imparted in children informally, although some of these societies gave a more formal teaching of the society and culture. Formal instructions do exist in these societies to govern the rites of passage from younger generation into the adulthood. It is expected that young people attained the necessary and survival skills and have a grounded knowledge in the culture. This is the foundation of education in Nigeria, but even most important was the implementation of the western education upon the societies.

This education philosophy was based on functionalism and productivity, even though some of the theoretical emphases exist. The main objective of this philosophy was to inculcate idea and wisdom of social responsibilities. The studies by Mkpa (2004), shows that three main educational traditions were known to have existed within Nigeria, which were the Indigenous, Islamic and Western education. The agent of the community-based education was known to be the Indigenous education, offered in the pre-literate that was offered by the community members with precise skills in human endeavours.

Based on the introduction of the formal system of education, most of the community's males will have to learn what their fathers do for a living and some of them will be sent to learn apprentice work. The boys were trained to take over from their fathers' occupation while on the other hand, the girls were trained to do domestic work like cooking, hear weaving, tailoring work, sweeping, house cleaning to help their mothers. The studies by Esu and Junaid (2009), indicate that traditional African education was characterised by the practices, in which the apprenticeship route of learning wherein people were students or acquired knowledge under their masters for a certain period before they could be on their own. This system of education was also known as back-to-basics, conventional education, or customary education, which was mainly aimed to transmit to the next generation those skills, facts, and standards of moral and social conduct that adults consider to be necessary for the next generation. Thus, traditional education is a system of education whereby society attempts to achieve knowledge, skills and attitudes in its cultural setting and heritage to foster continuously the well-being of humankind.

The traditional education curriculum was based on the underlying philosophy of the various job responsibilities in society. The apprenticeships system was all over

throughout the occupations within the context; the learner serves the trainer for a certain period, usually for one year, depending on the arrangement and the level of understanding before becoming a master of his own. The traditional education, irrespective of the geo-political variation within the country, trained people to be competent or fit for the job they were trained for in the society through the learning, training, and working on self-sustenance through economic skills; and making a tremendous effort towards the nation building and the society at large.

Even though traditional education was wide-ranging in the provision of social and vocational aspect of training, yet learning was based on the power of memories due to absence of learning by writing and instruction for the people of the future generation. In the early 14th century and before, Islamic education came into the northern part of Nigeria and this education came along with Arabic learning. However, Arabic is a language of the Quran and was therefore thought of having the great spiritual power or value of Islam. However, this system of education was mostly in the northern part of Nigeria where the knowledge of Arabic and Islam were impacted to the people in primary schools simultaneously.

However, achievement in the educational sector was slow throughout the era of the colony until after the end of the Second World War in 1945. In 1947, after World War II, the inauguration of the institute into a Technical Institute took place and afterwards the country developed into a three-tiered system of education based on the British system of education. The three-tier educational system is from primary, secondary, and higher education system within the Nigerian context. In line with the studies of Clark and Sedgwick (2004), Online Nigeria (2008) and Awe (2012), it is obvious that in the early 80s, that is the year 1980 to be precise, the importance of formal education was greatly recognised within the Nigerian context, and it became the government purpose of the federation largest social programme within the country, due to its relevance or importance in terms of its recognition. This has generated as much as 40% of the various states of the country's budgets according to the various studies. Obviously, the importance of formal education within the Nigerian context cannot be overstated based on its state recognition. However, most of the historical post-colonial training institutions that were meant to serve as drivers for effective training institution

are not properly maintained and governed, which affects the training and education of the country.

2.8.2 Institutional control and Training Qualifications within the System

The management of education played a vital role and its importance cannot be over emphasized in achieving the goals for quality education., according to the studies of Ibrahim et al. (2019), The National Universities Commission (NUC) is the regulatory body and standard setting body for the universities and degree awarding institutions within Nigerian context, which by law, is designed and empowered by the government legislations to advance standard quality in procedure and services that is in line with human resource contribution within Nigerian universities (Odetunde, 2004; Ibrahim et al., 2019). These institutional control bodies help by providing and coordinating the necessary resources for the actualisation of these educational system objectives. This is through a clear pathway that the available resources for training and education can be utilised in realisation of its set objectives, which must be in accordance with the organisational settings.

The institutional control and qualifications of education within the Nigerian context was based on the Federal administrative system, and it is through the management and heads of education that the nation is being governed. Although, the basic policy on educational sector is based on its structure, school duration and curriculum at different levels within the context are determined centrally. This means that the management of secondary and primary school education are being controlled by state and the local government respectively. However, higher educational levels owned by the state are controlled by the state government while those owned by the Federal Government are controlled and managed by the Federal Government of Nigeria. Based on the efforts made by the private sectors/individuals, privately owned higher institutions are managed by those private individuals, but various institutions are being controlled by the Federal Government through these institutional control bodies, which are outlined as follows;

- APSEB Apprenticeship Scheme Examination Board
- FMLP Federal Ministry of Labour and Productivity
- FMOE Federal Ministry of Education

- ITF Industrial Training Fund
- JCC Joint Consultative Committee
- NABTEB National Business and Technical Examination Board
- NBTE National Board for Technical Education
- NCCE National Commission for Colleges of Education
- NECO National Examination Council
- NERDC National Education Research and Development Council
- NUC National University Commission
- SME State Ministry of Education
- VEEB Vocational Education Examination Board
- VTIs Vocational Training Institutes
- WAEC West African Examination Council

The above institutional control bodies have almost the same functions towards the country's effort on training and education. These control bodies are challenged with different issues in the process of carrying out their own normal functions. One of the key issues within these control bodies are issues of standardisation with the settings.

2.8.2.1 Education

Education roles within the development of any organisational context cannot be overstated in its vital role irrespective of the state of the organisational settings. In line with the various studies of Nwiyi (2018), Ibrahim et al. (2019) and Jacob (2020), the development of most countries around the world solidly depends on the educational system. This is obvious that national development in terms of its economic growths depends on the education system of the country. This is an indication of the relevance of the educational system within a successful nation and most importantly the nation's economic growth. In addition, Jacob et al. (2020) stresses the need for education as a system that equips an individual person with the knowledge acquisition, training, and development, which enables such individuals to contribute efficiently to the nation's economic development. The studies further states that education is seen as a form of training, which an individual undergoes to become useful within the community or the organisational settings.

For the essence of this current research, education is termed as a key element for the enlightenment of an individual capacity through the knowledge acquired to be able to determine both negative and positive factors, which may influence the organisational settings and the nation's economy (Sharipov, 2020; Bagnall and Hodge, 2018; Oghenekohwo and Frank-Oputu, 2017). Obviously, the educational system is the backbone of a successful organisation in a competitive edge. Hence, management of educational systems are tasked with responsibilities of generating the basis of socio-economic growth.

2.8.2.2 Administration

Studies by Jacob et al. (2020), Jacob and Ndubuisi (2020) and Nwiyi (2018), show that administration within the context of an institutional settings is the process in which resources are being arranged to achieve goals set. However, this current study perceives administration within the context of an organisation, as an institution or business organisation, which is tasked with certain responsibilities of putting the relevant resources within the context in line with the organisational or institutional goals. This arrangement of these relevant resources provides links to both the management and the employees in the organisational settings in achieving its key objectives. Furthermore, literature indicates that the quality standard of education within the context of a successful learning institution depends mostly on the administration and how it is being managed on handling the education system (Solomon et al., 2020; Jegede, 2019; Noun, 2008). They further stress the need for appropriate arrangement of those tasks with the key responsibilities of educational development. Trainers, trainees, nonteaching staff, and the available resources within the context must be arranged for adequate attainment of standard quality of education in the Nigerian context.

2.8.2.3 Educational administration

Studies by Nwiyi (2018) and Jacob et al. (2020), indicate that the educational administration is an integration of suitable resources within any organisational setting, which could be human or material resources that are made available within the organisational setting in ensuring that the available resources are utilised for the purpose of the organisational settings. However, these available human or material

resources are not utilised in line with the organisational settings. Furthermore, studies by Asiyai (2020) and Iruonagbe et al. (2015) stress that the educational administration of Nigeria should double its effort on the need for high standard of education in the country and argue that topmost priority should be given to teaching/learning, physical facilities and infrastructures, effective workforce curriculum innovations and human resources development, which are keys in the competitive market within the global context. Obviously, the sole aim of the administration of the educational system in Nigeria to ensure that the educational system of Nigeria meets up with its global competitors in the construction market by ensuring adequate utilisation of these resources has been defeated. Furthermore, learning facilities within higher education within Nigerian context are totally inadequate and are not sufficient for effective teaching and learning to compete with other competitors in business organisations. The administrative body and agencies involved in the Nigerian education system with their responsibilities within the country include the following as outlined in Table 2-5.

Table 2-5: Administrative body and Agencies

Institutional control bodies	Functions within the context
Federal Ministry of Education **(FMOE)**	Policies/strategies concerning education are been control by FMOE
Joint Consultative Committee **(JCC)**	Functions as an advisory committee to education ministries, Higher institutions, and other agencies on educations
National Education Research and Development Council **(NERDC)**	Coordinators of educational research programmes within the context.
The National Board for Technical Education **(NBTE)**	Provision of standardized minimum guide, established minimum standards within technical colleges, polytechnics within the context.
Government owned polytechnics	Responsibility for the supervision and regulation of programmes offered by technical institutions at secondary and post-secondary levels through the accreditation process
National Universities Commission **(NUC)**	Accredits and approve university education programmes; provides a full listing of all approved or recognized federal, state, and private universities. This agency operates under the Federal Ministry of Education
National Commission for Colleges of Education **(NCCE)**	Coordinates all facets of non-degree teacher education in Nigeria
West African Examination Council **(WAEC)**	These agencies are responsible for conducting the Junior and Senior School Certificate Examination (SSCE) (NECO)
National Examination Council **(NECO)**	These agencies are responsible for conducting the Junior and Senior School Certificate Examination (SSCE) (WAEC)
National Business and Technical Examinations Board **(NABTEB)**	Organises and conducts the National Technical Certificate (NTC), the National Business Certificate (NBC) Examinations; and the advanced level versions of these examinations in several discipline or trades (NQAI, 2008)

2.8.3 Achievable Qualifications in the Educational Framework

Achievable qualifications in the Nigeria educational framework in with the NQAI (2008).

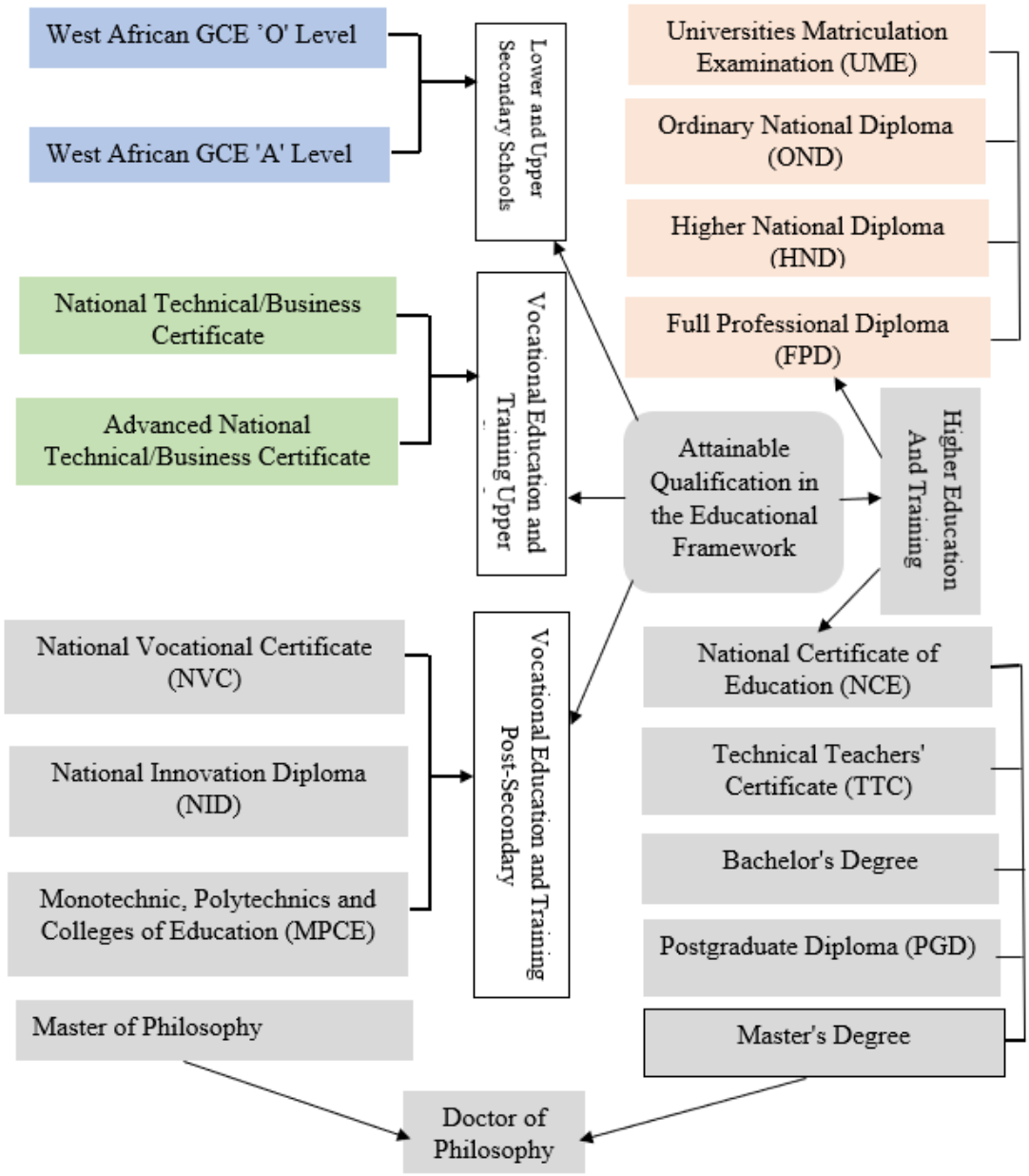

Figure 2-5: Attainable Qualifications in the Educational Framework

Source: Awe (2012)

2.8.4 Challenges within the control of the educational system in Nigeria

Generally, the management and administration of the educational sector in Nigeria are challenged with many external and internal issues. These challenges are key to the progress of the educational activities that are stated as:

2.8.4.1 Weak administration

This has been a problem within the system because incompetent leaders are appointed to oversee the various institutions of learning within the Nigerian context (Jacob et al., 2020; Ogunode and Musa, 2020; Bankole and Olaniyi, 2014). These weak leaders have no administrative skills, and most of them are not coordinated but are appointed to oversee the affairs of the various educational institutions. Most of these appointed leaders lack the professional skills of a cordial human relationship for effective and efficient leadership at work. According to Jacob et al. (2020), various educational institutions need leaders with leadership skills that are professionals to develop and foster the educational institutions. Furthermore, Ogunode and Abubakar (2020) and Ogunode et al. (2019) indicate that weak appointments within the Nigerian educational system is one of the key issues associated with an inadequate educational system. These has been experienced for the past years, and this has affected many educational activities. These activities of weak administration include funding of research and publications. Institutional activities within the sector are not being properly monitored and supervised; universities and other higher institutions of learning have no vision at all. Inadequate coordination between staff and students and staff welfare are either neglected or inadequate. These issues have led to an unsustainable lack of continuity of present and future performance due to the disruption and weakness of management, which cannot achieve its aim effectively.

2.8.4.2 Lack of modern facilities within the system

The recent technological equipment to improve the quality of education system within any successful business organisation observed by many studies are not available within the Nigerian context (Jacob and Ndubuisi, 2020; Jacob and Samuel, 2020; Jacob et al., 2020; Osunyikanmi, 2018). However, these facilities aid in the delivery of educational

services to gain organisational goals. Absence of these facilities has contributed to the falling standard of the educational system in the country, which affects the industry. For the essence of this current study, the educational system development can be improved through the provision of t recent technological equipment to facilitate learning activities through effective training within the settings.

2.8.4.3 Inadequate funding

Funding of most activities within the leaning institutions in the Nigerian context is a critical problem that is common, which has been affecting industry for years. The funds for research and other learning activities are always inadequate for the programmes. This is a challenge that has been experienced within industry, which has impacted negatively on workforce training. The Government appears to be reluctant on this issue and current workforce training and skills development within the construction related organisations are affected by this critical issue (Jacob and Samuel, 2020; Okolie et al., 2019; Oviawe, 2018; Agrawal and Agrawal, 2017; Okolie and Ogbaekirigwe, 2014).

2.8.4.4 Inadequate professional teachers

The quality of teaching and learning within the Nigerian context in the various institutions of learning appears to be inadequate and ineffective. Hence, effective knowledge impact cannot be fully guaranteed within the context (Ogunode et al., 2019; Osunyikanmi, 2018). In addition, comparing the system with that of developed nations, statistics reveal that staff to student ratio in Harvard University is 1:4, Massachusetts Institute of Technology (MIT) is 1:2, and Cambridge University in the UK is 1:3. However, within the Nigerian context, findings indicate that in the University of Abuja is 1:122, while at the national open university is 1:363 (Jacob et al., 2020; Jacob and Ndubuisi, 2020). Based on these findings, the level of knowledge impacted in learners may not be too effective due to the issue within the system.

2.8.4.5 Institutional corruption

Institutional fraud/corruption in the Nigerian context is not a new problem as the country was ranked 137th in the year 2020 out of 189 countries for corruption index (Jacob et al.,

2020; Afolabi et al., 2020). Similarly, Jacob and Ndubuisi (2020), state that Nigeria was 136th out of 176 countries in 2016 corruption index ranking. It is obvious that corruption has been experienced in the country for many years and has been impacting negatively on the country's educational sector, and the nation's economic growth. Furthermore, studies by Jacob et al. (2020), Ebekozien (2020) and Afolabi et al. (2020) indicate that corruption index in the year 2019 revealed that Nigeria was 146th out of 180 to that of 144th in 2018. Obviously, corruption has been in existence in the system for many years and its impact on the nation's educational system has been alarming. They also, identified components of corruption in the Nigerian construction industry are request corruption (demand side), the party that offers (supply side) and the party that is aware of what was happening but remains silent (condoning side) (Ebekozien, 2020; Frahm, 2018).

Workforce training within the Nigerian context, where several forms of corruption exist in every sector, including construction organisations cannot be effective. These forms of corruption contribute immensely to the industry low performance and are being considered as some factors affecting the industry and current workforce training. In addition, former British Prime minister, Mr David Cameron was heard on air telling Her Majesty the Queen of the United Kingdom, Queen Elizabeth II that the country (Nigeria) and Afghanistan are fantastically corrupt. Further evidence reveals that Nigeria is a corrupt nation (Alola et al., 2019). More so, Ebekozien (2020), states that the rate at which corruption acts in Nigeria is possibly on the increase and has hindered infrastructural development across the country. Obviously, workforce training in Nigerian construction industry and other businesses organisations are greatly affected due to corruption practices in the country.

2.8.4.6 Insecurity

This was one of the critical challenges within the Nigerian context that has affected almost every sector in the country. The issue was not limited to the educational sector and Nigeria alone but is a global issue. Insecurity challenges have impacted greatly on educational administration within the country, and this has affected the country's educational system enormously (Jacob et al., 2020; Osunyikanmi, 2018; HRW, 2016). This issue has engulfed

the country since the inception of democracy in 1999, most especially within the northern part of the country. The problems of insecurity within Nigeria has led to the destruction of schools, its facilities, and properties worth billions of naira (over $2,427,125.50 US dollars equivalent with the current exchange rate at a $1.00 = #410.00). It is obvious that lots of trainers and workforce/trainees within the Nigerian context lost their lives due to the current security challenges within the country, which led to definite closure of learning institution within the country (Ogunode, 2020; Abiodun et al., 2020). There are over 2,300 teachers within the northeast region who were killed, and over 19, 000 were displaced in the region due to security challenges by the sect of Boko Haram since 2009 (Ogunode, 2020; Abiodun et al., 2020; Tayimlong, 2020; This day paper, 2018; Mohammed, 2018).

2.8.4.7 Outbreak of COVID-19

The outbreak of the global health crisis (Covid-19 pandemic) has affected various business organisations across the globe and the Nigerian construction industry is not exempt from this problem. This has led to the shutdown of most business organisations and the construction industry and the institutions of learning within the Nigerian context were suspended, including academic activities to observe the government guidelines in ensuring the safety of its citizens by preventing the spread of the virus. However, developed nations like the UK, USA, and others, continue their learning activities online to ensure continuity of the learning activities (Ogunnusi et al., 2020; Osuizugbo, 2020; Kabiru and Yahaya, 2020). This was not the same with that of Nigeria because all the learning institutions and various industries, including construction related works, were all shutdown to follow government directives, leading to an indefinite closure of construction sites across the country (Osuizugbo, 2021; Ebekozien and Aigbavboa, 2021; Jacob et al., 2020; Jegede, 2020; Agbele and Oyelade, 2020). Obviously, the outbreak of the virus has impacted negatively on learning institutions and industry within the context. The impact of the virus has made Nigerians believe that the government has failed in its duties on educational development because learning activities were still going on within developed nations like the UK, while learners within Nigeria were doing nothing. This lack of effective and continuous training development, due to the negative impact of the virus

and other issues mentioned above, is endangering the future of the younger generation within the Nigerian context.

2.8.4.8 Lack of data plan

It is vital in any educational system to make a reliable decision in formulating strategies that are in line with the educational development. However, the educational system of Nigeria lacks adequate data plans and the educational database for the education statistics has been slow in those agencies responsible for generating data (Jacob et al., 2020; Ogunode and Musa, 2020). These are agencies that are tasked with the responsibility of generating data for educational development, the FMOE, Universal Basic Education Commission (UBEC), National Population Commission (NPC), National Bureau for Statistic (NBS). However, Jacob et al., (2020) indicate that the various agencies data plans are poor in the educational system, which slows the activities regarding data/information that was critical to be vital and reliable, irrespective of how current and reliable the data. Furthermore, studies by Petti et al. (2020) on Sustainable Development Goal (SDG) targets, recommended for further research to robust the correlation between national datasets and international target in achieving the 2030 SDG agenda from the European perspective. However, this study suggests that the government can address the issue through the adequate management administrative selection. Fighting corruption within the educational settings will be vital in confronting these critical issues, which needs to be addressed due to its impact on efficient and effective workforce/learners training.

Furthermore, there are indications that the construction industry comprises of over three million people as its workforces spread across the sectors within the industry in Nigeria, covering both soft and hard skills (Jwasshaka and Amin, 2019). These workforces ranging from the professionals, management or administrative staff, technicians, and labourers within the context. More so, females' participation in the industry seems to be rare to that of males, indicating gender imbalance. However, the importance of women participation in the economic growth and balancing of gender equality as fundamental for sustainable development cannot be overemphasize (Bradshaw et al., 2017; Orisadare, 2019). Studies by Jwasshaka and Amin (2019) revealed that even the available women mostly engage

themselves in managerial secretarial, messengers, helpers or labourers and few ones involved in specialised and other professional works. Obviously, the participation of women at the technicians' level is not inspiring in the construction industry considering the growing population rate in the country.

According to THE NATION newspaper by Kofoworola Belo- Osa (on November 22nd, 2021), it was clearly stated that 81.7 percent of the candidates that took part in the 2021 WASSCE for school candidates made credit passes in five subjects, which include English and Mathematics. Mr. Patrick Areghan, Head of WAEC National Office, Lagos stated that 1,560,261 SS3 candidates sat for the examination and 1,274,784 achieved the minimum benchmark required for entry into the university higher institutions. He further stated that out of these registered candidates, 630,138 (49.43 percent) were male, while 644,646 (50.57 percent) were female. In addition, WAEC (2022), recorded an increase of 16.46 percent in improvement in performance of candidates that obtained five (5) credit and above including English and Mathematics to that of the 2020 WASSCE that was 65.24 percent. A summary of the registered candidates for WASSCE within the Nigerian context for the past six years for the May/June exams are indicated in Table 2-6.

Table 2-6:Registered Candidates for May/June WASSCE from 2017-2022

S/N	**Year**	**Total No. of Candidates**	**Male candidates**	**Female candidates**	**No. of candidates with minimum benchmark**
1.	2022	1,601,047	597,811 (37.34%)	624,694 (39.02%)	1,222,505 (76.36%)
2.	2021	1,560,261	630,138 (49.43%)	644,646 (50.57 %)	1,274,784 (81.70%)
3.	2020	1,549,740	497,139 (49.53%)	506,529 (50.47%)	1,003,668 (65.24%)
4.	2019	1,590,173	822,098 (51.70)	768,075 (48.30)	1,020,519 (64.18%)
5.	2018	1,578,846	389,655 (47.32%)	396,361 (52.92%)	786,016 (49.98%)
6.	2017	1,559,162	829,853 (53.22%)	729,309 (46.27)	1,243,772 (79.77%)
	Total Average	9,439,229/6 = **1,573,204.83**	3766694/6 = **627,782.333**	3669614/6 = **611,602.333**	6551264/6 = **1,091,877.33**

In addition, other examining bodies that correspondingly conduct entry examination for SS3 candidates for entry into higher institutions that are not included in this study are the

National Examination Council (NECO) and NABTEB. The choice of WAEC body for this study is due to its recognition within the West African and global context.

Obviously, over a million SS3 students graduates yearly between the ages of 16-21 from different social and cultural background within secondary schools in Nigeria and are qualify for entering any higher institutions of learning. However, with the number of universities across Nigeria and coupling with the country economic situation, increasing population rate, there are great challenges of entry into the various higher institutions. It should be noted that the breakdown in Table 2-6 is only for one examining body (WAEC), other examining bodies includes the NECO, and NABTEB as stated earlier, which are not included for the essence of this current study. The number of secondary schools' graduates across the country calls for the needs to encourage the young people from different locality within the Nigerian context to develop more interest in construction related works as a choice of profession and start moving towards the achievement of the 2030 SDG. It's obvious that the number of female students that graduated from secondary schools in Nigeria is more than or almost the same with that of the males. However, a very few of these graduates both males and females are in construction profession, while most of them are within other professions.

This study will establish a collaboration that will engage and focus on the participation of the younger generations' that serve as key in the realisation of the SDG, most especially the females' participation in this profession.

Within the UK context as a developed nation, construction industry employed over two million workforce, which account to more than 6% of its GDP and school graduates made their ways into the construction profession as a choice of career (Shibani et al., 2020; Murray and Cotgrave, 2007). This suggest that a better image has been portray on the industry to the younger generation and they seem to have much interest in the profession. Based on the number of schools graduates within Nigeria and the growing population coupling with the nation economic challenges. It's obvious that the implementation of the research framework will require an estimated figure of not less than one (1%) of the candidates that sat for the WASSCE to be trained on construction profession to become competent to enhance productivity in the industry. This is the reason for adopting the same

concept as that of country like the UK, been a developed nation with successful construction industry. This will be ensured that at lease, 1% of SS3 graduating students annually, both males and females will be trained and enrol into the construction profession. The framework proposed to train at least one (1%) percent of the secondary school graduates due to the nature of its economic and a breakdown of the required workforce skills are indicated in Table 2-7.

Mathematically representation; X = 01/100 multiply by of the Average total number of candidates. Accordingly, (01/100) x 1,573,205 = 15,732 workforces/learners are expected to be trained across the country annually.

The proposed framework will focus on school leavers within the locality, especially those within the remote of part of Nigeria from different background that show much interest in professions, specifically from the ages between 18 and 35, which are the youthful ages in Nigeria. Obviously, women participation within the construction jobs is approximately 15% of the construction workforces in Nigeria (Jwasshaka and Amin, 2019; Akinsiku and Ajala, 2018). In view of this, women participation will account for 0.3% of the total trainees within the industry to enhance women participation. That is, 0.7: 0.3 of the workforces required in the industry as shown in Table 2-8. MALE: FEMALE. A total of 11,012 male workforces and 4,720 female workforces in the industry annually across the country within the six (6) regions as indicated Table 2-8.

Table 2-7: Breakdown of workforce skills needed

Require skills	Percentages (%)	Rank
Generic (Specific skills)	10.30	4th
Technical skills	49.30	1st
Academic or cognitive skills	10.70	3rd
Soft-Skills	07.50	6th
Employability skills	12.90	2nd
Conceptual skills	09.30	5th
	100.00	

Table 2-8: Number of workforces to be trained

Population of Nigerian construction workforces (3,000,000)	
MALE	**FEMALE**
11, 012 (0.7 %)	4, 720 (0.3 %)
School leavers = 30% (3,308) Each region = 5% (551) School leavers with 1/2-years' experience = 20% (2,198) Each region = 3.33% (348) School dropout and unqualified technical = 20% (2,220) Each region = 3.33% (348) Others that want construction profession as choice of career = 30% (3,308) Each region = 5% (551) **Total = 11,012** Each region = 1,835	School leavers = 20% (985) Each region = 3.33% (335) School leavers with 1 or 2-years' experience = 20% (985). Each region = 3.33% (335) School dropout and unqualified technical = 30% (1,375) Each region = 5% (400) Others that want construction profession as choice of career = 30% (1,375) Each region = 5% (400) **Total = 4,720** Each region = 855

2.9 How to measure the training framework successful implementation

The aim of the proposed framework is to achieve its objectives to find a solution to the problem under investigation. This research framework is measured using some standards workforce training successful system of measures (metrics). The measurement will be basically into two forms, based on the workforce/learner's training outcomes and process measures within the organisations goal settings towards achieving SDG by 2030. This framework measurement (workforce/learner's training outcome) examine what the organisation planned to achieve after the framework implementation. This includes an increased in the industry productivity and quality of operatives (work output). Based on this form of measurement, different evaluation metrics may be used, for example the workforce/learners test scores, by determine the ratio of the workforce/learners' questions answered correctly during the test and the total tests questions. Hence, multiply the answer by 100 to determine the workforce/learners test score in percentage. Mathematical representation of the workforce/learners' test score is shown below.

Workforce/Learners test score (X) = Total number of questions answered correctly (P)/Overall total of questions (Q) multiply by 100%

I.e., X = P/Q x 100%.

Workforce/learners' course completion rates **(X)** are calculated by determine the ratio of the learners' credits **(Y)** earned to the number of the available credit attempted **(Z).**

Mathematically, X = Y/Z x 100%.

The workforce/learners job satisfaction and performance can be calculated through a 1-on- meeting with the stakeholders of the organisation or using employee satisfaction index (ESI). While in the case of the process measure of the training framework after a successful implementation, this form of measurement will focus basically on how much the workforce/learners have learned and their engagement in the training process within the organisations. This will be majorly determined by the number of local people available (both males and females), school leavers, young people from different age group, and background across the country, which have enrolled into the construction profession after the framework implementation. In line with the framework objectives, the standard training success metrics in the construction organisations may have to includes:

- The determination of the number of participants that are expected to be trained, from younger generation age group/gender, background that completed the training within the regular time frame
- Determination of the success/failure assessments conducted through the training framework implementation
- Determination of the most vital behavioural changes due to the implementation of the proposed framework
- Return on investment (ROI)

The feedback from the construction related organisations stakeholders will play a vital in the determination of the above outlined. In addition, the performances of the industry in the size of the construction markets will determine the framework effectiveness.

2.10 Educational Development Reforms in Nigeria

This is essential in terms of the workforce skills upgrade. It was in line with this views that the FGN implemented some series of educational reforms within the country in the early 80s and 90s, whereby the educational system inherited from the colonial masters was significantly transformed during this process. In line with this great transformation, education at secondary level used to be in line with that of the colonial master (British). This similarity within secondary education consists of the General Certificate of Education (GCE 'O') levels, which was then followed by a two (2) years GCE 'A' level courses for training at the secondary level. This reform, the formal system of education was structured using the 6-3-3-4 system. This means that an individual undergoes training for six (6) years in primary level, three (3) years in junior secondary level, three (3) years at senior secondary level and four (4) years and above at the university level depending on the course of study. After the four (4) year duration course at the university level, this leads to a qualification with a bachelor's degree in the field of study.

This reform within Nigerian context, 6-3-3-4 educational system has been modified 9-3-4 with the aim of making education compulsory for young people within the country. Under this improvement, education was made compulsory from primary to junior secondary level (Adeleye, 2021; Bodang and Lengkat, 2021; Hryhorenko and Muslim, 2017; Awe, 2012; NQAI, 2008). In view of the restructuring, the FGN believe that this would in no doubt foster the country's development. Junior/senior secondary education levels of educational system replace GCE 'O' and 'A' level with junior/senior school certificate respectively.

The educational system reformation, just before the introduction of the 6-3-3-4 system, gave rise to many questions whether the current system is appropriate within the the Nigerian context in line with the socio-economic growth, political stability, and the cultural heritage of the country. This change has led to changes in curriculum of both the junior and senior school educational system, because both academic and prevocational streams were offered in junior and senior schools. In line with the reformation, junior secondary school graduates have the option of either proceeding to senior secondary school or technical/vocational college or teacher training college. In all levels of

education, all efforts and emphasis are focused basically on scientific and technological courses (science and technology). In the most recent times, establishment of the various vocational institutes, Vocational Enterprise Institutions, and Innovation Enterprise Institutions (IEIs), were approved by FGN for the provision of alternative routes to higher education. In line with the FGN agenda to foster the development of the country, and insufficient facilities in most of the higher education institutions, this has led to the establishment of these vocational institutions of learning. The creation of these vocational institutions will help to accommodate the numerous numbers of school leavers and reimburse private sector low participation in skills training.

In the effort towards educational reform, private institutions in the context participated in the training process. At the post-basic and tertiary levels, VET courses are being offered by private institutions. These private institutions are the Vocational Enterprise Institutions (VEIs) and Innovation Enterprise Institutions (IEIs), which were fully endorsed and approved by the Federal Government of Nigeria (FGN). These private institutions play a vital role in equipping secondary schools for the younger generations that were school leavers and want to engage in construction related works. This role is in line with the private institutes' key objectives in empowering the younger generation and making them be self-reliant and fully independent. Based on their objectives, these private institutions cover multidisciplinary areas within the curriculum, which will give learners the basic skills required by the various industries within the context and as such, these institutions offer diploma certificates to the successful learners after training.

2.11 Vocational and Technical Education in Nigeria

Evidence has shown that in most academic research within the context of the Nigerian educational system, "Vocational Education and Training" as a term are used interchangeably within the context. It should be noted that these are different key terms within the context of a research, although they have similar or almost serve the same purpose within the context. In line with the studies of Akanbi (2017), Oviawe et al. (2017), Okoye and Arimonu (2016) and Ayomike et al. (2015), vocational education is seen in a very simple term as an acquisition programme designed within a context for skill-based education at a lower level within the context. These skills programme aim at vocations

that are specific within the context that must be in line with a defined workplace entry requirement or need. However, further studies indicate that the forms of educational process which involve general knowledge, which include scientific and technological knowledge and practical skills acquired which are in line with a specific job within the context, is termed as vocational education (Tappin, 2002; UNESCO, 2005). Furthermore, Ekpenyong (2011, cited in Seyi, 2014) and Akinmoye and Aiyewalehinmi (2020) stress that the confusion on the term technical and vocational education can be easily figured out within the context in line with the different meanings and interpretations attached to it. They further state that vocational refers to business studies within a context while technical refers to technical studies or subject within a context

For the essence of this current study, technical and vocational education can be defined within a context of any settings as follows. Technical education within any organisational setting is an act of vocational preparation or training of a learner for a specific job at hand, which involves acquiring recent technology skills aimed at the workforce/learner becoming self-independent and competent within the organisational settings. This term is targeted at the preparations of technical graduates to become self-dependent to meet up with the current unemployment rate. While the term vocational education is seen as a programme which is structured for skills acquisition at a lower level of an organisation. However, Edokpolor and Owenvbiugie (2017), Uche (2016) and Awe (2012) believe technical education within any form of organisation facilitates the practical skills and scientific knowledge acquired within the organisational settings. He further stresses that vocational educational targets vocation based on its focus while technical education focuses on general technical knowledge. In addition, Oviawe (2018), Dike (2006) and Oni (2007) note that the aim of vocational education is to enhance skills of an individual's general skills within the context, which might be in line with their current jobs at hand or future jobs. They further stress that vocational education provides an individual with the basic practical skills to compete within global organisations.

The aim of vocational and technical education is to develop and build an independent, competent, and self-reliant society. Appreciating the role and importance of science as a tool for recent technology enhancement within the organisation is essential for the

nation's economic growth. Evidence in past studies within this field reveals that within the early 1970s, the importance of science teaching began to show its relevance within the primary and junior school curriculum (Oni, 2006; Awe, 2012). This development of numerous learning institutions, which are the polytechnics and the various colleges of technology, were created with the focus on the universities of technology. This effort was in line with balancing between conventional tertiary and science/technical oriented programmes. However, the studies of Oranu (1992) indicate that past studies on the Nigerian technical education system cannot be debated without the understanding of the examining and regulatory bodies within the context. Based on the regulatory bodies' plan and syllabi, the curriculum content and method of evaluation were dictated.

Craft-level technical education through the conduct of examination within the commercial and various technical subjects, is being controlled by the Royal Society of Arts (RSA) and the City and Guilds of London Institute (CGLI). In 1952, a multi-national examining body, which comprises of the various West African countries was established, which comprises of Gambia, Ghana, Liberia, Nigeria, and Sierra Leone. This examining body is the West African Examination Council (WAEC); the regulation of the technical subjects by RSA and CGLI continued even with the establishment of WAEC until the year 1960 before this body (WAEC) began to act on technical subjects. The key aim of these bodies (RSA and CGLI) was to ensure control of the education of students within the technical institutions' context (formerly trade and vocational centres), yet, CGLI oversaw examining the theoretical aspect of the trades. In line with the external protocols and guidelines, the design of the curricula was not in line with the nation's development needs in comparison with what was taught in the various technical institutions, and general education was given to the trainees, enhancing trades as their choice.

The examination of some technical and commercial subjects was taken over by the WAEC in 1972, precisely in December from RSA and CGLI in line with the federal government approval. This structure was in line with the Federal Government approval, which was enhanced with a qualification known as the Federal Crafts Certificate (FCC), which was issued by the technical colleges. The practical aspects of the trades examined by the CGLI were integrated by the FCC after taking over with an introduction of practical sessions by

WAEC in 1978 into its examinations. Yet, the curriculum of trades offered within the various technical colleges lacked more of general education. As a result of this, the image of technical colleges' graduates was demoralised because they were unable to secure admission within the context to any tertiary institutions. The national curricula and the module specification which was proposed by the National Board for Technical Education (NBTE) was approved by the National Council on Education (NCE) for the Technical/Commercial Studies Certificate programmes in technical colleges in 1985. The focus of the reform includes:

- General courses including English language and communication, mathematics, integrated physical science, and social studies into the technical education curriculum are mandatory.
- Enrolment of industrial staff and other categories of itinerant craftsmen at the technical colleges to take specific trade modules relevant to their fields.
- Integration of trade theory and practice in form of trade calculation and trade science into the curriculum.

In 1992, the National Business and Technical Examination Board (NABTEB) was introduced, and in line with further improvement or restructuring, a new scheme was introduced in 1995, which replaced the 1985 reform. The responsibilities of conducting technical and business examinations, which was previously examined by RSA, CGLI, and WAEC in Nigeria was controlled and tasked with much responsibility bestow by the National Business and Technical Board (NABTEB). NBTE modular curriculum and the modified WAEC syllabi are the examining bodies. This body based its examinations on two parallel syllabi, which offers examinations in four trade areas that involve construction trades, engineering trades, miscellaneous trades, and business studies. In line with the establishment of NABTEB it was tasked with a key responsibility of making an equivalent qualification between the National Technical Certificate (NTC) to that of the senior secondary school; this was to ensure that technical colleges graduates could also gain admission into relevant tertiary institutions like the polytechnic and that universities like that of the secondary schools. In line with this current development, graduates of technical colleges are being encouraged because they can now gain admission into any

tertiary institution such as the polytechnic and the universities of their choice like others in the general education. The various subject within general education and related trade subjects are mandatory for the learners in line with their choice of trades.

The National Technical Certificate (NTC) and the National Business Certificate (NBC) have been accepted by the National Joint Admission and Matriculation Board (JAMB). The acceptance of the NTC and the NBC are due to the suitable consideration of purpose as being adequate for enrolment of courses in the various higher institutions within and outside the country. Based on the educational structure within the Nigerian context, a skilled workforce within the Nigerian context should be encouraged to meet the needs of the local industries, most especially at the time of needs to overcome the current challenges within the country and in the global construction market. Yet reverse always seems to be the case.

It was obvious that Nigerian policy on education seems not to be capable or the system has been ineffective in adequate provision of manpower within the context to enhance the country's needs on socioeconomic development that was left by the colonial masters (Okolie and Ogbaekirigwe, 2014; Oviawe et al., 2017; Adiele and Ibietan, 2017). This is vital to industrial development and that of the nation as whole for its future development. It is very clear from past studies that the issues regarding the policy are clear and should be addressed within the context. This is due to continuous changes and the issues laid out seem to be directionless and in most situations within the Nigerian context it seems to be a tradition to abandon policies put in place. Furthermore, there is a tremendous decrease of training facilities within most of the learning institutions within the Nigerian context (Oviawe et al., 2017; Osaghele et al., 2015; Okafor, 2000). It is obvious that the institutions of learning, which were meant to enhance workforce/learner skills are inadequate for the task needed. The effectiveness of teaching and learning within the context has been affected. Akpan (2007) and Akanbi (2017), stress that lack of industrialisation within the Nigerian context was due to lack of learning tools in the context and further state that leaning cannot be only reading without practical. This was an indication that the aims and objectives of workforce/learner cannot be achieved effectively if the teaching and learning tools are not in a good shape or inadequately

placed. In addition, findings from Oni (2007) and Oviawe et al. (2017), suggest that funding of the various learning institutions was key for an effective training and advocate the need for proper funding of technical and vocational education.

Similarly, findings of Aina (1991) and Okorie (2000) indicate that issues regarding qualified vocational teachers, which are fully trained in line with the aim of achieving organisational training objectives, seem to be ineffective within the context. According to the various studies of Gekara and Snell (2018), Olori and Olori (2018) and Oranu (1998, cited in Awe, 2012) these indicate other critical issues affecting the vocational educational system which are in line with the issues regarding curriculum that seem to be ineffective within the context. A great emphasis was in line with the pre-vocational subjects at the lower levels. These lower levels comprise of both the primary and junior secondary levels within the country. There are shortfalls in the number of trainees recruited and the exodus of teachers in the nation; the motivation of the learners/workforce is low, compounding examination-oriented approaches to curricular implementation and inadequate political will. It is true or certain within the Nigerian context that paper qualifications within the context seem to supersede the remarkable skills acquisition. This has led to the reduction in acquisition of skills and most of the trainees seem to be more interested in the qualifications, to the detriment of the skills acquisitions within the context as a general form of orientation.

2.12 TVET within Nigerian context, Philosophy, and structure

In line with the current subject under investigation, the foundation of TVET within any organisational settings is based on the philosophy that was established in the context. This was in line with workforce skills enhancement and their performance to make them competent in the global construction market. This philosophy was based on making the younger generation becoming self-reliant, independent, and addressing the challenges concerning unemployment rate.

2.12.1 Philosophy:

In line with the philosophy of the vocational education within the Nigerian context, it is obvious that vocational education is a programme designed by policy makers within the educational system to ensure that learners within the context are educated beyond college grade (Adebisi, 2014; Awe, 2012; NPE, 2004). The design of the programme's key objective was to ensure that learners within the country are fully prepared for enhancing the existing workforce or the choice of a certain vocation as a choice of career within the country. The categories of the vocational education include the division of trade and industrial education, technical education, agricultural, home economics, which are all characterised by specialised nature (NDE, 1987). Likewise, the aspect of education that focuses on the learning of a certain techniques or procedures and skills within the context is technical education, which aims at preparing technicians in most situations above secondary education but not necessarily in gaining a degree award.

TVET Objectives as outlined in NPE (2004):

- Application of science, technology, and commerce in provision of trained manpower, at sub-professional grades
- Provision of younger generation (men and women) with adequate knowledge on complex technology
- Provision of necessary skills at the technicians' level to make youth competent and become self-dependent
- Provision of understanding on the foundation of engineering and technology
- Specialised services for the nation's economic development by set individuals
- Acquiring specific skills or vocation within the context

2.12.2 The structure

Findings indicate t four categories of education institutions outside the university which are key in provision of vocational and technical education within the context.

- At post elementary level are the pre-vocational schools:

This form of vocational education is designed to prepare individuals to gain the knowledge of sciences, practical skills and attitude acquired as technicians within the sub-professional level. It is equivalent to secondary education level

- Technical colleges
- Polytechnic
- At the post-secondary level are the colleges of technical teachers' education

However, NPE (2004) indicate the provision of higher education in the following types: Universities, Colleges of Education, Polytechnics, Monotechnic and Other correspondence institutions. Outlines of higher institutions within Nigerian context are indicated in Table 2-9 and Figure 2-6.

Table 2-9: Higher institutions of learning in Nigeria

Type	Higher institutions category	Number
Universities	Federal universities	25
	Federal universities of Agriculture	3
	Federal universities of technology	6
	State universities	48
	State universities of technology	5
	Private universities	78
	Other degrees awarding institutions	62
	Total	**176**
Polytechnics	Federal polytechnics	24
	State polytechnics	40
	Polytechnics with NCE programmes	7
	Private Polytechnics	18
	Federal monotechnic	22
	State monotechnic	17
	Private monotechnic	2
	Colleges of Health	2
	Total	**132**
IEIs	Innovative Enterprise Institutions (IEIs)	61
Colleges	Federal colleges of education (Regular)	12
	Federal colleges of education (Technical)	8
	Federal colleges of education (Special)	1
	State colleges of education	46
	Private colleges of education	42
	Total	**109**
	Grand Total	**478**

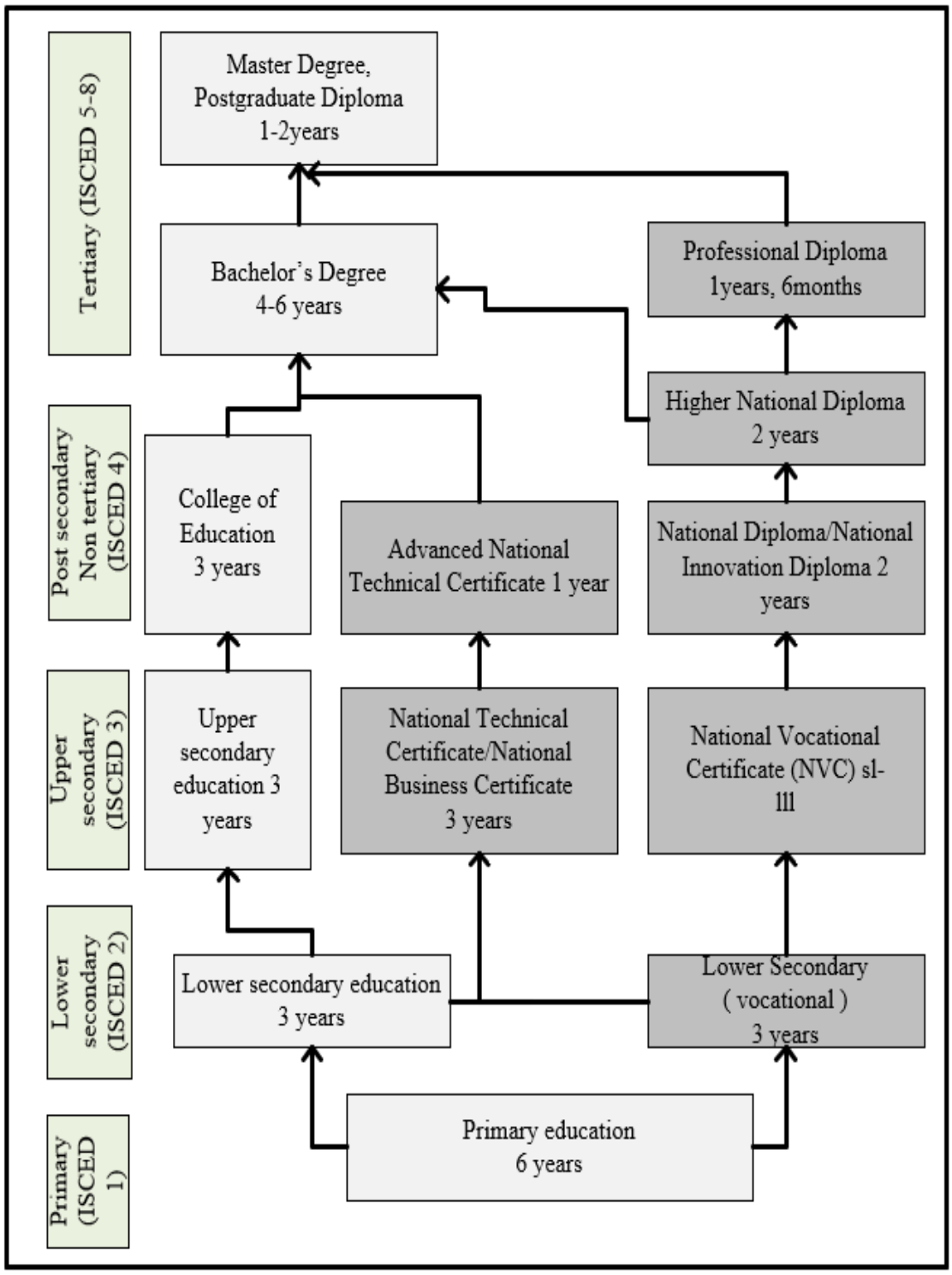

Figure 2-6: TVET in the Nigerian education system

(Source: UNESCO, 2019)

2.13 National vocational qualification framework (NVQF)

Based on the recent increase in technological advancement within construction related organisations, the importance and relevance of vocational education and training in competitive organisations cannot be overemphasised (Awe, 2012; NBTE, 2004). In line with this statement, organisations that want to be competent in the global competitive market ensure that the preparation of vocational education and training are given topmost priority to achieve the organisational goal settings. As a result of this, the need for the National Vocational Qualification Framework (NVQF), which started within the UK and commonwealth countries is now all over around the world (Afolabi et al., 2017; Awe, 2012; Comfort, 2012). Based on NVQF, a numerous number of countries, including the UK operation on NVQF, goes beyond vocational skills to gain qualifications for the entire education (Comfort, 2012; Awe, 2012). It was in line with this goal settings that a two-day seminar that involved participants from both private and public sectors, which involved participants of the British NVQ consultants from the UK, Federal Ministry of Education, Labour and Productivity, Professional bodies, Science and Technology was organised by NBTE in November 2004 (Awe, 2012). This seminar provided the various participants with the opportunity to deliberate on the formulation of the NVQF for the future development of vocational qualification. It would be necessary for one to understand that a framework was just a qualification template designed for competency-based qualification acquired for workplace and its relevance within the context.

As regards to the seminar with the various participants of the professional bodies, a framework as indicated in the Figure 2-7 was formulated in line with the organisational settings within the context. This is in line with the workforce skills enhancement within the country and a means of addressing or reducing the high rate of unemployment among the younger generation.

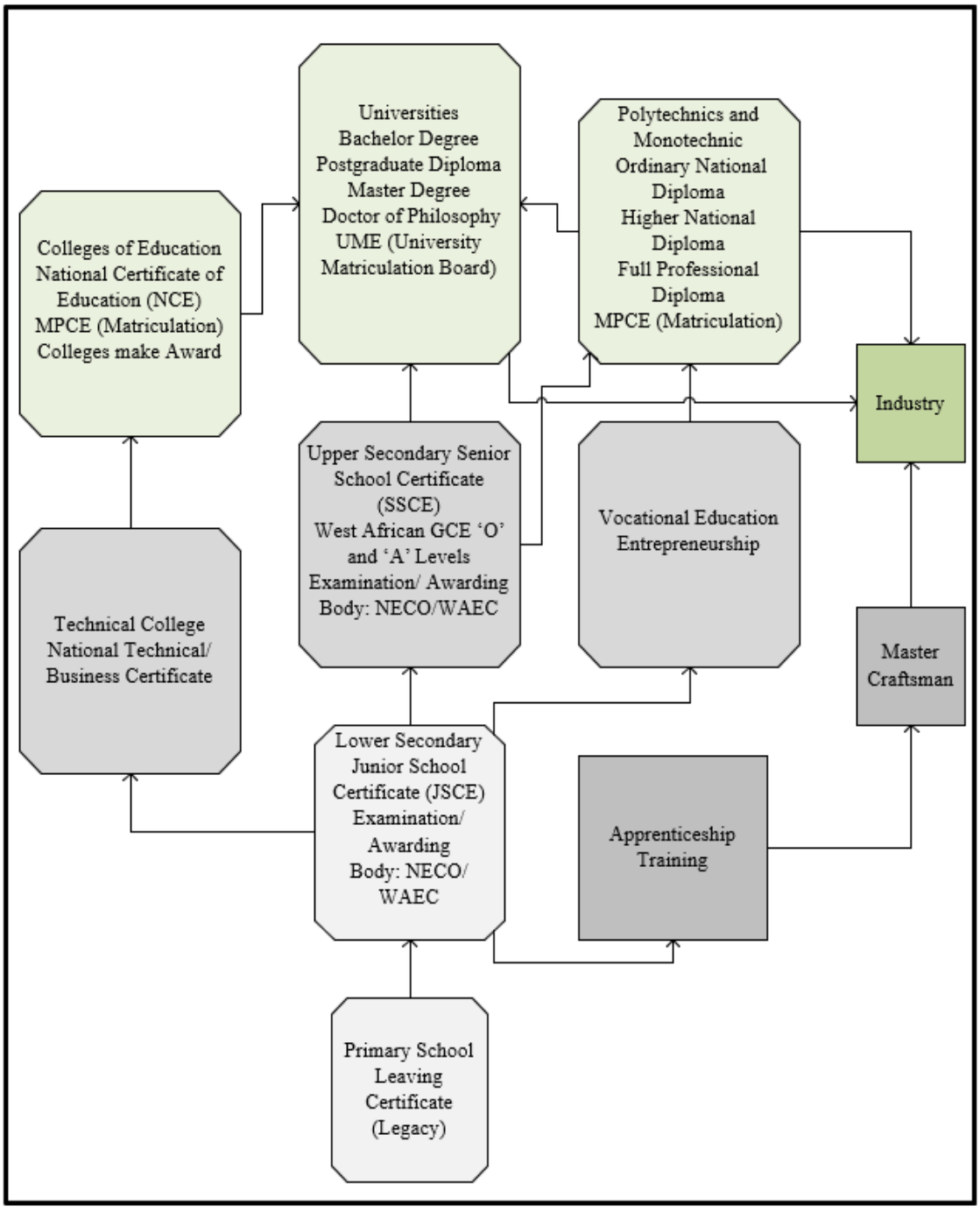

Figure 2-7: NBTE model of Nigerian Education system

Source: Education and Training System in Nigeria (2005) cited in Awe, (2012)

2.14 Problems of vocational and technical education in Nigeria

In line with the various studies on vocational and technical education towards Nigerian economic growth, there are key challenges that are being experienced within the sector. These challenges, within the Nigerian context, seem not to be new, existing since the era of the colonial masters (Oviawe et al., 2017; Bilau et al., 2016; Okoye and Arimonu, 2016). More so, there are various indications that these challenges on vocational training are numerous, and its impact seems to have affected the construction related organisations in many ways, which needs immediate attention (Idris and Mbudai, 2017; Oseghele et al., 2015; Ayonmike et al., 2015; Zite and Deebom, 2017). However, the role of vocational education and training within the Nigerian context in terms of employment and economic growth cannot be overstated, despite the outlined challenges within the sector by the various studies. More so, various studies of Oviawe and Ehirheme (2019) and Oviawe (2018) mention that despite the role played by the vocational education and training within the Nigerian construction industry in terms of its economic growth, the nation is still challenged by a high rate of unemployment among the younger generation. This is obvious that the effort made by the industry towards skills enhancement and, economic growth within the sector is being challenged by certain factors as outlined by the various studies, which are the mitigating factors responsible for the downgrade of the industry. These challenges have been experienced after the era of the colonial masters towards enhancing the workforce skills within the industry, which has been a concern.

Furthermore, there are clear indications that most of the learning institutions at the higher levels lack the necessary tools in line with the various institutional approach for learners' adequate needs for a suitable job skill or employment (Ayonmike et al., 2015; Ogbunaya and Udoudo, 2015; Ogbunaya and Udoudo, 2015; Awe, 2012). This is obvious that the sector of TVET within the industry has suffered numerous challenges that contributed to the downgrade of the industry performances and its contribution to the nation GDP. In addition, the studies of Awe (2012) states that Nigeria as country is left behind in terms of preparing its workforce skills towards meeting the global construction challenges to have a competent skills edge over its competitors. Evidence reveals that the rate of unemployment among the younger generation within the African context is high and

Nigeria as a developing country is not exempted. Recommendations were made by past studies on the way to enhance TVET within the Nigerian context for its future development and its economic growth (Chukwunwendu, 2015; Osidipe, 2017; UNESCO, 2009). In line with the past studies and their recommendations, introduction of TVET at the primary and secondary levels is important and will pave a means of enhancing the construction related organisations within the context. Furthermore, TVET gives focus on many goals towards skills enhancement that form part of the formal education system, which are incorporated within the sector as stated earlier, primary, secondary, and tertiary that are being challenged within the context of the industry.

2.15 Required skills for the Nigerian construction industry

The Nigerian construction industry needs skilled workforces with the right skills for its future development. Jayaram and Engmann (2017); Crowson et al. (2000), stress that employers of different organisational settings in construction related organisations need a skilled workforce with an adequate skill for the job within the industry. They stress the need of these skilled workforces for industrial development and contribution to the national economic development. Furthermore, Stasz (2001) stresses the needs for these skilled workforces within the industry and their great impact in terms of performance and job creation for the younger generation. They further argue the need for these skilled workforces as key to the development of the industry by identifying the right skills that are lacking within the Nigerian construction industry and the hindrances to the industry and the national economic growth. Also, studies by Arfandi and Sampebua (2018), Castronovo et al. (2017) and Stasz (2001) highlight the right skills required for the skills upgrades to include cognitive or academic skills, technical or vocational skills, the generic skills, work-related attitudes, or soft skills as the major skills that are lacking within the industry and call for an immediate attention. However, this study is of the opinion that the construction industry will continue to suffer the consequences of skills shortages and skills gaps due to the bad image portrayed to the younger generations by both parents and general education stakeholders.

Based on the studies by Osaghele et al. (2015), Awe (2010) and Odusami (2002), the Nigerian construction industry is in stern need of a skilled workforce for its future

performance and further state that technical colleges in Nigeria, whose sole aim was to give an intensive training to the younger generations to acquire quality skills in vocational education, has been defeated, as employers of the industries found some deficiencies in the graduates of those technical colleges. Construction related organisations within the African continent, in Nigeria to be precise, are being challenged with skills gaps in the industry as hindrances to industrial development. These skill gaps are highlighted according to the studies of Jayaram and Engmann (2017), Lututala (2012), Awe (2012) and Odusami (2002) as cognitive skills especially numeracy and critical thinking, non-cognitive skills especially communication, leadership, decision making and technical skills among the skilled workforce within the Nigerian construction industry.

The employers of the Nigerian construction industry believe that theoretical knowledge acquired by the workforce during training in their various classrooms is not adequate to make them competent to compete in the global construction market. However, the above statement is supported by studies of Jayaram (2017), Lututala (2012), Odusami (2002) and Awe (2010), who are of the same opinion that most of the employers of the various construction organisations seem to believe that the theoretical knowledge gained from classrooms is not quite enough for their workforce within their organisations and hence see it as a land fill (tip) of the iceberg that is unsatisfactory. Likewise, Jayaram and Engmann (2017) and Ogunde et al. (2017) are of similar views that most of the employers of the various construction related organisations seem to believe that they only value those with the non-cognitive or technical skills. The study further stresses that employers of the industry are of the views that institutions of learning should be able to give the fundamental skills of employability to technical college students, while the employers ensure that learners should be trained on the job that are in line with industrial needs.

In addition, a research study conducted within the context of the African continent by Ndoye and Walther (2012) found that skills gaps exist within the skilled workforce and these skills gaps are further highlighted by the study, being workforce communication skills, cognitive skills, literacy, and numeracy skills that are needed for the enhancement of the industry. This issue of inadequate skills within the industry has created and impacted negatively on industrial development and the nation’s economy. In a similar

vein, the National University of Educational Planning and Administration (NUEPA) embarked on similar research specifically on the south and south Asia curricular skills on their employers. The study discovered that similar skills gaps exist within these countries and there are needs for improvement to enhance workforce performance within the industry. Furthermore, Jayaram and Engmann (2017) and Okoye et al. (2015), state that the participants view specifically on workforce skills and its general requirements and the chances of acquiring skills in the various institutions of learning and the specific skills gap, as this is key to the industrial development. The study reveals non-cognitive skills, precisely workforce communication skills, honesty/ethics skills, teamwork, leadership skills and flexibility skills.

2.16 The Nigerian construction industry

The construction industry, for instance in most of the developing countries, is the driver of economic development. Other sectors largely depend on its products or services to fully operate to achieve its goals (Oke et al., 2019; Ishaq et al., 2019; Okoye et al., 2015; Odediran et al., 2012). However, the construction industry within the Nigerian context is still fraught with a lot of intrinsic challenge, ranging from inadequate technical and managerial know-how to insufficient financial, material and equipment capital base (Ogunde et al., 2017; Elijah and Oluwasuji, 2019; Ogunbode et al., 2017; Awe, 2012; Ofori, 2001).

Although the industry has lots of potentials; an example being the self-sufficiency in cement production, which on its own can alleviate the materials challenges and huge deficit in physical infrastructure such as roads, rails, airports, and seaports (Oluwakiyesi, 2011). For instance, it would be impracticable for any industry to function without any infrastructure in place or link roads for the transportation of raw materials or if there is no office building or other construction outputs. Hence, the construction industry plays an important role in the economy, and there is hope for the Nigerian construction industry in the coming years, with emphasis shifting to infrastructure growth.

The construction industry in Nigeria has experienced failure in its contribution to the nation's economy, since the discovery of crude oil in the seventies (Chen et al., 2016; Ogunde et al., 2017). Prior to oil and gas discovery, the construction projects executed have been on a large scale and these projects include buildings, bridges, sewage plants,

construction of roads and dams (Okotie et al., 2018; Awe et al., 2010). However, training status within the Nigerian context is ineffective with low-quality coupling with challenges against the realisation of quality training (Maigida, 2014; Ogbunaya and Udoudo, 2015; Okolocha and Baba, 2016). In addition, most of the technologies adopted by the construction industry in Nigeria are both local and imported.

This suggests the need for training and skills development plus a steady supply of manpower to the indigenous population to make use of the available resources and adapt the technology available (Aremu and Adeyemi., 2011; Arowojolu-Alagwe., 2013; Ayomike et al., 2015; Serumu, 2015; Chen et al., 2016). These skilled worker shortages have been experienced in most of the urban areas where a large percentage of unemployed workers are accompanied by technicians skilled gaps in the building trades such as bricklayers, carpenters, and plasterers (Oseghale et al., 2015; Afolabi et al., 2016; Zannah et al., 2017). Technicians are a trained skilled workforce that can either work under the supervision of a professional or independently in a complex system.

2.16.1 Skill shortage and skill gaps in Nigerian construction industry

A limited trained/skilled workforce is of major concern within the industry and has affected the industrial y performance. This has led to technicians' skills gaps and skills shortages within the industry, which requires immediate attention. However, studies indicate that there are shortfalls within the industry in terms of quantity and quality of technicians being trained to satisfy the challenges (Afolabi et al., 2016; Bilau et al., 2015; Oseghale et al., 2015). "*Skills represent a person's level of proficiency or competency to perform a task*" (Peterson et al., 2001:464). The Government's Skills Task Force STF (2003) defined **"Skills gaps"** as where members of the existing workforce lack the necessary skills to do the job and **"Skills shortages;"** as absence of people with the required skills in the workforce (Goyol and Sunday, 2020; Ayonmike and Okeke, 2016). More so, skills gap, as defined in the studies of Goyol and Sunday (2020) states that it's that shortage of performance; this is in line with what is being required and expected within the organisation.

For the essence of this study, technicians' skill gap is a major concern and is defined as workforce (technicians) actual skills possessed and the required skills on the job. This gives room or provides opportunities for organisations to identify its missing skills within a short period. The recruitment of the workforce by organisations is to fulfil the objectives of the organisation to meet up with the global standard. Yet, it usually happens in some cases, as certain knowledge and training are lacking among the recruited workforce which leads to or creates an avenue for skills gaps. However, further training of the existing workforce to improve industrial performance can fill the skills gaps and the problem of skill shortages can be addressed through enrolment of competent people in the industry.

In an article in Vanguard, Okogba (2019) lamented the skill gap in the Nigerian construction industry and poor project delivery has become a trend within the country and is of great concern. These skills gaps include "*Masonry, carpentry, plumbing, electrical installation, painting and decoration among others*"

2.16.1.1 Nigerian Construction Industry skills shortages

The Construction industry is mostly dependent on the availability of its workforce due to its manual activities predominantly in developing countries like Nigeria. This implies that adequate supply of a skilled workforce is of major concern to performance within the industry. However, the industry for many years suffered shortages of skilled workforce and required materials (Bilau et al., 2015; Mukhtar et al., 2016). Furthermore, Bilau, et al. (2015); Oseghale et al. (2015) argue that skilled shortages and skills gaps are often portrayed as major hindrances to the development of the industry and the nation's economy. Likewise, failure of any project due to insufficient skills is due to inadequate training/education (Mukhtar et al., 2016; Windapo, 2016). This has always continued to be a major hindrance to industrial growth and the country's economy.

Writing in Punch, Ihua-Maduenyi (2018) laments the standard of a competent skilled construction workforce is decreasing yearly, even by 15 percent of technicians within the construction sector. According to the paper, the construction industry poor performance is due to an inadequately skilled workforce and the need for improvement is paramount.

As Ihua-Maduenyi (2018) mentioned, the shortage of a skilled workforce is mostly due to the weak stock of skilled construction workforce in the country. Further suggesting that key strategy to the challenges and repositioning of the sector is the enhancement of domestic construction skills. This is through educational institutions with emphasis on providing students with practical training to supplement their theoretical knowledge.

2.16.2 Effect of the Technicians Skills gap within Nigerian Context

Nigeria, being a developing country with the fastest -growing economy in the whole of Africa, with its growing population, the country has been estimated to be among the most populated countries globally (Jacob et al., 2020). With the growing population, the country needs the services of the skilled and semi-skilled workforce within the construction sector to address the population growth and attendant housing needs within its context (Caleb et al., 2017; Oni, 2011). Obviously, the workforce that forms the largest part of the site labour within the building construction industry are the skilled workers (Bilau et al., 2015). These skilled workforces are the Bricklayers, Blocklayers, Plumbers, Tilers, Carpenters, and Painters etc. The effort of this skilled workforce within any organisation determines the input quality of the industry's products. However, the supply of this skilled workforce is dwindling or declining and the demand within the industry is high at the present time, due to the older workers retirement with wide experience. But, because of their ages and strength they are no longer there to perform the job and the young workers are not there to take over. In addition, the local apprenticeship scheme method, which used to be organised for old age, is no longer popular and most of the young ones are not encouraged to take over these jobs.

Most of the teenage youths prefer to do other businesses that are non-skilled like the motorcycle transport business, tricycle transport business popular call "Keke", or other petty trading to learning skills. Also, skills' acquisition in the various technical colleges within the Nigerian context are no longer of primary importance but are mostly secondary. This is true because most of the young ones are not interested in construction related work. The few young people are interested in soft skills and even, if necessary, actions are not taken by the relevant bodies or authorities. The time will surely come that there will be

more graduates of building and engineering while the number of skilled site operatives will remain low, and this will continue to affect the industrial performance and the nation's economic growth.

2.16.3 Technicians' Skills within Nigerian Construction Industry

Technicians' skills within the construction industry in Nigeria are of great importance and it has opened tremendous opportunities for greater performance which led to greater output and the nations' economic growth. The importance of technicians' skills cannot be over stressed due to its great impact on industrial performance and that of the nation in terms of its productivity. This implies that technicians' training is vital, because in most cases it led to opportunities for greater productivity through the acquisition of relevant skills during training. The industrial performance can be upgraded through a continuous technicians' effective training to improve productivity, achieve the goal sets of industry and construction is not exempted (Olusola, 2019; Asiyanbola, 2018; Dantong et al., 2011). The questions of how construction technician training will help the workforce to improve the modern construction industry and social and economic development has undergone a series of debate but recent research and experiences has proven that construction technician training has helped the workforce to do all of planning, organising, leading and controlling of resources necessary to meet organisational goals which, in another sense, equips individuals with necessary skills and knowledge to be self-reliant that remains oriented and improved the creation of job opportunities.

According to Onuka et al. (2012), man is dynamic in nature. The need to be current and relevant in all spheres of human endeavour make staff development a necessity to keep track with current events and methods. Looking at the craftsmen in the construction industry, they play a crucial role in the practical realization of any construction project. They are mostly engaged in the technical aspect of construction and at the management level serve as front line managers (supervisors); giving the role of interpreting the company policies into practical realization of the organizational goal of employers (Dantong et al., 2011) observed. The successful practice in the industry requires that the construction technician trainee possesses certain abilities, such as motivation and attitude,

which they match up with the right job. It can be observed that the relevance of the construction technician training cannot be far-fetched because of its importance in modern construction of today, but most construction companies in Nigeria are still finding it hard to adapt to the trends and changes in technological advancement due to their own selfish and suitability policies. Companies are concentrating on financial gains, forgetting the people that make the job and money Omole, (2001b: cited in Dantong et al., 2011). Gunawardena (1998), cited in Dubem et al., (2012) argue that there is even an absence of manpower planning and development among construction industries in developing nations, resulting in poor quality, high wastage, and long-term productivity decline in the industry. Odusami et al. (2007), Femi (2014) and Osaghele et al. (2015) stress that training of the workforce within construction industries should be taken seriously and topmost priority should be given to adequate training. The capability of the construction industry to develop, procure and deliver innovative complex and demanding projects is driven by involvement of highly knowledgeable and skilled site managers (Odusami et al., 2007)

2.16.4 Skills and Knowledge in construction industry

Skills and knowledge when imbibed by a construction professional can improve the technicians' performance in a construction related organisation. In most organisations and industries, operational planning, communication, and personal management skills and knowledge have been identified as the most important in line with the construction skills management practice (Ahmed et al., 2014). According to Ogundipe et al., (2018), Baharudin and Khairul, (2006) state that managerial skills, technical skills are other skills are required for enhancement of technicians' performance within an organisation. A country like Nigeria is being challenged with skill gaps as one of its major hindrances to the growth of the construction industry, which has impacted negatively on industrial performance.

Most importantly, there are different resource categories of the construction phase for the growth and development of the construction industry and are mostly abundant in most developed countries like the UK, the USA, Canada, Japan, China, Australia, etc. In developing countries like Nigeria, these resources are lacking or limited and are mostly

not in good condition, if available at all. The construction phase is categorised into skills labour, management, capital, and materials. However, Nigeria experienced issues of skills gap and skills shortage due to inadequate technicians training and skills development as one of the mitigating factors within the industry (Ogundipe et al., 2018; Idris and Mbudai, 2017; McKinnon et al., 2017; Bilau et al., 2015; Johanson et al., 2004).

According to Bilau et al. (2015), the nature of the construction industry is complex, coupled with the challenges on competitiveness with recent technological change calls for immediate training programmes on the workers skills acquisitions and knowledge. In addition, Adi et al. (2012) state that training programmes on workers skills and knowledge will enable the workers within the construction industry to compete with the global challenges. They further argue that for the industry to be successful, the workers must undergo these training programmes on skills and knowledge development to acquire new critical skills and knowledge to compete with others in the construction market globally. This is to say that training in the construction industry is so important because there are needs for the construction industry to compete with others and this indicates the need for workforce training programmes. Therefore, training analysis has become a prerequisite to fill in the gaps within the construction industries that wants to meet up with the global challenges (Chan and Daity, 2007; Mackenzie et al., 2004).

2.16.5 Attitude and behaviour of workforce within the construction industry

In a competent organisation that wants to be successful within a competitive market, its workforce attitude and behavioural patterns need to be properly examined in accordance with the organisational settings. The attitudes of the workforce and behaviours towards achieving a positive output are being determined. There is evidence that workforce attitudes are individuals' feelings towards a certain body or object, which can influence performance within the organisation (Li et al., 2018; Al-Sari et al., 2012).

Attitudes are mostly based upon the positive or negative evaluation of the consequences of a given behaviour and on personal beliefs about those effects (Pit-ten et al., 2018). At the same time behavioural decisions are frequently based on attitudes towards that object, whether consciously or not (Begum et al., 2009). However, the relationship between the

two can be quite complex (Barr et al., 2001) and the empirical research on the attitude-behaviour link has been yielding contradictory results (Van Doorn et al., 2007). The attitudes of people involved in the construction industry play a critical role in the control and management of the construction activities. Interdisciplinary approaches between all stakeholders are essential for successful waste management practices (Udawatta et al., 2015). The importance of human factors in waste minimisation was highlighted by Loosemore et al. (2002), and Li et al. (2018) who argue that waste can be prevented by changing people's attitudes. According to Kabirifar et al. (2020) factors such as the contractor's size, the education and training background of the workers and the waste management practices applied including source reduction, reuse and recycling measures, frequency of waste collection and waste disposal influence the attitude and behaviour of a contractor towards waste management.

2.16.6 Current behavioural patterns of construction workers

Construction is risky and one of the most hazardous and dangerous industries that needs to be properly managed to achieve the key objectives of the industry (Ganah and John, 2015; Ganah and John, 2017). It can manifest itself through hazards of work patterns and behaviour problems at work, which may be linked to the low level of H&S culture when compared with other related industries within the Nigerian context.

Recently, studies revealed that the Nigerian construction industry has the highest human rights abuse and other social problems such as H&S issues, poor working conditions, and others, when compared with those of developed countries (Olutuase, 2014; Abubakar, 2015; Agbede et al., 2016). Okoye et al. (2016) and Diugwu et al. (2012) highlighted that lack of awareness on H&S issues among Nigerian construction workers as major concerns. Similarly, organizations' reluctance to H&S management has been the biggest cause of fatal injury in workplaces within the Nigerian context. Thus, the overall H&S standard and corporate image of Nigeria's construction industry has been greatly affected.

According to Zhou et al. (2015), the trend of accidents within the construction industry has reduced progressively due to inadequate CPD regarding continuous efforts of researchers/practitioners. However, the needs for more training of workforces within the

context should be carried out adequately, based on adequate health regulations. The need for workforce training on construction safety is paramount because at the present the industry is regarded as one of the most hazardous.

2.16.7 Ethical practices

The Nigerian construction industry is a very complex industry in terms of its role in employment and the Nation's economic growth, which requires the services of its professionals. These professionals in the industry services must be suitable for training needs within the industry for the industry's future development through the realisation of its full potential. This can only be achieved if the professionals are knowledgeable enough, competent in realising the planned goals within the time frame. These professionals are expected to be psychologically fit to enhance performance, which is in line with the industrial regulations and principles. The professionals are tasked with responsibilities that demonstrate some morals and values, which are competency and integrity that are in line with the code of conduct and maintaining a cordial relationship with individuals within the context. According to Akinrata et al. (2019), the concept of ethical practices within an organisation can have an influencing impact on an individual's job security on its profession within the organisation. More so, evidence indicates that the early stages of construction projects are the most effective where different levels of values and ethical terms should be key within the context (Shah and Alotaibi, 2018; Mason, 2009; Fellows and Liu, 2008). Also, low ethical guidelines, among the professionals within the industry, have prompted quality issues impacted on workforce training and skills development.

Likewise, unethical practices within the context of the industry have led to customers' dissatisfaction on construction project delays, ineffective project delivery deterioration in professionalism, poor workmanship, poor project conditions & quality of infrastructural development and reduction in the building life span (Oseghale et al., 2021; Adah, 2020; Akinrata et al., 2019).

2.17 Key factors of performance in construction organisations

There is need to expand on the key factors of the related literature on this investigation. Hence, the identification of the key factors within this investigation will help in better understanding of the dynamic and active nature of organisations within the context.

2.17.1 Training and development

According to Awe (2012), Arthur-Mensah and Alagaraja (2018) and Jazayeri et al. (2018), workforce skills within any successful organisation are immensely improved within the context through training and skills development because of the knowledge acquired in the process. In addition, workforce training in the context of an organisation is fundamental for enhancement of skills because workforce skills directly influence performance in competent organisations to gain an edge over competitors (Detsimas et al., 2016; Okoye and Arimonu, 2016; Dianmantidis and Chatzoglou, 2012). Furthermore, the various organisations are more flexible and much better to react quickly to certain changes because of the training obtained, which enables trainees to develop both generic and technical skills. More so, the workforce training within an organisational setting is seen as an integral part of human resources management. Obviously, a correlation exists within training provision and organisational commitment that were positive. The workforces focus within an organisation may not be fully in line with the organisational goal sets if an effective and efficient training was not properly conducted before the task.

Arthur-Mensah and Alagaraja (2018) state that skills training has been incorporated in the primary curriculum to offer learners exposure within the context on practical and manual activities. Oseghale et al. (2015) stress the need for workforce training to improve performance within the various construction organisations. However, commitment of the management of construction organisations seems to be inadequate and not inspiring in all aspects. Obviously, the understanding of training importance and its consequences in the Nigerian context is not fully understood by most of the organisations' management. Furthermore, Jazayeri et al. (2018) state that most of the training programmes' assessment of competencies within the various organisations is inadequate, which the trainees are needed to demonstrate knowledge within the context. Similarly, Sweis et al. (2019) and

Abu Hussein (2016) state that, within the context of construction related organisations, labour processes and the use of techniques are advancing daily, which implies the need for continuous workforce training and development to enhanced skills levels to be refreshed. Furthermore, studies by Wagner and Kulwiec (2020) and Abomeh and Peace (2015) indicate the relevance of workforce training and skills development for the upgrading of the industry of construction within most organisational settings. The findings indicate the shortage of skills within the context and the need for adequate workforce training and skills development, which was of paramount important in this current study.

2.17.2 Organisational structure

The method by which works flow within the context of an organisation is termed as the organisational structure of the organisation irrespective of its nature. According to the studies of Funminiyi (2018), organisational structure is a concept that indicates the aligning resources and the functional framework with defined organisational objectives within the organisational settings. Also, Erickson (2005) states that the clarity of the task with the responsibility involved within organisations are achieved through an effective and efficient implementation of its organisational structure. Successful organisations that want to be competent within the global construction market must have an organisational structure that should be effectively and efficiently implemented and properly managed to realise the organisation goals. However, past studies indicate that most of the construction related organisations within Nigerian context have no definite organisational structure and the commitment of the management towards skilled workforce training is totally inadequate without any concern (Tella et al., 2007; Aghimien et al., 2019; Funminiyi, 2018). Obviously, the impact on organisational structures within organisations and workforces/learners' safety is paramount for motivation (Nikpour, 2017; Zaira and Hadikusumo, 2017). This is in line with Maslow's theory of needs that indicate the importance and relevance of workforce security and safety within the organisational environment (Ayodele et al., 2020; Evanoff et al., 2020). This is totally inadequate within the Nigerian context, as the security challenges are on the increase daily, and this has great impact on workforce training within the industry. The researcher observed that the current

security challenges, which involves banditry and kidnapping are focussed on learning institutions and have a negative impact on teaching and learning within the country.

2.17.3 Continuous improvement

In the workforce training and skills development for the survival of any organisations wishing to be competent within the global construction market, continuous improvement is key in the realisation of the organisational goal settings. Continuous improvement as a concept is a systematic and continuing process, which is planned, organised, incremental, and changed in the organisation existing practices, which tends to enhance performance (Boer and Gertsen, 2003). This investigation focuses on the need of workforce training for skills enhancement within the settings of construction organisations within the Nigerian context. This skills enhancement can only be achieved through a continuous improvement of the workforces/learners' training and skills development. Studies by Siregar and Sihombing (2021), Khan et al. (2019) and Omotayo et al. (2018) state that the influence of continuous improvement within the organisation is key to every organisation that wants to be competent within the global construction market. They further state that the need for innovative and modern mechanisms of managing the construction industry is imperative within the Nigerian context for its future development.

2.17.4 Competitiveness

Competitiveness within the construction market is paramount and every successful organisation wants to have an edge over other competitors in the global settings. Findings of Wuni and Shen (2019) and Lobo and Wilkinson (2008) in their investigation on skills shortages within the context of the New Zealand construction industry indicate that poor investment on training and skills development, and international competition for skilled workforce are some factors responsible for skills shortages and further recommend adequate funding for skilled for workforce training and upgrade of service conditions. In addition, findings of Detsimas et al. (2016) on skills gaps in both generic and skills within the construction industry in Queensland within the Australian setting indicate that training within workplaces is high but there is no balance because the training environment does not foster skills development. The study further reveals that formal and adequate training

mechanism is inadequate and suggest that workforce training has positive career growth within any context of development. Furthermore, findings of AbdulAzeez and Umar (2019) indicate that shortages of skilled workforces within the Nigerian construction industry are unanimously agreed by the professionals.

2.17.5 Human resource management

Ameh and Daniel (2017) investigated Human Resource Management within the Nigerian construction industry. The findings of the studies indicated that training and development practices were superficial, involving orienting newly recruited employees on facilities for optimum performance rather than developing employee job related competences. The studies further state that provision of appropriate modern facilities for work, and incentives for workforce to motivate staff were the prevailing motivation. This recommended further studies to assess the impact of identified human resources on productivity and project performances within the context. More so, the path to HRD: An investigation of training and development practices in the Libyan manufacturing sector in the 21st century by Abdulrahim (2011) identifies that most of the organisations lack effective procedures for assessing training and development and more so the training and development for HRD is inadequate since only little progress is made within the sector. Furthermore, Atoki (2013), investigation on training needs assessment processes in a Libyan organisational context: Libyan General Electricity Company case study, indicates that training needs for individuals to attend courses are inadequate and individuals who need training within the organisation are not considered by the management of the organisation. Similarly, findings of Bilau et al. (2015) on shortage of skilled craftsmen in small and medium construction firms in Nigeria indicate that skilled workforce possesses the ability to address the problem of rework due to poor level of workmanship, which may result in cost and time overrun.

2.17.6 Effective teaching and learning

For the essence of this current investigation, effective and efficient teaching and learning is vital for the realisation of this current study aims and objectives. This is in line with the proposed framework development for workforce training and skills development within

the Nigerian construction industry. Studies by Perryman and Calvert (2020), Foster (2018) and Adamu (2016) indicate that teacher training might be worth more than the qualification obtained for teaching, but the desire and passion for teaching play vital roles in effective teaching and learning. It was further stated that teachers within the Nigerian context do not have this recognition, and this has been a critical issue within the industry. Furthermore, findings of past studies indicate that shortages of skilled workforces in terms of quantity and quality is due to the dearth of studies that have focused on apprentices within the context, which are key to the industrial skills enhancement (Daniel et al., 2019). In addition, graduate disparity between the bachelor's degree (BS/BA) which is the preference of graduates to polytechnic with HND, which led to pay disparity within the context (Asfaw et al., 2015; Isa and Yusoff, 2015).

2.17.7 Behavioural factors (Ethic)

In line with the findings of Brown and Loosemore (2015) and Akmam et al. (2018), the industry of construction is greatly influenced by the various forms of behavioural factors which are basically identified as kickbacks, fraud and bribery that seem to be driven by high goal feasibility, conducive attitudes and supportive subjective norms and high perceived behavioural control over being caught. More so, findings of the studies of Nordin et al. (2013) indicate that the construction industry is fragmented, involving stakeholders in a complex contractual structure and a variety of psychological human behaviours that expose them to corrupt activities. The study further investigates the behavioural factors that lead to the model of corruption action, which identified four key factors that lead to corruption in the industry.

This indicates that two factors within the outlined factors do not correlate to corrupt practices, which are the desire to gain a private or professional goal through corrupt action and goal feasibility. Akmam et al. (2018) stress the need of decision making as an essential behavioural activity and identify factors that influence specific behaviour such as values, attitudes, habits, and social norms as well as controls. Furthermore, the identification of risk and ways of improvement based on the behavioural tendencies within the context of construction industry in Farooq et al. (2018), which stresses that management involves

risk assessment that is subject to various behavioural tendencies and the existing body of knowledge. More so, studies of Kuoribo et al. (2021) and Yap et al. (2020) indicate the most predominant ethical conduct exhibited are accuracy levels, accountability, honesty, reliability, fairness, and respect for individuals. Unethical are favouritism, bribery and corruption, professional negligence, falsification, fraud, and overbilling within the industry. However, within the Nigerian context, evidence shows that policy, human, and environmental factors significantly influence professionals and contractors' resistant behaviours to efficient and effective implementation of sustainable construction practices (Okoye et al., 2021; Akmam, 2018; Nduka and Ogunsanmi, 2015). Likewise, studies of Ebekozien (2020), Nwaogu and Chan (2020) and Loosemore and Lim (2016) stress that the significant concern within the construction industry in its corruption act or resistance behaviours which are not encouraging, despite the widespread academic concern towards injustice within the construction industry. These behavioural issues within the construction industry have a negative impact on workforce/learner training and skills development that affect industrial performance.

2.17.8 Skills development

This key factor is important in a competent organisation in a competitive setting. In line with the studies of Detsimas et al. (2016) on an investigation on skill gap in both generic and skill areas within the construction industry, findings reveal that current workplace training within the environment doesn't foster balanced skills development, although workplace training is high. This is due to the absence of formal and well-balanced training mechanisms within the context of construction related works. Furthermore, the studies indicate that a correlation exist between provision of training and employees 'organisation commitment'. However, the management commitment on workforce training to enhance skills is inadequate and this has a negative impact on the workforce performance. More so, the studies of Idris and Mbudai (2017), Awe (2012) and Uwaifo (2010), indicate that the curriculum of vocational training is adequate in terms of content and covers the required skills but is totally inadequate in terms of its implementation towards gaining the desired objectives as designed by the national policy on education. However, Arthur-Mensah and Alagaraja (2018), Arthur-Mensah and Alagaraja (2013) stresses the need for

skills development on Technical vocational and training for schools and beyond to tackle challenges on the high rate of unemployment among the younger generation. More so, findings of an investigation on the barriers of skills development within the context of the construction labour market by Watson and Sharp (2007), with focus on Brighton and Hove, South East England indicate that barriers on skills development in the structure of the construction labour market are established within the labour market and suggested a training scheme for the youth to be introduced and reviewed the apprenticeship training. Furthermore, Fortune et al., (2019) identifies the various skills and the factors that hinder these skills within the sector as: high cost of training and low wages as factors responsible for skills shortages in the industry.

2.17.9 Employees motivation

Employee motivation as a concept is in line with the strategy put in place to encourage the employees within organisations to put in their possible best in ensuring that the organisational goals settings are achieved through their routines. Osabiya (2015), details critical factors regarding employee's motivation within an organisational setting, which are key to motivation of organisations working as a team (teamwork), leadership by example, suitable facilities that have great impact on employees motivation, and influence on productivity. Also, Kiradoo (2014) identifies those motivational issues have influence on productivity and employees' performances, both intrinsically and extrinsically. The findings indicate the relevance of employee's motivation in organisational settings as key to every successful organisation towards the realisation of its goals in an effective and efficient manner. Furthermore, Fiaz and Saqib (2017) on leadership styles and employee's motivation, reveal a relationship between leadership and employee's motivation, which has an impact on industrial performance. Findings of Kusumawati and Wahyuni (2019) indicate that training has a direct positive impact on workforce performance and further state that motivation can serve as mediator between training on worker performance. Workforce' motivation within construction related organisation in Nigeria was totally inadequate and not encouraging. Therefore, the younger generations were not interested in construction work as a choice of career.

2.17.10 Strategies

Every successful organisation that wants to gain a competitive edge over others must have precise strategies that are key to the organisational advantage, which when implemented must realise organisational objectives. Organisations, irrespective of size, must have a strategy for enhancing workforce skills to be knowledgeable. The approach towards enhancing workforce skills was to identify the practicable strategies for finding a solution to the key issues and to determine the effectiveness of these practicable strategies through the developed framework. Ho (2016), in an investigation on labour and skills shortages within Hong Kong's construction industry, indicate that three strategies were responsible for the upgrades of the industry, engaging employers to provide adequate training for workforces, wages increase and importing a foreign workforce. In addition, studies by Alwan et al. (2017) on strategies for sustainable development in construction within the UK context indicate that there are sustainable issues that need to be addressed by the UK construction industry. Although, the findings focus on the negative impact of construction waste, it concentrated on other issues of ineffective leadership, outdated technology, and poor logistics as strategies deterring the construction industry. Moreover, AbdulAzeez and Umar (2019), state that shortages of skilled workforces in the Nigerian construction industry was consistently agreed by experts and adoption of multiskilling with sustainable execution strategies to bridge the skills shortage was suggested.

2.17.11 Challenges of training

Workforce training and skills development is key to every successful and competent organisation, but effective and efficient training are always in line with certain challenges. Various studies reveal the challenges within the organisation on workforce training to enhance workforce skills (Isa and Yusoff, 2015; Ho, 2016; Fiaz and Saqib, 2017; Mazhisham et al., 2018). However, findings from various studies indicate that within the Nigerian context, workforce/learner training has witnessed arduous challenges ranging from inadequate funding to lack of equipment, poor staff training and retention outlines, monitoring standard for training of prospective technologists that is inadequate, and the ICT environment that is not conducive at all (Okolie et al., 2019). However, Ogunode and

Musa (2020), Okwelle et al. (2017), stress the key issue in Nigeria is inadequate training facilities, funding, academic corruption, insecurity, weak leadership, unstable academic calendar, and an acute shortage of trained and qualified teachers.

2.17.12 Institutions

Aliu and Aigbavboa (2019) and Aliu and Aigbavboa (2021), indicate that most employers within organisational settings are satisfied with the built environment academic record and processes of achieving it. However, an expression of dissatisfaction concerns prior to the graduates working experience by employers in terms of communication skills and technical competencies based on task execution within the industry. Furthermore, there are indications that graduates continue to strive after graduation within the construction industry. These include leadership skills, critical thinking and analytical skills, problem solving skills and entrepreneurship skills. Furthermore, Ifeyinwa and Serumu (2016) identify the institutional constraints to vocational skills development including shortage of qualified vocational educators and inadequate training facilities. Also, Nwambam et al. (2018) stated inadequate trained lecturers/instructors, Institutional facilities/materials for entrepreneurship education and curricular contents, relevant for sustainable growth within the Nigerian context, are needed for skills enhancement. However, Antcliff et al. (2016) indicate that degree apprenticeships were announced within the UK in 2014 in line with skilled workforce skills upgrades and, as part of higher apprenticeships programmes, were aimed at delivering and testing both academic leaning and on the job training. Obviously, most developed nations are putting much effort towards skills enhancement within the construction sector but in Nigeria, the reverse has been the case. Higher institutions within Nigeria are influenced by corruption, which impacted negatively on the industry (Bogoro, 2021; Ndubuisi and Jacob, 2021; Ogunode and Musa, 2020; Jacob and Lawan, 2020; Asiyai, 2013; Gabadeen and Raimi, 2012). These further identify learning institutions funding to be inadequate, facilities for learning are inadequate and are not in line with the recent technology (obsolete), the available structures are not in good shapes, weak leadership, the calendars within the learning institutions are not stable and the impact of the health crises (COVID-19) virus made the situation worse.

2.17.13 Training evaluation

This should be considered for successful organisations that want to be competent in the global construction market. Based on the studies of Dianmantidis and Chatzoglou (2012), which determine the training factors and its influence on both trainee's learning perception and training usefulness, obviously learning outcome and training usefulness are influenced by training programme. These training programme components are trainer performance, training environment and training goal, content, material, and process within the organisational settings. More so, Chalmers and Gardiner (2015), commenting on effectiveness and impact of trainers' advancement programmes evaluation, indicate that teaching and learning development centres have not been carried out systematically and lack extended evaluation of their programme impact. The investigation led to the design of an evaluation tool to facilitate systematic evaluation within the system. More so, there are indications that trainees' reactions within any learning context which mostly affect learning are the state at which trainees are being satisfied in the learning process (Kirkpatrick and Kirkpatrick, 2016). Similarly, Kucherov and Manokhina (2017) state that most significant training evaluation examined in enhancing training efficiency and the training evaluation model that is widely used in advanced nations is the Kirkpatrick's model aimed at reaction level. Obviously, Russian manufacturing industry varies with the employees based on training evaluation levels on training program time and cost.

2.18 Summary of the chapter

This chapter discusses the concept of workforce training and skills development within construction related organisations in Nigeria. The relevance and needs of workforce training as a means of skills enhancement for the survival of the industry. The various strategies regarding training in related organisations were discussed and the challenges on skills gap within the industry were discussed and explored. The input-process-output was reviewed as a theoretical framework for the study. Hence, the methodology is presented in the next chapter.

Chapter three: Research Methodology

3.1 Introduction

This chapter discusses and justifies the research methodology choices for this research. The section starts with the discussion of the research methodology as a methodological concept, and the methods adopted to achieve the research objectives are presented. An overview on the research philosophy, approach, paradigm, and techniques were carefully chosen and adopted for the research. Furthermore, design and justification of the research instruments are discussed. Finally, an overview on the framework and validation process was presented.

3.2 Research methodology

The choice of a research methodology (RM) is an important element to every successful investigation within any area under investigation (Kumar, 2018; Attia and Edge, 2017). Therefore, there is a need for adequate attention in the choice of the research methodology in this current research. This is to ensure that the right choice of research methodology is made for the investigation which will be in line with the achievement of the research objectives for academic research. Based on the studies of Snyder (2019), Mohajan (2018) and Ngozwana (2018), research methodology of any subject under investigation is defined as procedures or principles of a logical process used in the identification, selection, and analysis of data on the subject under investigation to achieve a certain goal. The process of methodology of any research involves a logical procedure based on the philosophical principles or ideologies to critically evaluate the overall validity and reliability of the research in achieving its aim and objectives.

This research methodology design is in line with the nested model, indicated in Figure 3-1. The choice of the nested model illustration is in line with the research objectives and process of achieving them. The Nested model indicates three key areas within the research methodological process, which are the research philosophy, approach, and research techniques. Based on this study philosophy, the first layer of the research methodological process gives the idea behind the concept of the research methodology and gives a proper direction for the second and third inner layers. The research approach that forms the

second layer of the nested model gives an idea on the strategies of inquiry in the choice of the research methodology. Finally, the third layer of the nested model, which is the research technique, is the method adopted for the collection of the research data for analysis. These may include different means either through the questionnaires survey, semi-structure interview, observation, and the use of a focus group.

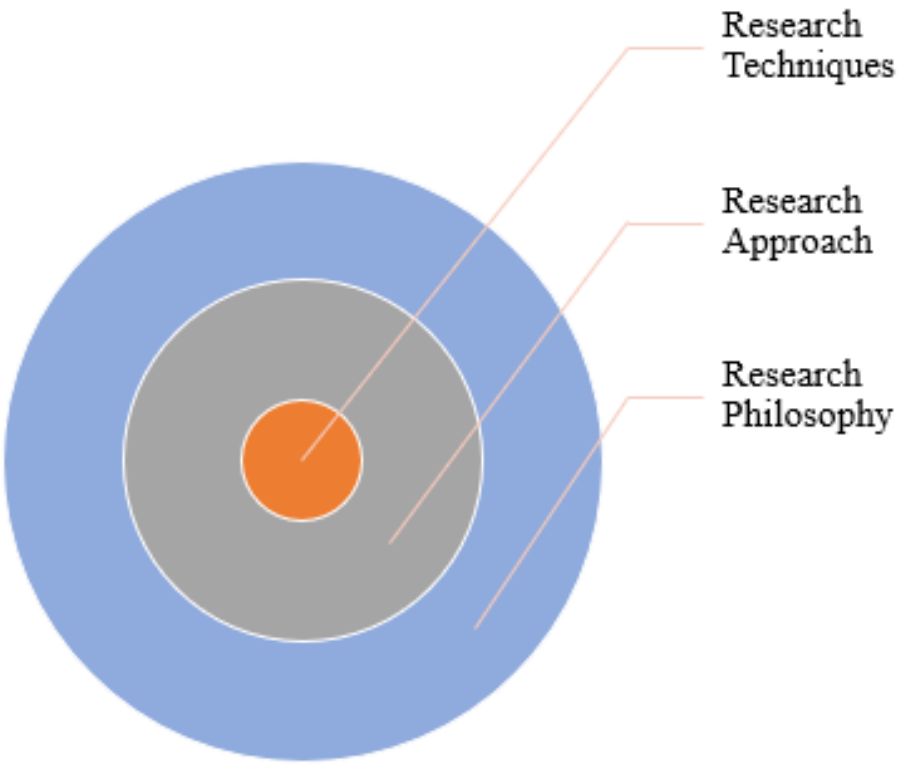

Figure 3-1: Nested Research Methodology

(Kagioglou et al., 2000)

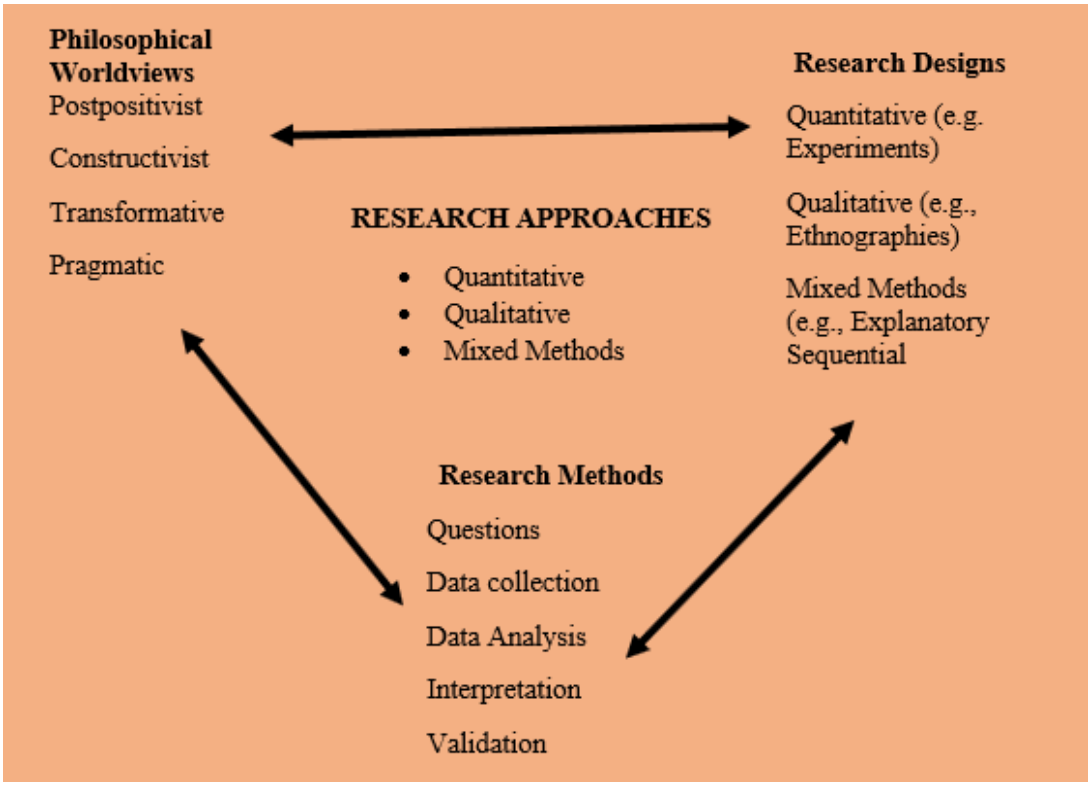

Figure 3-2: A Framework for Research Design

(Source: Creswell, 2014)

The choice of this research methodology design is in accordance with Creswell (2014) and Almalki (2016) who came up with a design framework for research in which three steps are involved in the processes as indicated in Figure 3-2. This framework starts with the identification of the research philosophy, which is the philosophical worldview that describes the philosophical position to guide the research design. Suitable methods of the research are then used in the process of data gathering for the survey analysis. This was to determine the key findings of the research, which was consistent with the research aims and objectives.

In this current investigation philosophy, there is a need for the researcher to consider the current research philosophy since the research philosophy is dominant in the current research methodology design to achieve the research objectives. Hence, this current research philosophy is in line with the philosophy of the study of Sauders, et al. (2019),

which is characterised by five layered onions in which appropriate assumptions must be made in each of the processes involves within the context of the research in Figure 3-3.

The choice of this current research methodology is related to the philosophy of the research based on the research onion developed from Sauder et al, (2019), the first layer being concern with the question of the research philosophy. The second layer is concerned with the research approach within the research philosophy. The third layer of the research onion is concerning with the research methodological choice. (Details on the research onion layers in Figure 3-3).

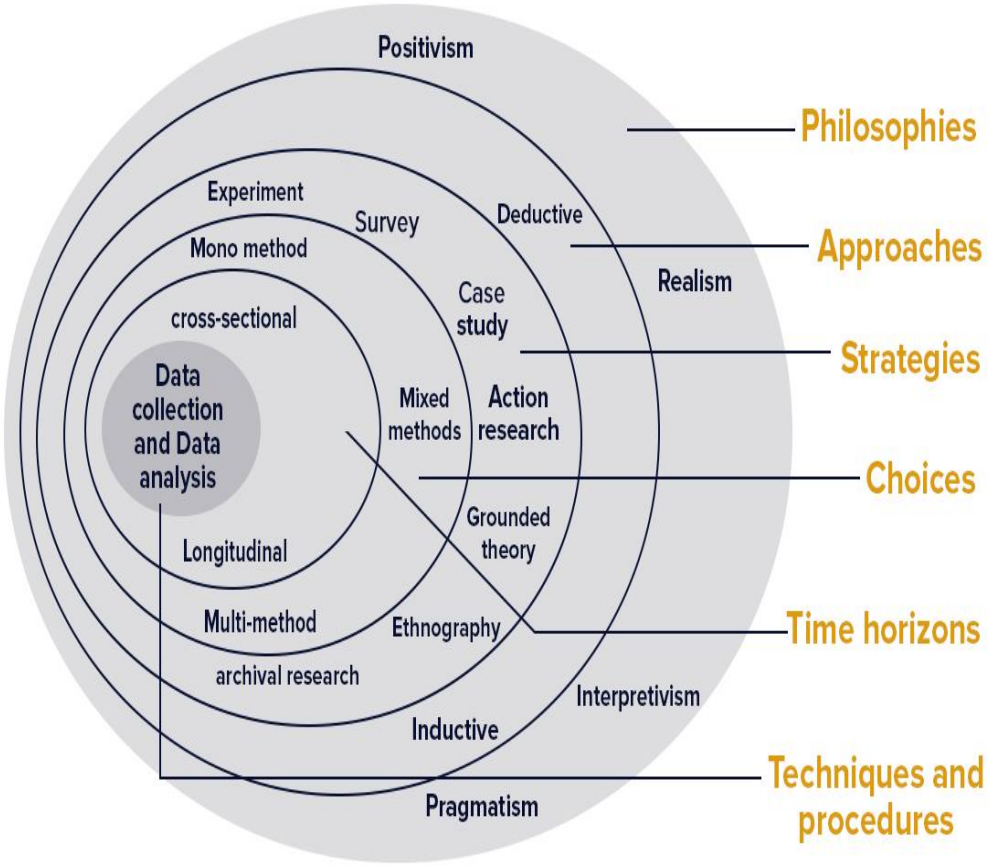

Figure 3-3: Research onion Developed

Source: Saunders et al. (2019)

3.3 Research Philosophy

In well-defined research, the concept of the research philosophy is considered as the first stage in the process of designing a research methodology. More so, literature findings reveal that any form of belief and assumptions about some aspects of the world and the nature of knowledge is known as a philosophy (Saunders et al., 2016; Collins and Hussey, 2009; Oates, 2006). The philosophy of a research is considered as the most important or the dominant element in the process of designing a successful research methodology (Padilla-Díaz, 2015; Hughes and Sharrock, 2016; Cahnmann-Taylor and Siegesmund, 2017; Noddings, 2018; Moon et al., 2019). Most importantly, the dominant element of the research process is belief that it is all about the processes or the technique in which data about a phenomenon should be gathered, analysed, and presented for research (Alvesson and Sköldberg, 2017; Creswell and Poth, 2017; Flick, 2018). As cited in Shibani (2016:92), Sauders et al., (2007:101) mention that "*an adopted research philosophy underlies important assumptions with regards to how reality is constructed*". This implies that the research strategy and the methodological processes will be grounded and moulded based on these assumptions and will be influenced through practical consideration. In addition, there is clear evidence from various literatures, which indicate that the philosophy of a research investigation can be categorised into two key dominant or leading groups as positivism and phenomenology (social constructionism) (Mayoh and Onwuegbuzie, 2015; Briggs and Coleman, 2019; Bohl, 2019; Primecz, 2020).

3.4 Ontology assumptions

Generally, evidence in well-defined research reveals that ontology refers to a person's perception on or of the reality or in a simple term, ontology as a branch of philosophy may be seen as a science of what is or which are the kinds and structures of objects (Kumar, 2018; Raubal, 2001; Klakegg, 2016). In line with this branch of philosophy within any context may tend to seek the classification and explanation of entities, which is a focus on the claims related to the nature of being and existence (Guyon et al., 2018; Attia and Edge, 2017; Klakegg, 2016). Ontology is a complex phenomenon that has to do with the types of things that exist as argued by the various studies of Mason (2002) and Thomas (2004). However, for the essence of this current study, ontology in a simplest

term is defined as a branch of philosophy that the researcher focuses on with reality in achieving the research aim and objective. Different studies of Hathcoat et al. (2019) and (Guyon et al. (2018) regarded the term ontology in a well-defined term as a branch of metaphysics which aimed at describing the structure of reality or studies of being within any defined context. Therefore, the term ontology in the field of research has to do with the analysis of the universal nature including its aspect which may be in line with objectivism and subjectivism. This is obvious that the term ontology as a branch of philosophy is being applied in any choice of a research methodology because it has to do with the study of reality and further selection of a category within several categories within the context. Thus, this satisfies the selection of a research method among several methods by which theories, believes and realities may be justified in the choice of research methods (Crotty, 2009; Kun and Brenner, 2015).

This current research philosophy based on the concept of research ontology is objectivism and subjectivism since ontology has to do with the study of the universe and the things within it (Saunders et al., 2016; Easterby-Smith et al., 2012). In addition, the current study focuses on most social activities and on interaction between workforces (users), in the process to know or understand conditions within the context. This was because data gathered from participants to seek their genuine opinions, which were used for the proposed framework development to be implemented within the context.

3.4.1 Epistemological assumptions

The term epistemology in a simple term refers to the way in which a person gains knowledge, and it has to do with what we can know and the processes of knowing it within the context of such knowledge being valid (Raubal, 2001; Klakegg, 2016). These assumptions must involve the determination of integration between the researcher and the subject to be examined or investigated within the context. In the studies of Hathcoat et al. (2019) and Guyon et al. (2018), the term epistemology is an aspect of philosophy that involves the careful studies of nature, limitations, and knowledge justification within the context. It should be noted that the concept of epistemology assumptions could be more complex than that of ontology assumptions as a branch of philosophy within any context.

Furthermore, in well-defined research, an inter-relationship does exist between the researcher's ontological assumptions, epistemological assumptions, and the research methodology as each one influences the other in an orderly manner (Grix, 2004). However, Crotty (1998), Guba and Lincoln (2005) are of the opinion that both ontological and epistemological assumptions mostly tend to overlap each other; therefore, both form a theoretical perspective.

Klotz and Lynch (2014) contend that each approach has its own epistemological and ontological assumption and each of them have different implication for the data collection and interpretation. This method is based on pragmatism assumptions (See Figure 3-4).

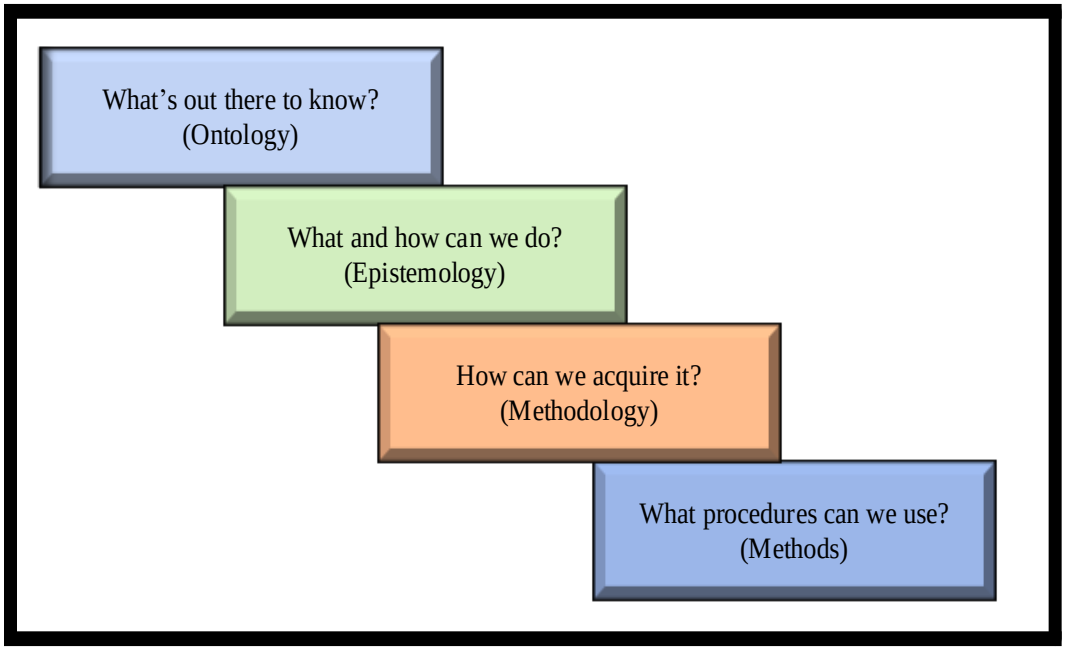

Figure 3-4: Component of the research paradigm

In line with the current research ontology, reality is being uncertain or ambiguous and in most cases from the point view of the workforce training within the industry, it is always complex and fluid in terms of workforce performance. This is particularly in line with the current subject under investigation (technicians' skills gaps within the context of construction industry) which seems to be complex and uncertain.

In this research philosophy, the researcher understands the fundamental issues on the technicians' training and skills development within the context of construction related

organisations most especially within the Nigerian context. Hence, the researcher infers most of the relevant features gained from both the employers and the employees within the industry in the cause of this investigation. This current investigation philosophy is based on the application of epistemological views in the determination of people's action regarding the technicians' training within the industry. Hence, the current research epistemology philosophy is in line with the commitment towards interpretivism and positivism in the understanding and achieving the research objectives. This is because pragmatism is not only the most common framework used by mixed research methods, but also central to the instruction of the new mixed research methods (Creswell and Plano-Clark, 2011; Johnson and Gray 2010 cited in Biddle and Schafft, 2015). Pragmatism combines elements of multiple methods from philosophical positions (Robson, 2011).

3.4.2 Axiological Assumption

This aspect of philosophy is regarded as the third and the last aspect of the research philosophy within the area of any successful research. The term Axiology was derived from two Greek words, "**axios**" meaning to have value', and "**logos**" meaning theory' or reasoning'. Combining the two words to give a term means that it has to do with a desirable theory or the theory of good and chosen values within a context (Yulianto, 2021; Faucher and Roques, 2018). In line with the studies of Saunders et al. (2019) and (2016), this branch of philosophy focuses on the studies of decision or judgement regarding values within the context of a research. More so, findings from studies indicate that axiology as a branch of philosophy is key on the role of values within the context of a research and the emphasis on the researcher judgement on values within the research area as an exact choice (Maarouf, 2019; Creswell and Poth, 2016; Biddle and Schafft, 2015; Ihuah and Eaton, 2013). They further state that it is being determined by different criteria or certain principles of human belief, knowledge, and the curiosity within the context. This has led to different contribution and interest within the field of studies by different researchers with different assumptions.

For the essence of this current research, it is based on value-laden due to the choice of the study, which focuses on human curiosity, contextual beliefs, involvement, or knowledge

within the context of training, which the researcher's key expectation is to contribute more values to the area under investigation. This is to ensure that workforce skills within the Nigerian construction industry can be improved to be on a par with global construction standards to be competent in the construction market.

3.4.3 Current research philosophical stance assumption

This study is based on management and education domain aspects within t construction related organisations. That is, both social and scientific mixed method is gaining a better momentum leading to the research background within the context. In line with the branches of philosophy, the conclusion on the philosophical stance of this research is based on the perspectives of pragmatism, that is a combined objective and subjective paradigm based on the concept of ontological assumption and exist between interpretivists and, positivist paradigms concept from the epistemological assumption. This is in line with the choice of the research methodology, a mixed method approach to develop a detailed framework for workforces of the Nigerian construction industry to enhance their skills through efficient training and educational development. Thus, a mixed method, consisting of quantitative and qualitative approaches, is incorporated within the research context pragmatically to achieve the aim of the research.

3.5 Research approach and techniques

The choice of the research methodology is based on research aims and objectives (De Loo and Lowe, 2011; Holt and Goulding, 2017). In this study, mixed method has been chosen as the most appropriate due to the nature of the research, which involved the use of (open-ended) and (closed-ended) questions as a means of data collection by the researcher in assessing people's wealth of knowledge on the current subject under investigation. The method involves both quantitative and qualitative inquiries in accordance with the research objectives, data collection and data analysis (Mertens, 2014; McCusker and Gunaydin, 2015; Brannen, 2017). The use of the two approaches enabled the researcher to fill in the knowledge gap, so that a holistic understanding could be generated through the research. Hence, the following procedure was taken to assess the performance or quality of construction workers skills.

3.5.1 Quantitative method

According to Creswell (2009) and Berkovich (2018), this quantitative method in most cases is usually in line with the positivism/positivist paradigm that involves data collection and the conversion of the data collected or gathered to a numerical form for statistical analysis and decision making. This analysis of the data collected from the participants will enable the researcher to draw a conclusion on the participants' views. However, this method also has its own strengths and weaknesses which are clearly stated or outlined by Creswell (2009), Struwig and Stead, (2010). Though, there are weaknesses of the quantitative method chosen, these weaknesses are balanced or complemented by the qualitative method chosen for this study.

3.5.2 Qualitative method

This method is a comprehensive umbrella term that covers a wide range of techniques and philosophies. However, people's experience is mostly examined through this approach using in-depth interview, focus group discussion, observations to allow you to come up with a positive outcome (Hennink et al. 2020; Friese, 2019; Tracy, 2019). The approach, in most cases, allows the researcher to identify the critical issues on the research and the distinctive feature of the research respondents' behaviour on the research. Likewise, Creswell (2007) and Eizadirad (2019) further state that this approach of research has to do with the necessary investigation process of considerate or thoughtful human problems, which are based on holistic picture, reporting the details view of informants, formed with words, and conducted in a natural setting. However, Eriksson and Kovalainen (2008), state that the method was in line with the phenomena in a social constructivist paradigm that emphasis the socially constructive nature of reality.

Table 3-1: Quantitative and Qualitative analysis

	Quantitative method involves the use of a design Questionnaire	Qualitative method involves an In-depth interview, and a focus group will be established
Description	A data collection from participants to seek their views on current workers skills within the context of the Nigerian construction industry through the designed industry questionnaire survey.	Questions on the questionnaires and research findings ha ve been thoroughly conducted at the second stage of the research with the participants face to face or skype and phone calls with the researcher.
Justification	The respondents view or perceptions on the findings of the research was achieved through closed ended questions from the industry questionnaire survey.	The participants view on the findings of the quantitative enquiry was through semi-structured interviews questions in line with the findings of the designed survey to complement the participants' opinions in the quantitative analysis.
Instrument used	Constructed questionnaires on workers skills within the context of construction related organizations based on the research findings to fill in the gaps.	An interview protocol to ensure consistency between interviews (clear purpose, format, and the duration of the interview).
Participants	Groups are Technicians and Trainers/Educationist and Project/Site Managers within the context of the Nigerian Construction Industry from the construction databased within the Abuja Metropolis	Groups of Technicians, Trainers/Educationist and Project/Site Managers, within the context of the Nigerian Construction Industry from the construction databased within the Abuja Metropolis

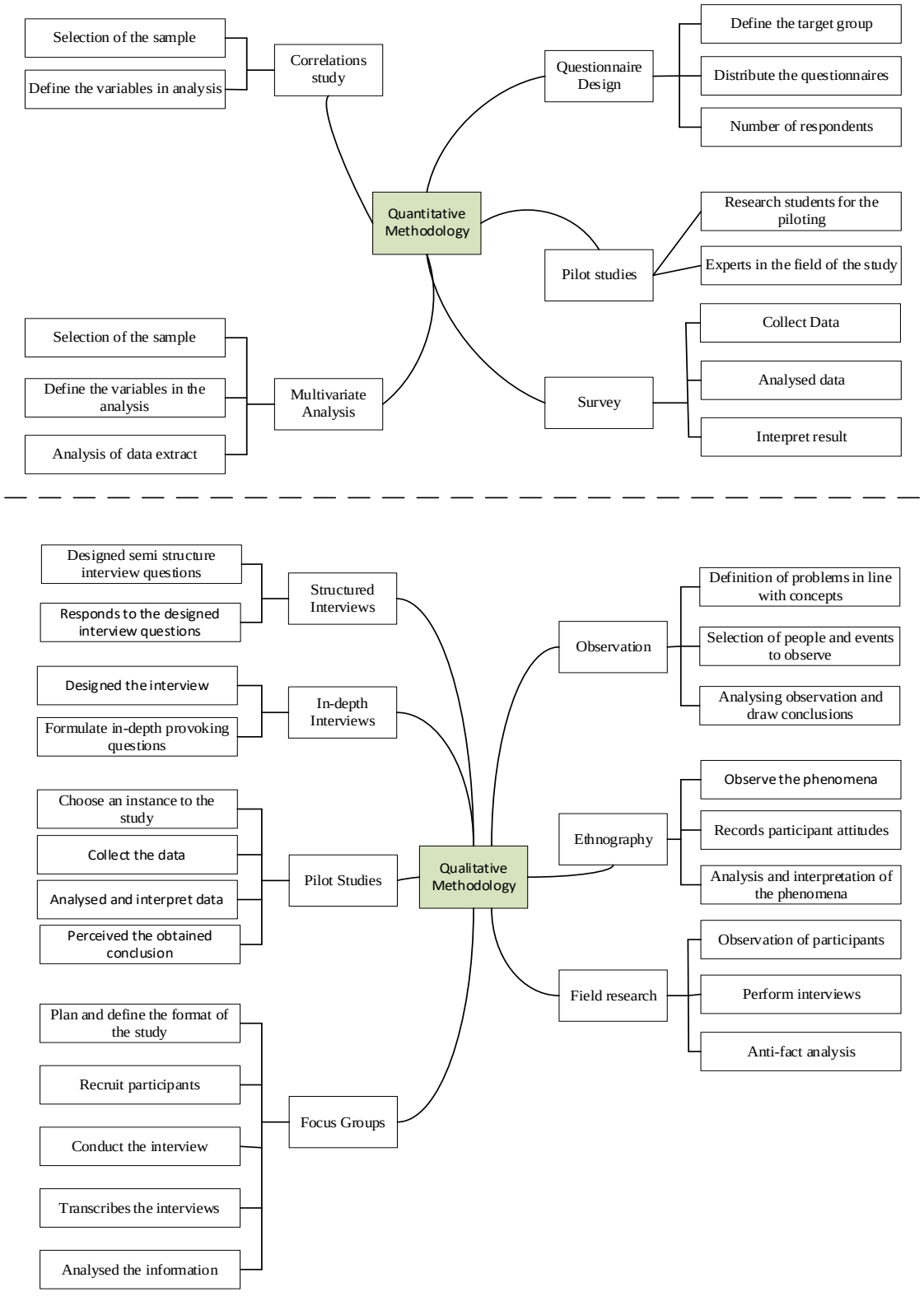

Figure 3-5: Mind map representation for quantitative and qualitative method

Most of the researchers of previous studies hold the view that the exploratory way of conducting social investigation is through qualitative research (Onwuegbuzie and Leech, 2005; Bryman and Bell 2007; Antwi and Hamza 2015; Almalki, 2016; Brannen, 2017; Bryman, 2017). In each of the research methodologies chosen, the description of each of the methodological processes are captured, which was based on the study of Queirós *et al* (2017) in Figure 3-6, a quantitative and qualitative approach detail in Table 3-1 and the mind map representative of both methods in Figure 3-5.

Hence, to make the most of advantages and minimising the disadvantages of both methods was carefully utilised, the mixed-method approach has been adopted in this study as most suitable to investigate TNA for technicians within the Nigerian construction industry. The method gives a better insight and several perspectives to facilitate multiple views of a single phenomenon, and a combination of distinctly different research designs is employed on training, abilities, and skills upgrade (Kumar, 2007; Doyle et al. 2009; Punch, 2013; Cegielski and Jones-Farmer, 2016). The method adopted is a combined approach, with the aim of balancing both the weaknesses and the strengths of each approach in achieving an in-depth understanding of the research objectives. Most importantly, qualitative research facilitates quantitative research by providing background information on the context. Equally, quantitative research facilitates qualitative research by collaborating and complementing each other during investigations.

General training and development and the evaluation of the training programme have been the focus of the previous studies within the Nigerian context. However, it is obvious that this research will contribute enormously to the existing literature, precisely within the Nigerian context. This research investigates the technicians' skills gaps within the construction industry and the approach to training needs and to provide an appropriate framework for the workforce within the industry. Though, it is certain that needs identification in the training process should be the primary focus, and it is equally important to be carried out properly and followed by other processes to gain a positive outcome. Finally, participants' opinions through the survey data collection contributed significantly to the achievement of the research aim.

3.5.3 Mixed-method approach application in this study

In previous literature, research methodologies are either quantitative, qualitative or the application of both methods in investigation (mixed method) (Onwuegbuzie and Leech, 2005; Rajasekar, et al., 2006; Srnka and Koeszegi, 2007; Antwi and Hamza, 2015; Almalki, 2016; Bryman, 2017). However, the choice of a research method mostly depends on the research aim and objectives within the context. This is to say that the choice of a research methodology varies, based on the type of research and dependent on its aim and objectives. This research choice of a mixed method approach enables the researcher to complement the opinions of the participants within the Nigerian construction industry.

3.5.4 Research Methodology and Design Justification

The concept behind this current investigation was in line with an integration of both engineering management and education with an aim of developing a framework for the workforce within the construction industry in Nigeria. This is to say that the choice of a qualitative method or paradigm is mostly associated with this method of enquiry because it is more linked to social sciences. The reason behind this is that most of the phenomenon that is investigated does not require any explanation with the help of numbers and indices. However, the understanding of the phenomenon is mostly through the analysis of the participants' descriptions of events (Leedy and Ormrod, 2005; Bryman and Bell, 2007; Palinkas et al., 2015; Alase, 2017; Mihas, 2019). By means of this method of enquiry (qualitative), data gathered from participants is through verbal (audio recording) or written words rather than numbers. This stage of the research was in accordance with the various studies of Barnham (2015), Thomas (2017) and Merriam and Grenier (2019), whereby the qualitative approach of enquiry seeks to gain an in-depth understanding on the participants' views towards a certain phenomenon.

Quantitative method of enquiry is mostly generic in term of its approach where the researcher uses statistical analysis to search for possible relationships between variables mostly in social sciences (Bryman and Bell, 2007; Lampard and Pole, 2015; McCusker and Gunaydin, 2015; Woods et al., 2016). In this approach, the data gathered are analysed mostly in numerical terms. The data can be translatable easily into various charts and

graphs, and the quality of the data can be tested easily using formal measures of reliability and validity. This approach has always aimed to discover the theories that may help to explain a phenomenon (Sultan, 2006; Hartas, 2015; Bryman, 2017; Hammersley, 2017). The approach is less likely to deviate from the plan of the original research, as the results of this approach are more analysed and interpreted easily. Hence, it should be noted that this present study is also grounded and rooted in positivism, the researcher laying more emphasise and strength on the research empirical nature. Therefore, this research would not have been achieved without the inclusion of quantitative data. The quantitative approach was used to gather data from the participants through the questionnaire survey and analyse the data from the sample study using SPSS software.

This method of enquiry has strategies that are suitable to this study to enable the researcher to achieve the research objectives in line with Creswell and Clark (2007) as outlined.

- Chronological or serial explanatory
- Chronological transformative
- Concurrent triangulation
- Concurrent nested and
- Concurrent transformative.

Evidence reveals that different means of data gathering always leads to an in-depth or widen the understanding of research analysis (Bonoma et al., 2008; Hammersley, 2016; Ary et al., 2018). Therefore, Primary data collection via industry questionnaires survey (quantitative), and secondary data via semi-structure interviews (qualitative) were used to broaden the understanding on subject under investigation. Collection of secondary data was key to complement the primary data gathered using the research instruments. Due to the nature of the topic under investigation, it was necessary to also have access to specific existing data on the companies to have a better understanding of TNA implementation and the key issues related to its implementation.

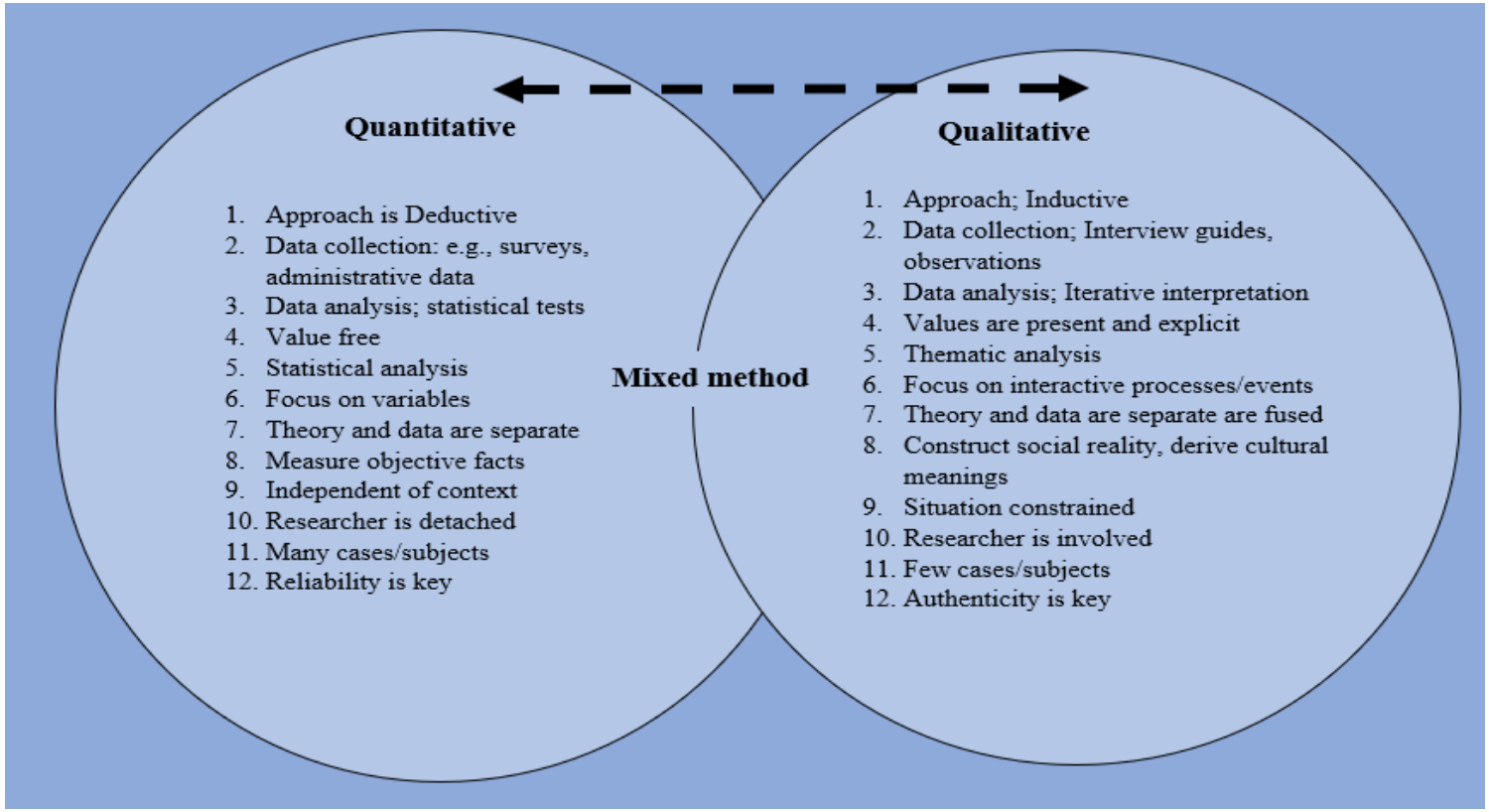

Figure 3-6: Key characteristics of qualitative and quantitative approaches

3.5.5 Deductive and Inductive approach

There are two most dominant theoretical approaches in most of the research disciplines. This study required a combination of both the inductive and deductive approach to gain an in-depth understanding of the practices of TNA that should be implemented in construction industry. Basically, this current study is purely interpretivism, meaning the combination of both inductive and deductive methods for a deeper understanding.

3.5.5.1 Deductive approach

The use of a deductive approach enables researchers to test the existing theoretical implications or explanatory models about the phenomenon under study against the collected data (Graneheim et al., 2017; Schreier, 2012; Blackstone, 2012). According to Gill, et al., (2011:46) as cited in Shibani (2016:100), "*A deductive research method entails the development of a conceptual and theoretical structure prior to testing through empirical observation*". This implies that there is movement from theory to data or from more abstract and general level to a more concrete and specific one. The process of deductive approach is categorised into the following four stages:

- The relevant concept of the subject under investigation is identified by the researcher. This implies that the workforce wealth of experience, attitudes, and perceptions in relation to the implementation of the training analysis will be taken into consideration.
- After the identification of the relevant concept, protocols are made to observe it and how it can be measured empirically. At this point, the research instruments for the study are the questionnaires and the semi-structured interviews, seen as the most suitable.
- By means of explicit (unambiguous) protocols developed in second stage above, hypotheses and theories (models) are tested by means of the empirical data gathered.
- There are comparisons between the empirical data with the developed model (theories and hypotheses) by the researcher. The previous studies related to this study will be used at this point.

3.5.5.2 Inductive approach

According to Gioia et al., (2013), the processes of conducting qualitative, interpretive research and a way of guiding analysis and presentation of that research is described as inductive research. However, Aristotle is of the view that the inductive approach is an approach of generating knowledge and the approach is always valid for most research (Pries-Heje et al., 2011) cited in (Sarhan, 2018:90). Furthermore, Gill, et al., (2011:56), cited in Shibani (2016) state that "*Inductive research involves moving from the plan of observation of the empirical world to the constructor of explanations and theories about what has been observed*". This is supported by Alase (2017), a tradition that can analyse raw data to the objectives of the researchers is described as an inductive approach.

For the essence of this research, the approach is concerned s with observation and theories that are planned towards the objectives or the goal of the research. Hence, this implies that the approach begins with data gathering or collections, followed by the analysis of the data gathered to gain an in-depth understanding of the study. Thus, data analysis results are used to formulate a new theory or to confirm an existing theory. According to Saunders, et al. (2007), the objectives of the investigation are to have a full understanding on what is happening or going on. Consequently, this current research aim is to gain an in-depth or full understanding of the subject under investigation, therefore the adoption of an inductive approach is relevant and most suitable to achieve the study objectives.

3.6 Time Horizon of the current study

Time Horizon of this current study defines the time frame for this current research, which is in line with the studies of Saunders et al. (2019), Saunders et al. (2016) and Sahay (2016), which state that the time frame for undertaking certain research by researchers in a field of a research to achieve the research objective is the time horizon of the research. Time horizon is considered into the cross-sectional and longitudinal category as shown in the research onions of this research study philosophy in Figure 3-3. For this current research, the time horizon of this current study is the period at which the research aims, and objectives are expected to be achieved by the researcher at a stipulated time frame as planned by the researcher himself.

3.6.1 Cross Sectional

This is the short time term study, which involves the collection of information (data) of the study at a specific time frame of the research (Melnikovas, 2018; Sahay, 2016; Gog, 2015). The researcher ensures that the focus is on a specific phenomenon at a point of time within the context of the research since the time frame for this is within a short period. The researcher carried out pilot studies to gain in-depth information from the participants and the respondents within a shorter period planned for the study. Pilot studies were conducted for different groups of participants within the context of the research to ensure that the researcher gained vital information to achieve the key objectives of research within the shorter time frame.

3.6.2 Longitudinal

This is a specific time frame at which data for the research analysis is collected repeatedly for comparison over a long period to gain the research objective (Melnikovas, 2018). The researcher examines a certain phenomenon within the context of the research and hence observes the kind of changes that occur in a certain period. In this study, data collected by the researcher from the three groups of participants and respondents of the survey, was carefully studied throughout the research period. It is for this reason, that the researcher involved different groups of experts within the context of construction industry to gain their different opinions on the subject under investigation. This current research study focused on a specific phenomenon at a specific time within the workforce training.

3.7 Research Design Implementation

Research methodology design is a framework that shows the plan on how all the research questions will be address by the researcher to achieve all the possible research objectives; this process aids as a plan on how to execute and achieve the research objectives (Bell et al., 2022; Harrison et al., 2022). In addition, Yin (2009:240) cited in Oni (2014) states that research design "*is an action plan to get from here to there*" that is the processes the research will follow to its completion. The design starts from the data collection process to the various analysis processes including the ethical consideration processes. This

served as a suitable guide for the researcher to follow during the research. The research design is also serving as a master plan for the research because it shows all the steps from the research problem statement to the end of the research. However, this must be planned in a suitable manner to address the various questions on: what has been researched? Why is the subject being investigated? How will this be done? Where does the research take place? According to Maxwell (1992), the above questions outlined must be answered in a logical and in convincing manner to achieve a proper research objective. However, Bryman and Bell (2007) argue that all the strategies planned for conducting proper research to achieve the research objectives is the research design of the subject under investigation.

For the essence of this study, it is necessary to consider the key processes that need to be followed to address all the questions outlined earlier to achieve the research objectives. The process of the research design must be undertaken in a sequential order to achieve the research objectives at the time frame related to this research has been conducted by making a scope of the study, drawing on established methods (Arksey and O'Malley, 2005; Booth et al., 2016). The literature critically assessed the extent and range of existing research on workers skills. The key documents that were used include international journals of education and training, engineering and technology documents, innovative science, project management and environment. The information from the various documents were categorised into useful headings that aid in deeper understanding on the literature, which led to the research methodology designed as shown in Figure 3-7.

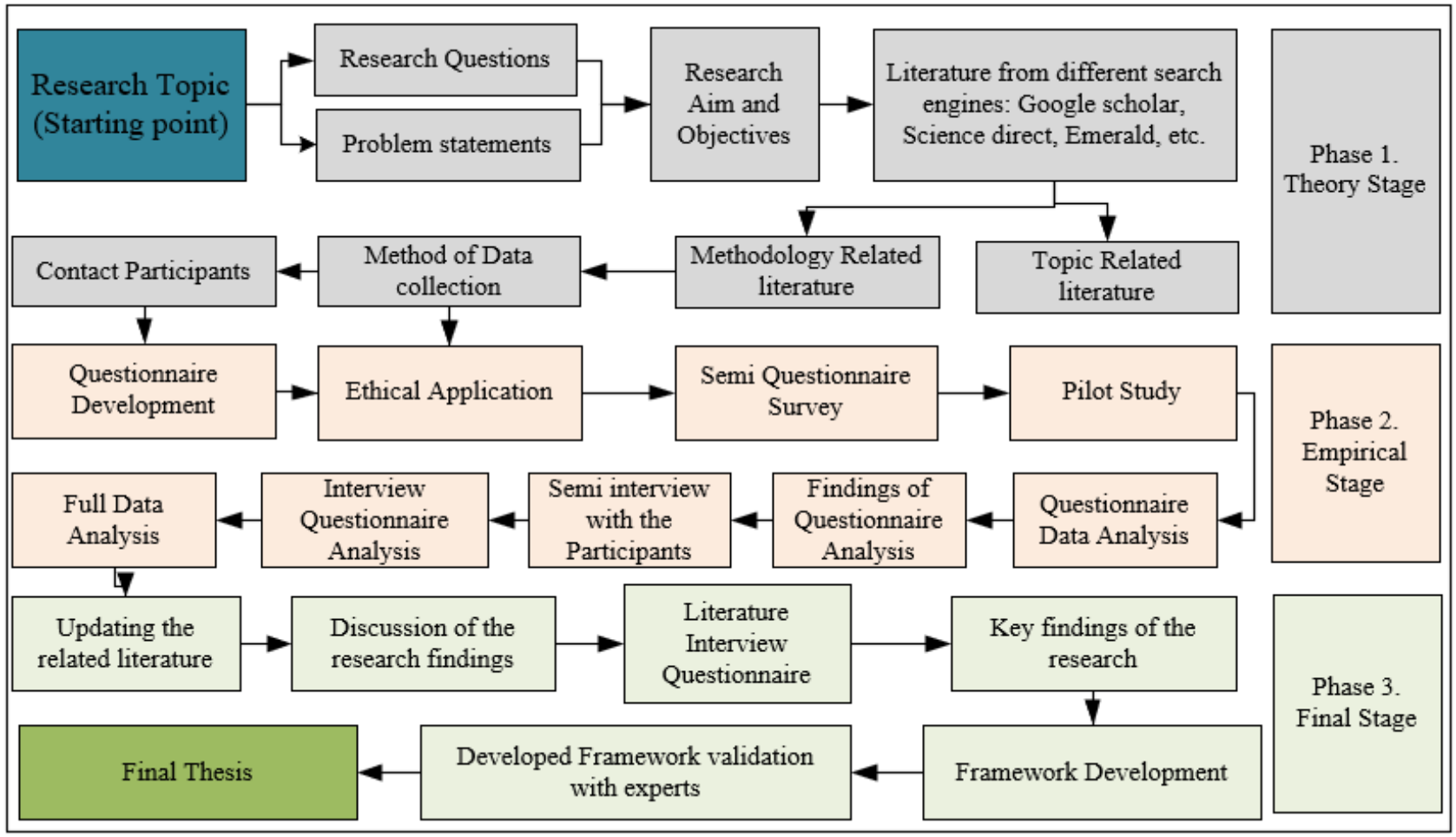

Figure 3-7: Research Methodology processes

3.7.1 Questionnaires Design

According to Blaxter, et al. (2006) questionnaires are mostly used within educational and social sciences research and are mostly combined with interviews to gather participants' opinions from their wealth of experience in their workplaces. A set of research instruments that seek respondents' views on a subject under investigation to gain useful information in the form of data through the sampling population for the investigation is termed as questionnaires (Creswell, 2007; Shekhar et al., 2019). In addition, White (2004), Brace (2018) and Rowley, (2014) stress that the instrument that describes a set of questions in the form of open and close ended questions to which respondents of the survey must respond as a questionnaire. This study questionnaire designed consists of closed and open-ended questions, which the sampling population react to base on their wealth of experienced to gain reliable information on the subject.

The designed questionnaire for this research covered related issues on TNA within construction organisations, precisely in Nigeria. The questionnaires explored both the workforce and the employers' attitudes within construction organisations. This was based on the current research objectives, which helped the researcher to further investigations in achieving the research aims and objectives.

The use of the designed questionnaires to gather participant's opinions to assessed workers' skills was based on the findings of previous studies (Brace, 2018; Nardi, 2018; Jann and Hinz, 2016), which led to the research quantitative survey. The important criteria of technicians' skill identified from the literature to fill in the gaps were fully captured. In the questionnaire, the factors that negate the development of workers' (technicians) skills and growth of the industry performance were carefully studied. This approach facilitates opinions gathering and comparison, and statistical aggregation of strategic data collection from the respondents. The guide and rules for designed questionnaire are indicated in Figure 3-8, Figure 3-9 and Figure 3-10 respectively.

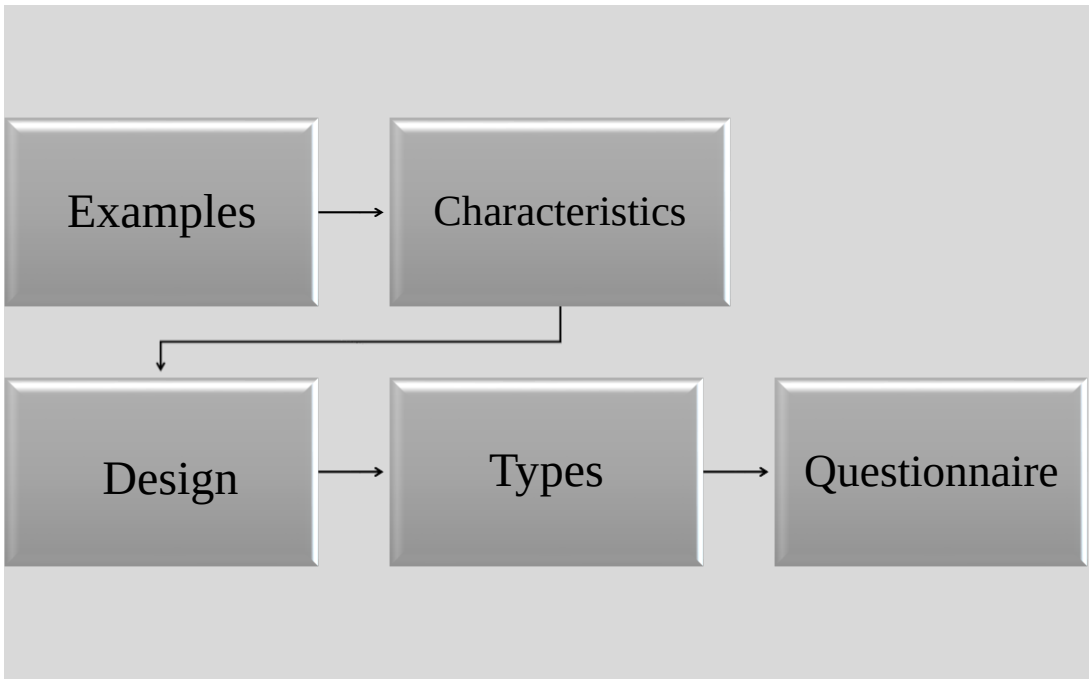

Figure 3-8: Ultimate guide to great questionnaires

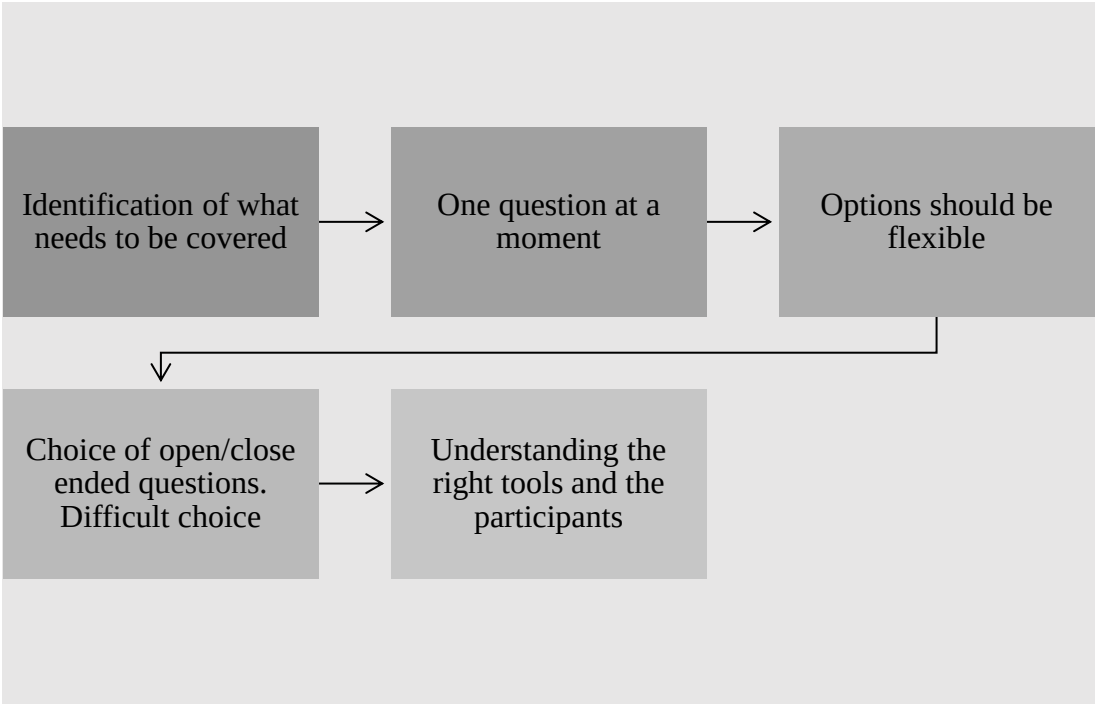

Figure 3-9: Rules on how to design the question B

Identification of what to be covered in the survey

- **First section of the questionnaire** – Participants general information

  This section seeks to identify the participants' personal information and wealth of experience in construction organisations, precisely in Nigeria to determine the reliability of the participants' opinions on the questionnaires survey. This designed questionnaire survey section captured participants working experience, educational background, age range, gender, organisations size.

- **Second section of the questionnaire** – Nigerian Vocational Education and Training (TVET) process; This section determines the current and previous training methods in Nigeria and those that seems to be more effective, explores the current challenges in the industry, the hindering factors and identifies some strategies to encourage young people within the Nigerian context to develop interest in construction professions as choice of careers.

- **Third section of the questionnaire** – Concerns the impact of workforce training on construction organisational settings to explore training impact and possible agencies that may assist with the quality assurance and benchmarking within the construction industry.

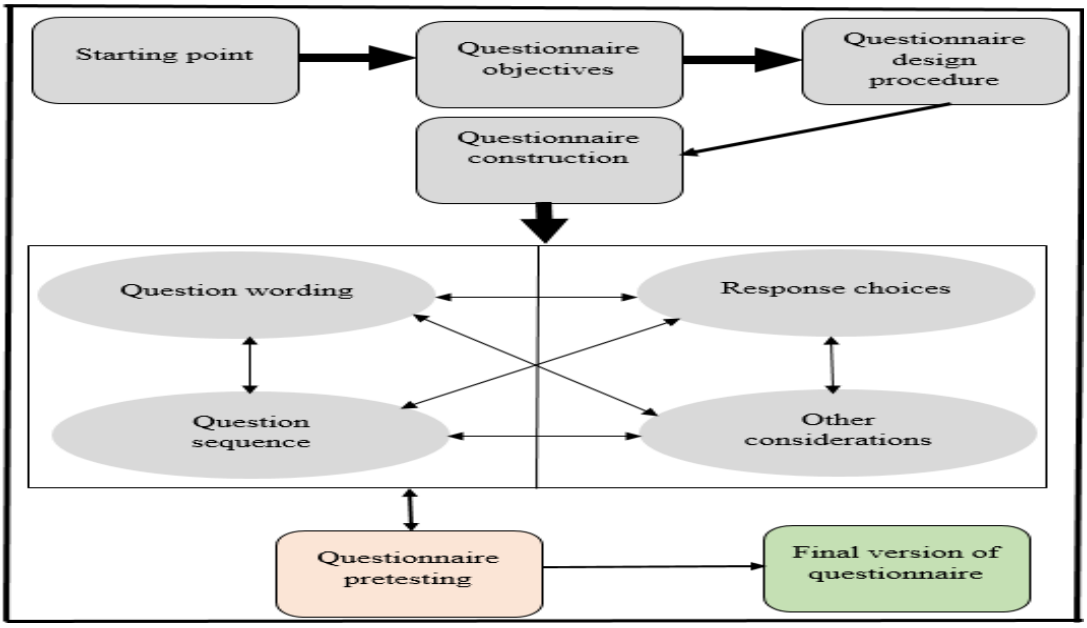

Figure 3-10: Questionnaire designed processes

Obviously, the Likert scale is generally important as a multiple-item measure of participant perceptions relating to an area with aims of feelings on the question in a study (Rowley, 2014; Bryman, 2016; Nield, 2019). To ensure that the participants give reliable information covering a wide range of issues that were important for achieving the research objectives, a semi structured, self-completion questionnaire was designed around opinion statements, with prepositions which are extracted from the relevant literature. A five (5) point Likert scale was used to determine opinions of the respondents as indicated in Table 3-2. The mean value, the standard deviation and the Cronbach's Alpha of the questionnaires were also determined as indicated in the same Table 3-2.

Table 3-2: Likert Scale Sorting Order

Agreement Scale	**Severity Scale**	**Seriousness Scale**	**Satisfied Scale**
1 = Strongly Disagreed (SD) **2 = Disagreed (DA)** **3 = Neutral (N)** **4 = Agreed (A)** **5 = Strongly Agreed (SA)**	1 = Not Severe (NS) 2 = Somehow Severe (SS) 3 = Moderately Severe (MS) 4 = Severe (S) 5 = Very Severe (VS)	1 = No effect (VS) 2 = Less Serious (LS) 3= Moderately Serious (MS) 4 = Somehow Serious (SS) 5 = Very Serious (NE)	1 = Very dissatisfied (VD) 2 = Dissatisfied (D) 3 = Okay (OK) 4 = Satisfied (S) 5 = Very Satisfied (VS)

(Source: John and Benet-Martínez, 2014; Alghadir et al., 2018)

3.7.2 Aim and Objective of the Research Questionnaire

This was to gain an in-depth understanding of the participants' views on the research objectives which are transformed into questions to gather information on the subject under investigation, which enables the researcher to fill the existing knowledge gaps within the context. It is in view of this that this research adopts the combined method approach to gather information from the selected participants. Questionnaires are the most effective way of data collection mechanism, if the researcher really knows exactly what to investigate (Brace, 2018; Sekaran, 2003). In views of this statement,

this current research is seeking information from the selected participants with wealth of knowledge and experience within construction related work to fill the knowledge gaps to achieve the research objectives.

Three questionnaires were developed which include both closed-ended and open-ended questions to gathered data from three main samples from the selected population of workers within the construction industries in Abuja Metropolis within Nigeria to gain in-depth data. Each of the questionnaires was split into two parts, of which the first section is (General information), and the second part (Training Analysis) to allow them to give a suitable answer to the research questions of their choice. Section one was to gain an in-depth understanding on participants' wealth of experience and show much confidence in the participant views. Section two of the questionnaire was to gain an in-depth understanding on workforce training need analysis and key challenges within the industry.

3.7.3 Survey Questionnaire Design

The Questionnaires were designed based on the few relevant studies from the literature (Bilau et al., 2015; Okoye and Arimonu, 2016; Ejohwomu et al, 2017) and will enable the researcher to score the answers to the research questions. This enables the researcher to sum up the overall measures of both the participants' attitudes and their views as regards to the research aims and objectives. Open-ended and closed-ended questions, which are driven from relevant studies, and have been distributed to the three groups of participants.

Previous studies indicate that researchers need to follow some essential guidelines when designing a questionnaire survey and this evidence has been considered in the questionnaire design (Brace, 2018; Bryman and Bell, 2007). Hence, questionnaires for this research were designed based on the evidence of related studies which are in line with the current research objectives (Brace, 2018; Bryman and Bell, 2007). Outline of the study questionnaires developed are as follows:

- Questions should be clear and unambiguous.
- Simple language should be used, and jargon should be avoided.
- Misunderstanding of the respondent's questions should be avoided
- Avoid questions that are leading and presumptive.
- Questions are short, exactly in relation to behaviour to prompt responses.
- Double-barrelled questions were avoided.

Therefore, this process of questionnaire design, with specific topic related to the subject under investigation, was put into consideration to ensure that related topics were used. A thorough checked was carried out to ensure that the questionnaires are easily readable and to ensure that the questions were clear and concise to the respondents. In addition, the respondents have a great opportunity to express their opinions through the open-ended questions that were developed.

3.7.4 Pilot Testing of the Questionnaires, Procedure, and Result

The aim of the pilot study was to test the reliability, authenticity, and the feasibility of the approach that was planned to ultimately to be use further in a larger scale study and questionnaire validation with experts within the selected construction industry (Adeleke et al., 2016; Mani et al., 2017).

The first draft of the questionnaire based on literature review findings for the pilot study was submitted to the supervisory team for review. After amendments were made, the questionnaires were again submitted to the supervisory team for their final review. The designed questionnaires by the researcher were submitted to the ethical committee for their consideration and approval was granted. After the supervisory team and Ethics Committee at the University approved, (See Appendix A). 12 construction workers were selected through stratified random sampling and recruited for the pilot studies within the Nigerian context. Due to security challenges in Nigeria, there was a restriction for travel to Nigeria for data collection. However, the final draft of the questionnaires survey for the pilot study was sent out to the participants through emails and post box. Few corrections were noted and amended before the full questionnaires were administered.

3.8 Sampling for Data Collection

The targeted population was across the country with the largest data from Abuja in the North central region in Nigeria, due to its expansion as the country's new capital city. According to the studies by Jwasshaka and Amin (2019), construction workforces in Nigeria are estimated to be over 3,000,000 across the whole country. But then, the estimated construction workforce population across the whole country will not be selected for the research because not all the estimated population are respondents for the survey with experience. In view of this, respondents for the research survey are knowledgeable construction workforces within Nigeria. A random sampling technique was used to obtain a representative population of the construction workforce opinions (Teddlie and Yu, 2007; Creswell, 2009). This was achieved using the construction industry database from the Civil Construction Directory Gallery (CCDG) in Nigeria. Sample size is the genuine number of samplings made on the aggregate population, which was the extent of the population that was served with the research instrument (questionnaires). 5% level of accuracy, 95% certainty level, 50% level of inconstancy and a purposive sampling technique was embraced (Chuan and Penyelidikan, 2006) was considered in this study. Thus, the sample size was chosen in view of this formula:

$$Sampled\ size\ (n) = \left(\frac{N}{1+N(e2)}\right)$$ (Yamane, 1967) …… Equation 1

$$\text{Sample Size (n)} = \frac{3{,}000{,}000}{1 + 3{,}000{,}000\ (0.05)^2} = 400$$ …… Equation 2

Where n is the sample size, N is the population, and the e is the level of precision. Considering the above factors for deciding sample size and using the formula gave 400 participants when applied, the figure indicate the least number of questionnaires to be distributed for the survey.

The study of Salant and Dillman (1994) cited in Chuan and Penyelidikan (2006) on the determination of sampling size for a research, states four factors should be carefully considered, which are outlined.

- Amount of sampling error to be managed
- Population size
- Population variation with respect to interest
- Smallest subgroup within the sample for which estimate are needed

The number of the sample population for this study was based on the Krejcie and Morgan's (1970) table for sample size determination for a given sample of 680, a sample size of 217 will be needed for cross sections of the population.

Krejcie and Morgan (1970) formula for sampling size determination is:

$S = X^2P\ (1\text{-}P)/d^2\ (N\text{-}1) + X^2P\ (1 - P)$

S = required sample size

X^2 = Table value of chi-square for one degree of freedom at the desired confidence level

N = the population proportion (assumed to be .50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05).

Consistent with the formula of Krejcie and Morgan's (1970) cited in Chuan and Penyelidikan (2006) above, 680 respondents of the survey from organisations (i.e., offices) of large construction firms across Nigeria. These covered all the regions in Nigeria, which are the city of Abuja metropolis in the Northern central region, Borno state (North-east), Kaduna state (North-west), Lagos state in the western region, PortHarcourt in Rivers state within the south-south region, and Anambra state in the South-eastern region were wisely selected, which consists of groups of construction workforces within the Nigerian context. Designed questionnaires were administered to the respondents to identify the TNA, actual skills, and knowledge for the Nigerian construction industry. Against the backdrop, 680 questionnaires were distributed, an E-mail address was made available to the respondents and self-envelop; Post Box is also available in Nigeria to be used for the distribution as indicated in Figure 3-11.

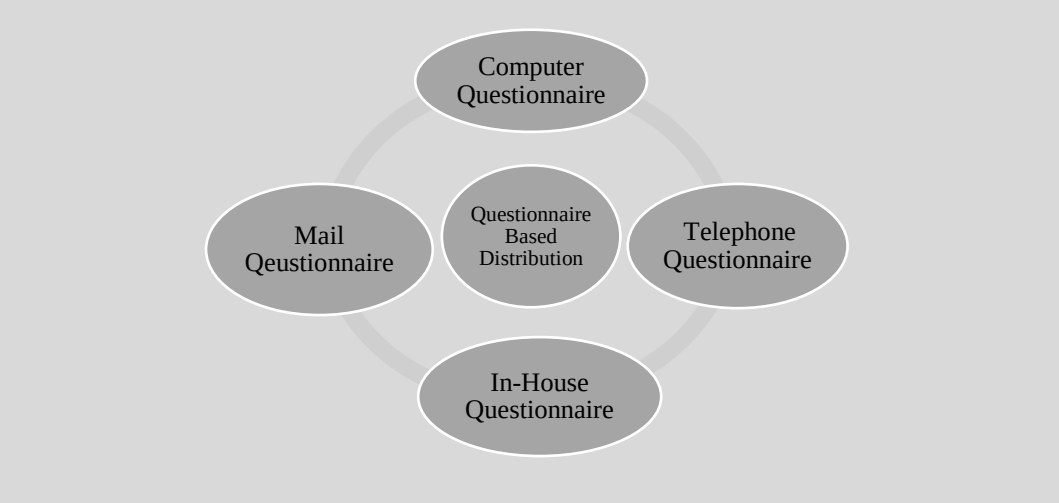

Figure 3-11: Questionnaire base distribution

3.9 Data Collection Methods

This research involved the use of two effective data collection techniques to gain the participants' views on the subject under investigation (TNA). The questionnaires survey was to gain information from the respondents was the first approach through the study questionnaires that were administered to the respondents through post box and mailbox. Semi-structured interviews questions were used as the second approach with selected participants in the industry. Hence, the data collection was through the questionnaires and semi-structured interviews indicated in Figure 3-12.

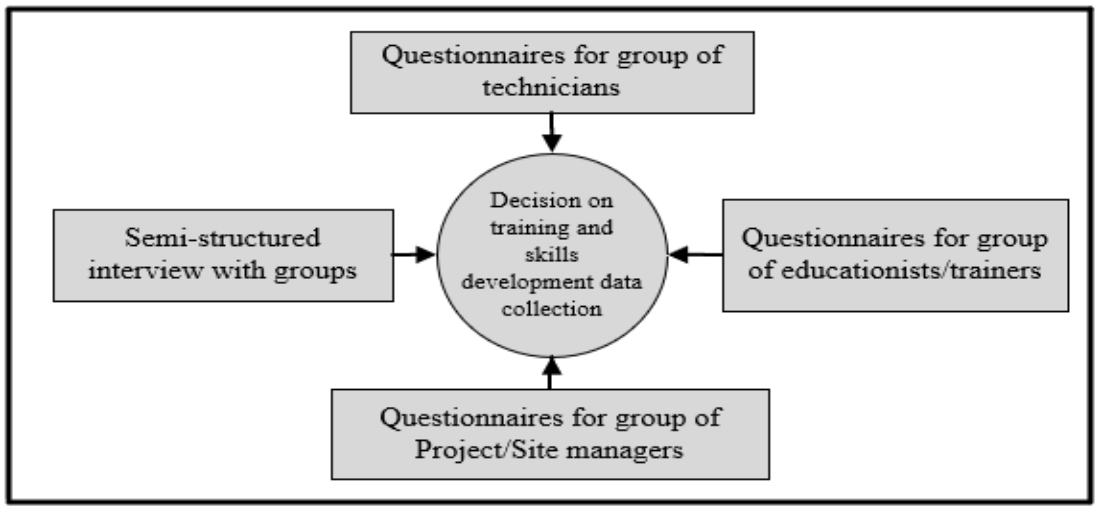

Figure 3-12: The research methods used in this study

3.9.1 Quantitative Data Collection (Questionnaire)

3.9.1.1 The cover letters

A cover letter was provided by the researcher to the participants involved in the research survey, which was clearly written on the subject under investigation. The participants were informed on the important of their wealth of knowledge and their input in the survey. Also, participants were encouraged that their participation was purely voluntarily, and information obtain from them will be confidential and will be used for the purpose of the research only (See appendix).

3.9.1.2 Administering the questionnaire

The distribution of the questionnaires to the groups of respondents within their various organisations was by hand, mail, by post-box. The researcher had developed a cordial relationship with the training department of the various industries, and this made it easier for the researcher to gain access to the industries. However, it should be noted that participation in the survey was voluntary, meaning participants had the right to withdraw. The distribution of the questionnaires to the participants was with the permission of the management of the various Nigerian construction industries. A total of Six hundred and eighty (680) questionnaires were distributed to offices of large construction firms from across Nigeria as indicated in Table 3-3 for the whole research and a breakdown of the questionnaires distributed and return.

Table 3-3: Questionnaires distributed and returned from each region

Geopolitical Zones (Regions)	**Questionnaires distributed**	**Questionnaires received**	**Percentage (%)**	**Rank**
North central (Abuja)	300	273	40.12	1st
South-west (Lagos)	100	71	10.44	2nd
South-south (Rivers)	90	57	8.40	3rd
South-east (Anambra)	80	53	7.80	4th
North-west (Kaduna)	55	39	5.73	5th
North-east (Borno)	55	28	4.12	6th
	680	521	76.61%	

Obviously, the highest data collected was from companies based within Abuja due to the largest availability of the ongoing public and commercial projects and most of these constructions related organisations' satellite offices are within the regions. The respondents include a group of Project Managers, Educationist/Trainers, and Technicians. The questionnaires were distributed as shown in Table 3-4 and Table 3-5. The respondents of the questionnaires were given considerable time to complete the questionnaires and a total of 521 questionnaires were returned. However, a total of 11 questionnaires were removed by the researcher due to the errors noted during data cleaning process. The total number of the questionnaires used for the analysis was 510 as shown in Table 3-4 and Table 3-5.

Table 3-4: Questionnaire survey distribution

Participants	Questionnaires Distributed.	Percent (%).	Questionnaires Returned.	Percent (%).	Invalid QR.
Project Managers	210	30.90	153	22.50	02.00
Trainers/ Educationist	210	30.90	160	23.50	01.00
Technicians'	260	38.20	208	30.60	08.00
Total	680	100%	521	76.60%	11.00

Table 3-5: Questionnaire survey distribution

Participants	Questionnaires Distributed.	Percent (%).	Questionnaires Returned.	Percent (%).	Unused SQ (%).
Project Managers	210	30.90	151	22.20	08.70
Trainers/ Educationist	210	30.90	159	23.40	07.50
Technicians'	260	38.20	200	29.40	08.80
Total	680	100%	510	75.00%	25.00%

A total of 210 questionnaires each was distributed to the project managers' and the Trainers/Educationist, making 30.90% percent each and a total of 61.80%, while the technicians received 260 questionnaires, making 38.20% of the total questionnaires distributed as indicated in Table 3-7. The researcher reminded the respondents to

complete the questionnaires within a period of two weeks and they were happy to return the questionnaires within two weeks of the distribution. Unfortunately, not all the questionnaires were return within the stipulated period of two weeks as agreed by the respondents at the initial stage. The total questionnaires returned to the researcher was 521 out of the 680 that were initially distributed, which was 76.61% of the survey questionnaires. This high return percentage for the data collected was after several follow-ups within the ethical consideration and extensions of the time frame from the initial proposed two weeks. The high return rate of data was within two months to the initial two weeks planned by the researcher. There was so much delay during this process due to several excuses by the respondents on time frame, which the researcher kept extending the time for the respondents to ensure a high responses rate could be achieved. This was because high responses rate would provide higher data quality and accuracy for a research data analysis. The time frame for the data collection was further extended for additional two weeks and several contacts were made by phone and physical contacts to facilitate the data rate. Several efforts were made by the researcher in facilitating and ensuring that a high-rate response would be achieved. Although, this has caused so much delay in the research process, but the researcher insisted on making efforts and persisted patience even with the limited time frame. A breakdown of the data collected is shown in Table 3-6.

Table 3-6: A Breakdown on the data collected within the stipulated period

	DATA RECEIVED within first month (1)				**DATA RECEIVED within second month (2)**				**Percentage (%)**	
Participants	**Two weeks**		**Four weeks**		**Six weeks**		**Eight weeks**		**Two months**	
Project/Site managers	**F** = 4	**M** = 23	**F** = 6	**M** = 33	**F** = 7	**M** = 36	**F** = 9	**M** = 35	F = 03.80 M = 18.70	22.50
Trainers/ Educationist	**F**= 7	**M** = 28	**F**= 5	**M** = 42	**F**= 6	**M** = 29	**F**= 4	**M** = 39	F = 03.20 M = 20.30	23.50
Technicians	**F** = 3	**M** = 56	**F** = 8	**M** = 81	**F** = 7	**M** = 22	**F** = 4	**M** = 26	F = 03.10 M = 27.40	30.60
Total	**121**		**175**		**107**		**118**		**F = 10.20 M = 66.40**	**76.60%**

The response rate showed in Table 3-6 and Table 3-7 are suitable for the analysis.

Table 3-7: Questionnaire survey for analysis

Participants	Returned Questionnaires	(%)	Valid QR	(%)	Invalid QR
Project Managers	153	22.50	151	22.20	0.50
Trainers/ Educationist	160	23.50	159	23.40	0.50
Technicians'	208	30.60	200	29.40	1.20
Total	521	76.60%	510	75.00%	2.20%

The questionnaires returned from the respondents are 153, 160 and 208 from Project Managers, Trainers/Educationist, and Technicians respectively. Out of the returned questionnaires, few of them were not completed properly and therefore those ones were regarded as invalid questionnaires, making a total of 11 questionnaires, which was about 2.20% and were disregarded. This has not affected the result of the data analysis since the percentage of the valid questionnaires returned was 75.00%.

3.9.1.3 Data cleaning

This stage of the research data analysis is the stage at which the collected data for analysis undergoes a thorough checking to avoid any errors in the data before inputting the data in a relevant software package for analysis. As stated by Trochim (2006), this stage of the research refers to the process of checking the raw data gathered from the participants for errors before the analysis takes place. In line with Trochim (2006), this method was employed in this analysis section of the research for the data received from the various groups of participants. The data collected was thoroughly checked to ensure that uncompleted data was removed in Figure 3-13.

The data rejected from the returned questionnaires was 11 from the three groups of the participants. However, this process in qualitative data was thoroughly checked from the transcription of the participants' views to ensure that any errors noted were rejected. This can be done by going through the transcribed views of the participants to ensure that the opinions of the participants are properly transcribed from audio device and are ascribed to the right participant.

3.9.2 Qualitative Data Collection (Semi-structured Interview)

This section of the data collection involves selected group of participants for the interview survey data. These groups of participants are professionals with a wealth of knowledge within construction related organisations. This section of the data collection will corroborate the questionnaire findings. Hence, the selection process of these groups of participants was carefully studied to gain a reliable outcome.

3.9.2.1 Semi-structured interview questions

Questions for the interview with the groups of participants were used to corroborate the questionnaire survey findings were carefully designed to gain vital information from the participants in the questionnaire survey. The semi-structured interview questions covered the sections that were not included in the questionnaire survey and issues noted during the questionnaire survey findings.

3.9.2.2 Pilot study

The semi-structured interviews questions undergo internal pilot testing with the supervisory team and the few areas that needed improvement were noted. The researcher improved those areas that were noted during the internal pilot testing with the team. After the amendment of the areas was noted, further recommendation from the team was made to the researcher to undergo a second testing with external professionals in the field of construction related works with wealth of experiences in Nigeria. This process led to the selection of five (5) participants, three of them from the Nigerian construction industry and two of them in the Nigerian universities, but with a wealth of experience within the United Kingdom (UK) and Nigerian context. The use of these participants was to ensure that those interview questions were not ambiguous, and confusing to the participants. During these processes, further areas were noted, which required amendment before the interview with the participants was conducted. Although, these areas were not much, the researcher needs to address them first, which those areas were carefully amended based on the comments and suggestions raised from the pilot testing participants.

3.9.2.3 Invitation for the interview exercise

After the final amendment of the semi-structured interview questionnaires with the participants during pilot study, a letter for interview invitation was sent to the participants for proper arrangement with the researcher. Then, the researcher sought their consent during the questionnaire survey and made several contacts with the selected interviewees. This made it easier for the researcher to proceed with the data collection process. After making the final corrections on the interview questions, the researcher travelled to Nigeria to conduct the interview with the participants, which were face-face interviews with the participants. Although, some of these participants were not available for the face-face interview but was conducted over the phone.

3.10 Data Analysis

This stage in any research involves organising and gathering of the data distributed to seek respondents' and participants' perceptions on a subject under investigation for the proper supporting and justification of decision making. Gill and Clark (2011) and Munch (2017) stress the need of this stage of the research as a powerful tool that can quantify and shape the structure of the data. Obviously, the investigations by Gill and Clark (2011) and Munch (2017), indicates that this stage of the research enabled the researcher to gain a full understanding on the whole picture and spot developing themes; the data analysis of the information from the participants gave a clear understanding of the research to both the researcher and the reader.

3.10.1 Quantitative Data Analysis

Quantitative data analysis of this research study, through statistical methods, has to do with understanding of the variability and measurement. This is in line with the studies of Agresti and Franklin (2007) that any unique factor recorded as a subject would be termed as a variable and the value of the data observed for the variable in the research is referred to as the observation. This research data analysis involved both the descriptive and inferential statistics with the help of SPSS software.

3.10.1.1 Description statistics

A descriptive statistical technique was used to assess the data collected from the developed questionnaires (Cox, 2018; Nardi, 2018). According to Elsaatea (1993:78) cited in Shibani (2016), "*The descriptive approach is based on the study of the phenomenon as it really is and seeks to describe it accurately in both quantitative and qualitative terms; the qualitative data describes the phenomenon and illustrates its properties, while the quantitative data gives us a numerical description of the phenomenon and illustrates its amount and dimensions*". The approach describes the phenomenon and the attitude of those affected by it (Glaser and Strauss, 2017). Parametric tests have been used to analyse the reliability and validity, which provides empirical reliance on the data collection. The tests used to analyse the data include the mean, a chi-squared test use to explore relationships between variables, correlation analysis was conducted to measure the relationship between variables to achieve the research objectives. In summary, the descriptive statistics comprises of the mean scores, derived from the respondents' view.

3.10.1.2 Mean scores

The mean value of a questionnaire survey is derived by allocating the responding values to the respondents' ratings factors. Example Very satisfied (5), Satisfied (4), Okay (3), Dissatisfied (2) and Very Dissatisfied (1). Hence, the mean score for each factor can now be computed as indicated in Table 3-8.

Table 3-8: Guide for the interpretation of results above.

No.	Mean score range	Meaning
1.	MS > 1.00 ≤ 1.80	Very dissatisfied (VD)
2.	MS > 1.80 ≤ 2.60	Dissatisfied (DS)
3.	MS > 2.60 ≤ 3.40	Okay (OK)
4.	MS > 3.40 ≤ 4.20	Satisfied (S)
5.	MS > 4.20 ≤ 5.00	Very satisfied (VS)

3.10.1.3 Questionnaires analysis

During the questionnaires' analysis, some of the questionnaires were excluded due to errors noted by the researcher before the analysis. Hence, available questionnaires for the analysis after disregarding the incorrect ones were 510 in total from the three groups of respondents. The questionnaire survey data analysis was to determine the opinions of the participants on the issues regarding inadequate workforce training and skills development from their wealth of knowledge within the industry and finding ways to improve on it.

3.10.2 Qualitative Data Analysis

The analysis of research data from both the participants and the respondents of the survey analysis is aimed at drawing a research conclusion, which was based on the research aim and objectives. These conclusions may be incomprehensible or obscured in the research context because of the collected data from the participants.

3.10.2.1 Interview analysis

The processes of analysing the data collected from the participants was carried out by the researcher, started with transcribing of each participant's views that was recorded by the researcher during the interview. This analysis of the qualitative data (interview) was carried out by following the necessary guidelines of the various studies (Creswell, 2009; Belotto, 2018; Friese, 2019). The guidelines for the collected data analysis are outlined as:

- Precise transcription of the participants recorded views
- Preparation and organisation of the participant transcribed views
- Re-reading of the transcripts iteratively, and
- The coding of the transcripts and developing themes from the transcripts.

The semi structured interviews on the study formed the qualitative data of the research which was a portion of the questionnaire. There was clear evidence that qualitative researchers suggest the use of NVivo software to conduct a reliable

interview data (Myers, 2009; Robson, 2002). The use of NVivo would help the researcher to examine and classify massive data and draw conclusions regarding these. However, the focus of this research study was on the technicians' skilled shortages and skills gap within the context of the construction sector, and three groups of participants used were Project/Site Managers, Trainers/Educationists and Technicians. The main aim was to examine these groups individually, to gain in-depth information from their wealth of knowledge within the Nigerian construction industry and to explore the relationships that existed between them.

The current study also involved the use of manual method for the analysis of the transcribed data from participants of the industry. Survey data analysis was carried out through a careful observation of the transcribed information by the researcher as indicated in Figure 3-13.

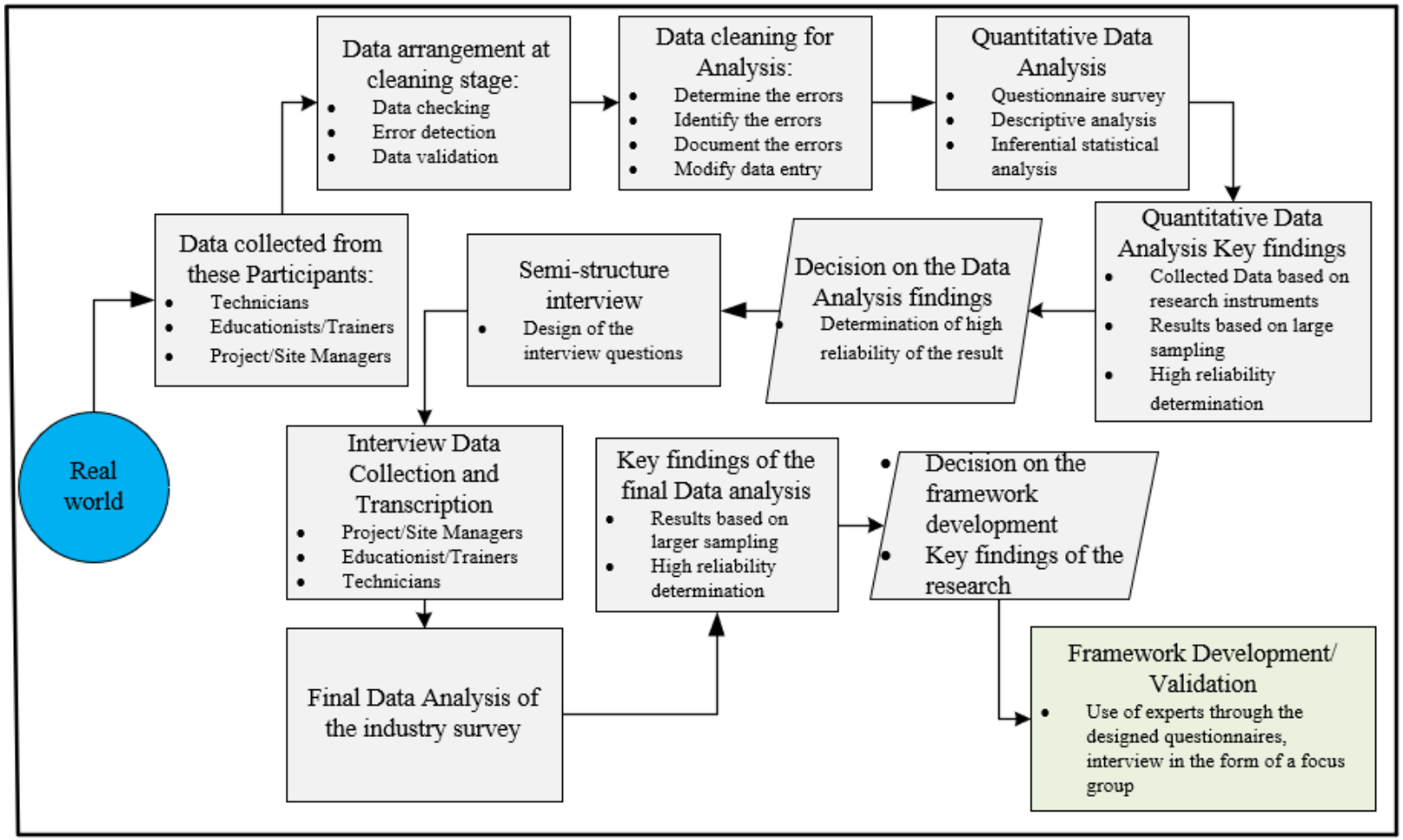

Figure 3-13: Data Analysis process

3.11 Validation of the Research Methodology

Validity is how accurately a method measures what it intended to measure in line with the subject under investigation in achieving the aim and objectives of the study. According to the studies of Flake *et al* (2017), validation of research methodology is fundamental in any successful research due to its measurement, which determines the accuracy of interest on subject under investigation studied. This implies that validation determines exact measurement of what has been studied and easily determines the phenomenon. However, incorrect measurement of the subject under investigation may be easily identified during the validation process. In addition, the study of Maxwell (2017) is of the opinion that validity, in the broad sense of trustworthiness or credibility, is a fundamental concept for all research. In addition, the research enables the researcher to explore in advance any issues that might have been challenging within the research.

3.11.1 Reliability of the Designed questionnaire result

The reliability of the developed questionnaire survey was used in the determination of the research methodology validation. Studies by Flake *et al* (2017), consider the consistence of a methodology measures something under a certain investigation with the aim of satisfying its reliability. These developed questionnaires consistence determines its reliability when distributed to the respondents, which was based with the Cronbach alpha coefficient value of reliability. The studies of Taber (2018) and Bujang (2018), show the measurement of internal consistency between several items, where measurement is the Cronbach alpha coefficient, and it varies from 0.0 and 0.9 been the lowest and the highest value respectively. SPSS software was used to determine the Cronbach alpha coefficient value to understand the reliability of the survey questionnaire in Table 3-9. The reliability test of the questionnaires survey outcomes has been satisfied. Cronbach alpha coefficient is considered acceptable from 0.7 and above (≥ 0.7) and considered partial or not satisfied if it is between 0.5 and to 0.6 ($\leq .06$) and rejected if is less than 0.5 ($\leq .05$). However, this research test of reliability for the analysis of the survey questionnaires indicates that the minimum Cronbach alpha coefficient ranges between 0.88 and 0.93. In conclusion, the reliability test of the survey was valid and reliable for the analysis and validation.

Table 3-9: Reliability summary for the three groups of participants

Variables	No. of Items	Cronbach's Alpha Based on Standardized Items
Technicians	122	.925
Project/Site managers	87	.903
Educationist/Trainers	81	.882

3.11.2 Semi-structured interview

According to the studies of Mavhandu-Mudzusi (2018), Adhabi and Anozie (2017) and Kılınç and Fırat (2017), the interview method of data collection is seen as a strong data collection method due to the interaction between the researcher and selected participants because it is easy to confirm the source. The semi-structured interview questions also underwent a pilot testing before distribution to the selected participants of the survey. The testing of the survey questionnaires was done with few postgraduate research students within and outside the UK with a wealth of experience within the field of construction related work. The interview questions underwent a thorough check starting from the supervisory team to the research students and other construction professions in Nigeria.

3.12 Proposed Conceptual Framework Development

The proposed framework adopted for this current investigation is in line with the theoretical modelling process of the IDEF0 modelling, which is designed, and analysed technique based on the graphics syntaxes and semantics (Omotayo and Kulatunga, 2017; Wilson et al., 1998). This modelling process supports an application of a holistic approach to the needs of the workforce training analysis within the context of the construction industry. The IDEF0 modelling is based on two basic elements, which are the boxes that contain the activity and the interfaces which are firmly represented by the various arrows indicated in Figure 3-14.

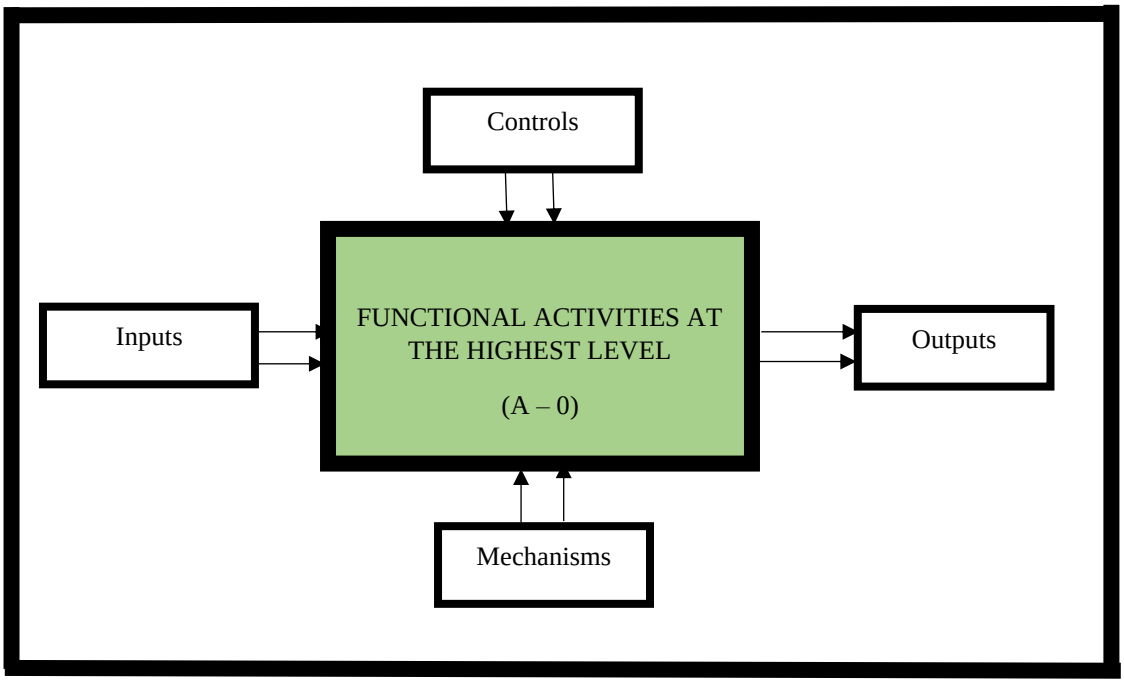

Figure 3-14:IDEF0 Modelling process

Source: (Soung-Hie and Ki-Jin, 2000).

The four functional activities at the highest level are:

- **Input** is key in the framework development, consisting of components to be transformed into the outputs stage through the activities at the highest levels.
- **Controls (process),** which are central in the framework development, which controls the training activities of the workforces
- **Mechanism** function is the prerequisite within the framework that comprises of elements that run the system, and tools required to change an input activity to output
- **Outputs** in the framework are the outcomes/output evaluation in the framework that elements produce after training activities in organisations are being determined.

The concept of IDEF0 modelling enables the researcher to gain an understanding on the various components in the framework development. However, the theoretical framework adopted and applied in the development of the framework for the current investigation is the framework matrix. (Davies, 2019; Sinclair, 2019; Azizi et al., 2021). The IDEF0

modelling concept was suitable in establishing the process of briefing, design, constructing, and operating projects into different framework phases (Sinclair, 2019).

3.13 Validation of the Proposed Framework

A Training and Skills Development Framework for construction Technicians (**TSDF**) in chapter six of this study was validated in line with the methodology context using the various experts' judgement. An invitation letter to the selected participants of the framework validation (see Appendix) was prepared by the researcher and sent to the participants before the validation exercised. This exercise was carried out with these professionals online in the form of a focus group due to the current outbreak of the virus. These participants are professionals in the field of construction related works with a wealth of knowledge and experience within the Nigerian construction industry. The Framework **TSDF** for workforce in Nigerian construction industry has been developed and is presented in chapter six (6) of this study. Hence, the framework **TSDF** validation with selected participants was presented in chapter seven. The framework validation exercise was both internal and external with experts in the form of a focus group within and outside the UK, to determine its reliability and validity.

3.14 Summary of the Chapter

This chapter discusses and justifies the choice of research methodology for the current study to achieve the research aim and objectives. The discussion centres on the research philosophy, paradigm, and design instrument used to achieve the research objectives. An overview on the methods used in development of the proposed framework, which forms the central point of the research, is also discussed in this section. Hence, the next section of this study will discuss the results of survey data presentation and analysis.

Table 3. 1: Proposed Framework from the IDEF0 concept

Objectives	**Stage 0**	**Stage 0.1 (Prior)**	**Stage 0.2 (Current)**	**Stage 0.3 (Post -Certification)**
Input function (Involvement)	*Strategic level at which government directives are defined and clarity sorted.*			
Mechanism function:		*PREPAREDNESS* **OR** *READINESS*		
Institutional Control:				
Sustainable Issues				
Ethical Issues				
Outcomes				
Output evaluation				

Chapter 4: Perception of the Nigerian construction industry experts on training and skills development

4.1 Introduction

This chapter presents the analysis of the survey data from the selected respondents on the subject under investigation. The chapter starts with the preliminary data analysis, followed by the reliability test (Cronbach's alpha) of the main constructs. Detailed data analysis was conducted, and key findings were provided. Interviews were needed as some issues emerged from the quantitative analysis that required further investigation.

4.2 Quantitative Data Analysis and Findings

The preliminary data analysis of the industry survey is mainly aimed at analysing the data gathered from the selected groups of respondents' which were from different Nigerian construction industry to gain an in-depth understanding on the subject under study. In other to gain relevant information that would be reliable and useful to the research objectives from the survey respondents, the researcher asked relevant questions to the subject under investigation with the expectation of gaining an honest view on each question. The respondents' honest views are vital to the findings of this study and to achieve their positive opinions. This was achieved through the collection of the pertinent data from the respondents by sorting out those collected data that were mostly appropriate to the research objectives. This was to ensure that the researcher captured the necessary data to achieve the research objectives.

The collected data was carefully sorted from practicing professionals with a wealth of knowledge and experience within the construction sector, including technicians currently practicing within the construction sites, vocational education, and training (TVET), technical and vocational education institution students and trainees and unskilled youths. It should be noted that the unskilled youths were essential on the information regarding young people not showing interest in construction related work. Hence, data cleaning was employed in the collection approach to ensure that uncompleted questionnaires and not properly filled ones were rejected, and those that were filled in properly were considered relevant for the survey analysis.

4.2.1 Descriptive Analysis

This section examines the distribution of the variables of the study under investigation, which include the respondents' profile, age range, occupation, education status and qualification, and their experience in the construction industry. A descriptive statistical technique was used to assess the data collected from the questionnaires survey (Cox, 2018; Nardi, 2018). The approach tended to describe the phenomenon and the attitude of those affected by it (Glaser and Strauss, 2017). Parametric tests were used to analyse the reliability and validity; this provided empirical reliance on the data collected. The tests used to analyse the data included the mean, a chi-squared test use to explore relationships between variables, correlation analysis was conducted to measure the relationship between variables to accomplish research objectives. In this study, a descriptive statistical analysis was used to describe the attributes of the responses through the provision of the basic information on potential relationships among variables within a dataset.

4.2.1.1 Respondents Profile

A total of 680 questionnaires were distributed to the participants within the Nigerian construction industry across the country with major focus in the Abuja metropolis, North-central, North-west, North-east, South-south, South-west and South-east. This research demography showed that respondents were of different age ranges and genders showed in Table 4-1. A total of 208 questionnaires from the Technicians, 153 from Project/Site Managers and 159 from the Trainers/Educationists were returned (3.9.1.2). However, some of the returned questionnaires were uncompleted and were considered invalid during the analysis process. The questionnaires rejected constituted to an overall total of 11 across the three groups, which was 2% of the questionnaires distributed. Hence, 510 questionnaires returned were valid for the analysis, which was 75% of the distributed questionnaires. An overall total of valid questionnaires for the analysis were 200 from technicians, 159 trainers/educationist, and 151 project/site managers.

There were indications of (31– 40) years as dominant age range (51.0%), the youthful age range was between (18–30) years (18.4%) for the survey indicated in Table 4-1. This was consistent with the studies of Belau et al. (2015) and Ogunsanmi (2016), who argue that young people show no interest in construction related works. There was evidence on respondents' occupations, education levels, working experience and company size across

the three groups as shown in Table 4-2, Table 4-3 and Table 4-4. In addition, most of the respondents were within small and medium enterprises as shown in Table 4-4. The skills in demand for the industry would increase worker performance and ability to exploit new opportunities through the blend of skills of these respondents. These high-quality skills would allow the sector to increasingly compete in term of the high quality of their workforce. This suggests that the views of this group of respondents could be reliable for this survey analysis and relevant to the research objectives. 60.3% of the respondents were supervisory technicians, with higher qualifications, and (11-15) years of working experience within the industries of various sizes (Micro enterprise, small, medium, and large enterprise) as indicated in Table 4-2.

Furthermore, 61.4% of the selected participants belong to others (trainers/educationists) with higher qualifications and working experience within the industry for more than 21 years as indicated in Table 4-4. Studies by Bilau et al. (2015) and Ogunsanmi (2016), argue that young people are not interested in construction related skills. However, in developed countries like the United Kingdom (UK), reports indicate that the demand from young people for apprenticeships was outstripping the available training places (Awe, 2006; Bilau et al., 2015).

4.2.1.2 Age and gender of the participants

The majority (65.3%) of working age people range from 35 – 64, whereas 18.4% of the construction workers are aged from 18 – 34 in Table 4-1. It is obvious that a high rate of experienced personnel with age range from (35-64) participated in the survey. However, young people's participation in the survey was low (18-34) as indicated in Table 4-1. In addition, there are indications of gender inequality in the participation of the respondent for the survey, which is 10.1: 89:9.

Table 4-1: Profile of respondents Age range and Gender across the three groups

Participants Age Range	Percentage (%)	Participants Gender Percentage (%)	
18 - 34	18.40	Female = 2.80	Male = 15.60
35 - 44	51.00	Female = 3.70	Male = 47.30
45 - 64	14.30	Female = 2.10	Male = 12.20
65 and above	16.30	Female = 1.50	Male = 14.80
Total (%)	100%	10.10%	89.90%

This is obvious that women participation in construction related works in Nigeria is at a minimal level, indicating that construction works within Nigeria are men dominated profession which is not encouraging. Although, the survey participants selection was carried out randomly. However, findings of past studies indicate the low participation of women within the construction profession may be due to culture and practices, lack of confidents to compete with their male counterparts, effect of stereotyping of the profession as masculine jobs, religious believes, norms, and custom within Nigeria (Jwasshaka and Amin, 2019; Afolabi et al., 2019). In Nigeria, culture and religion practices has a negative impact on women participation in most of the economic activities and this has been a barrier to women participation in construction careers. As tradition demand, construction activities are viewed as activities carried out by men after their fathers, while women are mostly engaging in kitchen activities helping their mothers with cooking. This culture and practices have negative impact on the choice of construction related works as a career for women in Nigeria. However, women participation within the construction profession is paramount and the need for gender equality globally as a way of fostering women involvement towards achieving the **SDG** by 2030.

Furthermore, there are indications that the role of women to men participation in all economic activities within Nigeria as a developing country that is undergoing economic reform is 43.1% to 56.9% (Jwasshaka and Amin, 2019). Obviously, this study survey indicated that women participation in the survey seems to be low and not inspiring. This is within the ratio of (Females: Males), (10.10: 89.90) % as indicated in Table 4-1.

Although, the role of women participation in the economic growth is vital but within the construction sector seems to be low due to culture and practices within the country. This has created a gender gap within the profession, which affected the industry contribution to the nation's economic growth. The minimal women participation within the industry is not inspiring at all for the industry contribution in the realisation of the **SDG** by 2030, which is paramount. Thus, this study anticipates encouraging women involvement in the construction related organisations for the industry to achieve its full potentials and be highly competitive in the global construction market. This will enable the industry to realise its full potential and start moving towards the achieving **SDG** by 2030 through effective and efficient training for workforces' skills upgrades.

4.2.1.3 Occupation, Education, Experience, and participants company size

It is important to clearly identify the participants of the research current jobs, their profession and wealth of experience within the construction sector, particularly within the Nigerian context. It is also vital to know the size and type of the organisation used for the research survey. The researcher gains confidence and reliability on the information received from the participants.

4.2.1.3.1 Group of technicians

The perception of the respondents in Table 4-2 revealed that 60.3% of the respondents are the supervisory technicians and only 14.3% are primary school holders. There are more managerial professional and technical positions in the construction industry. Overall, 63.5% of respondents have a higher education qualification. Most of the participants have experience within the industry for more than 5 years (74.5%) indicated in Table 4-2. Obviously, small, and medium enterprises dominate the sector with 79.4% of respondent of the survey. Studies by Vladimirovich et al. (2019) and Martynova et al. (2017), show that in upgrading the market economy in a modern condition, adequate attention is being given to small and medium enterprise and its challenges. Human skills and training will influence the patterns of employment in the construction industry in Nigeria, which is an important subject of study reported in this thesis.

Table 4-2: Profile of respondents (Technicians)

Occupation		**Education**		**Experience**		**Company Size**	
Current Job	*%*	*Education Level*	*%*	*No of Years*	*%*	*Type*	*%*
Electrical technician	3.2	Primary School	14.3	0 – 5 years	25.6	Micro Enterprise	3.2
Mechanical technician	15.9	Secondary school	19.0	6 – 10 years	38.6	Small Enterprise	28.6
Supervisory technician	60.3	Higher Institution	30.2	11 – 15years	19.5	Medium Enterprise	50.8
Building Technician	19.0	Vocational	22.2	16 – 20 years	14.8	Large Enterprise	17.5
Operational technician	1.6	Others	14.3	21 and above	1.6	Others	0.0

4.2.1.3.1 Group of Project/Site managers

The Project/Site managers are graduates of higher institutions with years of working experience within construction related works, particularly within Nigeria as indicated in Table 4-3. Most of the respondents were working for small and medium enterprises as shown in Table 4-3. The skills in demand for the industry will enhance workforce skills and ability to exploit new opportunities through these respondents' skills blends. These high-quality skills allow the sector to increasingly compete based on workforce quality.

Table 4-3: Profile of respondents (Educationist/Trainers)

Occupation		Education		Experience		Company Size	
Current Job	**%**	**Education Level**	**%**	**No of Years**	**%**	**Type**	**%**
Electrical engineers	9.4	Secondary School	1.4%	0 – 5 years	24.3	Micro Enterprise	3.9
Mechanical engineers	7.1	Higher Institution	98.6%	6 – 10 years	38.6	Small Enterprise	28.6
Building Engineers	47.1			11 – 15 years	29.5	Medium Enterprise	50.1
Operational technicians	25.0			16 – 20 years	5.8	Large Enterprise	17.5
Others	11.4			21 and above	1.9	Others	0.0

Table 4-4: Profile of respondents. (Project Managers/Site Managers)

Occupation		Experience		Company Size	
Current Job	**%**	**No of Years**	**%**	**Type**	**%**
Project Manager	8.2	0 – 5 years	13.1	Micro Enterprise	6.1
Site Manager	51.0	6 – 10 years	32.4	Small Enterprise	30.6
Supervisory Manager	22.4	11 – 15 years	20.2	Medium Enterprise	42.9
Operational Manager	18.4	16 – 20 years	15.2	Large Enterprise	10.2
Others	8.2	21 and above	9.1	Others	8.2

4.2.2 Detail Descriptive Data Analysis

The collected data was analysed using the SPSS software package through descriptive statistics with the focus on the percentages, mean values, standard deviation, and the Cronbach Alpha to determine the reliability of the respondents' views. The use of this approach in this research study was to organise and summarise the collected data from the selected participants in different forms to ensure that the targeted research objectives are achieved. In line with this statement, this approach is the most appropriate that enables the researcher to extract concisely the participants' view on the various questions asked during the survey. In addition, it enables the researcher to make a reasonable comparison and draw a generalisable conclusion on the participants' views.

4.2.2.1 Mean

This study mean analysis to show the trends of the participants' responses to identify the importance of the various variables in providing answers to each question of the survey is indicated in Table 4-6. In any statistical analysis, the mean analysis identifies the participants responses strength on any answered questions. The analysis mean with its confidence interval is the information measure of the central tendency of the variables.

The range of values for the mean was determined by the confidence intervals where the true population mean was located with a given level of certainty. According to Bryman, (2008), Pallant, (2020), the mean is determined by the relation to interval and ratio variables and is most relevant to ordinal variables. In this data analysis, the mean score was employed to determine the strength of respondents to the questions. The mean score in each of the tables was to draw a conclusion on the strength of the respondents' views.

Table 4-5:Mean Score Range and Meaning

No	Mean Score Range	Meaning
1	MS > 1.00 ≤ 1.80	Very dissatisfied (VD)
2	MS > 1.80 ≤ 2.60	Dissatisfied (DS)
3	MS > 2.60 ≤ 3.40	Okay (OK)
4	MS > 3.40 ≤ 4.20	Satisfied (S)
5	MS > 4.20 ≤ 5.00	Very satisfied (VS)

4.2.2.2 Reliability Test of the analysis.

This research questionnaire reliability test was carried out during the pilot study before the final survey questionnaires were distributed to the various selected groups of participants. The degree of consistency of a research instrument is the measure of its reliability (Shaba, 2008; Saunders et al., 2016). In line with this statement, Cronbach's alpha coefficient of the questionnaires survey has been calculated to satisfy this statement. The reliability is tested during pilot studies to minimise the rate of unfairness before a complete questionnaire distribution. However, the questionnaire survey analysis, using computer software considers the Cronbach's alpha for the test of reliabilities as indicated in Table 4-6. According to Sun et al. (2007), Taber (2018), Neamatshahi et al. (2019), the Cronbach alpha coefficient must range within 0.7 and above to have a reliable data and coefficient less than 0.7, then the data is either questionable or unacceptable.

Table 4-6: Cronbach's alpha for each field of the questionnaire

No	Field	Cronbach's alpha
	Training methods to facilitate the quality of workers skills	**.893**
	Most effective training methods for construction workforce	**.890**
	Factors Hindering TVET in enhancing the skilled upgrade	.880
	Effect of the technicians' training on construction industry	**.784**
	Duration of training for employees in the industry	.948
	Most effective training for construction related works	.790
	Duration of training for employees in the industry	.954
	Young people not interested in construction related works	.984
	Management of building construction site problems	.882
	Strategies to motivate youths in construction related works	.948
	Strategies on skills shortages in construction industry	.954
	Agencies with quality assurance and benchmarking	.872
	Duration of training for employees	.930
	Average	**0.901**

$0.9 \leq \alpha \leq 1.0$ Excellent $0.8 \leq \alpha < 0.9$ Good $0.7 \leq \alpha < 0.8$ Acceptable $0.6 \leq \alpha < 0.7$ Questionable $0.5 \leq \alpha < 0.6$ Poor $0.0 \leq \alpha < 0.5$ Unacceptable

4.2.3 Nigerian Vocational Education and training/institutions

4.2.3.1 Training providers to facilitate the quality of workers skills

The majority of the respondents' perceptions to the questionnaire survey were very satisfied (Table 4-7) with the Polytechnic/Colleges of Technology, university education, the technical teachers colleges, Science and technology colleges, formal apprenticeship training methods, informal apprenticeship training methods as current and effective training methods for construction related organisations in terms of vocational training within Nigeria. In addition, the survey indicates that technical teachers' colleges and the science and technology colleges were also effective training methods for construction related works. Yet, fewer respondents concurred with the formal apprenticeship method. In this survey, it appears that the Trade Centre Method of training is not common. According to Isa and Yusoff (2015), the importance of construction knowledge, economy and the society at large is education. This implies that tertiary education globally is the key to the development of both human and societal goals. This survey's findings indicate tertiary institutions are key requirements to skills development. The survey findings revealed a strong correlation between Polytechnic/Colleges of technology and technical teachers' colleges with a Pearson correlation value of .623*** as indicated in Table 4-7 and the overall Cronbach alpha value of .893 in Table 4-6. (Appendix D1).

Table 4-7: Training providers for construction workers

	Response scores in percentage %					**Mean Value**	**SD**	**Pearson correlation**	**Rank**
	VS	S	OK	DS	VD				
Polytechnic/ Colleges of Technology	63.5	25.4	6.3	4.8	0.0	4.48	.820	.623	1
Technical Teachers College	41.3	44.4	7.9	4.8	1.6	4.19	.895	.545	3
Technical colleges	4.8	76.2	17.5	1.6	0.0	3.84	.515	.456	7
Science and technology colleges	46.0	30.2	19.0	4.8	0.0	4.17	.908	.545	4
University Education	49.2	30.2	12.7	7.9	0.0	4.21	.953	.489	2

Very Satisfied = SV = 5, Satisfied = S = 4, Okay = OK = 3, Dissatisfied = DS = 2, Very dissatisfied = VD = 1,

Strongly agreed = SA = 5, Agreed = A = 4, Neutral = N =3, Disagree = D = 2, strongly disagree = SD = 1

4.2.3.2 Effective training methods to facilitate workers skills

The respondents' opinions on training in Nigeria are polytechnic/colleges of technology and university training, which are regarded as effective training (See Table 4-8). Studies by Yusuff and Soyemi (2012), show that the polytechnic is more suitable training for construction related works and skilled development in Nigeria. Yet other studies rejected this assertion, saying the polytechnic/colleges of technology are being discriminated against by many professional bodies both within and outside Nigeria (Ogbunaya and Udoudo, 2015; Olibie et al., 2013). For instance, a Higher National Diploma (HND) graduate from a Polytechnics/Colleges of technology cannot gain an offer into any postgraduate degree without an additional qualification and equal opportunities are not given during employment. Yet, Polytechnics/Colleges of technology are considered as more appropriate training for construction related works. Likewise, studies by Adetunji et al. (2017) indicate that the university consider itself as the highest and the most effective learning institution for human resource development. However, Olibie et al. (2013) and Maheswari (2016) argue that tertiary institutions' standards should be raised to the same level and staff development and training intensified. (Appendix D2).

Table 4-8: Effective training to facilitate workers skills (Technicians)

	Response scores in percentage %					**Mean Value**	**SD**	**Pearson correlation**	**Rank**
	SA	A	N	DA	SD				
Polytechnic/ Colleges of Technology	77.6	18.4	4.1	0.0	0.0	4.73	.820	**.566**	**1**
University Education	73.5	24.5	2.0	0.0	0.0	4.71	.953	.566	2
Technical Teachers College	53.1	42.9	4.1	0.0	0.0	4.49	.895	.529	3
Informal apprentice training method	20.4	12.2	55.1	12.2	0.0	3.37	.507	.175	4

Very Satisfied = SV = 5, Satisfied = S = 4, Okay = OK = 3, Dissatisfied = DS = 2, Very dissatisfied = VD = 1

4.2.4 Challenges within the construction industry

4.2.4.1 Barrier to skilled workforce training

Inadequate funding of TVET, ineffective training/instructional models and shortages of qualified TVET trainers/teachers were perceived by the participants in the survey as major concerns and require immediate attention. These views on these critical issues were consistent with findings of the studies those tertiary institutions within Nigeria are not properly funded and this impacts negatively on workforce/learner training (Lawal and Viatonu, 2017; Kara et al., 2016; Maheswari, 2016; Isa and Yusoff, 2015). As noted by respondents that these issues require immediate attention, findings from the literature also indicates that these issues led to the decrease in the industry's performance that led to low contribution to the national GDP (Oseghale et al., 2015; Tao et al., 2017; Tunji-Olayeni et al., 2017; Ameh and Daniel, 2017). Similarly, Ogunde (2017) argues that there are several factors that negate the growth of the Nigerian construction industry and hence recommends compulsory adequate training and skill modification programmes for construction technicians to aid sustainability of construction projects in Nigeria. In the same vein, Ayonmike (2014) stress that tools and machines were short in supply, obsolete and non-functional as well and could not meet the various requirements of vocational education training programmes. (Appendix D3)

Table 4-9: Analysis of Barriers of skilled workforce training (technicians)

	Response scores percentage %					**MV**	**PC**	**SD**	
	SA	A	N	DA	SD				Rank
Poor funding of TVET in Nigeria	68.3	27.0	1.6	3.2	0.0	4.60	440	.685	**1**
Ineffective training /instructional models	14.3	76.2	9.5	0.0	0.0	4.05	411	.490	3
Shortages of qualified TVET teachers	25.4	68.3	6.3	0.0	0.0	4.19	440	.535	2
Insufficient facilities for training	9.5	65.1	20.6	4.8	0.0	3.79	458	.676	7
Ineffectiveness of training models	4.8	19.0	65.1	6.3	4.8	3.13	458	.793	8

Strongly agreed = SA = 5, Agreed = A = 4, Neutral = N =3, Disagree = D = 2, strongly disagree = SD = 1, MV= Mean Value, PC= Pearson Correlation

4.2.4.2 Skilled workforce training challenges on quantity and quality

Most of the respondents' views indicate that the quality of the workforce is the highest with the mean value of 3.84. However, few of the respondents are of different opinions that the issue regarding workers' quantity is of major concern which gives rise to the mean value of 3.67 (Appendix D4).

It is obvious that skilled workforce quantity and quality needs to be properly addressed to meet up with the challenges within the industry, with regards to (i) Quality standard of skilled labour and (ii) Quantity of skilled labour trained. These are in line with findings of Okoye and Arimonu (2016), Ifeyinwa and Serumu (2016) and Ayonmike (2014) among others whose views were the same with the factors hindering skills upgrade within Nigerian construction industry. However, there is a clear indication of a serious challenge of poor funding of TVET with the mean score of **4.60**, insufficient facilities for training with a mean value of **4.19**, ineffective training methods with a mean value of **4.05,** shortages of qualified TVET trainers with a mean value of **4.03** and the least with the mean value **3.13** for non-participation of contractors within the industry and **2.32** for Unwillingness of trainees to acquire in-depth vocational knowledge in Appendix D3.

4.2.4.3 Severity of skilled workforce training on standard practices

The pattern of the respondents' views seems to be similar on the severity of the workers on standard practices. The respondents gave a positive response as strongly satisfied that in most cases, the bricklayer, block layers, stonemason, plumbers, carpenters and joiners, pipe- layers, pipefitters are the most affected within the context of the construction industry in Nigeria. This study is in line with the studies of Ogundipe et al., (2018), Ogunde et al., (2018) and Awe, (2012) that the apparent increment in fatalities and injuries during construction projects within the Nigerian context is increasing despite all the regulations put in place within the industry and is highly unacceptable. In addition, Umeokafor et al. (2014) and Ogudipe et al. (2018) indicate that the major focus has always been on the level of implementation of safety rules and regulations, procedures for monitoring safety performance, accidents causes and effect, hazard control mechanisms, sustainability of safety measure employed by building firms, and levels of adopting health and safety plan for building projects. (See Appendix D5).

4.2.4.4 Young people interest in construction works

Most of the respondents of the industry survey clearly showed that young people lack adequate guidance and counselling to take skills acquisition as a choice of career in construction related works within Nigeria as indicated in Appendix 6. Obviously, this survey with the participants' perceptions was in accordance with the study of Awe (2012), who states that young people within the Nigerian context show no interest in construction related work. However, Martynova et al. (2017) and Vladimirovich et al. (2019) and this study stress the need for developing interest of young people in entrepreneurship since it currently has the potential to improve the socio-economic situation of young people. (Appendix D6).

4.2.5 Possible strategies to workforces' skills enhancement

4.2.5.1 Strategies to encourage youth in construction works

Most respondents indicate that the government should ensure that skills and vocational training be made free for young people who are willing to do and to embark on it as part of their career within the Nigerian context. However, some of the respondents are of the opinion that to encourage young people in construction related work within the Nigerian context, there should be an improvement on job security to ensure that the construction jobs within the Nigerian context should be properly adequate, unlike the current situation where job security is totally inadequate. Furthermore, the respondents' perceptions reveal that the technicians' wages should be considered by improving their wages to make the technicians' wages attractive and make skilled trainees want to earn while undergoing skill training. Furthermore, Rexhepi et al. (2018) stress that the future of a successful organisation mostly depends on the successful parkways provided for young people by the organisation to develop and prepare them in contributing to the development of both the organisation and to society at large. (See Appendix D7).

4.2.5.2 Strategies to address skills shortages within the industry

The respondents' perceptions indicated that addressing skill shortages within construction related organisation in Nigeria is ensuring that adequate provision by the government to adopt multi-skilling techniques for new skills/vocational trainees. However, few of the respondents are of different views that the government should ensure that unskilled youth,

most especially those that are unemployed, are mobilised for skilled training. In addition, the government should try to re-introduce the apprenticeship scheme and make it of a higher standard and very effective to the current ones. Evidence showed that the issue of skills shortages within the construction organisations across the country can be resolved strategically adopting the multi-skilling approach (AbdulAzeez and Umar, 2019; Karimi et al., 2018; Silva et al., 2018). (Appendix D8).

4.2.5.3 Agencies with quality assurance and benchmarking

Most of the respondents of the industry survey perceptions reveal that the agencies that were mostly effective and could be charged with the responsibilities of assuring quality and bench marking of craft skills training within the Nigerian construction related works are the Federal Government Labour Ministry and the Construction Labour Union in which the respondents' views are strongly satisfied. (Appendix D9).

4.2.5.4 Possible management of construction site problems

Most respondents' views regarding the management of construction site problems in the industry survey focused on technical problems, poor communication, and the shortage of skilled workforce within the Nigerian construction sector. This is a clear indication that workforce training will be greatly affected and will be of major concern and needs immediate attention. (Appendix D10).

4.2.5.5 Possible indicators to assess training needs

Development of employees' skills, 36.5% of the participants strongly agreed (SA), 58.7% of the participants agreed (A), 4.8% are neutral (N) with the mean score of 4.32. To meet new changes in work setting, 4.8% of the participants strongly agreed (SA), 36.5% of the participants agreed (A), 58.7% are neutral (N) and 4.8% disagreed (DA) with the mean value or mean score of 3.46. (Appendix D11).

Most of the respondents' views regarding the possible indicators to assess the needs of training within the construction industry is focused on career development and the employees' development as the major possible indicators for construction related work.

4.2.5.6 Possible training impact on organisations

The mean of the possible training impact in an organisation is as follows; Productivity and efficiency, 28.6% of the participants strongly agreed (SA), 63.5% of the participants agreed (A), 4.8% are neutral (N), 1.6% disagreed (DA) and 1.6% strongly disagreed (SD) with mean score of 4.16 (Appendix D12).

Most of the respondents' perception on the impact of training within their various organisations indicates that there is a great impact on the organisation productivity and efficiency. However, some of the respondents were in support of increasing job satisfaction. This research objectives and evidence from the literature reviewed indicates that the impact of workforce training within the industry should lead to an increase in the productivity and efficiency of the organisation (Kusumawati and Wahyuni, 2019; Athar and Shah, 2015; Asfaw et al., 2015; Elnaga and Imran, 2013; Farooq and Khan, 2011). Reviewed literature indicates that the importance of workforce training within an organisation cannot be over emphasized. Hence, workforce training in organisations is essential for improving the performance of the organisation. Therefore, effective training of the workforce leads to better productivity and efficiency of the industry. This study indicates that, within the Nigerian context, training is usually conducted when new staff are recruited and sometimes once in three to four years for existing staff to minimise cost. This is a critical issue with major concerned and needs immediate attention.

4.2.6 Effort on workforce training within organisational settings

4.2.6.1 Analysis of Training needs within the industry

The maximum, minimum value, and mean score for each variable and the Cronbach's Alpha of the variable of training needs within organisations are indicated in Table 4-10. The mean value is 2.11, which means that the participants' views mostly lie between the "Yes" and "No" options. The respondents' views on the processes that are carried out during training needs analysis is not encouraging at all. The respondents' perception was barely satisfactory on the how the workforce is being trained on how to document problems encountered within the industry. However, many studies indicates that modern organisations, both within the developed and the developing part of the world, depend on teams within the organisation ranging from the line managers down to the line workforce for performance (Levine and Argote, 2020; Secchi and Camuffo, 2019).

Table 4-10: Analysis of training needs within the industry

	Response scores in percentage %					MV	SD	Cronbach's Alpha
	Yes	No	I don't know	Min V	Max V			
Processes that are carried out during TNA. Which one have you performed								
Document the problem	42.9	55.1	2.0	1	3	2.11	1.325	
Plan the needs analysis	27.1	60.8	12.1	1	3	2.11	1.325	
Conduct the analysis	15.7	70.2	14.1	1	3	2.11	1.325	.882
Report findings	7.1	70.5	23.4	1	3	2.11	1.325	
Investigate the problem	5.7	65	29.3	1	3	2.11	1.325	
Analyse the data	1.4	80.6	18.0	1	3	2.11	1.325	
Relevant of training needs identification in your organisation? Please tick as applicable								
Not important	1.4	90.6	8.0	1	3	2.11	.834	
Slightly important	2.9	96.0	1.1	1	3	2.11	.834	
Moderately important	10.0	85.5	4.5	1	3	2.11	.834	
Important	48.6	40.5	11.9	1	3	2.11	.834	
Very important	37.1	53.9	9.0	1	3	2.11	.834	

4.2.6.2 Satisfaction with the training programmes

The training programme satisfaction mean values within an organisation shows 34.3% of the participants were very satisfied (VS), 47.1% of the participants were satisfied (A), 12.9% are neutral (N) and 5.7% dissatisfied (DS) with 4.10 as the mean score (Appendix D13)

This indicates that training conducted within most of the organisational settings is not too satisfactory according to the workforce of the organisations. This calls for an improvement within the organisational settings to meet up with the global challenges within the construction market. In line with the studies of Morsy et al., (2016), Demiral (2017) and Latif (2012), training programme within an organisational setting always aim at achieving organisational objectives through workforce skills' upgrades. Although, training of the employees may seem to be expensive, the role played in the organisation development is the most important to sustaining economic importance. However, the perception of respondents indicates that only 34.3% percent of them are very satisfied with the training programme conducted. The effectiveness of the training programme conducted was not clear. This seems there were problems of inadequate TNA, problems of management commitment towards technicians training, and strategy and training

planning seem to be inadequate and immediate attention is needed. In line with the studies of Jaworski et al. (2018), Ocen et al. (2017) and Terera (2014), satisfaction of workforce training programme within any organisation is paramount for workforce performance and the entire industry.

4.2.6.3 Training programmes impact

The perception of many respondents on the outcome of the training programmes within the construction industry reveals that the workforce is not satisfied with the turnover rate within the industry. This has been increasing in the organisational settings and the needs to address it have become necessity. However, training programmes within successful organisations are aimed at improving employees job performance by changing the employees' skills, knowledge, abilities, and behaviours in their various organisations (Diamantidis and Chatzoglou, 2012; Robson and Mavin, 2014; Yaqoot et al., 2017; Akhorshaideh, 2013). This is a clear indication that the employees' performance within the organisation will improve and hence the organisation turnover will also improve. As indicated, inadequacy of workforce training within most construction organisations is due to lack of truthful and transparent leadership within the organisational settings. Training and knowledge to identify the major problem within the industry and finding a solution to the problem identified during construction related work, will lead to low turnover. However, employees' turnover within every organisation is the key and will ever remain an important concept in any successful business organisation and the area of management (Popp et al., 2019; Memon et al., 2017).

Table 4-11: Analysis of training programmes outcome

	Response scores in percentage %					**Mean Value**	**Std D**	**Rank**
	VS	S	N	DS	VD			
Productivity and efficiency	25.7	30.0	21.4	21.4	11.4	4.17	.734	**2**
Increasing job satisfaction	34.3	47.1	12.9	5.7	0.0	4.10	.837	**3**
Decreasing turnover rate	40.0	32.9	11.4	14.3	1.4	3.96	1.109	5
Increasing absenteeism	20.4	12.2	55.1	12.2	0.0	4.01	1.148	4
Increasing profitability	51.4	35.7	5.7	5.7	1.4	4.30	.922	1

4.2.7 Training needs analysis within the organisation

This study believes that concerning young people within construction, organisations should make effort to learn on their own since the management of their respective organisations are not showing much effort on their training needs. The learners may learn on their own and become acquainted with knowledge on recent technology such as YouTube and social media.

4.2.7.1 Effort on workforce evaluation process

Generally, the importance of training evaluation within an organisational setting can never be over emphasised, based on its role for skills' enhancement and the organisation performance for realisation of its objectives. Studies by Anh (2018), Chang-Richards et al. (2017) and Chinta et al. (2016), stress the importance of educational evaluation within an organisational setting. This approach involves lots of activities within the organisations, with topmost priority placed on different models on educational evaluation.

However, the participants view on their workforces' perceptions towards training are being evaluated. As regards to this, 18.5% of the participants are of the view that they often used questionnaires during their training to determine their workforce views regarding training. 12.5% of the participants only used the interview with employee in this process, while 14.9% of the participants are of the view that they carried out the group interviews with managers and supervisors during this process. The participants opinions that they engage them through a job description for individuals are 16.0% and 18.2% mentioned determination through training committees in their respective organisations.

4.2.7.2 Concept behind employees training

There was an indication when employees are newly recruited, 21.4% of the participants strongly agreed (SA), 21.4% of the participants agreed (A), 42.9% are neutral (N) with the mean score of 4.40 in Table 4-12.

Most of the respondents of the industry survey perceptions clearly indicate that most of the organisations do conduct training for their workforce when they are newly recruited. On the other hand, a few of the participants state that their workforce does undergo training on new working methods. However, in the case of young adult workforce, there seems to be a tremendous decline in the rate of training time as being average duration of

training events (Mason, 2020; Imbun, 1997). Furthermore, the overall decrease in number of employers of the organisations to provide training per workforce is hard to reconcile with survey indication on most of the organisation's requirements for improvement and updating of their skilled workforces'. In addition, the participant views also indicated that training was only conducted when the performance appraisal assessment showed some skills gap within the organisations. The need for training of the workforce is vital within the industry.

Table 4-12: Reasons behind training of employees within the industry

	Response scores in percentage %					Mean Value	SD
	SA	A	OK	DA	SD		
When employees are newly recruited	41.4	21.4	22.9	7.1	4.3	4.40	1.197
On new working method	4.3	28.6	51.4	7.1	8.6	4.13	.931
On new equipment	15.7	11.4	57.1	10.0	5.7	4.21	1.020
Creation of new jobs	17.1	12.9	55.7	7.1	7.1	4.26	1.059
When performance appraisal assessment shows some gaps	17.1	12.9	45.7	18.6	5.7	4.17	1.103
Compliance with legislation and regulation	15.7	15.7	41.4	15.7	8.6	4.06	1.250

4.2.8 Indicators of training within organisations

4.2.8.1 Workforce training needs indicators

To determine the workforce training in construction related organisations, the question asked was to determine the participants' perceptions on the needs of the indicator methods in the organisations. 28.9% of the participants of the survey strongly agreed that their organisations mostly used questionnaire methods in the determination of the needs of the workforce training, whereas 30.4% of the participant held a different view on the method used for the determination of the needs for training in their respective organisations. In addition, 25.3% of the participants strongly agreed that examination work is the method used by their organisations in the determination of their workforce TNA. However, a few numbers of the participants stated that they used assessment and competitive analysis as a preferable method for the determination of workforce TNA (See Appendix C).

Table 4-13: Reliability summary for the three groups of participants

Variables	No of Items	Cronbach's Alpha Based on Standardized Items
Technicians	122	.925
Educationist/Trainers	81	.882
Project Managers	87	.903

4.3 Qualitative Data Analysis and Findings

There is clear evidence in various studies that qualitative interviews are conducted in research to gain an in-depth understanding on the phenomenon of the subject under investigation (Yin, 2014; Sauders et al., 2016; Akhtar et al., 2017; Basias and Pollalis, 2018). In line with the above statement, this study has conducted interviews with selected groups of participants with as wealth of knowledge within the Nigerian construction industry to gain an in-depth understanding of the subject under investigation.

Some revealing themes that came out of the quantitative analysis findings and discussions were framed into questions for the next stage of the research. The qualitative aspect of the analysis, with a clear focus on behavioural aspects of the workforce was outlined.

- Technicians training
- Organisational structure
- Employee motivation and integrity
- Management commitment

4.3.1 Profile of Interview Participants

The selected groups of participants' (interviewees) for the quantitative interview section of the analysis profiles were presented in Table 4-14. These included the interviewee code that was assigned by the researcher during the interview to distinguish between each of the participant since their names were not revealed to maintain the confidentiality in the research process stated earlier in the research in a consent letter sent to the participants.

Table 4-14: Interviewees Information

Interviewee Code	Position in the Industry	Background	Years of Practice
P-M1	Project Manager	Builder	15 years
P-M2	Project Manager	Architect	17 years
P-M3	Project Manager	Civil Engineer	12 years
P-M4	Project/Site Engineer	Builder	11 years
P-M5	Project Manager	Architect	18 years
P-M6	Project Manager	Civil Engineer	26 years
P-M7	Trainer	Engineer	15 years
P-M8	Trainer	Engineer	25 years
P-M9	Trainer	Builder	16 years
P-M10	Trainer	Engineer	16years
P-M11	Project Manager	Builder	15 years
P-M12	Project Manager	Builder	16years
P-M13	Project Manager	Builder	10 Years
P-M14	An Electrical technician	Elect technician	15 years
P-M15	An Electrical technician	Elect technician	10 Years

4.3.2 Qualitative Data Analysis Findings

This was a face-to-face interview with the participants and the researcher to corroborate the quantitative survey analysis findings on some revealing themes that came out of the quantitative analysis findings and discussions, which have been framed into questions from the previous section. These themes that came out from the quantitative analysis section were framed into questions based on workforces/learners' behavioural attitudes, specifically on the subject under investigation (TNA). The participants opinions showed issues that were not properly addressed during the questionnaire survey.

After conducting the interviews with the participants, the researcher transcribed the recorded data during the interview into Microsoft Word data. The data underwent a thorough search by the researcher to ensure that errors were completely removed before the next analysis process. The researcher ensured that the transcribed Microsoft word data was formatted before coding it appropriately to ensure that participants names were completely anonymous based with the research data consent. Furthermore, the analysis of the data was carried out to corroborate with the quantitative analysis findings and the reviewed literature findings.

Ryan and Bernard (2000) and Bazeley (2011) state that the process of classifying or arranging and tagging text with codes in qualitative analysis for easy identification and to facilitate retrieval in the future is referred to as coding. This process in the qualitative analysis simplifies the contextualisation by helping the researcher to view the text in categories and by the source. The process of coding in this analysis helps to create a link between the data to ideas and to supporting data.

4.3.2.1 Behavioural factors and its impact on technicians' training

There are several factors that came out from the interviews with the selected participants of the research, which are important in the technicians' skills upgrade within the Nigerian Construction Industry. The identified factors include management commitments towards technicians training; lack of organisational structure concerning; inadequate funding on TVET programs; inadequate projects managers' support on the technicians' training; absence of incentives measures; poor leadership/management commitment; inadequate communication network within the workforce and inadequate enforcement of mandatory standards on technicians' training within the industry.

4.3.2.2 Inadequate commitment of Project managers towards technicians training

The researcher observed inadequate Project/Site Managers' commitment towards the technicians training in the Nigerian context. This has been revealed by the participants that project managers' commitment on technicians training has been inadequate. The interviewees indicated that the management of the industry was always reluctant when it came to the technicians' training and claimed to be too busy. "The *management team is too busy to organise training but encourages the technicians to go on training once in three years*"(P-M1).

The issue of inadequate commitment of project managers towards the technicians' skills training is critical and has no doubt affected industry development. There will be no technicians' skills enhancement through training without the commitment of the management of the industry. Technicians' training within an organisation is always key to the organisation performance because the technicians form the vital aspect of the industry that requires competent and effective workforce/learners skills, which can be accomplished through suitable training to improve their skills.

Similarly, another participant mentioned that the challenge of inadequate commitment of the managers towards the technicians' training in their various organisation was due to bad governance and political leadership. "**…** *the commitment of the project managers has been completely inadequate due to the absence of good governance, and it has affected the workforce training*" (P-M6).

This inadequate commitment of the project managers on the technicians will then flow down the industry, which will then degenerate into so many problems that cannot be reported. Without adequate management commitment on workforce training, there would be critical problems, which would affect the workforce/learners' training and skills development within the industry.

4.3.2.3 Inadequate organisational structures concerning technicians training

The researcher observed that the organisational structures within the industry for skilled workforce development are totally inadequate. In every successful organisation within the construction market, maximum impact towards the organisation output is significant. This can only be achieved through the best delivery value, which can be possible only if there are skilled workforces' improvements in the industry. Inadequate organisational structures within the industry are of major concern and have affected both the existence and the newly recruited workforce within the industry. "…*there is no definite organisational structure or plans for the technicians, but we mostly make used of the Divisional structure if the needs arise*" (P-M13).

A few numbers of them stated that the organisational structures regarding technicians training are either inadequate or does not even exist at all within the industry. This implies that the importance of organisational structure is in no doubt totally forgotten by the management team of the organisations, and this will have a negative impact on both the skilled workers and the industry performance. Based on this challenge, such organisations will not be competent in the construction market and the productivity of the workforce will not be of great expectation.

4.3.2.4 Inadequate use of recent technologies

From the participants' views, the researcher identified that the knowledge on recent technology within the organisations are completely inadequate. In achieving a better

output within a successful organisation, adequate knowledge on recent technology was keen at all levels and must be taken into consideration. However, the interviewees' perceptions indicated that most of the workforce within the organisations was challenged with the issues concerning use of recent technological equipment. How to operate them was an issue and some of the recent technological equipment was lacking in the organisations." .... *inadequate knowledge on recent Technology, Poor performance of workforces within the building construction industry*" (P-M4).

A lack of proper integration of knowledge on recent technology was considered as most critical within the construction sector and this has impacted negatively on workforce training within the industry. In addition, some of the organisations borrowed the required tools for commissioning to be fully registered and then return it after the registration.

4.3.2.5 Setting of organisational goals concerning workers training

The researcher noted that organisational goals' setting towards workers' training was either lacking or inadequate within the industry. The challenge of achieving better workforce training within the industry is greatly influenced by inadequate organisational settings. "*...There is no organisational setting, but the industry operates on divisional structure, the key areas that need improvement will be given adequate attention*" (P-M6).

This lack of proper organisational settings regarding technicians' training within the industry has led to the technician's poor performances and hence affects the national construction sector. Most of the project managers of these organisations do not have a definite organisational structure for the technicians' training. However, the organisations did set out their structures through incentives and checked the key areas that required development. The willingness for the organisation to make adequate organisational settings will greatly improve the workforce training in acquiring better skills.

4.3.2.6 Procedures to achieve the organisational goals of the industry

It can be observed in other challenges within the industry that the necessary measures or procedures in achieving the organisational goals of the industry through the workforce training are also inadequate and some are not properly followed. However, one of the interviewees stated that: "*This industry looks out for training that covers areas that need improvement and ascertains their authenticity*" (P-M7).

Equally, the other participants stated that the industry do carry out the statistics of the available technicians' that needed training to improve their skills. However, this was observed that the steps taken were not done on a regular basis but once in three to four years.

"… *We take the statistic of the available technicians within the industry to know those that are available for the training*" (P-M3).

There should be guidelines that need to be followed in the selection processes rather than only taking the statistics of the workforce available for training. Although, if there were necessary guidelines that were meant to be followed, the management did not even follow these guidelines, but operation was based on whom you knew. If this happened, which was usually inevitable within the various organisations, it would affect the selection processes for the training of the workforce.

4.3.2.7 Handling construction mistakes/errors

It was noted that a challenge of handling construction mistakes during construction work was inadequate and had a negative impact on the workforce training of the industry. According to the interviewees, errors within the industries during construction activities were always inevitable. However, the occurrence of errors during construction works needed to be minimal for positive project delivery. If the errors within a project executed were more than normal or expected, it would result in project failure and the project executed would not last for the period expected due to those errors. The participants in the interviews stated that a normal routine inspection was carried out during construction work. However, how effective these routine inspections and how often they had been conducted was of major concern to this study "... *Because we in the industry usually carry out routine inspections, these errors are usually minimal and non-critical*" (P-M4).

Although, the interviewees stated that the industry usually underwent a normal routine inspection to ensure that those errors were minimal, but the normal routine inspections were usually not carried out on a regular basis. In few cases, before the routine inspection, errors had been made and the ones that could be corrected would be corrected while the ones that could not be corrected would be left as it is.

4.3.2.8 Employees motivation to work

The researcher noted poor employee motivation within the industry by the management of the industry. Although, most of the management mentioned that this was due to the economic situation of the country and bad governance from the top down to the lower level. This study is of the view that employee motivation is key to the development of a successful organisation. However, the researcher observed that it was inadequate within the existing industries during the survey. According to several interviewees "…*Stipends are set aside to take care of such issues but due to bad governance these allowances are paid once a year*" (P-M9).

However, the allowances set aside for motivating the constructions workforce are totally inadequate and are not properly handled by the management which they stated was due to bad governance and the economic situation of the country.

However, the study views it as the management is not ready to motivate the workforce because workforce motivation will definitely come with a price and the outcome of the motivation will surely improve their workforce skills and hence the industry performance.

4.3.2.9 Response on strict project deadlines

From the interviewees, it was observed that the response of the technicians towards meeting strict construction deadlines was not properly adequate. The management of the organisations weas expected to encourage the technicians by making an adequate provision of things that would motivate them to do extra work (hours) to meet up strict construction project deadlines. Although, the participants admitted that the little things they gave were not much, yet it is due to the challenges experienced within the country. "*… the industry usually makes a provision for the workforce by paying them petty cash just to encourage them to do extra work to meet the project dateline*" (P-M1).

4.3.2.10 Organisation response on tight deadlines

The researcher noted that the management of the industry did try to meet up tight construction deadlines irrespective of how bad the situation might be. The finding of interviews indicated that strict measures were sometimes ignored by these project managers to ensure that they met up with the deadlines. However, a few of them stated that the workforce was encouraged by giving them petty cash to ensure that they would

do extra job to get the work done. Though, the petty cash was not much, it seemed the workforce has no option but to take it or they might lose their job. "**…***the challenge we have are shortages of a well-trained workforce and the inadequate supply of resources to our workforce to encourage them do extra work*" (P-M8).

Although, the interviewees mentioned that meeting strict deadlines of construction projects was key to every successful organisation, the encouragement of the workforce within the organisation was important within an organisational setting. However, the researcher noted that most of the management carried on by ignoring some important guidelines to meet up the construction strict deadlines. The key to every organisation towards meeting a strict deadline would be working with a well-trained workforce that was determined to get the job done.

4.3.2.11 Managers 'response on project deadlines

Most of the construction related organisations are of the opinion that meeting strict project deadlines within any organisational settings was paramount and stressed that several challenges do occur during implementation or execution of the project, which may lead to project delays. However, the interviewees mentioned that meeting strict deadlines of construction projects was a key prerequisite to every successful organisation. However, it was obvious that most of the management ignored some of the important guidelines to ensure that they met the construction strict deadlines. Working with well trained workforce that was determined to do the job properly is a requisite to a successful organisation for meeting a strict deadline.

"*…there are safety guidelines that need to be adhered to, but the implementation is always the challenge*" (P-M10).

In most cases, the workforce of the industry weas not conversant with the safety measures and the necessary protocol that needed to be followed during and after work. This was of paramount important within the context of the construction industry because much of the construction work is hazardous. This means that the need for intensive workforce training is of necessary within the industry and there should be necessary guidelines for them to follow to achieve the organisational settings. However, sponsorship of the workforce within organisations used to be another challenge that was critical within the organisation.

4.3.3 Behavioural factors to Technicians' motivation and values

4.3.3.1 Organisational motivation of employees

From the participants' views, the researcher noted that there are some irregularities that the project managers within the industry do to ensure they meet up strict construction project deadlines. However, some interviewees stated that the workforce was encouraged by offering them petty cash to ensure that they could do extra jobs to get the work done. "**…** *First, with regular payment of dues owed. In addition, there are other payments of allowances such as the hazard allowance*" (P-M6).

The technicians on site were always encouraged to go for training to improve their skills. Financial incentives and non-financial motivation were mostly free training for those that require or mostly need training. The industry also provides food for them in the place of work, and they do enjoy it.

4.3.3.2 Incentives measures for school leavers and young people

From the interviews, it was indicated that the management of the industry does not have any plans for school leavers at all. However, the industry sometimes makes some necessary provision for them depending on the management team of the industry. This does not happen on a regular basis rather it happens occasionally and sometimes it is not something big but just small to keep them happy. It is not in line with industry regulations, but it is based on the management of the organisation at the time they encounter such challenges. Though, the offered petty cash is not much, and it seems the school leavers have no options but to take it. " *In most cases the industry doesn't have plans for them at all but sometimes, the industry makes provisions of little or small stipends for school levers but to be honest not always*" (P-M2).

4.3.3.3 Organisation in different scenarios due to economic downturn

The researcher noted that most organisations were struggling with their workforce payment because of economic downturns since the year 2008, when the financial market erupted and the whole world was affected. The management of the industry seemed to use that as excuses to say that they are working hard to overcome the challenges. "**…***most of the industries within this country are going through similar challenges on the workers' payment since the economic recession in the year 2008*" (P-M4).

However, the management claimed that they did try their possible best not to be affected by the challenge, except when there were general strike actions. These won't hold abruptly, but if there was a sequence of activities that lead to strikes, so they always planned accordingly.

4.3.3.4 Effective strategies to tackle technicians' skills challenges

This interview determines both the technicians and the project managers behaviour towards workforce/technicians' skills and teamwork development training in the context of the construction industry. This was noted that the management adopted the principle of training and retraining of workforce within the industry through a normal regular check to address the skills workforce challenges. "*Training and retraining, regular checks and drive towards positives attitudes of their workforce*" (P-M5).

However, technicians training in the industry used to be expensive, unless the government could help, but it seemed the government was not ready to help, even to create a conducive environment for businesses to strive was a big problem. Generally, retraining, and regular workforce check is the best strategy and should be done frequently.

4.3.3.5 Employees skills training in the past/present time

The common training method for the workforce was on the job training methods, attending conferences, onsite training in demonstrations and visual auditory. The participants' attitudes towards the institutions of learning in terms of construction related works were founded in the polytechnic/colleges of technology, university education and teachers' colleges. Trade centres seemed not to be effective in this generation. "…*training method within this industry is the training on the job. Attending trainings, attending conferences, visual and auditors, onsite trainings in demonstrations – visual auditory etc*" (P-M9).

There were different institutions available in Nigeria that were responsible for training and most people believed that the polytechnic training methods were the most effective in comparison with that of the universities in terms of the construction related work.

4.3.3.6 Organisation working as a successful team

The organisation working as a successful team was not adequate within the industry. Although, most of them pointed out that each of the various divisions in the organisation, was headed by a representative, marking other subordinates to the representative. However, this was not adequate because not all the employees will be loyal to their representative even though he is their representative "*We must have a representative from each division for any project to give a report at the end of the project*" (P-M1).

4.3.3.7 Resolving conflicts within teams

The interviewees pointed out that conflict in teams within the organisation is always inevitable and necessary precautions are meant to be followed during work. Furthermore, there are guidelines and instructions to be followed within the industry to ensure that conflict can be reduced to minimal levels within the organisation. However, these guidelines are not effective and reliable in the construction industry and are not dully followed. "*Conflicts in teams is inevitable within the organisation but instructions are given to the hierarchy which is followed*" (P-M8).

In most cases, for example, in each of the tasks, there must be a leader within each task. The leader of the team is the representative of the team, and everything should be passed through the leader. This will help to resolve or minimise conflict within the team since each of the team is headed by a leader with leadership quality.

4.3.3.8 Relying on sub-contractors and to what extent

Most of the construction related organisations depend on sub-contractors for large project implementation and effectiveness. The participant's perceptions indicate that mostly during large projects the organisation will have to go and find a professional in the area, which they are having difficulties in the projects. In most cases, relying on subcontractors is inadequate and may lead to disappointment and delay of project delivery. "…*in most construction projects, we rarely make use of sub-contractors. Only for specialised job descriptions*" (P-M8).

This study noted that sub-contractors within the context of construction industry are always inevitable because the industry cannot do without them. But in most cases, within the developed world, it is rare in most of the construction related organisations. However,

within the Nigerian context, most of the construction related organisations makes use of sub-contractors for larger projects such as solar installations, and supply of special/scientific equipment.

4.3.3.9 Communication barrier

This interview survey determines the opinions of the participants on the communication used during the construction process within the industry. From the participants' observations it was indicated that there was no communication gadget in most of the existing organisations within the industry. However, there should be sufficient guidelines and instructions to be followed within the context of the industry to ensure that there are flows in communication and a cordial relationship between the workforce within the industry. However, most of the organisations do not have these communication gadgets within their industries and the guidelines in place are also not duly followed. Some of the interviewees stated that: *"…we mostly make use of phones for communication but most of them don't have phones"* (P-M8).

The use of phones alone within the industry is not enough for workforce skills enhancement. In line with past studies, the tremendous benefits of using a mobile device on any construction site is being able to use RFID technology to improve material management. This is because the literature indicates that language barriers are also a major hindrance and have impacted negatively on the technicians' skills improvement and is a major concern. This study observed that language barrier is also a major hindrance to the workforce training and skills upgrades within the context.

4.3.4 Behavioural Factors that influence Technicians' integrity

4.3.4.1 Managements support for training

It was observed that there was inadequate support of the project managers towards the technicians' training. However, training of the workforce was vital to both the existing and newly recruited technicians within the industry. This training might not be carried out on a regular basis, as perhaps once in three to four years and the training might not involve every technician within the organisation; instead in each unit an individual was selected to represent the group. "…*I have been trying my best to improve my skills by regular practising on my own*" (P-M15).

This study indicated that every successful organisation believes that training of its workforce was important to the performance of both technicians and the industry. The Construction industry depends on the performance of its workforce and this performance can be achieved through the technicians' training because the technicians do a lot of the manual activities in the organisation. Inadequate technicians' training will critically affect the performance of the industry and its workforce competency within the industry. Improving the workforce skills in an organisation through training is key to the development of the industry and to the workforce benefits.

4.3.4.2 Funding for TVET programs

The challenging to achieve quality training is greatly affected due to financial constraints from the government. The willingness of the government to provide funding for TVET programs would help to enhance the quality workforce training. "*…there is inadequate funding from both the local, state, and federal government on TVET within the Nigerian context*" (P-M14).

> The issue of poor funding of technical vocational education and training has been an issue for a long period of time. Although the government has made tremendous effort to support the education sector, the issue of corruption has been another critical factor that affected the construction sector so deeply. Although, a very few numbers of the workforces did undertake those training on construction related works but, in most cases, they needed to sponsor themselves which was not easy for most of them because most of them did not have the means. The Government is not doing much to assist the construction related workforce financially and the construction industry was not doing much about it.

4.3.4.3 Safety measures

It is obvious that safety measures taken within the construction industry about technicians during construction work exists. However, guidelines/protocols to be duly followed in the industry to ensure safety of the workforce are totally inadequate. "... *industry has some safety measures or guidelines that should be followed during any construction projects*" (P-M15).

The Nigerian construction workforce do believe that if an unfortunate situation occurs during work, they believe that it is the will of God and not because of negligence. For example, if an accident happens during work, they will not believe it was as a result of carelessness and that the management on its part was not playing its role because if they played their role as leaders, it would cost them money.

4.3.4.4 Handling difficult situations

Project managers and the technicians' behaviour in the construction industry was meant to be in line with the organisational settings for the effective realisation of the organisation objectives. However, both the technicians' and the project managers' behaviour towards analytical skills/problem solving or difficult situations amongst the workers of the industry were totally inadequate. "…. *In a situation where the problem is beyond us, we call the attention of the site manager immediately for proper solution, though in few cases*" (P-M15).

It was observed that, if there were serious issues or problems during a construction project, the workforce mostly discussed the way forward among themselves before telling the person that oversaw them. However, if the problem was beyond their understanding, they called the attention of the site manager in charge of the project to fix it. If problem were not resolved, the industry made adequate arrangement to ensure they resolved it first before work continued.

4.3.4.5 Time to be quick in decision making and obstacles met

The primary objective determined the technicians' and project managers' behaviour towards motivation and values of their workforce. The project managers and the trainers' behaviour within the construction industry on decision making was not always planned within the organisational regulation. However, the project managers' behaviour towards decision making on their workforce on any challenges encountered within the industry seemed to be inadequate. ".. *In most cases the decisions that are taken are not always planned for, but it must be taken because of the emergency to avoid issues within the industry*" (P-M14).

However, some of the challenges that often led to quick decision making were due to poor financial support for the industry workforce. This might affect the industry seriously

because the workforce might not want to work on credit and sometimes, they might not want to borrow money from somewhere to pay their employees so they might take a drastic decision in favour of the industry and not its workforce. Moreover, some managers might decide to manipulate figures to balance the poor financial support between the industry and the workforce since the employee performance depended on its wages.

4.3.4.6 Decisions making

The managers' behaviour within the construction industry on difficult decision-making during training of workforce selection requires comment. However, both technicians' and project managers' behaviour towards this process was inadequate within the industry. "… *the most difficulties encountered within the industry are mostly during the selection process for the technicians to undergo training*" (P-M15). However, the selection process usually underwent a rigorous process to avoid issues of bias and tribalism was common within the environment. Decisions taken are always difficult and more challenging because you might end up having lots of enemies in the selection process. Since the selection process is usually difficult, it seemed the saying of "who you know" may come to play in the selection process because only few of the workforce would be selected for the training to save the industry from spending much money. This was obvious that nominations processed for workforce training may not be fair-minded.

4.3.4.7 Time to successfully communicate with other individuals

This section was to determine the workforce behaviour towards communication skills within the industry. The general means of communication within Nigeria as a country is the English language. However, the language that is mostly spoken depends on in which part of the country the industry was located. Generally, there were three most common and dominant tribes in Nigeria out of the several languages in the country. In the western part of the country, the dominant tribe is the Yoruba, Hausa in the northern part and Igbo in the Eastern part of the country. Obviously, the previous studies showed that employees within the construction related organisations did have challenges with their workforce on communication.

" *…At times the industry selects only those that understand English language and others that don't understand English will not be given much attention*" (P-M14).

The selection process for the training conducted once in three to four years, did favoured only few workforces within the industry. The selection process always favours those with the knowledge and understanding of the English language. Obviously, communication amongst the workforce is paramount and should be given adequate consideration in achieving quality workforce skills. Factors that could influence the technician training in the industry are summarised in the Table 4-15.

4.4 Summary

This chapter presents the analysis of the questionnaire survey and interviews conducted with the selected participants. The collected data of the participants' views on the subject under investigation was analysed in view of the research objectives. The findings of the analytical survey, and interviews underpinning this are presented in the developed framework in Chapter Six, which will improve the quality of both the existing and newly recruited skilled workforce and the industry performance. Hence, further discussion on the industry survey analysis will be discussed in the next Chapter.

Table 4-15: Factor that could Influence Technicians' Skills

	P-M1	P-M2	P- M3	P- M4	P-M5	P-M6	P-M7	P-M8	P-M9	P-M10	P-M11	P-M12	P-M13	P-M14	P-M15
Inadequate commitment of Project managers	✓	✓			✓		✓		✓		✓		✓		
Inadequate organisational structures			✓					✓							
Inadequate Setting of organisational goals	✓				✓		✓			✓	✓	✓		✓	✓
Steps taken or procedures	✓														
Handling construction mistakes/errors			✓	✓		✓		✓		✓		✓	✓	✓	✓
Employees motivation to work															
Technicians' integrity/honesty	✓														
Organisation meeting tight deadlines			✓												
Organisation motivation of its employees		✓													
Incentives measures organisation		✓		✓											
Organisation teams in different working scenarios	✓	✓													
Effective strategies to be adopted				✓	✓			✓	✓		✓	✓	✓	✓	✓
Relying on sub-contractors	✓					✓									
Communication tools used during		✓	✓		✓		✓	✓				✓			
inadequate projects managers support on the technicians' training		✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓
Inadequate funding from government on TVET programs				✓											
Safety measures taken during any task															

Chapter 5: Further discussion on data analysis and synthesis

5.1 Introduction

The findings of the collected data of the questionnaires survey and the interviews were presented in the previous Chapter 4. This chapter critically discusses the key findings of this collected data and analysis that is relevant to the research objectives to develop a training and skills upgrade framework to boost the workforce quality within the Nigerian construction industry. This research study instrument was constructed in line with the subject under investigation through a careful investigation on the mitigating factors that are responsible for the downgrade of the construction industry within the Nigerian context. Based on this statement, analysis of the previous chapter was discussed in view of the developed framework.

5.2 Construction training highlights after data analysis

The reviewed literature indicates that training and skills development of the workforce in an organisation is a key prerequisite to successful and competent organisations within the construction market. This is across all organisations within the global context and the need exists for organisations to consider adequate attention and give topmost priority to workforce training for skills upgrades for its future growth. This could boost the workforce performance and the industry output stability. Hence, creating an increase in the industry contribution to the nation gross domestic product (GDP).

Following the rising interest in human resource development in the general context of the construction sector within Nigeria, the need for adequate training for workforces/learners was paramount. This has led to the justification of this research framework development to improve competency by developing the skills and knowledge of the construction related workforce to meet up with the global challenges within the construction market. The skills gap which has led to the current problems within the industry has affected the performance of the sector, which inspired the researcher to come up with a solution. This framework will identify the existing skills and knowledge gap that downgraded the industry and its poor performance. This will gradually lead to achievement of the required effectiveness

level of ensuring and maintaining a competent workforce within the Nigerian construction industry.

5.3 Key findings of the industry survey data analysis

This section discusses the key findings of the data analysis in Chapter Four with the central aim of the developed skills framework for skilled workforces within Nigerian context. The discussion followed a thematic format based on the variables from both questionnaires of the quantitative and interview of the qualitative data analysis.

5.3.1 Training providers to facilitate the quality of workers skills

The need for training providers with a wealth of experience within construction related organisation is a key prerequisite and unavoidable for the industry's development. This is in line with the current research objectives, which is the development of a framework for the workforce within the Nigerian construction industry. The proposed framework will boost the workforce skills and industry performance within the context.

Hence, this survey analysis findings indicate that trade centre and technical colleges used to be the common training method that produced many technicians across construction works in Nigeria. These training providers have been in existence between the early 1970s and the 1980s, which were based on the guidelines of the existing classrooms. These training methods also involved the training with materials that existed within science areas and mathematical ability (i.e. numerical competency) with hands on intensive workshop and laboratory work. However, evidence has indicated that coupling with the coming of the training method that prepares an individual's (trainee) for world of great jobs, is the "on the job training method". On the job training prepares an individual for a better job done within the global construction market, and there is a need for vocational education to be more acquainted with the societies' needs and the demands of the economy, the fullest of an individual ability to be utilised to the highest order (McGrath et al., 2019; Nkechi et al., 2012, Salami, 2011). In addition, this method of training was perceived as a major manufacturer or essential producer of construction related workforces within Nigeria. In the past was the Craftsmen Training Scheme (CTS) with focus on technical

colleges (TC) for the training of the workforce and this was successful at that time for different areas of the country's economy.

Furthermore, the analysis also indicates that the informal local apprenticeship training method was also recognised as one of the training methods that have succeeded in the training of the workforce on construction related work within the Nigerian construction industry. In this method of training, the instructor in most cases provided services to the trainee for a certain period of a year until the trainee of the job is fit to be on his own and can be completely independent. This apprenticeship training, dated in the past during the precolonial era, is the type of on-the-job training and it was dominant on the job training within the Nigerian context and has graduated so much of the workforce within the area of construction related work. Most of the skilled workforce within this type of on-the-job training are the bricklaying/blocklaying, concreting, stonemason, carpentry, plumbing, welding, and other core construction related skills. In the on-the-job training, the duration of the training usually depends on the trainees' level of understanding and a minimum duration for the training is from two to six years at most.

Based on the studies of Cherechi (2018), Osarenren-Osaghae Irabor (2018) and Salami (2011), the policies of the past education system in Nigeria are observed to be the major challenge because the policies are not allowed to run the full course before changing them. Furthermore, the general bias of the education curriculum towards the area of science and liberal arts whist little or no attention has been given to the VET. As mentioned above, it seems to believe that graduates of secular studies in the Nigeria stand a better chance of getting a better position in the economy. This has led to the downgrade of the Technical Colleges (TCs) in effective and efficient workforce training of construction organisations.

5.3.2 Effective training providers for construction workforce

The formal apprenticeship system of training was structured education/training which deliberately integrates and alternates learning in the workplace with learning in an education/training institution. In this training, the learner acquires skills for a trade or craft in an enterprise, learning and working side by side with an experienced craftsperson, and complemented by classroom-based instruction. Evidence has shown that the duration of

the formal apprenticeship ranges from one to three years and usually takes place at secondary or post-secondary level ‘hence, giving the students the opportunity to engage in industry supervised workplace practices (Ripani, 2016; Mieschbuehler and Hooky, 2016). It should be noted that the TVET institutions under the view of NBTE comprises of Polytechnics, Monotechnic, Innovation Enterprises Institutions referred to as IEIs, Vocational Enterprise Institutions (VEIs) and Technical College (TC).

In addition to the findings of the industry survey analysis, the other effective route for the construction organisation is the training of science and technology colleges (STCs). This method of workforce training seems to combine the training of classroom instructions and practical experience on site in construction related work. This training of the workforce has been identified as a low-level manpower to the general education which requires more emphasis and more funding for adequate training given to the trainee. However, findings indicate that the colleges of science and technology need adequate investment to enable the colleges to carry out effective training through the provision of the learning equipment by the institutions for learning, which can enhance workforce skills effectively (Dainty et al., 2004; Johnson, 2002). This study suggests that to address the challenges of provision of the institution equipment for learning is through corporation between organised management of the constructions related works and the three tiers of government in the country.

The situation in the past as far as that of the year 2010, in April, which indicated that 85 Vocational Innovations and Enterprises Institutes (VIEI) were duly registered by the NBTE. However, only 5 out of the registered 85 offered courses related to craft skills in construction related subjects. In line with the SDG vision 2030, these cannot be achieved properly without the contribution from construction related organisations because of their role in the nation’s economic growth. This can only be achieved through effective training of the workforce within the construction organisation to improve performance.

5.3.3 Influencing Factors hindering TVET in upgrading skilled workforces

This industrial survey analysis findings indicate several factors that hinder the effectiveness of workforce training within the Nigerian construction organisations that are discussed as:

5.3.3.1 Inadequate funding of TVET

The funding for training issue is not a new problem within the context and is not restricted to the construction related workforce only. This is a general issue within the educational sector and other businesses. However, inadequate funding has over the years had an impact on the area of TVET within the educational sector and most importantly the construction industry. According to Oviawe (2020) and Oviawe (2018), adequate funding is vital to successful construction organisations and is regarded as an important input of any successful educational system. Adequate funding can lead to the adequate provision of essential purchasing power, which education requires for its human and materials resources. Based on the objectives of this research, funding of TVET is vested on the Nigerian government which include all the three tiers of government (FGN - LG) levels. The State Government (SG), owned or public Vocational Training Institutions (VTIs) are only funded by the government. The trainee in these institutions pays a subsidized and relatively low fees and charges which constitute an insignificant part of the finances for running of the institutions (UNESCO, 2009; Awe, 2012). However, different studies argue that TVET has for years undergone some financial difficulties in the hands of the management of general education in terms of sharing formula when it comes to funding (Oviawe, 2018; Zite and Deebom, 2017). Furthermore, Salami (2011) stresses that financial allocation from the government to TVET has been identified as lower than expected and is insufficient for the main purpose, which has been a critical problem within the industry. This study's findings indicate that administrative blockages due to corrupt practices in Nigeria hinder access to funding allocated to TVET for construction related organisations.

5.3.3.2 Inadequate facilities for training

Achieving high quality skills of a workforce within a successful organisation needs suitable and adequate training equipment/tools. However, current findings indicate that training/instructional model for technical and vocational education and training (TVET) and vocational colleges is inadequate. This issue is also based on the inadequate funding impact on the industry due to weak administration of the educational system, corruption, and misappropriation of funds within the sector. Poor funding also contributes to the provision of inadequate facilities for learning within vocational colleges. Inadequate facilities are hindrances to vocational colleges due to the impact on workforce/learner training. However, this study's findings indicate that ineffective training/instructional model is also in line with the management commitment towards the technicians' training which has been considered as inadequate. These findings are based on the evidence that most of the vocational related organisations are challenged by inadequate facilities for training of the workforce (Ekunke, 2008; Olaoye et al., 2017). However, the findings of this study reveal that most of the construction organisations learning facilities are either in a dilapidated shape or do not exist at all.

5.3.3.3 Shortages of qualified TVET teachers/instructors

Findings indicate that qualified TVET teachers/instructors' shortages is critical and has a negative impact on workforce training. The need for immediate attention to ensure adequate provision of qualified TVET teachers/instructors is made for workforce skills enhancement within the industry. This study's views on a CPD and effective training of TVET teachers/instructors are paramount, which should be a continuous process. Shortages of qualified TVET teachers/instructors are mitigating factors against technicians' skills upgrades and has been a threat to industry over the years. Evidence shows that shortages of qualified TVET within construction organisations is due to inadequate and mismanagement of funds that were mainly to be used for the industry (Ugwoke et al., 2020; Ndukwe and Allen, 2018; Ayomike et al., 2015; Ogbunaya and Udoudo, 2015; Muya et al., 2006; Salami, 2011). Furthermore, the necessary recruitment conditions of the qualified TVET teachers/instructors are inadequate and the industry's

poor image lead to shortages of these TVET teachers (Okoye and Arimonu, 2016; Tafida et al., 2015).

5.3.3.4 Ineffective training/instructional model

Ineffective training/instructional model for technicians' training and skills development was characterised as hindrances to the development and performance of the industry. This problem has nearly left most of the VE half-baked graduates in the field of construction with deficiencies in most of the essential skills. Most developing countries, including Nigeria, are challenged with inadequate policy framework that controls or regulates the stakeholders' activities within the industry (Mesfin and Van, 2019; Remington, 2018; Okoye et al., 2013). The activities of these stakeholders are not regulated based on certain guidelines, but rather it has been controlled by an individual for their self-interest (Tshuma and Jari, 2013; Achugo and Chigo, 2014).

5.3.3.5 Absence of practical instructions in TVET curriculum

The main aim of vocational education (VE) is to ensure that low level manpower is trained properly to become more competent in the global construction market. This low-level manpower are the artisans, operatives, craftsmen, and master-craftsmen within the industry of commerce, construction industry and agriculture and ancillary services. Based on this study's objectives, the curricula should have not been structured and implemented towards the general education as it's currently done, or achievement based on mere paper qualification through which admission of STCs students into tertiary institutions for learning is the outcome of The National Business and Technical Examination (NABTEB) for further studies. However, the bias of the educational curricula was one of the critical issues affecting the Nigerian education and training system which in turn affects the VET, which occurs between the management of general education that seems to have less interest on the VET (Akanbi, 2017; Adewale et al., 2018; Okoye and Arimonu, 2016; Salami, 2011). These studies' observations seem to show that the curricula of education and training have more regards for the science education compared with that of the arts education and management and they seem to be biased within their work and this was an indication that policy was critical and was a major concern in this study.

More so, evidence has shown that the skilled workforce within the Nigerian context seems to lack the necessary training because the skilled workforce training is not properly designed and, in most cases, has been structured based on the traditional learning method (apprenticeship system) of learning (Adewale et al., 2018; Ifeyinwa and Serumu, 2016; Odusami and Ene, 2011).

5.3.3.6 Government lack of commitment to TVET

Findings of the survey analysis indicate that the Government's lack of commitment towards TVET is of major concern, which has had a great impact on skilled workforce training. Government policies towards enhancement of TVET seem not to be effective and encouraging within the industry. Though, evidence indicates that tremendous effort was made by the state and the FG towards poverty reduction with focus on the country's economic upgrades, still the government effort was not inspiring (Odewumi and Dekom, 2020; Ifeyinwa and Serumu, 2016; Salami, 2011). Findings of this study indicate that Nigeria as a nation is behind in competing with its counterparts within the construction market globally due to the identified issues concerning workforce training within the industry. A skilled workforce needs to be fully prepared to be highly competitive with its counterparts. In addition, vocational education and training seems to have succeeded in areas of both employment and economic empowerment in other countries, yet the level of seriousness on the vocational education within the Nigerian context seems to be poor and was not encouraging at all (Agbo and Okwudili, 2018; Ogbuanya and Izuoba, 2015; Seyi, 2014; Dike, 2004). However, government and the private sector need more efforts to double up and channel towards VE to accelerate and achieve the goals of the nation's economy through effective workforce training.

5.3.3.7 Non-participation of contraction industry private sector

The industry survey analysis also identifies absence and non-participation of the construction industry's private sector (CIPS) towards workforce training and skills development as a hindrance to effective skilled workforce training within the industry. Based on this study objective, non-participation of the construction industry's private sectors, within the context were related to insufficient funding. This can be controlled or

managed through active collaboration of both the management of CST in the construction related organisations and the government. This responsibility can be conquered through collaboration, as government alone cannot shoulder the responsibility of training the skilled workforce. Hence, this study views that construction related organisations bodies, alongside the allied construction industry professional regulatory councils, need to fully participate in the planning, organising, monitoring and funding of construction related CST, which was based on the studies by Okolie et al. (2019), suggest full encouragement of private sectors in the initiation and its effective participation in provision of standard facilities needed for effective learning for both schools and interested groups.

5.3.3.8 Absence of effective training and skills framework

Most of the developing nations including Nigeria, the apprenticeship system of training is either missing or inadequate. This study indicates that the apprenticeship system in Nigeria lacks the necessary policy framework that would be monitoring the management activities of the industry towards the technicians' training (Oviawe, 2018; Akanbi, 2017; Zite and Deebom, 2017). However, most of construction related organisations within the Nigerian context are owned by private individuals. The policy of the industry is controlled mainly by the private individuals themselves. Jegedea (2020) and Okadi et al. (2020), stated that vocational education suffered in the hands of the management of the general education most specifically in terms of funding sharing.

Obviously, policy framework is inadequate and has a negative impact on the vocational education and training within the Nigerian context. In addition, findings of previous related studies also indicate that application of TVET within the Nigerian construction industry was critical due to unsatisfactory policy framework and sought for improvement in both the curriculum design and delivery to be competent in the construction market (Okadi et al., 2020; Ujevbe et al., 2020; Edokpolor and Dumbiri, 2019; Oviawe, 2018).

5.3.4 Impact of influencing factors on standard of the skilled workforces.

Influencing factors on the skilled workforce, as discussed above, also have an impact on the standard of skilled workforce quantity and quality.

5.3.4.1 Technicians' Skills training on the standard of work

The impact of the influencing factors on the technicians' training and skills development within the industry has created a huge gap on the technicians' performance, which has affected the industry and its contribution towards the nation's GDP. The technicians' inability to acquire the required and reliable knowledge to develop their skills and be competent in the construction market has been defeated and this has led to low skill standards because they have been deprived from the standard knowledge, skills and competencies gained during training within the industry. They lack the confidence of self-independence to become self-employed without any monitoring and supervision from their masters. This has created a huge gap in the rate of unemployment within the organisation of construction related works and the nation's development. Obviously, these influencing factors has led to the generalisation of workforce competency within the industry that was termed as being low and unacceptable or to be self-determining (Kirkpatrick et al., 2019; Gamble, 2016).

5.3.4.2 Skills training on the quantity of the workforces

The negative impact of the influencing factors outlined in Table 4-15 on skilled workforce training has a great effect on the quantity of the workforce's products in the country. This is due to the inability of the construction related organisation in conducting effective training and recruitment of their workforce due to the issue of funding as mentioned earlier. The issue of funding has resulted in lack of vocational education training facilities within the industry, and this has created a huge gap in the number of the workforce admitted for training as well the number of vocational education graduates. In addition to the stated problem, TVET teachers are not recruited to train these learners due to the same issue of funding and this indicates that skills shortages in terms of both the quantity and standard of the workforce are already reduced, and this affects the industry's performance. Findings of the literature review indicate that the skill shortage of the workforce in the construction organisations is not limited to the Nigerian context alone, but it is a global issue and suggests a need for massive investment in workforce training and skills

development (Chang-Richards et al., 2017; Detsimas et al., 2016; Dainty et al., 2004; Mackenzie et al., 2000; Johanson, 2002).

5.3.5 Participation of private organisations in skilled workforce training

The current issues concerning workforce inadequate training within construction related organisations may have contributed towards the lack of private organisations' participation. This gives rise for the involvement of private organisations in workforce skills enhancement. For the essence of this investigation, there are several ways within the construction industry that successful private organisations that are properly structured can immensely participate in the workforce skills development within the Nigerian context in terms of effective training as outlined:

- Creation of skilled workforce training schools.
- Skilled workforce sponsorship for more knowledge
- Provision of skilled workforce essential tools for training
- Enabling environment for skilled workforce training and work practising
- Creation of private vocational education training centres for young people
- Regular workshops for skilled workforce within the organisation.
- Encouraging a regular CPD workshop for the skilled workforce.
- Unskilled people should be recruited into the construction related organisations.

In the construction related organisation in Nigeria, skilled workforce training is paramount due to their larger proportion within construction related organisations. This defines the need to enhance their skills with the target of achieving construction project delivery on time and avoiding cost overrun and meeting quality standards of the project to be delivered. However, most of the construction related organisations within the Nigerian context recruit most of its workforce from neighbouring African countries (Belau et al., 2015; Osaghele et al., 2015). The need for huge investment in training of skilled workforce within the industry to create jobs for younger generations locally within the construction organisation is paramount.

A level of collaboration between the VTIs and ITF exists within the industry. However, to address this issue, the number of participants that are organised for these industrial training is limited due to the economic situation in the country.

5.3.6 Young People not showing interest in construction related jobs

Young skilled workforces are key to every successful economic and construction related organisations' roles and are vital in this development. Participation of young people in the industry that involved mechanical and manual intensives activities is paramount to the nation's economy growth. The role played by young people is paramount to gain a competitive edge. However, young people seem to show less interest in construction related work, which impacts negatively on the industry performance. This study identified issues that daunt the young people towards construction works within Nigeria as outlined in the following sub-sections:

5.3.6.1 Lack of adequate guidance and counselling for skill acquisition

Findings of the analysis indicate that young people within Nigeria who t were primarily use in construction related jobs in the industry do lack the proper understanding of the construction job as a choice of career. Adequate guidance on construction related work as a choice of career is needed from both parents and friends. The important of a skilled workforce for the nation's economic development is not properly understood by these young people. Young people within Nigeria are ignorant of the importance of acquiring skills for construction related work. Obviously, young people lack effective counselling in schools and other learning institutions on the needs to acquire vocational education as a career (Olaniran and Mncube, 2018; Nweze and Okolie, 2014; Igbo and Ikpa, 2013).

5.3.6.2 Lack of incentive/encouragement from the vocational education curriculum

Findings of this survey identify a lack of incentive/encouragement from the vocational education curriculum as a hindrance to motive that encourage young people's interest toward construction related organisations. This issue affected construction organisation development, which is a matter of concern. Most of the jobs occupied needed university

education qualifications, and this has affected those individuals who are more oriented to industry than the academia by reducing the nation's economic prospects.

Evidence shows that the skilled workforce trained through VE is set for occupational life since its graduates are equipped to overcome challenges encountered at work globally (NPE, 2004; Salami,2011). The achievement of a VET was based on industrial experience on a certain job within a work-oriented society which involves knowledge and acquisition of occupational related skills (Ugwuja, 2010).

However, policy makers seem not to have an inadequate plan towards vocational education and training that makes an average individual have a bad impression on vocational education and have a negative perception of it. In addition, policy makers of the educational sector within the Nigerian context have replaced the old TCs with the STCs by recommending further studies for the need and acquisition of paper qualification without recommended skills for the jobs. Even more so, by comparing the NABTEB certificate to those of the WAEC and NECO for competition for Further and Higher Education (FHE). Studies of Awe et al (2012) and Buli (2017) argue that if the orientation of a paper qualification at the expense of practical skills acquisition is left without proper checks, then the organisation of construction related work within the context of the industry will suffer the consequences. This study supports the notion that the system of education will continue to produce many graduates in the field of construction work in Nigeria. However, abundance of graduates from the section of soft and practical skills will continue to be an issue, which leads to skill shortages and gaps within the Nigerian construction industry.

5.3.6.3 Lack of Job security with the industry

The findings of the industry survey analysis identify inadequate or lack of job security and absence of H&S measures as a key issue which is critical and discourages young people's interest in construction related work. The job security and H&S regulations are not encouraging. Hence, it has been considered as a de-motivating factor by the young people of Nigeria. Construction related organisations are mostly owned by private individuals (multinationals and indigenous), and construction related organisations and

most of these individuals can only retain their workforce for few periods of time. Despite the poor image portrayed of the industry, yet the security of the job is not guaranteed, and this has also been a factor that discourages young people's interest in construction works.

5.3.6.4 Inadequate or absence of H&S measures within the industry

Safety is vital in all ramifications, either in a place of work or at home. The industry survey reveals that the attitudes of most construction related organisations towards the safety of their workforce are inadequate. Some of the existing industries do not have safety measures to follow at all while some construction related organisations have safety measures but they are not duly followed, and the safety of every human being is paramount. The attitude of the management of the industry discourages young people's interest towards construction related organisations, which has led to demoralisation of young people's interest in construction work. It was observed that most of the work on sites is carried out without the use of Personal Protective Equipment (PPE), which is against the regulations of the Health and Safety Act. The workforce is doing the jobs on site without any insurance covering them. Findings of the survey outline the discouraging factors of safety measure within construction as:

- Inadequate or poorly organised occupational health services within the sector
- Absent or inadequate training of the workforce on health and safety
- Management attitude towards the workforce is inadequate and unacceptable
- Government policy on safety measures is ineffective within construction work
- Unreliable or poor dissemination of information on safety techniques
- Non-payment of workers' compensation under the health and safety policy

A great example of poor measures taken within the industry on H&S measures is from the top management staff of industry as an issue for concern in the construction related organisations in Nigeria (Govindan et al., 2021). These factors in one way or the other discourage the young people's interest on construction related organisations because it seems their safety in the place work is not guaranteed and at the same level is not insured at all.

5.3.6.5 Construction site work is too degrading

The issue of the negative image on the construction organisation is one of the factors discouraging young people from acquiring construction related works as a profession. The negative image portrayed on the construction related workforce does not give any positive message across the sector. Young people in Nigeria have a strong feeling that construction related work is mainly for those that could not do well in general education. This wide-spread erroneous notion that VET is only for those who cannot do well in secular education discourages many who would have considered construction skills as a career. Young people have a strong perspective on the artisans as second-rate citizens and in most cases, they view construction site work as a dirty job. The construction skilled workforce has lost its dignity of labour because of its job. In addition, the middle level and high-level skilled professionals in the industry also have no regard for the craftsmen and treat them without esteem.

These issues are identified in the literature studies, which are key to construction related work as a career for young people and this has deterred so many young people from choosing construction related work as a choice of career (Navarro-Astor et al., 2017; Kappia et al., 2007). There are indications that young people's perceptions towards construction related organisations in Nigeria and other developing countries of the world, that the artisans/technicians are generally regarded as 'never-do-wells' or failures, societal rejects and hopeless people that should continually be at the bottom of the 'socio-economic ladder' (Gerstein and Friedman, 2016; Salami, 2011). As a result of this poor image on construction related work, most of the young people within the Nigerian context view construction craft careers as downgrading and condescending. Inadequate payment of the construction skilled workforce has worsened and further constricts the ability of the sector to attract young people into the industry.

5.3.6.6 The young generations are lazy and hence unwilling to acquire skills

This study proposes a framework for workforce skills enhancement which considers the interest and motivation of the younger generation for accomplishing its objectives. This is obvious that the key objective of the proposed framework can only be realised towards

the efforts made by the younger generation and interest shown by them towards training. One of the key objectives for this study is to encourage young people to show more interest in construction related work as a profession. This will be in line with the growing population rate estimated to be 400 million by 2050 (Jacob et al., 2020), which makes the country to be the third largest after China and India, and most of the population are the youths. This will be relevant to ensure that the management of the various construction related organisations see it as vital to motivate these younger generations towards greater future challenges. However, participants' opinions indicate that most of the younger generation want quick and easy money that led to so many criminalities act call "**Yahoo plus**" within the country.

5.3.7 Possible strategies to workforce skills enhancement

Several countries have pursued the goal of more high-skilled jobs through requesting higher qualification levels of the workforce, particularly by expanding higher education. This expansion increases the supply of graduates onto the labour market. The idea behind this supply-side intervention is that a high skilled workforce will attract businesses that wish to or already do compete on quality and innovations or will encourage existing organisations to make use of these skills and improve performance, including moving into higher-level added markets (Ashton et al., 2017; Warhurst and Findlay, 2012). The problem is that there is increasing evidence of a growing level of over qualification, and that economics are not generating enough high-skilled jobs. However, this study's findings identify some of the strategies that can be applied to motivate or encourage young people within the Nigerian context on the construction related organisations to enhance the skilled workforce in the industry.

5.3.7.1 Strategies to encourage youth in construction works

As part of this research study, the necessary or plausible ways of permanent solutions to the young people's interest on construction related work in an organisation within Nigerian context has been explored. The findings of the industry survey reveal the possibilities of potential strategies that could enhance young people's interest on skilled work in the construction industry, which are:

- Make skills and vocational training free
- Make craftsmen wages attractive
- Make skills trainees earn while they learn
- Ensure dignity for labour for Craftsmen
- Introduce practical/skills-oriented programmes in educational system.
- Accord recognition to skills/vocational education
- Make skills instruction mandatory in both junior and senior secondary schools
- De-emphasize non-skilled general education
- Properly fund technical/vocational education
- Make career guidance and counselling mandatory in both junior and senior secondary school level
- Improve on job security in the construction industry

The industry survey analysis findings indicate the poor pay rate of the skilled workforce; the poor image portrayed on jobs in the construction industry is worrisome. The increase of construction related organisations pay rate will be a good starting point to encourage both the existing and newly recruited workforce. The increase in workforce wages will motivate younger generations to develop interest in construction related jobs as a choice of career.

Inadequate funding is a hindrance mentioned earlier to the TVE and development of the industry. Findings indicate that funding in every successful organisation is like a tool that in most cases will make the organisation attractive to unskilled people, both young and adult. Hence, this study suggests adequate funding be provided within the construction organisations to make skills acquisition attractive to the younger generation. Young people's attitude towards construction jobs will change and people will begin to make their way into the industry. If the funds from the Petroleum Trust Fund (PTF) and that of the Organized Construction Industry Private Sector (OCIPS) are channelled to TVE and properly managed, the industry will experience a tremendous improvement and there will not be issues of skills shortages in the industry.

This will be the fastest way to reduce crime rate amongst young people that are jobless and want to have something to do to sustain a living. This suggestion is in line with the studies of Odusami and Ene (2011) and Salami (2011) whose opinions towards motivation of young people's interest on construction related work as a career, encourages the industry of construction to address the challenges of skill shortages.

5.3.7.2 Strategies to address skills shortages within the industry

The findings of the industry survey analysis on strategies that could be adopted to address the skilled workforce shortages and skills gap within construction organisations include:

- Adopt multi-skills methods for new skills/vocational trainees
- Mobilise unskilled youth for skilled training
- Re-introduce the apprentice scheme and make it effective
- Make secondary education skill-based
- Make general education practical/skills oriented
- Accord recognition to skills/vocational education
- Make skills instruction mandatory in both junior and senior secondary schools
- De-emphasize non-skilled general education
- Properly fund technical/vocational education
- Make career guidance and counselling mandatory at senior secondary school level
- Group sub-contractors for purpose of training apprentices
- Improve on job security in the construction industry
- Re-train the existing craftsmen
- Establish special apprenticeship training centres

However, inadequate commitment of the public sector in the construction related work has led to the issue of skilled workforce inadequate training within the construction industry, which led to the current challenges of shortage of workforce; with its attendant effects on the productivity of the sector and the overall development of the nation's economy (Afolabi et al., 2016; Okon and Friday, 2015; Salami, 2011; Muya et al., 2006). This industry survey analysis indicates the importance of the construction organisation in

CST for skilled workforce training which cannot be over emphasized within the industry. As identified by the survey analysis, training of the young people to acquire vocational skills will help to enhance the industry development and the nation's economy.

In addition, creation of more vocational training centres within the country will also be a great help to the industry upgrade to tackle challenges on shortages of a skilled workforce. Furthermore, adoption of the relevant techniques as identified in this study will be vital. There is an indication that there are identified avenues that need to be fully explored within construction related organisations and the mobilisation of the young people for CST. This is in line with the recruitment of these young people into construction to acquire skills regularly to be competent in the construction market through effective training.

There are indications that the general system of education at present should be made practical oriented, which will be a better idea to encourage young people to develop more interest in construction work. Based on the concept of training and development of young people into construction organisations, this study suggests the need for secondary schools, both in the junior and senior sections of education, to be skill based as a favourable concept to tackle skill shortages. This study is of the view that training of a skilled workforce needs appropriate attention in the educational system of the country, from the foundation stage to secondary education level. This will be an effective strategy for a good start in the process of addressing skill shortages within the industry.

Effective training methods related to construction organisations were found to be that of the apprenticeship training schemes, both formal and informal. These training methods were effective to generate reliable and competent skilled workforces within the industry at present and in the past as revealed by these findings. This education scheme needs to be re-visited on a regular basis with the modifications of new concepts to overcome hindering factors argued by this analysis as a solution for addressing skilled shortages.

5.3.7.3 Agencies with quality assurance and benchmarking

The need for suitable benchmarking and Quality Assurance (QA) was paramount within this context. The analysis of findings on the important strategies on QA and benchmarking

of Construction Crafts Skills Training (CCST) are discussed in this section of the study. The findings of the industry survey analysis explore the options on the various strategies on the agencies, which may be engaged with the responsibilities for QA, benchmarking, and accreditation of CST within the context of the industry. This survey analysis indicates that the combined efforts by these agencies are of great importance:

- Organized Construction Industry Sector (OCIS).
- Nigerian Construction Industry Training Board (NCITB).
- Vocational Training Institutes (VTIs).
- Allied Construction Industry Professional Bodies (ACIPBs)
- National Board for Technical Education (NBTE)
- National Construction Apprenticeship Training Board (NCATB).
- Federal Government Ministry of Labour and Productivity (FMLP)
- Local Government Education Boards (LEDs)
- State Government Education Boards (SEBs)

The FGN through the FME, in conjunction with its appropriate agencies, are tasked with the responsibilities of overseeing the Quality Assurance (QA) in the various tiers of education (NBTE, 2011). The regulation and accreditation of the various TVE colleges' academic programmes and other level of technological education are tasked with the responsibility of NBTE. At the polytechnic level, the ACIPBs in conjunction with the NBTE organise and ensure that the departments that offer professional courses undergo accreditation in their various departments. The accreditation aims to ensure that QA is maintained and curriculum standards within the sector assured. Based on the curriculum standard, CST within the industry is wisely monitored to ensure the standard is maintained for QA purpose. The OCIS and ACIPBs' participation within the QA is strongly supported by the survey participants and benchmarking processes within construction crafts training programmes as representative of the industry.

5.3.7.4 Agencies for examination of and certification

The findings of the survey analysis indicate that the responsibility of the examination and certification of the craft-skill trainees in Nigeria could be charged on some possible agencies. However, findings of the survey analysis are of the views which are discussed in this section of the study. Based on the survey analysis, construction crafts trainees' agencies for examination and certification of the graduates include:

- Vocational Education Examination Board (VEEB).
- Vocational Training Institutes (VTIs).
- Apprenticeship Scheme Examination Board (APSEB).
- National Business and Technical Examination Board (NABTEB)
- Federal Ministry of Labour and Productivity (FMLP).
- State Ministry of Labour and Productivity (SMLP).
- Federal Ministry of Education (FME).
- State Ministry of Education (SME).

The design of the system allows the trainee to spend a duration of three years in Junior Secondary School (JSS) to obtain a Junior School Certificate Examination (JSCE). The National Examination Council (NECO) is the organised body that is responsible for issuing the certificate after successful completion of the training. There is another three years duration of training at the senior section, which is the Senior Secondary School (SSS). The trainee is expected to sit for the final year examination, Senior Secondary School Certificate Examination (SSCE), which is conducted by the West African Examination Council (WAEC) and the National Examination Council (NECO). The senior school leaving certificate is issued by the organised body of the WAEC and NECO. However, at the end of the two-tier system of vocational courses offered by the FGTCs, NABTEB is the organised body that awards the National Technical Certificate (NTC) and the Advanced National Technical Certificates (ANTC). To expand on these, the duration of the lower program is three years after the JSS and is equal to that of the SSCE because they are equivalent to each other, while that of the advanced program requires not less than a year for a pre-entry industrial work experience and ranks on the lower 'tertiary

education level (WENR, 2004; NABTEB, 2011). The input in the examination and the certification by the VTIs is based on administering the continuous assessment of vocational trainees.

5.3.8 Behavioural factors and its impact on technicians' training

There are key factors identified from the findings, which include:

- Management commitment towards technicians training
- Lack of organisational structure concerning technicians training
- Inadequate funding from government on TVET programs
- Inadequate projects manager support on training and skills development
- Inadequate incentives measures on technicians' skills training
- Poor leadership/management commitment within the construction sector
- Inadequate communication network within the workforce
- Inadequate enforcement of mandatory standard on technicians' training

5.3.8.1 Inadequate commitment of project managers towards technicians' training

Inadequate commitment of industry management on workforce training is in line with the various studies of Okoye and Arimonu (2016), Bilau et al. (2015), Osaghele et al. (2015) and Akomolafe and Olatomide (2013). Based on these studies views, workforce training and skills development is a continuous process and should be a continuous process within any successful organisations, most especially within construction related work due to its nature. However, this has been greatly affected due to staff training and retention within the industry. This process should be an adequate process of enhancing workforce skills in the industry, which can either be conducted locally or internationally. Findings of these studies indicate that sponsoring trainees for overseas training is usually expensive compared to those being trained locally. However, the industry is challenged with lack of training facilities that seems not to be available within the context. Furthermore, the biggest challenge the industry experienced over the years was bringing back those who were sponsored for the training abroad. The management commitment towards the workforce training within the industry is totally inadequate from the previous chapter

analysis findings. This current study considers that workforce training facilities should be made available in the industry. Provision of these training facilities may encourage the management and boost their commitment towards skills training.

5.3.8.2 Inadequate organisational structures concerning technicians' training

The management and administration responsibilities within the organisations are not properly followed. Organisational structure is important for a successful and competent organisation and if these structures are not in place, this will lead to a negative impact on the organisation. This may lead to low performance and output in productivity within the industry. Most of the construction related organisations management concerned may have limited power in discharging their role within the organisation. If the organisational structure of an organisation is not properly designed, this may generate issues that can affect workforce performance within the industry.

Concerning organisational structure within the context of the industry, critical issues on fragmentation within the industry is a key issue. This has been linked to the curriculum of general education within the context, which seems to be generic instead of vocational education on its own. Due to this issue, findings of various studies indicate that vocational education suffered through the management of general education (Osaghele et al., 2015; Belau et al., 2015). These are key issues regarding organisational structure, as most of the existing industries in Nigeria do not have definite organisational structures and even those with one, it is not being followed. This is linked to the inadequate curriculum structure, which should have given adequate attention to VET workforce within every successful construction related organisations.

5.3.8.3 Inadequate use of recent technologies

Workforce knowledge on the available tools in organisational settings is of paramount important in the actualisation of the industry goals. This is factual within the competent and successful organisation that is striving hard to maintain its performance within the global construction market. The adequate workforce/learners' knowledge on recent technologies are keys to the survival of the industry. However, these seem to be missing

within most of the existing construction related organisations in Nigeria. These facilities are not available and those industries with these facilities are either inadequate or only a few members of the workforce that can operate these facilities. Studies by Jacob et al. (2020), Jacob and Ndubuisi (2020), Osaghele et al. (2015) and Awe (2012) found that inadequate infrastructural facilities have a negative impact on the training and educational system in Nigeria, which has created a huge setback in training and educational system upgrades. The participants of the industry survey are of the opinions that most of the construction industries in Nigeria lack these recent technologies and those few ones with the facilities struggle on how to use them within their organisational settings.

5.3.9 Behavioural factors to technicians' motivation and values

This section is primarily to determine the technicians' and managers' behaviours on adequate training towards motivation and values of their workforce within the industry.

- Organisation motivation of its employees
- Incentives measures for school leavers and young people
- Effective strategies to be adopted to tackle technicians' skill challenges
- Employees skills training in the past/present time
- Organisation working as a successful team
- Resolving conflicts in teams and maintain team dynamics at work Meetings to review and update project plans
- Relying on sub-contractors and to what extent
- Communication tools i.e. communication gadgets and tools used on site

5.3.9.1 Organisational motivation of its employees

This is an important section within any successful organisational settings regarding its workforce/learners' training towards attaining its gaols. This focuses on the organisations' encouragement towards their workforce by boosting their morale to determine their energy level, their commitment in performing their duties and the amount of creativity, which the workforce/learner can do. However, most of the construction organisations in Nigeria do not see the need of motivating their workforces and have been so discouraging

within construction organisations. The general belief is that management of construction organisations claim that the country's economy was bad, so they are struggling to survive.

However, studies by Shaaban (2018) and Astuti and Made (2020) and Nguyen et al. (2020), indicate that employee motivation and citizenship behaviour in organisational settings are vital issues in the realisation of the organisational objectives. They stress the need for workforce motivation to enhance performance in organisational settings.

In addition, Sylviana et al. (2020) state that employee s motivation can be an influencing factor within organisational settings in realisation of its objectives because employee motivation determines an individual reaction to something because of physical and psychological deficiencies, that is the impulse that indicates the evidence of meeting a certain goal. Furthermore, Sinaga (2019) stresses the need for employee motivation within organisation in realisation of its organisational settings.

5.3.9.2 Incentives measures for school leavers and young people

This strategy employed by professionals within the general setting of an organisation is vital in terms of motivating learners/workforce within successful organisations as a payback. In the preparation of a learner to achieve the planned objectives, incentives are usually given to the learner/workforce to motivate them to do better in what they do as means of encouragement. In school leavers situations within the organisation or learning institutions, meal delivery service, lunch, or dinner, may be given to them during training to encourage them. However, the construction related organisations do not participate in this effective and efficient means of motivating the workforce/learner regularly within their organisational settings. Petty cash giving was one of the most common incentives to motivate workforce/learners within organisational settings that performed his/her task effectively in achieving the required organisational objectives.

5.3.10 Behavioural factors that influence technicians' integrity

This determines the factors that influence the technicians and project managers' behaviour towards technicians' honesty/integrity and safety within the industry as outlined in Table 4-15 outlined below.

5.3.10.1 Inadequate managements support on training

The top managers of most construction related organisations in Nigeria commitment and support towards skilled workforce training is totally inadequate. Findings of this study indicate that most of the management of the organisations are either complaining about issues concerning funding or problems associated with changes in leadership. This seems to be the key factor that discourages the management of the various industries to carry out training. The management concerned on workforce seems to be defeated and training of the workforce was put on hold. However, this current study stresses the need for adequate workforce training as a means of boosting workforce skills. Obviously, the management of the organisations seems not to understand the imperative nature of workforce training in realising organisational settings in achieving SDG.

5.3.10.2 Safety measures during task or job

Most construction related work seems not to observe safety guidelines within the industry and most especially on the construction site. The site managers of the industries are reluctant on safety guidance and the government does not conduct regular checks to ensure that industries are complying with the safety rules and guidelines. H&S at work is paramount in any place of work, especially construction related work where risk is high. This was due to management inadequacy and government reluctance in their duties of ensuring adequate compliance of the safety rules. Studies by Nnedinma (2017), Aalders and Wilthagen (1997), Fairman and Yapp (2005) and Hutter and Amodu (2008) indicate the failure of the Nigerian construction industry in terms of its H&S.

5.3.11 Summary

From both primary and secondary data analyses done, it is understandable that critical challenges exist on workforce skills in Nigeria that lead to the downgrade of the industry's contribution to national growth and survival of the country. The findings of the industry survey provide the need of this investigation to enhance the quality of workforces' skills in the Nigerian construction industry. The participants' perceptions, as captured and analysed, give a richer consideration on the subject matter, to find solutions to the

problem. The current views of the workforce training and skills upgrades is not an integrated approach, considering the stakeholders, namely, the government at federal, state, and local level, educationist/trainers, and project/site managers. It may appear that each 'agency' operates in a silo without a systematic existing body charged with coordinating all these disparate parts. A better approach is needed for the survival of the construction industry in terms of its performance to be competent in construction market. Although, tremendous efforts were made by the FGN regarding workforce training, this study findings reveal that existing workforce training in Nigeria is a **"stand alone"** without observing any training regulatory body.

Summary of the key issues are: the inadequate management commitment towards workforce training and funding, instability of government and irregularities in regulations to training and corruption, and knowledge shortages in terms of technical skills, interpersonal skills, project management skills, enterprise skills, business skills and conceptual skills. There has been a tremendous shortage of skills and knowledge within the workforce, which has a negative impact on the industry and the nation's economic growth. These findings will be used to generalise on the entire Nigerian construction industry, which will be appropriate to develop a guideline to address these issues. Hence, a skills development framework is presented in the next section.

Chapter Six: Proposed Conceptual Framework Development

6.1 Introduction

The aspiration of this research is the development of a training and skills development framework for construction technicians to improve the competitiveness of the Nigerian construction industry. The chapter starts with discussion on the purpose of the framework development and the rationale behind the conceptual framework developed. This is in line with the educational system improvement that can be actualised and sustained through an integrated approach through combination of specific measures and processes, which are the contextual problems analysis, framework formulation and description.

6.2 Purpose of the framework development

The proposed framework development was based on the challenges found from this research within the Nigerian construction industry. The proposed framework will improve industry performance by enhancing the workforce competencies in the construction market. The existing model of the general education system through the NPE within Nigerian context gave rise to the background for the framework development. There is evidence that the current system has focused on general education as industrious and productive, in which inputs are transformed into outputs (Oladejo, 2019; Oviawe, 2018; Nwosu and Micah, 2017; Scheerens, 2011). However, vocational education is not given the adequate consideration it deserves to make its enormous contributions towards the nation's economic growth.

In addition, vocational education in Nigerian image has been portrayed negatively to the younger generations and other competitors. This has created a negative impact on industry performance and created a huge gap between the industry and its competitors, which affected the industry in its contribution towards the nation's gross domestic product (GDP). An overview on the basis for the development of this framework was clearly understood through the context of the general educational system based on NPE (Akpan, 2019; Arop et al., 2018; Akanbi, 2017; Olibie et al., 2017; Scheerens, 2011; UNESCO, 2011). The knowledge gained on the national policy of the education system in Nigeria

gave rise to an in-depth consideration on the proposed framework development based on the IPO components. Henceforth, the adoption of the IDEF0 modelling concept provides an in-depth understanding on the approach towards the framework development.

6.3 Current state of the existing training framework and findings

Findings of the industry survey analysis presented in Chapter 4 outline the state of the existing technicians training system within Nigerian construction industry as:

- The current policy within the context on TVET is inadequate
- Inadequate funding of TVET and Government lack of commitment
- Ineffective training/instructional model/ Insufficient facilities for training
- Shortages of qualified TVET teachers/instructors
- Absence of practical instructions curriculum and Absence of modern training facilities
- Non-participation of construction industry private sector organisations
- Unwillingness of trainees to acquire in-depth vocational knowledge
- Inadequate commitment of Project manager on technicians' training
- Absence of effective training and skills framework
- The calibre of students that are attracted to vocational training in most cases is not the best in comparison with other industries.

6.3.1 Behavioural factors and its impact on training

There are several factors that come out from the analysis of the industry survey and interviews that are relevant to the technicians' skills upgrade, which are identified in Section 5.3.8 of the thesis.

6.3.2 Behavioural factors that influence technicians' integrity

Factors that influence current project managers' and the technicians' behaviours towards honesty/integrity and safety within the context of construction industry are outlined and discussed in the previous chapter 5 (Section 5.3.9) of the thesis.

6.4 Sources for the proposed framework development

The research approach employed in the collection of the data for development of the framework was a mixed method. This involved both approaches (primary and secondary) data analysis. The subject under investigation was thoroughly investigated through the means of the existing literature review. The framework development is the central point of the current study to enhance the workforce skills within the industry. The literature review covered training concept, current and previous workforce training, history of the Nigerian education and training, educational reform and qualification, workforce training concepts in construction related organisations, skills shortages and skills gaps, skill needs within the construction industry, the Nigerian construction industry and its challenges, technical and vocational education and training (TVET), problems of vocational education, which are related to the subject under investigation. These enabled the researcher to gain an in-depth understanding on the issues that gave rise to secondary data collection on key issues concerning technicians training and skills development that led to primary data collection.

The analysis of the quantitative data gave rise to the design of the interview questionnaire to corroborate the quantitative data findings. The qualitative analysis served as a second source of the primary data to further clarify the findings that were not clear during the quantitative analysis through the interview with participants. The data collected for the interview was analysed further using relevant techniques based on the research objectives, which include participants' observations and data transcription.

6.4.1 Structure of the sources of the framework development

The guide on the developed framework is presented in Figure 6-1

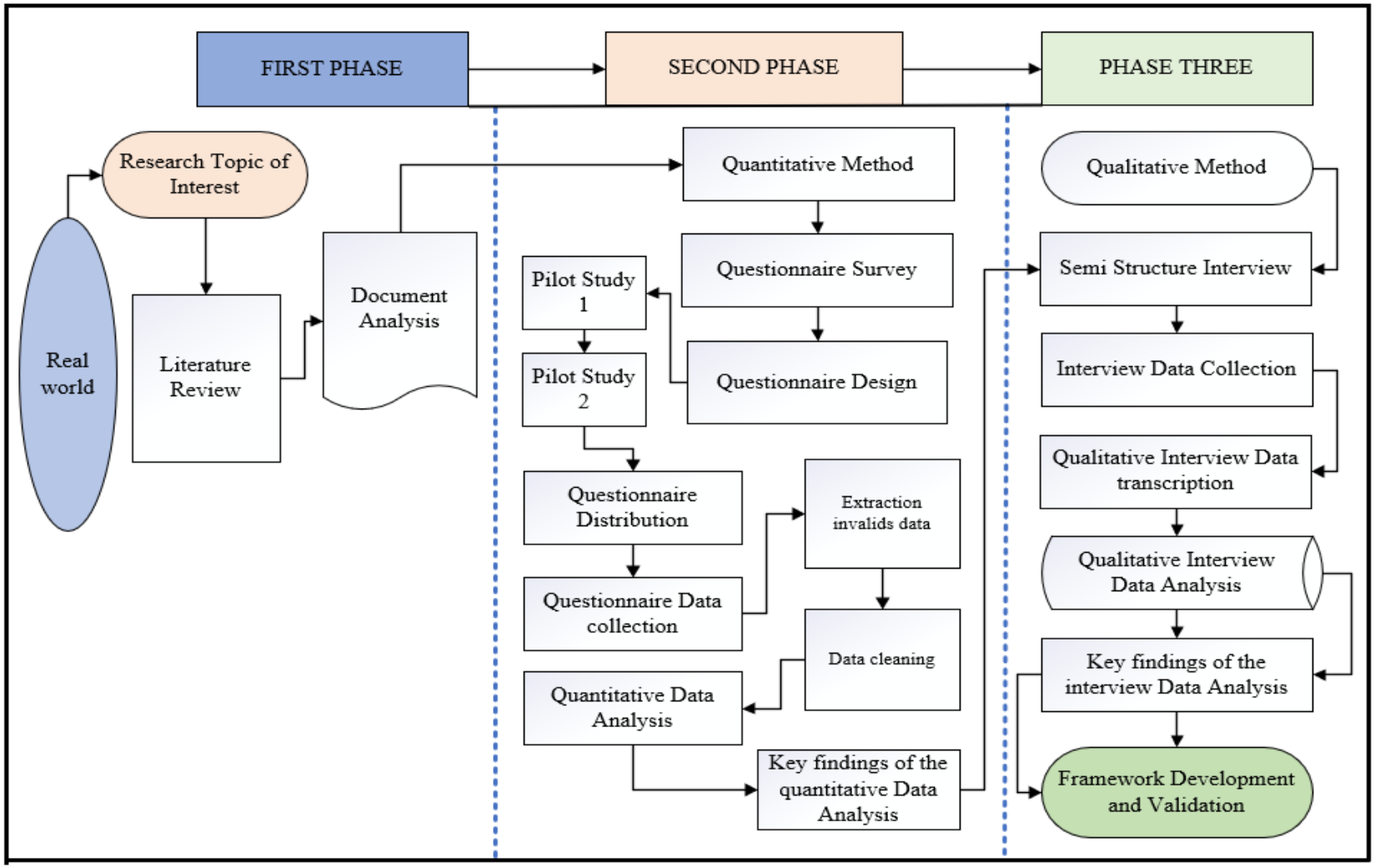

Figure 6-1: Structure of sources for proposed framework development

6.5 Effort made by the FGN on skilled workforce training

The effort made by the government of Nigeria towards poverty eradication, empowerment of the younger generations and entrepreneurships' enhancement in the past, was through the establishment of different training programmes within the context of the industrial setting within Nigerian context. These previous efforts made by the FGN created several training programmes established in line with the reforms of the skilled workforce that was planned to meet up with the country labour needs. These training programmes were aimed at enhancing entrepreneurship and youth empowerment. A few numbers of these training programmes were outlined by previous studies of Ayonmike et al. (2015), Efobi and Orkoh (2018), Okwelle et al. (2017), Amaechi et al. (2016) and Awe (2012).

6.5.1 National Poverty Eradication Programme (NAPEP)

Previously, the efforts made by the FGN led to the establishing of this training programme which was aimed at reduction of youth unemployment. To reduce the unemployment rate, mostly among the younger generations, training has been categorised with the same primary goal and focus. This scheme focus was to provide skills acquisition opportunities for the unemployed younger generation and make them self-reliant, which are divided as:

- Youth Empowerment Scheme (YES)
- Quality Education Programme- (QEP)
- Capacity Acquisition Programme (CAP)
- Credit Delivery Programme (CDP)
- Mandatory Attachment Programme (MAP)

6.5.2 Industrial Training Fund (ITF)

This was established in line with the effort towards skilled workforce training and youth empowerment by the FGN in the year 1971 as manpower agency under the then Federal Ministry of Commerce and Industry (FMCI). At present, the scheme is under the Federal Ministry of Industry with the primary aim of impacting technical skills of the workforce in the industrial sector. The government effort towards this development was to address the issues of skilled workforce shortages in the country. The major aims and objectives of

this scheme were to provide training for the skilled workforce and foster encouragement or incentive of skills within the industry. According to this objective, the scheme would generate more indigenous trained people who would be competent to compete within the global construction market to enhance the nation's economy. The ITF has many services which are outlined as follows:

- Vocational and Apprentice Training (VAT)
- Administration of the Student Industrial Work Experience Scheme (SIWES)
- Direct Manpower Development Training (DMDT)
- Development of Human resource data and provision of training services to industry and commerce to enhance manpower capacity and in-house training delivery effort

6.5.3 The National Directorate of Employments (NDE)

This was another effort by the FGN towards skills acquisition within the industry and for the younger generation. Also, the National Youth Employment and Vocational Skills Development Programmes are designed to benefit the younger population, which include:

- The National Open Apprenticeship Scheme (NAOS)
- Waste to Wealth Scheme (WTWS)
- School on Wheels Scheme (SOWS)

6.5.4 Approval of private owned Vocational Enterprise Institutions (VEIs)

This was another effort made by the FGN towards encouragement and upgrade of the craft skills in the context of the industry to broaden and gain access to Technical/Vocational Education and Training (TVET). The support of the private owned vocational enterprise institutions and Innovation Enterprise Institute (IEIs) basically aims at meeting the skills need within the industry and wealth creation for the younger generation through the self-empowerment of the citizens.

6.5.5 National Board for Technical Education (NBTE)

The document analysis findings indicate that the National Board for Technical Education played a vital role in the nation's agenda on Training and Vocational Education (TVE) to meet the nation's agenda towards training and vocational education of construction craftsmen. In response to the vision and to accomplish this agenda, the board emphasis has been centred on highly skilled technical and professional manpower aspect of the TVE. The board seems to have less focus on vocational education to produce semi-skilled, sub-professional tradespeople who are needed within the construction industry and other related industry for production. It would be obvious from the findings of the reviewed literature and the document analysis that the board (NBTE) has failed in achieving its designed aim and targets towards meeting the needs of the industry plans on the purpose and objectives of the Nigeria as a country agenda on TVET for the construction industry and other industrial sectors (Kagara et al., 2020; Ejeka et al., 2018; Oviawe, 2018; Moses and Kingsley, 2013; Awe, 2012). Based on the nations' agenda and the challenges within the Nigerian context, there is a need for a better consideration to construction related organisations upgrades because the industry is recognised worldwide as one of the major drivers of the nations' economy and job creation for the younger generations. Hence, the research proposed framework is fully developed in the next subsection **6.6** to determine the central aim of the research.

6.6 Development of the proposed TSDF

This developed framework would serve as a guideline to improve the technicians' skills quality in Nigeria with the view to enhance the new entrants and the existing workforce competence within the industry as outlined below.

- The current policy on TVET within the Nigerian system of education is totally inadequate. Vocational education has suffered through the management of general education which seems not to value the VET. The integration of the system is not effective and there is a need for improvement on the policy by ensuring that vocational education and training are given adequate support for career prospects.

- Due to the lack of sufficient funding of TVET, the current vocational institution for training of the workforce in construction related organisations is below standard with less training equipment, which did not give a clear message about the industry, The aim of the institution was to impact knowledge to provide trainees with the necessary skills to be competent and reliable in construction market, but this aim was defeated due to inadequate learning facilities. However, suitable private organisations are vital to corroborate with the government at any level to overcome the challenges of funding in construction organisations.
- Corresponding to the approval of the private owned vocational enterprise institutions (VEIs) and Innovation Enterprises Institute (IEIs), the government of the Federation has provided opportunities for those private individuals who do not have enough capital to invest in the industry. Such individuals will not focus their attention on the need and the knowledge the trainees should acquire to improve their skills to gain employment. By incorporating and initiating young people's training to promote employment among younger people, through provision and development of courses that are related to vocational education and training, will enhance experience within the context. But the reverse will always be the case and the aims are defeated. The trainees and the industry/society will suffer the consequences as revealed by this situation. Hence, the government can improve on this critical challenge, which has been experienced with some guidelines to monitor those private individuals and committees to be set up to ensure that those guidelines are duly followed to ensure regular checks.
- The image of TVET should be examined by upgrading and making the industry attractive to the public, unlike the negative image portrayed that TVET is mainly for the hopeless and failures in society. This does not send a good message on the industry to encourage young people and adults to join the industry. The government at all levels should ensure young people who are interested in any of the vocational education courses as a career should be encouraged by awarding them scholarships. Attached to the scholarship is provision of other incentives for the scholar to motivate them on construction related jobs as a career.

- The industry regulatory mechanism on workforce recruitment and trainees' mobilisation should be established within the industry to ensure proper enrolment from high schools and other sources. This can either be online or construction clubs or online advertisement on social media such as Facebook, Twitter, and WhatsApp.
- The private individuals who own those construction related organisations should be paying less tax to the government to encourage them to participate effectively towards the development of the industry. Employers of the industry should ensure a warm and friendly relationship exists between them and their employees and provide some incentives for the trainees to encourage them.
- There should be a continuous review and updating of the policy framework on the regulation of TVET within the context of the industry.
- There should be a clear partnership between the public and private organisations to collaborate with each other to develop and promote TVET
- There should be an established form of regulatory agency that must be highly functional and reliable in the enforcement and control of the apprenticeship system
- The perceptions of the young people towards TVET should be completely modified from the negative perceptions they have on construction related work. This negative orientation which young people have on the industry can be changed through the help of social media awareness and physical campaigns.
- There is too much fragmentation of the educational providers for the construction industry. This should be considered to improve workforce performance, which has been inadequate due to the fragmentation of the education providers within the industry. This does not encourage workforce effective integration, coordination, and proper workforce communication within the industry.
- A reduction or streamlining the number of providers to a visible few, which should be regulated tightly by the government of the country. Construction related organisations should think of capital processes which will be automated and streamlined. The implementation of an information system which will be of great help to the workforce to gain required access databases from other departments that can improve inter-departmental efficiency.

- Development of policies/strategies that will bring about such change. This should be in line with the regulatory agencies that must be highly functional and reliable in the enforcement and control of apprenticeship system.
- A better integrated approach between educational providers, funders, and public & private construction organisations. This will provide better collaboration within the industry to enhance the workforce performance. An integrated approach concept between educational providers should be adopted to gain unique requirements for the whole cycle from the design to the system integration
- Elevating the **value** of construction operatives, thereby removing the stigma of "a second- class profession" because their training is vocational.

6.6.1 Procedure for the proposed TSDF development

Numerous models/framework that are based on workforce training and skills development exist. However, these existing frameworks/models are designed based on different criteria that involved numerous approaches on framework evaluation and design based on the research objectives (Darwin, 2012; Ramzan, 2015; Stufflebeam and Shinkfield, 2007; Chinta et al., 2016). Findings of this study indicate that existing training and skills development models are either not in use or no longer adequate to be implemented to address the challenges linked with recent technological knowhow in construction organisations and varied skills required for the industry' enhancement to compete in the global construction market.

Generally, research models designed on evaluation technique are based on studies of Darwin (2012), Guba and Lincoln (1989), and Chinta et al. (2016), the standard categories are basically motivated by individual legitimacy, which depends on the quantitative data from the research respondents. The second category is the fourth-generation category which is basically motivated by enhancing the learner learning and this depends mostly on wide-range qualitative data that involves the use of developmental continuous methods with a programme development action plan.

The standard evaluation category of the model is used in a few developed nations like the United State of America (USA), the United Kingdom (UK) and Australia, which is the

quantitative survey of students' opinions (Darwin, 2012; Chinta et al., 2016). However, findings of this research indicate that the existing models seem to be fragile, unreliable, and susceptible to various influences and the value of the respondents as a means of evaluating a complex system like higher education institutions within the context, which may include multiple stakeholders covering learners, instructors, and administrators. The popular Kirkpatrick evaluation model was developed for evaluating training with four components of reaction, learning, behaviour, and results. In the process of evaluating a large-scale educational system, the need for a more comprehensive model is paramount. The context, input, process, product (CIPP) approach is a management-oriented one widely used in public schools and higher education institutions in USA and across the globe. CIPP includes context stages where evaluators identify environmental readiness and community needs, input suggests a project that addresses the needs identified in the context stage, process controls and assesses the project process, product stage measures and judges project outcomes, worth and significance (Aziz et al.,2021; Neumann et al., 2018; Chinta et al., 2016; Zhang et al., 2011). CIPP is one of the most popular evaluation models that implement social approaches in each of the four components. The goal of CIPP is "to improve" not "to prove" (Stufflebeam and Shinkfield, 2007) issues in the organisations. CIPP is suggested as an appropriate evaluation model for assessing higher education institutions.

Furthermore, in an **input evaluation**, the involvement of the effectiveness of training programmes, which fundamentally denote to the system performance indicators (SPI) include the qualification of the trainee, experience of the instructor, instructional materials that are available and which has already been tested, training facilities that are available, which covers tools and technical expertise, alternative programme strategies, competencies of administrative function, efficiency of course development and training budget (Chang and Chien, 2012; Rovai, 2003). The input evaluation of training/skills development in the proposed framework was to provide adequate information regarding resources, its quality and how best it's been utilised for the planned programme objectives in Table 6-1, Table 6-2 and Appendix C, moreover, considering the need to examine the trainees available in the programme and consider their needs as paramount. This evaluation provides consistent information that refines and states the precise position of

the programme in a competitive construction market, by validating the programme and course objectives. Furthermore, input evaluation was key in forecasting the future costs and the sustainability of the evaluated programme.

Process: Basically, all activities that enhance the value of an organisation, involving planning, design, developing and delivery of educational training. In addition, the evaluation process has to do with examining what was happening in the programme and how it has been implemented, and what should be happening or not. This stage provides information regarding the position of all the components of the program, which determine trainer's effectiveness. **Output evaluation** within this context is like the outcome as used in the developed framework. In the output, that is the long term, employees could gain trainees reactions, knowledge, skills, and enhance job performance from the educational training. The purpose of the input process output (IPO) model is to reduce the cost of training programmes and enhance the training flexibility and responsiveness of the setting (Bushnell, 1990; Chang and Chien, 2012).

6.6.2 Context

This proposed framework context is determined evidently, which is technician training and skills development notifying that it has an impact on all other elements of the system. All the elements of the framework in Table 6-1 and Table 6-2 are the input, process, output, and impact. However, in this study contextual factors are the political, economic, social, technological, legal, and ethical factors. These factors are subdivided into internal and external factors of the framework. Currently, there is only one internal factor, which will have an adverse effect on the framework, being the ethical and moral issues of the education providers. In Nigeria, given the high level of corruption and business functions, the ethical factor will have an edge on influencing those that are involved in the framework. Thus, if these factors' impact is minimised, then there is hope for a better functional application of this framework.

6.6.3 Basis for the proposed framework development

The basis for the development of this research framework is the application of the of IDEF0 function modelling process. The IDEF0 modelling process is an enhancement tool that was developed from the Structured Analysis and Design Technique (SADT), which is a well-known graphical language (Veis et al., 2009; Omotayo and Kulatunga, 2017; Yildirim et al., 2017). The IDEF0 modelling concept aids in restructuring the developed framework and effective collaboration between analysts and customers, that is, education providers and construction students. According to Omotayo and Kulatunga (2017) and Manenti et al. (2019), the IDEF0 modelling serves as a tool in the development processes, which is correspondent to this study. The framework development comprises of the research key components that are complex and need to be clearly understood. The idea of the IDEF0 modelling application in this research is that complex processes that can be viewed from a clearer perspective by experts are clearly defined within the context. This concept is related to continuous improvement of activities and its key components are the **input**, **control**, **mechanisms**, **functions,** and **output** (Hirao et al., 2008; Veis et al., 2009; Soung-Hie and Ki-Jin, 2000), in Figure 6-2.

In the construction process of the proposed framework, a clear understanding was derived from the IDEF0 modelling processes to explore the overall training effectively. This was in line with the research objectives and the concept is fully explored into the various activities of the proposed framework within the context

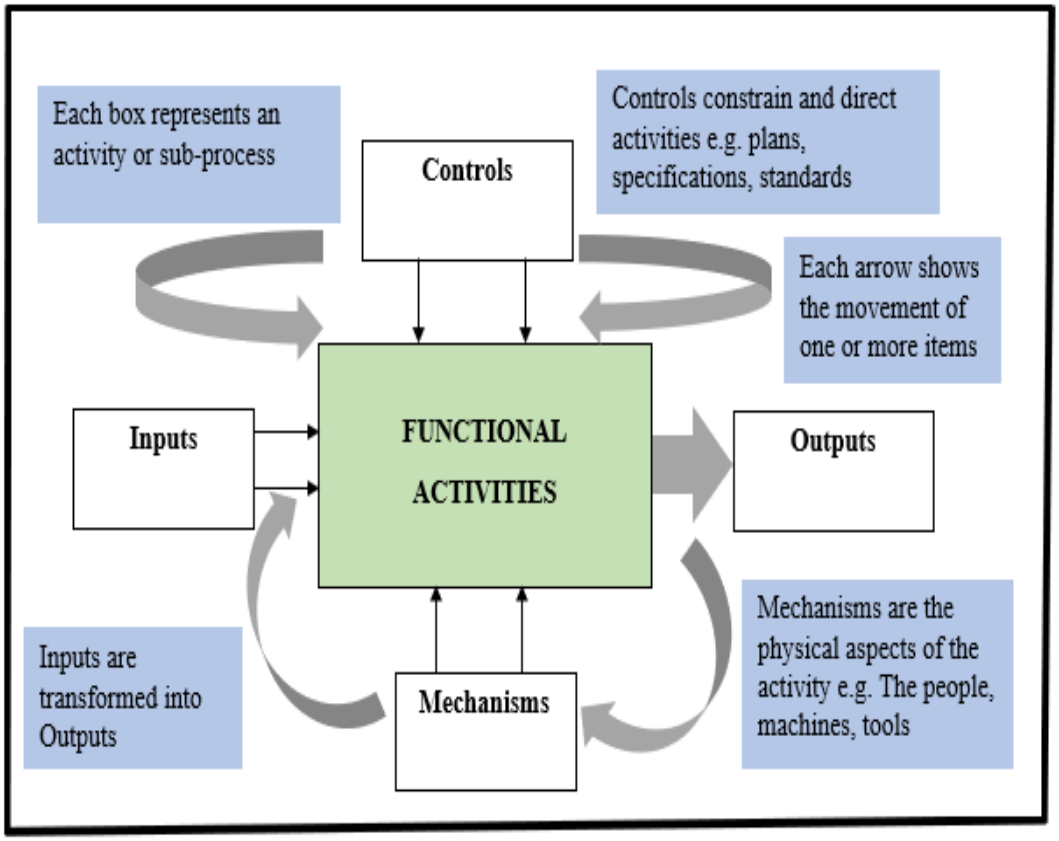

Figure 6-2: IDEF0 Modelling process

Source: (Soung-Hie and Ki-Jin, 2000).

6.7 Justification of the IDEF0 modelling concept in the framework developed

The IDEF0 modelling processes is an upgrading tool that was established from the SADT, a well-known graphical language, which was designed purely to model the organisational or system activities, actions, its decisions in the realisation of the organisational objectives (Veis et al., 2009; Omotayo and Kulatunga, 2017; Yildirim et al., 2017).

This concept is a simple methodology with numerous examples within the context of this current research. The IDEF0 modelling concept uses two basic elements as its modelling language, an example in this current study is only one type of box representation within the method as it was applied in this current study compared with other approaches and this makes this methodology simple to understand. In the case of other approaches, each of the boxes represents a single process. However, in the concept of the IDEF0 process,

the difference is in the placements of arrows and conventional inputs and outputs, and two different arrows that represent the “control” and “mechanisms” in Figure 6-2. The IDEF0 modelling process are the Inputs, Controls, Outputs, and the Mechanisms functions that are collectively called the ICOM and IDEF which is an acronym of ICOM IDEF0. The zero indicates the additional IDEF0 standards.

In the IDEF0 modelling process, control components are the form of inputs which are used to direct the activities within the process. However, some certain degree of uncertainty does exist to determine either the component if it be an input or a control. The simplest way to determine the uncertainty is that inputs are transformed to create the output in some ways while controls occasionally are changed. The controls covered the standards, plans, templates, and checklists components. However, the mechanisms are the resources and tools required for the completion of the whole process. These mechanisms include the people with certain skills, machines, and other tools within the context of an organisational setting. The framework was developed after gaining an understanding of IDEF0 modelling concept and its application in the determination and identification of the input components, control mechanism and output components.

Furthermore, the proposed framework focused on four key dimensions in the construction context. These keys dimensions in the developed proposed framework are: Organisation Strategic View, Developing the Technician Skills Sets, Developing the Technician Skills and Assessing the application of the Technicians Skills, which are denoted as the key stages that must be followed for the realisation of the organisational settings described in the horizontal phase of the proposed framework.

6.8 Training and Skills Development Framework (TSDF)

This proposed framework developed will boost the technicians' skills within the Nigerian construction industry and its future growth. This will contribute to the wider development of workforce skills acquisition in construction organisations, and enhance performance, in terms of its beleaguered outputs and competences in the industry. Hence, contribution made to the nation's economy through the industry will improve enormously and its performance within the global construction market.

The proposed framework is a two-dimensional (**2D**) approach, the *columns* denote the criteria which are assessed at the key levels. At each level of the analysis of a criterion, there are four stages, which inputs listed or components are required to be processed to enable advancement to the next criterion in **Table 6-1, Table 6-2.** These processes within the framework are in line with the development and achievement of the organisational objectives of the workforce training and skills development learning system. Each level of a criterion is in line with the key processes which are related to the exchange of the information that will lead to achievement of an organisation's training needs.

At the levels within the criteria, the processes for the workforce/learners training needs are clearly defined in line with the organisational settings. This stage examines all the necessary action requirements that must be in place for appropriate achievement of the organisational goals within the context. It is essential for the activities to be completed for effective implementation of the whole framework. Strong links that properly integrate daily management activities through the required processes needed are clearly stated in the column stages of the framework. A schematic structure of the proposed framework is in **Table 6-1, Table 6-2** and detail on each of the stages in **Appendix C.**

Table 6-1: An outline of the proposed skills development framework

	PROCESS STAGES								
CRITERIA	**0** **Strategic View**	**1** **Developing the Technicians Skills Sets cohort**			**2** **Developing the Technicians Skills**			**3** **Assessing the application of Technician Skills**	
Introduction *This section of the framework determines the key levels or criterion of the framework within the context of an organisational settings. At this stage, the key levels/criterion and their components are determined and outlined.*	*At this stage, policies/strategies actions at which government directives are defined and clarity sorted within the context. These requirements occur before activities can happens in the whole framework.*	*This is the stage at which the workforce or the learner competency is determined or examined in line with the organisational goal settings to achieve a positive output. At this stage, learners are being prepared for the task ahead and competency is most important.*			*This stage of the framework determines the critical skills of the workforce and competency is being examined as well to fully prepared the learner for the task ahead. Clarity on the workforce/ learner performance environment is as well defined within the organisational goal settings.*			*At this stage of the framework, the performance of the trained technicians (i.e. graduates) in terms of their competency using agreed performance key indicators within the context of the organisational goal settings.*	
A. Input Functions • Unqualified technical students (**John Doe**) • School leaver (**Jane Doe**) • A person with two years' experience (**Jack Doe)**	Policies/strategies	Workforce ability examined			Workforce critical skills			Trained technicians	
Example- Unqualified technical student (John Doe)	*Pre/Remedial programme/studies*	**First Year**		**Second Year**		**Third Year**			**Fourth Year**	
	Maths and English needed within 12 months (year)	*6 months*	*6 months*	*6 months*	*6 months*	*4 months*	*4 months*	*4 months*	*6 months*	*6 months*
	WAEC, NECO, NABTEB – 5 O levels including merit in Maths and English	*Maths*	*Maths*	*Technician's*	*Reports*	*Industrial placement (IP)*	*Logbook*	*CPD*	*Training plan*	*Training appraisal*
		IT	*IT*	*Subject area*	*Subject*					
		Etc.	*Etc.*	*IT/maths/computer*	*Specific*					
Example - School leaver (Jane Doe)	*WAEC, NECO, NABTEB – 5 O levels including merit in Maths and English*	**First Year**		**Second Year**		**Third Year**			**Fourth Year**	
		6 months	*6 months*	*6 months*	*6 months*	*4 months*	*4 months*	*4 months*	*6 months*	*6 months*
		Maths	*Maths*	*Technician's*	*Reports*	*Industrial placement (IP)*	*Logbook*	*CPD*	*Training plan*	*Training appraisal*
		IT	*IT*	*Subject area*	*Subject*					
		etc.	*etc.*	*IT/maths/computer*	*Specific*					
A person with two years' experience (Jack Doe)	No qualification assessed Learner's Assessment base on years of experience	**First Year**		**Second Year**		**Third Year**			**Fourth Year**	
		0 months	*0 months*	*6 months*	*6 months*	*4 months*	*4 months*	*4 months*	*6 months*	*6 months*
			Maths	*Technician's*	*Reports*	*Industrial placement (IP)*	*Logbook*	*CPD*	*Training plan*	*Training appraisal*
			IT	*Subject area*	*Subject*					
			etc.	*IT/MTHs/computer*	*Specific*					

B. **Mechanism Function (Instruments):**	Resources e.g. (equipment)	Learning modules/ courses	Continuous improvement	Learners' competency
Introduction *This is the level of the framework at which the inputs components are transform into the output components of the desired organisational settings are determined within the context.*	*These are the strategies at which the available processes, procedures, tools, resources, innovation, and equipment as required for the next stage of the framework by which the process is been performed to achieve the desirable output are clearly defined.*	*Learning modules within the context of training organisation, learning aims and objectives, learning programmes within the learner's ability and competencies as well as the necessaries processes within the context for skills enhancement for the technicians.* *Mentoring programmes are formal training may also serve as key to development plans to sustain the learner's skills enhancement.*	*At this stage of the model, workforce continuous improvement is examined through course assessments and feedback which are encouraged within the context. This is in line with the framework objective. This implies that following are given due consideration.*	*Workforce competencies are developed at this stage of the system through the learning objects within practical engagements of graduates' students in the various built environment organisations with engagement with their logbook (timesheet).*
C. **Institutional Controls**	Institutional stakeholders	Modules/lesson plan	Design curriculum influence	Stakeholders Feedback
Introduction *At this stage of the framework, the non-engineered instrument, such as an administrative or legal control, which helps to minimise the potential for human exposure to, is determined within the context of the organisational settings.*	*At this stage of the framework, Different institutional stakeholders' requirements will influence the strategies and policies of the awarding educational body from their own interest which needs to be taken on board.*	*At this stage of the process in the framework, the necessaries arrangements are put in place to ensure that the curriculum are properly design in line with the required skills by the learner*	*Things that will influence the design of a curriculum and assessment as address in the learning outcomes and objectives at each level of the technician training (think).*	*This is the stage at which feedback from employers particularly stakeholder seated at the board of directors of the various colleges.* *Setting up employers' staff liaison meeting to capture industry standard.*
D. **Safety Regulations**	Healthy and sustainability	Commitment and Planning	Effective health and learning	Performance boosted
Introduction *This stage of the framework determined the formal advice that are legally enforced on health issues within the context are determined. At this stage of the framework, regulations made by the government on health and safety at work are determined within the context.*	*At this stage of the framework, it determines the healthy and sustainable learning, working as well as healthy environment for learning within the context for the trainee concern*	*The commitment, course-plotting, working groups, action planning, delivery, assessment which forms part of the implementation and operational/effective planning within the context are determined at this current level*	*Supportive working and learning contexts with effective health quality, welfare services, appropriate range of widely used learning facilities within the context*	*Performance of the organisation is boosted and tremendous increase in productivity within the context.* *Furthermore, the organisation capability is strengthened towards making a great contribution to a pursuit of the range of services through the improvement of trainees and students' recruitment in line with the organisational goal settings within the context.*
E. **Effective Strategies**	Skills Gap Analysis	Key objectives are clearly defined	Invest in the right resources	Test, measure, and repeat
Introduction *This level of the framework determined the resources allocated achieve a certain plan and deliver the expected target after undergoing the necessary checks.*	*The effectiveness of the strategies to enhance performances is clearly defined and must be in line within the context of the organisational goal settings.*	*The key objectives are stated and clearly defined and effective goals setting to ensure an effective and efficient workforce training are clearly determined.*	*The right resources needed for the effective training are put in place and ensuring a quality learning culture with a fit technology. The required resources may involves:* - *Technology knowledge bases*	*At this stage of the framework, the available strategies, and resources to achieve the organisational settings within the context are evaluated to see if the organisational goals or targets are made within the context.*

- Make skills and vocational training free - Make craftsmen wages attractive - Ensure dignity for labour for craftsmen - Make career guidance and counselling mandatory at junior /senior secondary school level - Mobilize unskilled youth for skills training	*Before getting started, critical areas that needed immediate attention are put into consideration within the context.*	*The available strategies, and resources to achieve the organisational settings are determine within the context* - Make skills and vocational training free - Make craftsmen wages attractive - Ensure dignity for labour for craftsmen - Implementation of a workforce learning system - Development of a workforce learning paths for each workforce within the context	- *Trainers* - *Training materials* *The available strategies, and resources to achieve the organisational settings are determine within the context* - Make career guidance and counselling mandatory at junior /senior secondary school level - Mobilize unskilled youth for skills training - The of data for a better decision marking within the context - Think processes, Not Events - Ask workforce for input and feedback within the context	*A test of a subset of high performance is clearly determined to see how its applicable in practice. At this stage valuable feedbacks are gathered to help in the identification of various potentials pitfalls before effective application*
F. **Sustainable Issues**	Environmental issues impact	Scarce resources	Scarce resources	Scarce resources
Introduction *This stage of the framework determines the decision making which does not have a negative impact on the current organisational settings and the future goal settings within the context. In line with this key objective, sustainability impacts on a wide range of ecological and human issues, related to natural resources commitment to human and wellbeing within the organisational settings*	*The impact of any of the environmental issues on the economy are determined within the context of the organisation*	*As there are unlimited wants and limited resources there will always be scarce resources within the learner's environment.* *For a stable learning environment, there must be replacement or renewable resources that are been used that may run out in few times. At this stage of the framework, the learner inability to access digital technology is determined within the context.*	*The process, the Learning environments and industries are destroyed by floods because of global warming,* *The issues regarding the idea that resources and services should be made using the available resources that can be replaced – this could be raw materials or energy requirements that has a negative impact on the learners.*	*The pillars of the sustainability are achieved within the organisational settings. These pillars of the sustainability are Human, social, economic and environment known as the four pillars of the environment. The sustainable components are determined.*
G. **Ethical Issues**	Bribery and Corruption	Safety and security issue	Digital technology access	Ethical issues examined
Introduction *This is the stage of the framework, which decision marking, scenario, or activities, that creates a conflict within the organisational moral principles with those of the society. They are sometimes legally dangerous due to solving the issues that might fill the gap of a certain law within the context*	*At this stage of the framework, Corruption and* *Adhering to rules and regulations* *Safety and security issues clearly determined within the context of the organisational settings for its future development.*	*At this stage of the framework, the learner inability to access digital technology is determined within the context* Establishing ethical (ethical motivation within the context) *At this stage of the framework, Ethical sensitivity, which is the interpretation of a particular situation, recognition of ethical issues, awareness of what actions are possible and the effect on the parties' concern is determined at this stage of the framework*	*At this stage of the framework, the ethical components are determined within the context* - *Ethical sensitivity* - *Ethical judgement* - *Ethical Motivation* - *Engaging in ethical behaviour*	*At this stage of the framework, the ethical components are determined within the context* - *Ethical sensitivity* - *Ethical judgement* - *Ethical Motivation* - *Engaging in ethical behaviour*
H. **KPI**	KPI using *SMART* guide	Set goals	KPI examined	KPI Feedback
Introduction *This is the stage of the framework that determine the set of quantifiable measurements used to gauge the organisational overall long-term performance. This stage of the framework precisely helps the organisation in the*	*The system set organisational goals to achieve it targeted objectives by tracking its progress to fulfil the needs of its stakeholders. At this point, measurables values are*	*The system, the learners, or the workforces within the organisational focuses on all levels towards achieving a certain goal which is in line with the organisational goal settings.*	*The framework, the trainee performance indicator is determined at this level of the organisational settings through the following.* • Examination work • Assessment for the trainees	*The framework, the information that is in line with the organisational learning objectives based on the learner's performance is clearly determined. This stage determined the information on the*

determination of its strategic, operational achievement, financial resources determination with those competitive organisations. *At this stage of the framework, KPI is determined based on an acronym SMART for its measurement.* **S-** Specific, **M-** Measurable, **A-** Attainable, **R-** Relevant, **T-** Time-Bound	*determined on how effectively, on how the system is achieving its objectives. This KPI can be carried out in an effective way using the acronym SMART as a guide.*		• Observation • Work placement • Employee Engagement • Net Promoter Score • Stakeholders Satisfaction • Test scores during training • Test scores after training	*learning in line with learning goals or learning outcomes within the context.*
I. **Outcomes:**	Input component are process	Measurable goal settings	Measurable goal settings	Workforce competency
Introduction *This is the stage of the framework at which the organisational wants or needs to achieve in line with the global construction market*	*Those components from the input stage are processed to give a positive results or outcome, which are clearly defined within the context of the system.* *The measurable goal settings of the trainee or learner is determined in line with the research objectives to the expected positive result within the context.*	*The outlined input components within the context are being determine based on the objectives of the organisational setting, which is in line with the outlined below.* *At this stage of the framework, the determination of the measurable goal settings of the organisation will be based on the objectives of the organisational settings.*	*The framework, workforce competency within the organisational settings is determined based on the organisational settings which is in line with the global construction market performances.* *The determination of the measurable goal settings of the organisation will be based on the objectives of the organisational settings.*	*Workforce competency within the organisation is evaluated based on the organisational settings which is in line with the global construction market performances. Hence, workforces' performances within the context are confirm based on the following outlined.*
J. **Output Evaluation**	Skills evaluation	Learners' behavioural skills	Learners' qualifications	Learners' competency
Introduction *This is the stage of the framework key objectives that determine the evidence of the learning activities within the organisational setting which, were clearly performed as planned within the organisational goal setting.* • Competent technicians' graduates • Effective training providers • Improve workforce behavioural pattern • Improve technicians' graduates • Construction industry development • Job creation for the younger generation within the context • Improved workforce skills and the industry performances • Training providers • Trainers' recruitment	*The output of the workforce training and skills development is determined to ensure that the organisational goal settings are achieved.* *At this stage of the framework evaluation of the learner performances is key or paramount.*	*The framework, learners' behavioural aspect within the context is being determine in line within the organisational settings.* *Behavioural factors to motivation and values, learners' integrity is being determine within the context as the learners are prepared for the task ahead.*	*The framework, the learner's commitment towards the learning process is determined in line with the institutional regulatory guidelines.* *The various qualifications and grades of the learners are determined in line with their performances*	*The direct product of the all the learning activities within the context are clearly determined.* *The outcome of the activities becomes the major quantitative measurement in the evaluation plan to be monitored.* • More competent technicians graduate within the context with various qualifications • Improved business performances within the industry and construction market • Trainers and workforce recruitment and retention within the context • Strengthening workforce skills and abilities towards the economic growth of the nation. • Reduction in unemployment and massive increase in job creation or job availability within the context of the industry • Positive contribution within the sector is enhanced while the negative ones are reduced drastically

Table 6-2: A condensed version of the TSDF

		Process stages									
CRITERIA	**INPUT**	**0** **Strategic view**	**1** **Developing the Technicians skills Sets**				**2** **Developing the Technicians Skills**			**3** **Assessing the Application of Technicians Skills**	
	Key levels/criterion and their components are determined at this level.	*Government directives and clarities are defined before activities can occurs.*	*Competency of the workforce is determined*				*Critical skills and competencies are examined*			*Agreed performance key indicators within the organisational settings*	
Input functions	School leavers School leavers with experience	Policies/Strategies	Workforce ability examined				Workforce critical skills			Trained technicians	
	Example - School leaver (John Doe)	*WAEC, NECO, NABTEB – 5 O levels including merit in maths and English*	First year		Second year		Third year			Fourth year	
			6 months	*6 months*	*6 months*	*6 months*	*4 months*	*4 months*	*4 months*	*6 months*	*6 months*
			Maths	*Technician's*	*Technician's*	*Reports*					
			IT	*Subject area*	*Subject area*	*Subject*	*Industrial placement (IP)*	*Logbook*	*CPD*	*Training plan*	*Training appraisal*
			etc.	*IT/maths/computer*	*IT/maths/computer*	*Specific*					
	A person with two years' experience (Jane Doe)	No qualification assessed but assessment is based on years of experience.	First year		Second year		Third year			Fourth year	
			0	*0*	*Year 2*	*Year 3*	*4 months*	*4 months*	*4 months*	*6 months*	*6 months*
					Technician's	*Reports*					
					Subject area	*Subject*	*Industrial placement (IP)*	*Logbook*	*CPD*	*Training plan*	*Training appraisal*
					IT/MTHs/com	*Specific*					
Mechanism Function	Resources e.g. (equipment)	Resources e.g. (equipment)	Learning modules/courses				Continuous improvement			Learners' competency	
Institutional Controls	Institutional stakeholders	Institutional stakeholders	Modules/lesson plan				Design curriculum influence			Stakeholders Feedback	
Safety Regulations	Healthy and sustainability	Healthy and sustainability	Commitment and Planning				Effective health and learning			Performance boosted	
Effective Strategies	Set Skills Gap Analysis	Skills Gap Analysis	Key objectives are clearly defined				Invest in the right resources			Test, measure, and repeat	
Sustainable Issues	Environmental issues impact	Environmental issues impact	Scarce resources				Scarce resources			Scarce resources	
Ethical Issues	Bribery and Corruption	Bribery and Corruption	Safety and security issue				Digital technology access			Ethical issues examined	
KPI	KPI using *SMART* guide	KPI using *SMART* guide	Set goals				KPI examined			KPI Feedback	
Outcomes	Input component are process	Input component are process	Measurable goal settings				Measurable goal settings			Workforce competency	
Output Evaluation	Skills evaluation	Skills evaluation	Learners' behavioural skills				Learners' qualifications			Learners' competency	

6.9 The proposed TSDF

This section of the framework is the *columns* that denote the criteria that were assessed at the key levels, which followed the level of the analysis of a criterion. The criterion followed the four stages which inputs listed, or components are required to be processed to enable advancement to the next criterion.

6.9.1 Input functions or Involvements within the context:

At the topmost level of decomposition of the proposed framework, the inputs components identified in Table 6-1, Table 6-2 and appendix C involves the 'raw' technical students' resources needed for training, school leavers that want to pursue construction professions as a choice of career. The input stage also contains other resources that are within the system, which are also relevant to workforce/learner skills enhancement. These input components surrounded government policies/strategies and resources, stakeholders, workforce/learners' strategies, curriculum development, partner agencies, resources that involves financial, environmental, and human resources within the framework. Others includes effective training providers, behavioural factors that include the processes of embedding new behavioural pattern, technician motivation and values, behavioural factors that influences technicians' integrity (Appendix C).

6.9.2 Mechanism Function (Instruments)

This is the topmost level in the framework that needs to be decomposed further to detail functional training activities for workforces' skills enhancement. In, so doing the inputs components are transformed into the output components of the desired organisational settings that are determined within the context. In Table 6-1, Table 6-2 and Appendix C, these components are captured; Documentation, Processes, Learners' resources accessible, Innovation, communication, Group debate, Duration/period, Partner agencies, Effective teaching and Learning environment, Human resource management (HRM), organisational structure, Environmental resources and financial resources, Institutions of learning, VET, requires skills, knowledge requires, workforce/learner practices, skills development, and processes of embedding new behavioural patterns. This stage of the framework captured series of value-added activities that happen within the context.

6.9.3 Institutional Controls

This stage of the developed framework determine the non-engineered instrument, such as management or administrative or legal control, which helps to minimise the potential for human exposure within the context of an organisational settings as indicated in Table 6-1,

Table *6-2* and Appendix C. Several factors should be put into consideration, depending on the type of the institutional controls within the context during evaluation. This is to determine how the institutional control can be effective when implemented to achieve a certain organisational setting within the context. It should be noted that the several factors for the evaluation process may differs within the context and depend on the setting of the various organisations. As indicated in this framework, the following components are captured within the context. The regulatory agency includes FMOE, NUC, NCCE, ITF, FMLP, VTIs, VEEB etc.

6.9.4 Safety regulation

The formal advice that is legally enforced on health issues within organisational settings are determine at this stage. Regulations made by the government on H&S at work are determined in the organisational settings. The proposed framework captured the following components as key for workforce skills enhancement. These are NAFDAC, NESREA, EPA, EEOC etc as indicated in Table 6-1, Table 6-2 and Appendix C.

6.9.5 Effective strategies

This level of the framework focuses on determination of the available resources which are allocated within the context of an organisation of the framework for delivering certain plans and achieving the expected targets after undergoing the required checks. The proposed framework captured the component of the different strategies at different stages of the process of realising the central objectives of the framework.

6.9.6 Sustainable Issues

This stage of the proposed framework determines the relevant decision making that does not have a negative impact on the organisation and its future goal settings. This developed framework captures the various components within the context, which include social, economic, and environmental issues. The proposed framework suggests that sustainable issues should be considered for efficient workforce/learners' skills enhancement within the industry. A clear and suitable roadmap is drawn to determine its implication on the workforce/learners effective and efficient training as indicated in Table 6-1, Table 6-2 and Appendix C.

6.9.7 Ethical Issues

This stage within the proposed framework determines the decision making, scenario, or activities that create a conflict within the organisational settings' moral principles with those of society based on the organisational goal settings. They are sometimes legally dangerous due to solving the issues that might fill the gap of a certain law within the context. This framework captures the following component: corruption and adhering to rules and regulations, safety and security issues, unfair labour and business, unfair competition, conflict of interest, inflation of bills, professional incompetence, poor work delivery and fraud. The developed framework recommends that ethical issues do have a greater impact on workforce/learners training and a careful consideration must be made.

6.9.8 Key Performance Indicator (KPI)

Due to the dynamic nature of the construction industry, training of workforce/learners becomes more dynamic due to uncertainties of recent technology and the processes of competitive advantage within the global construction market. In line with the global competitive edge within construction market, organisations of the construction industry need to use the KPI to gauge their performance. The developed framework suggests that the KPI determination within the context of an organisation may lead to the identification of different factors and their traits that lead to the challenges within the industry. The developed framework suggests for an effective and efficient KPI to be performed in the

organisational setting for workforces' skills enhancement and the industry performances in the global construction market. The KPI of an organisation can affect the organisation performance if not properly conducted in accordance with the organisational settings and with regards to competitive edge within the construction market since it is used for performance measurement.

6.9.8.1 Measuring the success of the proposed TSDF framework

The KPI from the proposed framework can be measured effectively as follows:

6.9.8.1.1 Boaster for institution of learnings

The success of the framework implementation is determined, through the measurement of the KPI by the industry stakeholders. The workforce/learner's that completed the training, multiply by their average completion time, then multiply by their average pay rate. This determine the rate at which the workforces/learners' skills are enhanced.

Graduation rate: The number of the workforces/learners that completed their training programmes and obtained their certificates at the regular time frame determine the success of the framework application. This KPI is determining by the ratio of workforces/learners graduating to the number of workforces within the organisation.

$$X = (\textbf{No. of Y})/ (\textbf{No. of Z}).$$

Where, X is the graduation rate**, Y** is the number of workforce/learners graduating, **Z** is the overall number of workforces/learners. The workforces/learner's graduating ratio to the previous ones that completed the training programme are measured. Obviously, the exact number of the graduating workforces/learners to the current one that completed their training courses within the stipulated period are being determined by the organisations' stakeholders. Obviously, the framework served as a booster for learning institutions if the KPI outcome is positive. The current and newly employed workforces' performance and output will improve, workforce turnover reduction and organisational culture improve.

6.9.8.1.2 Enrolment of school leavers into construction profession.

The rate at which school leavers will enrol into the construction profession will improve massively after the framework application. This will determine the percentage of school leavers into the profession.

A**ttendance rate**: This is determined by measuring the number of the workforces/learners that have achieved, say from 70% attendance and above in a semester or session after the application of the framework. The total number of school leavers enrol, divided by the required population of workforces, then multiply by 100%. This will determine the success of the framework implementation.

For example, Enrolled school leavers after implementation = X, Enrolled school leavers before implementation = Y, Expected or required number of trainees by the organisation = Z. Therefore, this can be resolve mathematically as; the percentage (%) of school leavers = Number of school leavers enrol (X)/ Number of expected trainees (Z) then multiply by 100% for the current workforce. This actual number will be compared to the previous number of school leavers enrolled to determine if the framework implementation is successful or not within the organisations. Assuming X=350, Y= 280, Z = 500.

Percentage of school leavers = (X/Z) X 100% (Q): (Y/Z) X 100% (P).

This determines the number of the local people, the school leavers going into construction related jobs across the country. If Q is greater than P, then the framework implementation is in line with achieving the SDG by 2030. In addition, this will tell if the number of females enrolled into the profession has improve or not to resolve gender equality within the industry.

6.9.8.1.3 Marketing size of the industry

A tremendous improvement will be seen in the marketing size of the construction industry after the proposed framework implementation. This is measured based on the organisation productivity by the stakeholders. The current production within the industry is compared to the previous one and if the present production is more than the previous production, then the framework application is successful. The productivity within the organisation can be determine by the work done or covered by the organisation's workforces before and

after the framework implementation. For example, a project execution that usually takes the organisation 4 weeks to complete it, may take the organisations less than three weeks. This is obvious that the organisation productivity has improved. Hence, the marketing size will improve to have an edge over its competitors within the construction market.

6.9.8.1.4 Effective and efficient workforce's/learner's skills

This KPI determine the degree at which the workforce's/learner's knowledge and skills obtained within the industry after the framework implementation. This is based on the research key objective to enhance workforce skills and the organisations performances to have an edge over its competitors. This KPI also determines the workforce's/learner's ability through the application of the knowledge acquired in practice within the industry. As recommended by the framework, trainees will ensure that school leavers and others skill workforces within the locality are fully engage in the learning process to start moving towards the realisation of the SDG by 2030. The current workforce skills are measure by work covered to the previous work done to determine the increase in the current work done. The feedback from the stakeholders of the construction organisations will determine the success of the framework application.

6.9.8.1.5 Time to proficiency

This KPI serve as a tool to determine the proposed framework implementation within the context of the construction related organisations. This determine the workforce/learner's the precise and exact time it takes to grasp the training outcome once the proposed framework has been implemented within the organisations. The most effective way to measure this KPI is to determine the average daily rate of the newly employed workforce. This is then multiplied by the number of new agents and the average time to proficiency. In line with the current needs of the skilled workforce within the construction related organisations, the faster the workforce/learner acquired or gained knowledge after the framework implementation, the sooner the outcome/results produce effectively. This KPI determine or measures the degree of training suitability and effectiveness within the organisations to meet up with the SDG.

6.9.8.1.6 Impact on the construction industry performance metrics

The implementation of the proposed training and skills development framework within the context of the organisations enables the various construction related workforces or learners to increase the efficiency of services and productivity and stay compliant. In line with the research objectives, effective workforce/learner's training is prerequisite to both organisational and individual performances in the setting. Based on **TSDF** objective, the system measurement before and after the **TSDF** implementation, the key understanding of the **TSDF** contribution or impact on the organisations will be determine. This will shape the future workforce skills training scope that clearly defined effective performance towards sustainability development.

6.9.8.1.7 Stakeholder satisfaction

The stakeholder's satisfaction determined the success of the proposed training framework application. This KPI will be measured through the development of responses charts and analyse input within the context to take important measures. The stakeholders' views on the training framework implementation consist of meetings and facilitating discussions that determine the achievement of the organisation goal settings, which is based on the SDG by 2030. The organisations stakeholders will rate the organisations performance on a scale of (1-5) to gain the organisational goals, to recommend the industry performance to friends and peers through their feedback. Basically, the KPI measurement will be on a scale of (1-5), where 1= unacceptable, 2=Needs improvement, 3= Meets Expectations, 4= Exceeds Expectations and 5= Outstanding after the framework implementation.

6.9.9 Output (performance output)

As shown in Figure 6-2, this is the topmost level of the developed framework. This stage of the framework will result in the output of a competent construction technician graduate**,** career development**,** better quality skills, performance output, evaluation, workforce practices and trained practitioners achieving organisational goal settings. The developed framework indicates that output components comprise of the various components captured within the output stage. The arrows in Figure 6-2 indicate links between the various components within the output stage. This indicates that the link is from one

component to another within the output stage and that will lead to the impact stage of the developed framework in Table 6-1, Table 6-2 and Appendix C. In addition, there is a clear indication that it would in turn lead to the development of competent and employable skilled workforces. This is due to the immediate result of training obtained and the skills possessed from the training providers to improve their skills.

6.9.10 Impact

The impact will be measured by the output of the technician graduates over a rolling three-year period. Industry monitoring will take place for different areas associated with competence in the work environment. However, initial measurement will take place by the results that come out of their final year assessment as a first start. A continuous improvement of grade in the positive direction will give an indication of the training done. Training impact, evaluation and motivation serves as an additional component of the impact stage that has been introduced to differentiate between the output components, which were terms basically as short-term training results output components while the Impact components are regarded as the long-term training results impact components.

6.10 Stages of the Proposed TSDF developed

The developed research framework was structured in different sections as shown in the developed training and skills development framework in Table 6-1, Table 6-2 and detailed in Appendix C to improve the quality of the workforce within the context of construction related organisations and make Nigerian construction industry competent in the global construction market. The framework was constructed into five key sections and each of these key sections contain some subsections with various components.

6.10.1 Strategic views

This is one of the key levels within the proposed framework developed that visibly defines the organisational capacity in establishing the central aim of the research. This key level within the framework determines each criterion at each level in establishing a long-term objective in making a substantive analysis of its competencies to have an edge over its competitors within the context to enhance performances.

6.10.1.1 Scheme concept technicians training and skills development

The construction industry image has been portrayed to the younger generation negatively in the past and the younger generations are still having negative thoughts concerning the industry. Based this statement, the younger generation's perception towards the industry is not inspiring, as it is a place for school dropouts or people who cannot do well in school (Adewale and Adhuze, 2017; Afolabi and Oyeyipo, 2017; Olaniran and Mncube, 2018). This suggests the adequate need for the industry stakeholders to change this negative image portrayed on the industry to start moving towards SDG by different means. The mind-set of the new entrants, most especially among the younger generations that were unemployed and want to work in construction organisations needs to be motivated to have interest in the profession. Consistent with the studies Salami (2011), Salami and Olawoyin (2018), Ankeli (2019), vocational skills and training programmes have not been functioning properly as required by the global construction standard due to numerous issues that involve unsatisfactory construction training framework/model/protocol within Nigeria. The procedural approach of making the technicians training scheme effective was to ensure sustainability in the development of technicians' skills through training to develop their skills to be competent in construction market (See Appendix C).

6.10.1.2 Skills development framework (TSDF) scheme policy

The technicians training and skills development is key to the country's economic growth and should be a requisite to profitable performance. The idea behind this in the framework is that there are needs for the Nigerian government or the stakeholders to have a workable training policy related organisation in Nigeria. Past studies revealed the inadequacy of the policy on the construction related organisation and the general education system has overseen the VET that seems to be the backbone of the construction professions (Oviawe, 2018; Osaghele et al., 2015). The construction training policy must be properly evaluated and differ from that of the National Policy on Education (NPE), since the current one is not in favour of the vocational education and training. The training policy shall clearly state the appropriate training and skills development philosophy of the technicians in the field of any construction related organisation. In addition, the training policy may be made an integral part of the national construction policy within the industry (See Appendix C).

6.10.1.3 Collaborative Effort in the technicians training

The inadequate commitment of the public and private organisations' management towards the technicians' training has impacted negatively on the technicians' training and skills growth. This implies that a meaningful approach towards addressing the challenges in the construction industry should be properly registered with construction skills training in construction related organisations. Studies by Odusami and Ene (2011) and Awe (2012) found that the non-commitment of the management of construction industry has affected the performance and industry productivity. Obviously, the survey findings indicate that the construction related organisations stakeholders' commitments are not effective due to bad governance in the country for years, which has affected the industry and discourages the younger generations from getting into the profession. Based on these skills challenges, participation and collaboration into construction skills training will be utmost to address the current needs of skilled workforces in the construction industry.

6.10.1.4 Skills development conceptual framework objective

The survey findings indicate that critical issues exist within the industry due to inadequate technicians' skills and the younger generation within Nigeria seems to be more interested in the oil and gas profession to the construction careers. Obviously, the current training of skilled workforces in the construction industry is either inadequate or not functioning properly due to the absence of the recent technology application in the technicians' skills training. The protocol designed in this framework is for both the existing workforce, the newly recruited ones and those that have interest in the field of construction related work. Hence, this framework objective tends to improve the individual workforce awareness level, skills around expertise, motivation to job performances and the industry overall productivity and performances. This **TSDF** key objective is to enhance workforce skills within construction profession to start moving towards the realisation of the SDG by 2030.

6.10.2 Developing the technician's skills

This section of the developed framework primarily focuses on the construction related organisations workforce transformation on their mode of critical thinking, the strategy to

be applied to mould the workforce's skills in the sector. At this stage, managing strategy on reactive people to align the industry's business and human resources in ensuring the right workforces with the right skills set are in the right position to be competent enough to perform effectively. This ensures that the existing workforce within the organisation context skills are fully develop in terms of recent technology and the new knowledge required concerning the shortage of skilled workforce. In addition, a proper management of the workforce attitude towards the innovation and the changing nature of skilled labour, within organisational settings to overcome the challenges in the construction market is established. This will be based on achieving the SDG by 2030 through effective training.

6.10.2.1 Skills development framework regulatory bodies

This is to strengthen the technicians' skills effectively, to make them innovative and adapt to the current nature of work within the industry. There are needs for better responsibilities of construction regulatory bodies. Based on the concept of strengthening and shaping the technician's skills in construction organisations, the framework suggests that groups of interest shall be assigned within the industry to carry out specific responsibilities for its effectiveness. These are professional bodies within the construction related organisations. These bodies outlined in Table 6-3 are the government agencies, parastatals, construction professionals, which are involved in the services of the technicians that are tasked with the responsibilities of skilled workforce training in construction organisations.

6.10.2.2 Collaborating bodies (Stakeholders) for TSDF

Strengthening the technician's skills in the in the construction organisations is key in the TSDF objective, this suggests that registered professional bodies should collaborate with the construction organisations for the effective workforce training to improve skills and start moving towards the realisation of the SDG by 2030. This collaborating bodies are construction related and fully registered are outlines in Table 6-3.

Table 6-3: Collaborating Bodies and registered bodies

Collaborating Agencies	Registered Body
Nigerian Institute of Building (NIOB)	Council of Registered Building of Nigeria (CORBON).
Nigerian Society of Engineers (NSE)	Council of Registered Engineers of Nigeria (COREN)
Nigerian institute of Architects (NIA)	Architect Registration Council of Nigeria (ARCON)
Federation of Construction Industry of Nigeria (FOCI)	Formerly Federation of Building and Civil Engineering Contractors
Federal Ministries	Labour and productivity, Youths and social development, Education

6.11 Workforce evaluation

Workforce evaluation was recommended to gain an effective and efficient **TSDF**. This comprises of the processes, systems, and tools that are utilised within organisations for reliability, authenticity, validity, and effective decision making on the required job to ascertain the organisational goal settings. This should be carried for better outcome. This workforce evaluation recommended in the TSDF (See Table 6-1, Table 6-2 and Appendix C) consists of different processes as detailed in Figure 6-3.

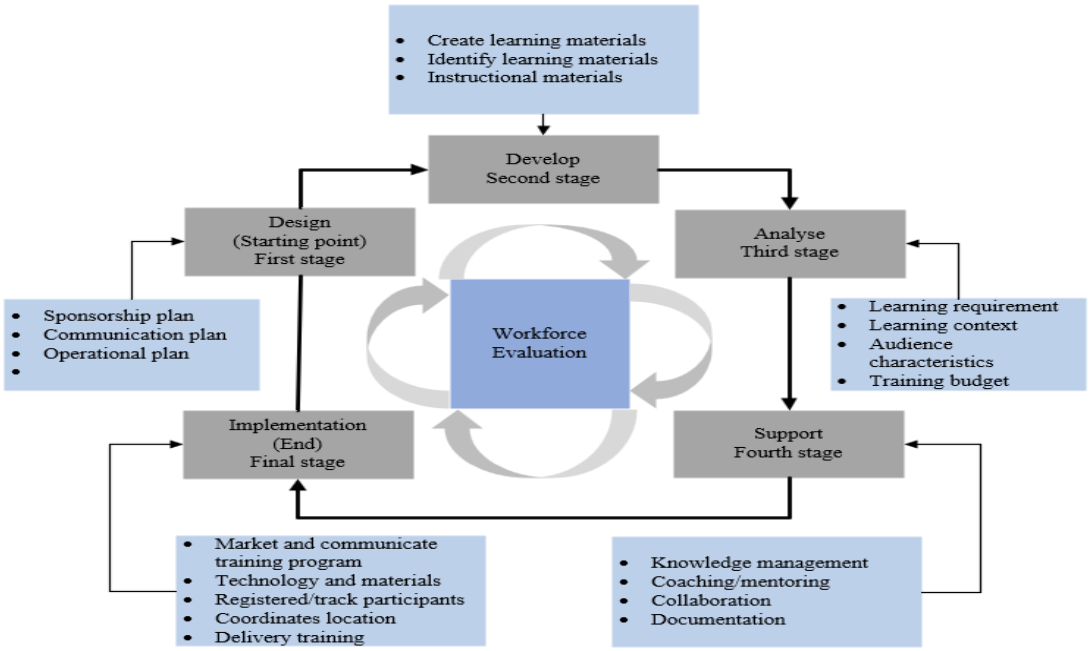

Figure 6-3: Workforce evaluation

6.11.1 Design phase of the workforce evaluation

The workforce evaluation presented in Figure 6-3 followed Deming's principles of continuous improvement. Workforce/learner's improvement is an effective continuous process. This process starts with the designing phase of the process in the development of the technician's skills. This has to do with the sponsorship plan, communication plan and operational plans, which must be consistent with the learning objectives. In this phase, the learning and the instructional materials are of major concern and topmost priority. This phase identifies and develop the delivery learning materials, and practice. The learning contents are fully developed and a clear picture on the learning materials and the necessary plans on the teaching method and effective approach on how it will impact on the learners. This research aim is to enhance workforce' skills, the process led to the following:

- The developer designed objectives must be precise with the learning content
- The design outlines should give rise to the provision of the task, strategies, and sequencing of the learning method
- The assessment practice and feedback should be indicated within the context.
- The required technology should be identified within the context

6.11.2 Development phase of the workforce evaluation

This stage of the process must create learning and identify learning materials and the instructional materials which must go with the aim of the learning objectives within the teaching context. At this phase of the workforce evaluation phase, the content assets are formed by the developer and gathered from the previous phase of the process. This stage of the process mostly relies on the first phase of the evaluation processes which is the design phase. In this phase substages do exist which are the plan of action and learning, roles, and responsibilities to be assigned, documentation preparation because of the organisation and planning process important for systematic process.

6.11.3 Analysis phase of the workforce evaluation

This stage of the workforce evaluation covers the learning requirements, learning context, the audience characteristic, and the training budget within the context. Problems within this phase should be clearly identified and simplified in accordance with the objectives of the learning process within this phase. In this stage of the workforce evaluation process, the developer should be conversant with the learners' needs, objectives and content needed within the context that is in line with the learning objectives before instructional design. Learners' performance and achievement are analysed based on the training purpose and its expected outcomes to determine the achievement of the organisational objectives. This section of the workforce evaluation provides an overview on the delivery choices. This framework recommends the trainee ensures effective training within the context through the different means of delivery choices, which may differ depending on the learner's skills needs as indicated in Figure 6-4.

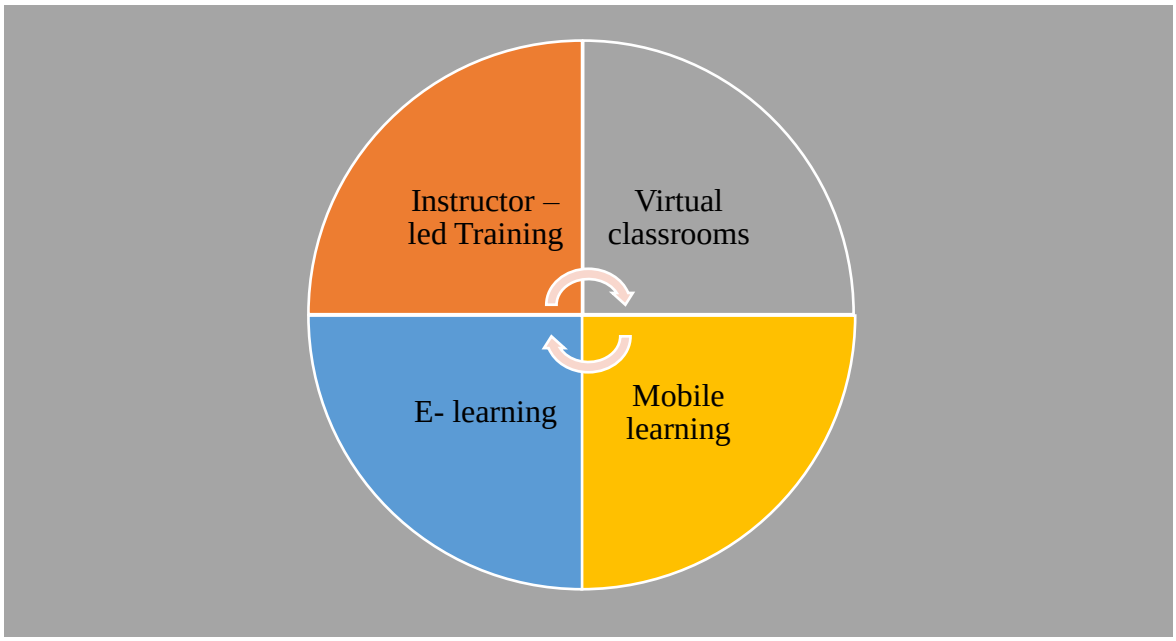

Figure 6-4: Training Delivery Choices

6.11.4 Implementation phase

This is the stage at which the developed course is placed into action and monitored through its implementation within the context of the learning objectives. As shown in

Figure 6-3 and in Figure 6-3, the implementation phase is the last phase of the workforce evaluation process and this stage gives a clear indication of training delivery success. The developed training and skills framework recommends an effective workforce evaluation process that can lead to an effective implementation of the workforce performance.

6.12 Developing the Technician Skill Sets

This stage of the proposed framework focuses on the aspect of the workforce development concerning the organisational goal settings. The section of the framework determines the integration of both learning and performance of the workforce within the industry based on the job in the workplace.

6.12.1.1 Implementation strategies of TSDF Scheme

This section of the developed framework was key on building a standard, reliable learning environment for construction organisations technicians. The scheme is vital for workforce skills upgrades, creating development of a limited strategy towards boosting workforce skills in enhancing the industry performance. This stage of the developed framework recommends building an effective and enabling environment for learning to improve performance. This TSDF scheme was designed through the development of an enabling environment for effective and efficient monitoring of the system.

6.12.1.2 TSDF Scheme Regulatory Agency

The developed framework recommends that training of the technicians within the context of construction scheme requires adequate regulation. TSDF scheme presented in Table 6-1, Table *6-2* and Appendix C will help in maintaining the quality and raise the various construction related organisations standards. A good number of developed nations consider construction related organisations as key drivers for their economy and have specific agencies and parastatals for monitoring and supervision of those industries to ensure adequate and proper implementation of the workforce training and skills development goals. A very good example of this scheme is the Construction Industry Training Board (CITB) in the United Kingdom (UK) which, is in partnership with the Construction Industry Council (CIC). Another example of this scheme is seen in the case

of Hong Kong, which is the Construction Industry Training Authority (CITA) that always regulates all construction related skills training within the country. In addition, these schemes are also seen in the case of Switzerland and Australia. In the African continent is that of South Africa, which is the Construction Education and Training Authority (CETA) that regulates all the construction skills training within the country of South Africa. Although, the Nigerian government has made a significant effort towards the development of vocational education for the younger generation, the proposed framework is of the opinion that there is a great need for further improvement and addition of the Technician Skills Training Board for construction related organisations, which will differ from the existing one, the National Board for Technical Education (NBTE). This should be a board that will oversee all the technicians' skills training and development of all the construction related organisations in the country.

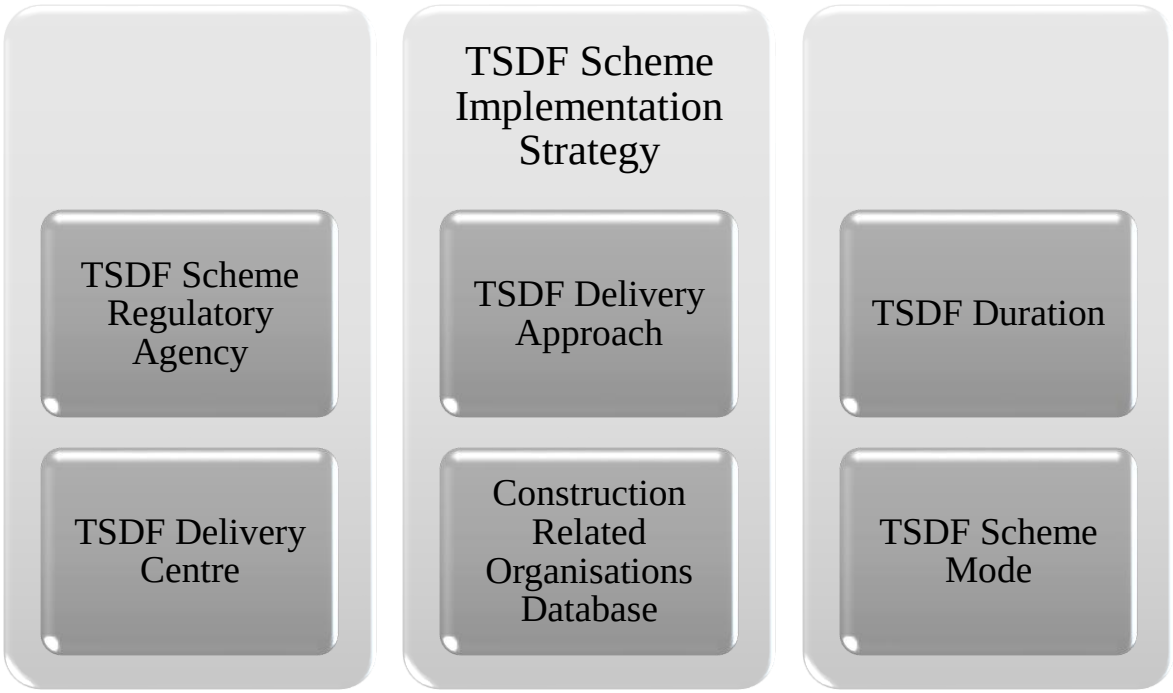

Figure 6-5: TSDF Scheme Regulatory Agency

6.12.1.3 Construction related organisations database

Corresponding to the effort made towards the development of the industry, the developed framework suggests the need for the scheme within the industry to be tasked with the responsibility of compiling and creating database of construction related organisations.

This database will provide information necessary for the strategic decision making, strategic planning, policy formulation and goal definition. Therefore, the database should cover the registered construction industries that are prepared for businesses in Nigeria, including both private and public organisations of construction work (i.e. indigenous and multinational). This will boost the industry performance because the implementation and plans towards the scheme practical policies will be better. The suggested database for the scheme in the developed framework can help in:

- Provision of positive and negative information necessary for strategic decision making, planning strategic, policy formulation and goals definition
- Accessing external and internal data to identify growth opportunities and the direction of such growth
- Establishing a framework for defining and enforcing organisational policies (Note that those policies are translated into business rules at lower levels in the organisation)

6.13 Assessing the technicians' skills sets

This four-levels recommended by the proposed TSDF determine the preparedness of the workforces/learners' readiness for the required job within the organisational settings. This stage serves as an appropriate/suitable tool in strengthening the various connections between secondary and postsecondary education in the organisations. At this level, the learners/workforces' competences in the industry are determined through demonstration of career readiness for future development.

6.14 Application of the proposed framework from MIT research

The Massachusetts Institute of Technology (MIT) research is a private land-grant research university in Cambridge, Massachusetts, established in 1861. The MIT research played a very important role in the advance of modern technology and science, which ranked among the top academic institution around the globe (Bayrak, 2020). The MIT research was developed within the 1st world country and its mission was to advance knowledge and educate learners within science, technology and other related areas that work best for the world within the 21st century (Hernandez-de-Menendez et al., 2020). In addition, the MIT research being an institute is basically in collaboration with others to meet up with

the challenges through effective commitments made, distribute, and preserve effective knowledge in overcoming the current global challenges (Feldman and Desrochers, 2003; Lécuyer, 1998). The MIT research provides its learners with effective and efficient education, which basically integrate academic study and the enthusiasm of quality research with the collaboration of the diverse community in line with accomplishing the SDG. The MIT aimed at advancing, developing, and most importantly inspiring the learners' skills to improve livelihood through creativity and efficiency.

Furthermore, the MIT research through the diverse community and its activities created a strong relationship or Networking within the industry by fostering collaboration within the communities for sponsoring and funding the processes of innovative companies at the starting point as topmost priority of its activities (Hesse et al., 2015; Acworth, 2008; Lüthje and Franke, 2002). Based on this statement, the construction workforce abilities or skills within successful construction related works should be given a top priority to boost the industry performances and make it competent in the construction market.

Although, the MIT research was developed and implemented within the developed world. By contrast, the focus of this section is basically on how the MIT framework may not be applicable to the local conditions within Nigeria been a developing nation with different economic criteria, cultural and ethnic differences, as well as religious background. The application of the MIT research in Nigeria through the utilisation of effective and efficient workforce training should have improved the nation's economy if the aforementioned factors were effective. This will overcome the current challenges within the industry and make it competent within the competitive construction market to start moving towards accomplishing the SDG by 2030 through the skilled workforces within the industry.

In African setting, the MIT research can be captured through the local communities, which is made up of paramount chiefs, the local people within the communities. However, the set-up is basically challenging for the application of the MIT research. Nigeria, a country that is experiencing economic reform, fostering entrepreneurship is key through the availabilities of quality skilled workforce in construction organisations. This effort is due to the widespread recognition that the construction related works are seen as a driving

force for the nation economic development and job creation for the youths (Forje, 2018; Abdullahi and Bala, 2018). Studies by Hesse et al. (2015) stated that within organisations, people vary to the extent they can collaborate with others in the organisation effectively and hence, there should be need for proper awareness for the collaborative skills needs (*Schoenfeld, looking toward the 21st century: challenges of educational theory and practices. Edu Res 28:4-14, 1999*). Furthermore, Scoular et al. (2020) stressed the need for collaboration within organisations in providing a holistic perspective in organisations. Obviously, the MIT research events are basically in line with the collaborating efforts within successful organisations.

In Nigeria, collaboration system is not effective due to ineffectiveness of the management or stakeholders' roles, or commitments based on their interest and drives for collaboration (Moyanga and Adeoye, 2021; Kukoyi and Adebowale, 2021; Akintola et al., 2020). As mentioned earlier in Table 2-5 and Table 6-3 of this study, the collaborative body within the Nigerian educational system comprises of different bodies, which functions together to achieve a certain goal. For instance, the FMOE in Nigeria is basically in control of the policies/strategies (NPE) concerning educational system, Joint Consultative Committee (JCC), functions as an advisory committee to education ministries, Higher institutions and other agencies on educations, the National University Commission (NUC) accredited and approve university education programmes (Agwu et al., 2022; Jacob et al., 2022; Aiyedun at al., 2021; Akanbi and Jekayinfa, 2019). These bodies functions together with the aim of achieving a certain goal, which is based on the MIT research application activities and innovation through collaborations to make a positive impact. However, the collaborating network and the impact made is still blurred mostly within the local conditions in Nigeria. This is due to inadequate management commitment to workforce training, corruption, which lead to the industry poor performance. The following issues experienced include.

6.14.1 Ineffectiveness of research ethical processes

The importance and relevance of any successful research within a system cannot be over emphasize particularly in a country that is undergoing economy reform like Nigeria. This must be in line with the research ethical processes because the ethical process involves

the application of principles that form the basis to a diversity of topics particularly in the scientific research (Okoye et al., 2017; Ogunrin et al., 2016; Akpabio and Esikot, 2014). The ethical processes play a vital role within the academics and modern inventions, which must be dully followed to achieve successful research. However, these ethical processes in the Nigerian context seems not to be effective and the application the application of the MIT research seems not to be effective within the remote part of Nigeria. In other to successfully address this issue, the stakeholders or management of the industry in Nigeria must ensure that researchers or its workforces follow adequate ethical process, and this must be carried out through effective and efficient training.

6.14.2 Ineffective Education System

The application of the MIT research may not be too effective in the local condition of Nigeria despite of its relevancy for the nation's economic growth, as the education system within Nigeria is not effective (Ogunode and Musa, 2020; Jacob and Lawan, 2020). This is due to so many factors as outlined; Poor Funding and Governance, Corruption, Lack of Management Control, Politicization of Education, Poor Infrastructures, Indiscipline, Poor Parenting and Guidance, Lack of Teaching Aids, Unstable Curriculum and Subject, Unwillingness to Study Education in Schools, Lack of sufficient and effective teachers' welfare, High-priced Education, Scarcity, and unaffordable Cost of Books or learning materials at all educational levels. This makes it more challenging for the application of the MIT research in Nigeria and this can be addressed through effective training.

6.14.3 Ineffectiveness of technological innovation

The application of the MIT research requires a considerate or an effective knowledge on recent technology to achieve the vision 2030 of the SDG. However, the MIT research application may be very challenging within the local conditions in Nigeria because a lot of researchers in Nigeria mostly within the remote areas do not have the necessaries knowledge on the use of the recent technologies and most of the research documents are within a secured data based that required a full understanding or knowledge for its application (Onuka and Onabamiro, 2017). To address this issue, an effective and efficient technological skill should be included in the curriculum to effectively enhance the

researchers through effective training. Hence, there are needs for learning institutions and construction organisations to embrace collaborations networks with the government and other sectors to pursue convincing challenges through the MIT research innovation to make an impact. This trend will engage the local people, most especially in the remote parts of Nigeria from different background (males and females) into construction profession and start moving towards achieving sustainable development. The use of **MIT** research as a basis for the research framework development and its application within the Nigerian construction industry, basically with the availabilities and collaborations of systems where MIT innovation can make impact, which are used and organise to boost the workforce skills enhancement through effective and efficient training.

6.14.4 Summary of the chapter

This chapter presents the key achievement of the main purpose of this research study- A Training and Skills Development Conceptual Framework **(TSDF**) for enhancing the workforce (Technicians) skills quality within the Nigerian construction industry. The developed framework was structured in a two-dimensional (**2D**) (i.e. matrix) approach, the *columns* denoting the criteria which are assessed at the key level. The central discussion includes the impact of the framework on practitioners, technical education providers and the technical graduates within the industry. **TSDF** will serve as a guideline for construction technicians' training and skills development in Nigeria. Hence, the proposed framework validation with the experts of construction related organisations in the form of a focus group is presented in the next chapter.

Chapter 7: Validation of the Proposed Conceptual Framework

7.1 Introduction

This chapter addresses the validation of the developed **TSDCF** within a selected group of participants. The process of validating the proposed framework has become inevitable in this study to satisfy its authenticity within the context of the industry. The chapter starts with the purpose of the framework validation and the concept of the validation process. Thereafter, the parameters for the framework verification and the justification of the validation process for the developed framework. Hence, the chapter ends with a detailed analysis of validation feedback and summary of the validation process findings, and the whole chapter summary.

7.2 Purpose of the developed framework validation

The purpose of validating the research framework is to ensure that the concept of the methodology used in the development of the research is satisfactory and sound enough to be applicable to the context of construction related organisations (Awasthy et al., 2020; Sarlak et al., 2020; Hayashi et al., 2019; Gräbner, 2018; Flake et al., 2017; Koro-Ljungberg, 2008). The validation exercise will underpin, buttress, and support the findings of both primary and secondary data used for the framework development, which are key and reliable in the development process. The developed framework will serve as a guide for construction related organisations technicians' training and skills development in the construction industry. Therefore, some of the key objectives of validation process of the developed framework are:

- To gauge the understanding of the framework components by professionals in the field of construction related organisations in Nigeria.
- To determine the reliability and the authenticity of the developed framework through the feedback and experiences from the professionals in constructions; and
- To identify the benefits of the developed framework in construction organisations and its application within the context.

7.3 The concept of validation

The concept of validation has been identified by different literatures, but they have the same meaning depending on how the validation is done or carried out in the framework validation process. Brinberg and McGrath (1992) and Andersen et al. (2018) state that the validation concept has to do with truth, rigor, and value of research within the stages of the research process most especially within the conceptual framework, the choice of validation methodology, and the empirical domain of a certain study. However, Borg and Njå (2013) argue that validation concept is a process that does not have an end because it has been carried out repeatedly to ensure that new information or knowledge is achieved to enhance the accuracy of the prediction. In addition, the framework of the validation concept has been identified by Brinberg and McGrath (1985) as shown in Figure 7-1. The validation concept followed three different stages as; the conceptual field, which involves the evaluation of effectiveness, internal consistency, testability, and adaptability of the applicable concept within the context. The second stage of the validation process is the choice of methodology, which involves the efficiency, lack of bias, and explicitness which would succeed. However, the third category is the substantive field, which is anticipated, that the study shall be beneficial in terms of the potential practical application, and this shall be consistent with the application of practical which shall be subject to replication and convergence of its boundary identification (Ahadzie, 2007).

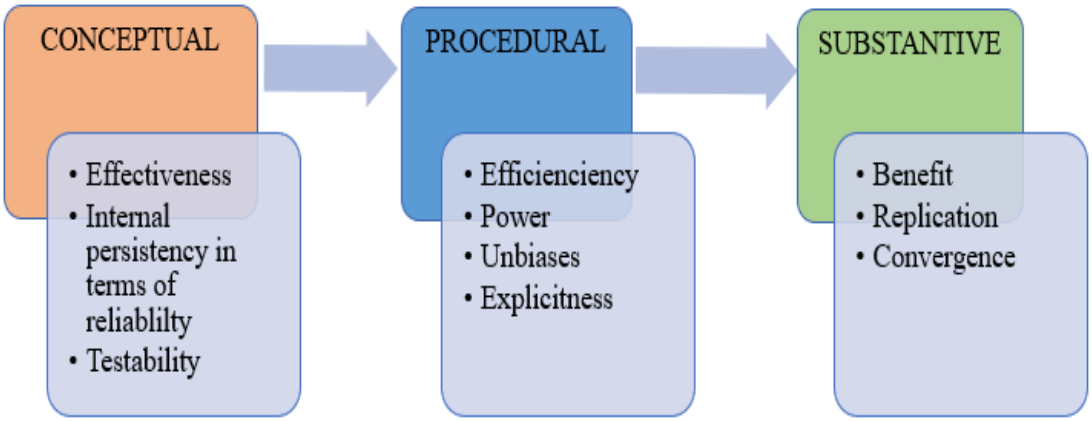

Figure 7-1: Research validation framework

(Source: Adapted from Brinberg and McGrath 1985)

7.4 Validation technique over evaluation and testing technique

The choice of a validation technique over evaluation and testing method with the participants was to determine the proposed framework reliability from the selected participants views. The adopted technique has provided confirmation, boosts confident, and satisfies the reliability and authenticity of the proposed framework objectives based on the studies of Jacobson and Johansson (2004), Parekh (2005), Gräbner (2018) and Piccioli (2019).

The proposed framework needs to undergo either testing, evaluation, or validation to check the reliability and authenticity of the research framework based on the research objectives. In line with the research aim and objective, the need for the developed framework to undergo this test will be paramount because the framework authenticity and reliability within the context are important. This reliability of the current research aims, and objectives can only be achieved if the framework undergoes either testing stage, evaluation, or validation stage using experts' judgement. The validation of the proposed framework was based on experts' judgement with a wealth of experience within the field of construction.

7.4.1 Framework evaluation

This technique is also in line with the various studies for the determination of the reliability and authenticity of a proposed framework within the context of a research study. This technique or procedure usually serves as a tool that has been used in linking evaluation questions and organising the output/outcome components, the different processes involved in the survey data collection methods. Basically, this technique is generally involving the guidance on the survey data source and how it has been managed and utilised within the context for its primary purpose.

7.4.2 Framework testing

This technique is an established form of guidelines that are used in accordance with the design of a developed framework to determine the authenticity and reliability of the framework. This technique is characterised by the different properties, which involves reliability, usability, communication, test data, portability, reporting, and integration corresponding to the developed framework objectives. It was not possible

to carry out technique considering the present health challenges (COVID-19) and travelling restrictions within and outside the country due to the pandemic. In addition, testing of the framework is time consuming, meaning it takes longer time or maybe years to check if the framework works or not. Hence, the choice of framework validation for this research framework is the most appropriate for time management.

7.4.3 Framework validation

Validation of a research framework within the context of research is vital because it determines the research framework reliability and authenticity of the research choice of methodology in achieving the research aim and objectives. This technique determines the potential framework limitations within the context of the research and determines its possible impact, and processes at which the researcher's findings arrive at the conclusions. According to Jacobson and Johansson (2004) cited in Mohamed (2018), validation is confirmation and satisfaction of the research designed objectives with an intension of fulfilling the research aim within the context of any structural settings. Similarly, studies of Tigelaar et al. (2004), Parekh (2005), Cane et al. (2012) and (Patton (2014) support that framework validation would be a sequence of phases to ensure that the research findings were built consistent with the research designed objectives within the organisational setting.

7.5 Validation process

In agreement with the previous studies of Brinberg and McGrath (1985), Andersen et al. (2018) and Ho et al. (2020), the results of the developed framework were presented to the experts with a wealth of experience within the field of construction related work to comment on the relevant sections of the developed framework. In line with the face validity technique, the validation of the current framework involves the purposive selection of experts in the field of construction and asking them questions on the developed framework to determine the framework validity. During this process of validation, the benefits of the developed framework were also determined and assessed based on the users' (practitioners/experts) opinions on the relevant findings. The validation process was conducted to have a full understanding of the developed framework including its accuracy and consistency in attaining effective workforce training key objectives.

7.6 Proposed framework validation

This subsection reports on the process involved to determine the proposed framework effectiveness in terms of its objectives and, also, if its authenticity is fully achieved. The developed framework validation was according to the organisational settings that are related to construction related works in the Nigerian construction industry. These organisational setting objectives are the reimbursements or the benefits that both the construction industry and its workforce in Nigeria will gain because of adopting the proposed framework and its full implementation. These benefits may vary within organisations, which may involve trainees' learning abilities and acquiring new skills or behaviour towards performance. The remaining portion of this subsection of the study discusses the validation exercise, which was conducted with the various experts in construction organisations, with a wealth of experience and knowledge about the research topic in and outside Nigeria.

7.6.1 Conceptual stages of the proposed framework validation

The validation exercise of a research framework is believed to be a set of linked activities, which are based on the objectives of framework validation. The conceptual stages for the validation process are important and it involves four processes. These processes are key areas to focus on by defining a set of goals and determining the available resources for realising the set of goals based on the framework objectives.

The validation of the proposed framework for construction technicians was to achieve the research aims and objectives in addressing the challenges with training provision and skills upgrades in the construction industry in Nigeria. The framework validation follows basically four stages to ensure the researcher gains a deeper knowledge on the framework authenticity in the organisational setting, which are:

- Planning stage
- Development stage
- Implementation stage
- Action and improvement stage

The following sections discuss these stages in detail.

7.6.2 Planning Stage of the validation process

This stage was planning for a pilot study with the supervisory team and three participants within construction related work. This is a preliminary unstructured interview with the team during supervisory meetings and the selected professionals in construction. This was to gain an insight on the authenticity of the proposed framework and its application within the context. After gaining constructive feedbacks from the supervisory team during several meetings and three selected researchers, the aim of the preliminary studies was achieved. After the final amendment, validation invitation was sent to the selected participants for the proposed framework to notify them on time for the validation exercise. This was based on pilots' studies that allowed developing improvement in an organisational setting through Plan-Do-Check-Act (PDCA) process within the field of a reliable research procedure (Azevedo and Shane, 2019; Mora et al., 2019; Novo-Corti et al., 2018; Realyvásquez-Vargas et al., 2018; Lancaster et al., 2004). It should be noted that the final pilot interview with the team lasted for a duration of approximately 55-60 minutes before the final amendment was made and ready for distribution. The pilot studies (interviews) with the three participants and the supervisory team took place online through Microsoft Teams at the University of Central Lancashire (UCLan) Library, Preston main campus.

7.6.3 Development stage of the validation process

The distribution of the validation notification to the participants and their feedback (endorsement) on when to commence the validation. After gaining feedback from the selected participants, the interview questions were amended and distributed to the participants for verification through the validation exercise. It should be noted that the time frame for the interview validation was 30 – 60 minutes online via Microsoft Teams due to the impact of COVID-19. This process involved a presentation about the developed framework of the study to the selected participants at this stage.

7.6.4 Implementation stage of the validation process

At this stage of the validation process, all the minor and valuable developments were made corresponding to the research aim and objectives. This stage allowed the researcher to use a recorder to record all the areas noted for improvement, which was destroyed as the participants were informed during the process that it would be

destroyed after transcribing the interviews. Each of the participants was provided with the developed framework with the validation invitation sheet included the purpose of the validation and relevant information that supports the developed framework. At this stage, open-ended questions covered the key areas on the proposed framework as outlined below:

- The developed framework clarity, relevance, and its usefulness to both the trainees and trainers within the context of the Nigerian construction industry;
- The framework credibility in line with the research aims and objectives;
- The framework quality/resonance within the framework objective; and
- The framework explanatory sufficiency with the trainee's understanding.

7.6.5 Action and Improvement stage of the validation process

The developed questions of the questionnaire for the validation process to seek the participants' views were in accordance with the studies by Kirkpatrick's (2017) evaluation modelling process. The validation was based on the participant reactions towards favourable training methods, the learning ability of the trainees, the learners' outcomes, and learners' change in behaviour towards skills enhancement.

7.7 Justification of the validation technique

According to the studies of Lineberry et al. (2015), the importance of a framework validation and its justification within the context of a research cannot be snubbed because the authenticity and reliability of the developed framework is being determined by the experts/professionals' opinions during the validation exercise. They stress the need for the activities of validation and justification in the educational research enterprise as key to any successful research. In line with this research objective, sound assessment is key to education and training in the context of learning and to all educational research. The validation of the developed framework was to gain confidence from the selected participant since they were professionals in the field with a wealth of knowledge and experience within the context of the industry. This would boost the generalisability of the research findings and the framework developed to enhance workforce quality and hence industry performance. For effective validation exercise, the participants underwent an online discussion with the researcher in the form of a focus group to gain feedback on the framework for proper consideration.

Some of the participants received the developed framework through emails and postal mail. This approach has become necessary due to the current challenges on the global health crises (COVID-19) pandemic and to also reduce the cost and safety of travelling to Nigeria for the validation exercise.

7.8 Constraints for the developed framework validation

The validation of the proposed framework with the participants/experts was online in the form of a focus group due to the outbreak of the current pandemic. This led to the distribution of the validation questionnaire/developed framework to the participants before the day of the validation exercise. The participants for the validation exercise received a copy of the developed framework before the meeting date through an email/post and further discussion was carried out online via Microsoft Teams with the researcher. One of the key constraints experienced during the validation exercise was technical issues, the network in Nigeria was not too strong and that lead to network failure and some of the participants were unable to contribute their opinions. However, the researcher was able contact them by phone. This was due to the impact of the COVID-19 virus that affected and served as the validation exercise constraint.

7.9 Participants selection processes for the validation

The participants' selection process for the validation exercise involved practitioners and experts within construction related organisations with wealth of experience within the Nigerian context. This group of participants were contacted in the form of a focus group for the validation process through Microsoft Teams or by phone and the discussion lasted for 45-50 minutes. The discussion with these groups of professionals within the construction organisations comprised of Civil Engineers, Architects, Buildings Engineers, Project/Site Managers, and Educationist/Trainers. In addition, decision makers within government bodies and agencies, HR and managers within the industry are involved. This debate enabled the researcher to gain a deeper knowledge on the framework validation outcome and criteria for the validation processes were outlined below:

- The selected participants for the framework validation must be working in the Nigerian construction industry with wealth of experiences and an expert in training within construction related works (which includes years of working experience not

less than 10), experience within the private organisations, government and non-governmental agencies that are construction related. These criteria were to match the participants' experience within the proposed framework

- Validators are those with a wealth of experience in the building production process management within the Nigerian context and other countries like the United Kingdom (UK), Canada, and Australia with a wealth of experience within the construction organisations. Experts with a wealth of experience in the developed nations to compare the relevance of the framework in the developing country; and
- A validator working experience in the industry must not be less than ten years.

These selection criteria are in line with the research objectives that form the basis for the framework validation as indicated in Figure 7-2. The selection of the validation participants was through stratified random sampling from the initial respondents of the industry survey in Figure 7-2.

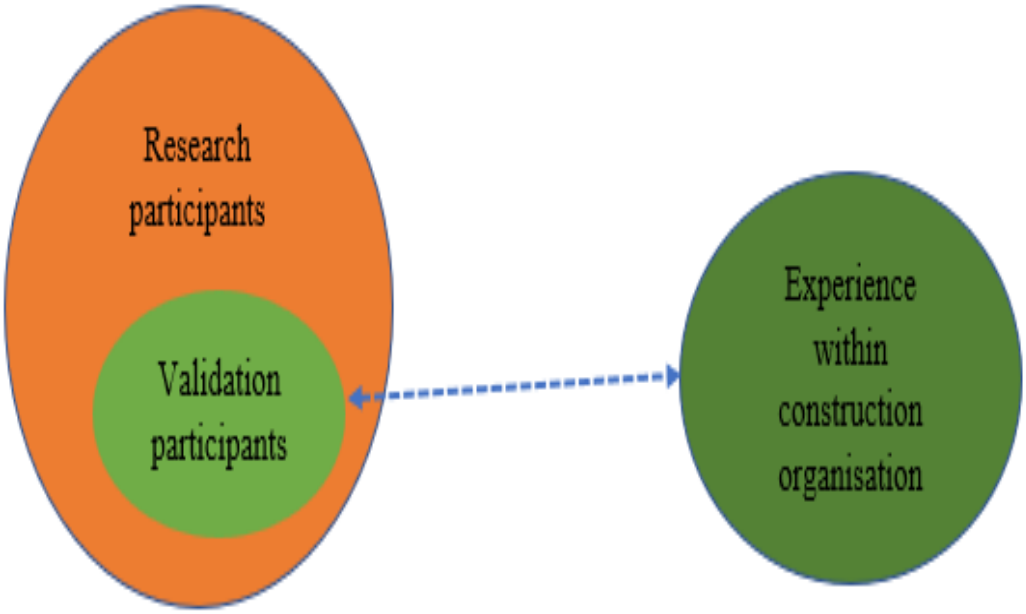

Figure 7-2: Validation participants' selection.

The profile of the participants for the framework validation is presented in Table 7-1.

Table 7-1: Selected participants' profile

Validation ID NO	Training Background	Professional Practice	Years of Experience	Educational Qualification
PFVal 1	Building Engineering	Construction & Architectural design management	26 years	PhD
PFVal 2	Civil Engineering	Construction Management	15 years	PhD
PFVal 3	Civil Engineering	Construction/Project Management	18 years	PhD
PFVal 4	Civil Engineering	Civil Engineering and Construction Management	16 years	PhD
PFVal 5	Building Engineering	Building Engineering	15 years	PhD
PFVal 6	Construction Management	Construction and design management	16 years	PhD
PFVal 7	Project Management	Construction/Project Management	15 years	PhD
PFVal 8	Civil Engineering	Civil Engineering/Construction Management	16 years	PhD
PFVal 9	Civil Engineering	Civil Engineering/Construction Management	13 years	PGDE
PFVal 11	Civil Engineering	Civil Engineering/ Construction Management	21 years	PhD
PFVal 12	Quantity Survey	Construction Management	15 years	PhD
PFVal 13	Project Management	Construction/Project Management	24 years	PhD
PFVal 14	Civil Engineering	Civil Engineering/Construction Management	16 years	PhD
PFVal 15	Building Engineering	Building Engineering	15 years	PhD
PFVal 16	Project Management	Construction/Project Management	17 years	PhD
PFVal 17	Civil Engineering	Civil Engineering/Construction Management	15 years	PGDE
PFVal 18	Construction Management	Construction and design management	19 years	PhD

7.10 Participants' feedback

The developed framework might be characterised with the attribute of TNA within the context of Nigeria and other developing countries in African continent due to the challenges' similarities. The validation exercise involved eighteen participants to determine the proposed framework as self-explanatory; key learning issues; current technical areas; continuous improvement; in the framework questionnaires.

7.11 Analysis of validation feedback

The framework validation feedback analysis from professionals with a wealth of experience within construction organisations was vital. The feedback analysis was based on the experts' observations at the validation exercise based on the validation objectives key themes. This analysis followed the sequences outlined below:

- Relevance and usefulness of the proposed framework.

- Credibility and design of the framework.
- Resonance or key learning issues of the framework.
- Explanatory sufficiency or self-explanatory of the framework.
- Current technical areas of the framework; and
- Continuous improvement of the framework.

The feedback from the framework validation exercise with the participants was positive. Although, suggestions were made during the validation exercise on some areas in the framework that needed amendments, which was resolved and reflected in the final version of the proposed framework presented in the previous chapter.

7.11.1 Relevance and usefulness of the Research Proposed Framework

This section determines the participants' perceptions on the proposed framework on its **relevance and usefulness,** the participants strongly agreed with the proposed framework impact on performance of construction technicians. Participants' views indicated that 83.3% strongly agreed, while 16.7% agreed. In addition, 80.0% of the participants strongly agreed with the links between the different components of the proposed framework, based on its logical/consistent and relevant to the construction industry while, 20.0% agreed. Furthermore, 73.3% strongly agreed while 26.7% agreed that the institutional control revealed within the framework influences training of construction technicians. Likewise, 53.3% strongly agreed, the usefulness of the developed proposed framework, while 46.7% agreed with the usefulness.

The validation outcomes with the participants were acceptable for this research and a further analysis carried out due to the participants' opinions during the exercise. Furthermore, the participants (100%) perceptions were either strongly agreed or agreed with the framework impact on performance and behaviour of construction technicians, links between different component of the framework, influence of the institutional control and its usefulness in its current format towards enhancing the technicians' skills within construction related works. Obviously, the experts' views towards the proposed framework based on its relevance and usefulness for application was positive. However, some noticeable points were raised during the validation interview process and amendments were made in this final version of the proposed framework. *"Based on my wealth of knowledge and experience over the years within*

*the context of construction related works, I think the proposed framework is suitable/useful and relevant to the technicians' skills upgrade. However, the proposed framework can be reduced in size by careful observations on the final version of the thesis, at this current stage, the framework seems to be clear but too voluminous" (*PFV01). This expert observation was noted and reflected in this final version by focusing on the key areas.

"I'm optimistic that the links between the different components of the proposed framework are clear and straightforward, but I still believe that the researcher can still do a little bit of work in the final version of the framework. There are few repetitions of words like at this stage. However, the links in the framework are comprehensive in detail, clearer to the reader and will be useful for practical and academic purpose within the context" (PFV02).

Furthermore, participants for the validation exercise strongly agreed the usefulness and relevance of the framework for improving the technicians' skills within the setting of the Nigerian construction industry. One of the participants commented:

I strongly agree that the proposed framework is useful and will be relevant for the technicians' skills development within the context of any construction related organisation. Th proposed framework is comprehensive and applicable, ensuring the need for incentives to motivate school dropouts, trainees' engagement and collaborating agencies within the industry (PFV04).

Obviously, the proposed framework was relevant and useful within the industry. This was an indication that the research aim, and objectives were progressively gaining momentum in terms of skills actualisation.

7.11.2 Credibility and Validity of the proposed framework

Participants perceptions on the framework structure and its application on skills upgrades indicate that 77.8% strongly agreed, while 16.7% agreed, 5.6% neither agreed nor disagreed. In addition, 78.6% strongly agreed, the understanding and effectiveness of the framework to construction industry, while 21.4% agreed. Also, 80.0% strongly agreed the mechanism functions of the proposed framework have an

influence on input, output components of the framework for training of construction technicians, while 13.3% agreed and 6.7% neither agreed nor disagreed.

Obviously, 100% of the participants are of similar perceptions towards the proposed framework application, structure/design, and credibility based on the research aim and objectives. Participants' perceptions were either strongly agreed or agreed on the effectiveness of the proposed framework, easy to understand by the trainers within the learning environment for skills enhancement. Thus, there was an indication that 100% of the participants participated in the validation exercise have the similar perceptions towards the framework efficiency and credibility for skills enhancement. However, the participants strongly agreed that the mechanism of the framework has an influence on the input and output components of the technicians training. *"I agree with the structure and credibility of the proposed framework for the technicians' skills enhancement within construction related organisations. This is in line with my experience in the field of construction related organisations in Nigeria. However, the final version of the proposed framework should indicate the inputs components in order of priority to make it simpler to the reader"* (PFV05).

Furthermore, another participant observed that a lot of work has been done on the proposed framework and the structure of the framework was in line with the research aim and objectives, which has been indicated in the proposed framework. This was a clear indication, and the framework objective based on its structure/design and credibility was confirmed by experts within construction organisations based on their experience. *"I can confirm to you that a lot of work has been done on this proposed framework and the structure of the framework and its credibility are well satisfied in terms of the technicians skills development concerning training needs of any construction related organisations"* (PFV08).

Hence, the proposed framework credibility and design was in line with the t research objective and was based on the studies by Olsen et al. (2018), Telio et al. (2016), Dellinger and Leech, (2007), which state that the proposed framework validation may be based on expert judgement within the context. These studies support that quality research framework validation should undergo a credibility check, which must be related to the research objectives and supported by the framework validation objectives. The credibility check gave more confidence in the framework validation

process for the learning institution to be satisfied with the proposed framework. This research framework validation has satisfied the credibility check based on experts' judgement during the validation exercise and the framework will be recommended for application within the industry.

7.11.3 Quality skills requires for skills upgrade within the Framework

This determines experts' judgement on the objectives of the proposed framework based on the technicians' learning environment. Participants of the validation exercise strongly agreed with the proposed framework on the enhancement of the skills required for construction technicians. Participants' views on the proposed framework validation process indicate that 83.3% strongly agreed while 16.7% agreed with technical skills. Furthermore, participants' views on interpersonal skills, 81.3% strongly agreed, 12.5% agreed and 6.3% neither agreed nor disagreed with the technicians' interpersonal skills. In addition, 87.5% strongly agreed with the project management skills, while 12.5% agreed. Likewise, 66.7% strongly agreed with the conceptual skills, 20.0% agreed, while 13.3% neither agreed nor disagreed. Furthermore, 53.3% strongly agreed with the enterprise skills, while 46.7% agreed. More so, 86.7% strongly agreed with the business skills, while 13.3% agreed.

Participants perceptions towards skills required for enhancement of the workforces' skills are in line with the proposed framework validation. A good number of the validation participants strongly agree (83.3%) with the skills required as shown within the framework for workforce' skills enhancement within the industry. It is obvious that these participants either strongly agreed or agreed and some of them neither agreed nor disagreed with the skill needs within the organisational settings.

Furthermore, a certain number of participants' perception also indicates the strong extent of agreement by the participants with the suggestion of the need of project management skills at the technicians' level. This has been strongly indicated above as the extent at the participant agreed has been quantified in percentage and shown above.

Likewise, the participants' perceptions on the extent to which they agreed with the conceptual skills, enterprise and business skills are high and the extent to which they strongly agreed (86.3%) with these skills as been suggested in the proposed framework are highly encouraging. This is an indication that the research aim has been achieved

since the central target was to develop a proposed framework for workforce' skills enhancement. It has been strongly agreed by these groups of professionals within the context that the proposed framework can help in improving the workforce's technical skills, interpersonal skills, project management skills, conceptual, enterprise and business skills.

7.11.4 Explanatory sufficiency or self-explanatory of the framework

Most of the participants in the validation exercise strongly agreed that the proposed framework explanatory sufficiency is self-explanatory. These participants' opinions showed that 83.3% strongly agreed, 11.1% agreed while 8.1% neither agreed nor disagreed. In addition, over 80.0% of the participants strongly agreed with the strategy applied in achieving the outcomes, while more than 10.0% agreed with the applied strategy. The outcomes of the framework validation with the participants showed that the framework was sufficiently explanatory.

Furthermore, participants stated that the framework was self-explanatory to the trainers, policy makers, decision makers, project managers, educationist, etc and the proposed framework was based on the research aim and objectives. *"...this proposed framework for technicians within construction related organisation is explanatory sufficiently in line with the research objectives"* (PFV08).

This was obvious that the professionals' judgement was in accordance with the research objectives. The Participants' perceptions were focused on the technicians' skills enhancement within the proposed framework. These opinions were important with the efforts made towards meeting and addressing the current challenges within the construction market by improving the workforce skills. The proposed framework was a clear and straightforward document that was self-explanatory to both trainers of the industry and institutions of learning. The validation by experts was a confirmation of the framework reliability, authenticity, its application, and for the workforce skills upgrade.

7.11.5 Current technical areas of the framework

The perception of the participants on the proposed framework inputs components indicates that 76.5% were strongly satisfied, while 23.5% are satisfied. In addition,

73.3% strongly satisfied, 20.0% were satisfied, while 6.7% are neither satisfied nor dissatisfied with the framework mechanism components. More so, participants' views on institutional control, 68.8% were strongly satisfied, 25.0% satisfied and 6.3% neither satisfied nor dissatisfied with the institutional control mechanism. Furthermore, participants' perceptions on sustainable issues role in the proposed framework, 81.3% were strongly satisfied, while 12.5% were satisfied and 6.3% were neither satisfied nor dissatisfied. Similarly, 71.4% of the participants opinions on the role of the ethical issues in the proposed framework were strongly satisfied, while 21.4% view were satisfied and 7.1% were neither satisfied nor dissatisfied.

The participants' views were strongly satisfied with the input components as suggested in the proposed framework. These participants' views were generally accepted, which was essentially in line with the framework objectives. Furthermore, the participants' opinion indicated that the proposed framework was strongly satisfactory in terms of the mechanism component as suggested, which was key in the framework development.

7.11.6 Continuous improvement of the framework

This section of the chapter determines the suitability of the various elements within the proposed framework, questions based on the framework improvement were asked. This was to determine any further improvement in the developed proposed framework for the technicians' skills enhancement. This determines the entire relationship between the various elements (components) within the proposed framework based on the key objectives of the proposed framework validation.

The participants' views showed that 77.8% were strongly satisfied with the framework key performance indicators role, while 22.2% satisfied. More so, 81.3% were strongly satisfied, 18.8% were satisfied with the proposed framework evaluation output and its components. Similarly, 75.0% of the participants opinions on the role of the entire framework were strongly satisfied, while 25.0% view were satisfied.

Based on the participants' views, lots of work was carried out and the framework was useful, relevant, explanatory sufficiency, self-explanatory. However, participants noted some few areas that needed few amendments to achieve the objectives of the proposed framework. A participant stated that:

"Consider making the framework more dynamic by reflecting levels implementation for each criterion. This would increase access and understanding of institutions by simplifying and enabling self-assessment to identify where they currently lie on the framework and improve the odds of possible adoption and implementation" (PFV06).

This above statement indicates the need for improvement in the proposed framework parts and this has been amended based on the participants' views and suggestions. The collected data and the findings of the validation exercise were used in refining the proposed framework in its final version. Hence, the final version of the framework has been improved as suggested by the professionals in construction within Nigerian context and was presented in the final version in Chapter Six.

7.11.6.1 Validation of the proposed framework using typical examples

For the validation of TSDF, a typical example application, e.g., a school leaver, a person with two years' experiences as indicated in **Table 6-1** and Table *6-2*. The proposed framework (**TSDF)** is the central aim of this research that has been achieved successfully. However, one of the key requisites to the developed framework is it's validation by the researcher and experts within the construction organisations to ensure that it's tailored to the research objectives, which established the research specific values and goals. This is to ensure the content is fitted and rooted based on its aim. The framework must be structured suitable to the organisational settings, with focused on motivating young people (males & females) participation within the construction professions, culture, and region, towards achieving **SDG.**

School leaver (Jane Doe): A school leaver is expected to start from the **zero level,** which WAEC, NECO, NABTEB, O levels with a merit in English and Mathematics will be consider as entry qualifications. At this stage of the framework, the learner's O Levels will be fully assessed to determine it entry. The learner is expected to undergo the different levels, which are the **Level 1** that focus on the Academic aspects. At this stage, the subject modules for the learner's understanding are paramount. These modules or subjects include Mathematics, Physics, Chemistry, Further Maths, Technical Drawing, English, IT and General Studies etc. The second phase of Level 1 will focus on the technician's subject area, IT, Maths, and computer science. In the third phase of Level 1, workforce report, subject specific is paramount. Workforce/learners abilities are clearly examined in line with performance to proceed

to the next level within the context. However, a provision is made for **unqualified technical student** that show interest in construction profession. An additional period of 12 months (pre or remedial studies) is given to them to enrol before starting the main programme. During this pre or remedial period, the learners are expected to have the available qualification and is ready to proceed to the first stage of the training.

The **Level 2** is the practical stage, which an industrial placement (IP), logbook and continuous professional development (CPD) are examined during the learning process. Workforce critical skills are determined to proceed to the next level. At the final stage, **Level 3**, is further divided into two halves sections, 6 months for training plans and 6 months for training appraisal for learners to become fully trained technicians.

A person with 2 years' experiences (Jack Doe):

The learner is expected to start from the second phase of the academic year, **Level 1** as indicated in the framework. This stage does not require O Level, qualification as criteria for entrance to proceed to the next stage of the programme. No qualifications are assessed at the strategic view of the framework, but workforce/learners are assessed based on their years of experience and ability before entry. The process continuous as indicated in the Table 6-1 to become a trained and competent technician.

7.11.6.2 Limitations of the implementation of the developed framework

The proposed framework **TSDF** will serve as a boaster for institutions of learning to enhance workforce skills and the industry performance. However, limitations may exist in the framework application within the context. The introduction of the recent technology and its application has helped workforces in many organisations including construction related organisations. However, the corollary of this innovation is the case in the Nigerian context and other developing countries. Hence, the limitations of the use of the training framework regarding the availability of appropriate technology in more remote parts of Nigeria is the ineffectiveness access to Internet services and power supply (power failure). Although, there are Internet services in most of the cities in Nigeria, but to gain access to power supply (electricity), which most of the technological equipment solidly depends on it for daily operations is a pressing issue, i.e., a big challenge. This has made it impossible for some of the workforce/learners within these remote areas to gain access and they find it very difficult to explore.

However, generators may be available during the training, but it is expensive and most of the construction organisations cannot afford it or may not want to provide it to save cost. This affects both the trainers and trainees in exploring or making advantages of the digital resources.

Second major limitation in the application of the framework is the culture practices within the context. As it is strongly believing in Nigeria, most especially within the remote areas where the local people both males and females that were supposed to be engaged in this training believe that construction related works are professions strictly for men and not women. This limitation may serve as a hindrance and will require a lot of educational motivation factors as mentioned the thesis to encourage them.

7.12 Summary

The framework validation was in two parts. Part 1 by means of a constructed questionnaire response and Part 2 by a focus group. The experts involved in the validation process were those with wealth of knowledge and experience in construction related organisations, both outside and within the Nigerian construction industry. The feedback collected from the participants during the validation exercise was useful and helped in refining the proposed training and skills development framework. The next chapter presents the research conclusion, recommendation, knowledge contribution and limitations.

Conclusions, Recommendations, Knowledge Contribution and Limitations

8.1 Introduction

This is the final chapter of the thesis, which concludes the investigation conducted in accordance with the aim and objectives of this research study. The discussion on the conclusion of the research findings, assessment of the various evidence gained to acquire the research aim as indicated in Chapter One. The chapter discusses the main contribution of the research as related to the academic and technicians' practices in construction related studies. The limitations and recommendations for further research are also discussed in this chapter.

8.2 Achievements of the research objectives

The main purpose of this research was to introduce a new approach for training and skills development that will contribute towards improving the construction industry in Nigeria in terms of its performance and competitiveness, when fully implemented. This research aim was achieved by accomplishing six objectives. The proposed framework was developed based on the findings of the literature review, industry survey analysis, which comprises of these key areas: strategic views on the technician skills, developing the technician skills, developing the technician skill sets, assessing the application of technician skills and the output evaluation. These key points were considered as stages that each criterion should follow in the framework development.

This investigation was purely descriptive in nature which has been conducted within the Nigerian context with the aim of improving the technicians' skills as they form the largest part within the construction industry. The analysis of both primary and secondary data presented in Chapter Four and discussed in Chapter Five, findings and conclusions were derived in line with the achievement of the research objectives.

1. To conduct a critical literature review on workers' skills acquisition and training within the context of construction industry.

Most of the countries worldwide are making much effort through huge investment in training within construction organisations including Europe and other developed nations are successful. These includes the UK, USA, Australia, Canada, France,

Germany, China, Japan, India, Indonesia, South Korea, Norway, Sweden, UEA, etc. However, several issues were identified in the study which were responsible for the downgrade of the industry in terms of its performance, despite the huge investment made towards industry improvement.

One of the critical issues identified by the extant literature was the issue of skill shortages and skills gap which were identified as key problems experienced within the settings of the construction industry in most countries, particularly within the developing countries of the world including the African continent, Nigeria to be precise. Findings of these extant literatures reveal that skills shortages and skills gaps were recurrent problems that were not limited to the developing world, but it is a global challenge experienced in the industry of construction since the economic meltdown in the year 2008.

1. To critically assess the current workers' skills acquisition and training within the context of the construction industry in Nigeria

The related literature on issues concerning workforce training and skills development was intensively reviewed to gain a full understanding concerning the subject under investigation. The Nigerian construction industry is challenged with the issues of skills gaps due to several factors including inadequate training and skills development strategies and plans. The extant literature of the current studies gave an insight on the key research problem statement, a deeper understanding on how to achieve the research objectives. Within the African continent, Nigeria is challenged with issues of skills gaps due to inadequate training and skills development within the industry. The related literature on the issue of workforce training and skills development was to gain an in-depth understanding on the subject under investigation.

In the cause of achieving the research objectives, reliable theories in the development of the research framework emerge and the concept of the IDEF0 modelling process through complete development, application, and validation of the TSDF was considered the most appropriate for achieving the research aim. This concept of IDEF0 modelling process was chosen as the most appropriate means of understanding the development concept of the current research framework because of the identification of the functions (or activities) in a hierarchical structured way that reveals all the

relationships between functions based on the information that is considered essential in this research. The framework matrix modelling process consists of a series of columns called the stages that are in line with the text description in the provision of decomposition of a complex object formally into its constituent parts or sub-activities.

Furthermore, the literature also reveals that the industry has been affected due to the global health crisis, COVID-19 pandemic that seems to be the largest global pandemic that has the greatest impact on economic growth globally. Obviously, COVID-19 has lead to economic downturn in most of the developed countries like the USA, UK, since the national emergency lockdown in March 2020 pronouncement. The impact experienced globally was the delay on projects, reduction in productivity, recruitment of a skilled workforce was one of the new opportunities established.

2. To identify and categorise the factors that negate growth in technicians' skills in Nigerian construction industry

The influencing factors have led to the industry downgrade for many years and its performance and contributions to the country economy was affected. The findings of the investigation revealed the issues that lead to low performance and the industry contribution to the nations GDP for its future growth are:

Inadequate training facilities; academic corruption; unstable academic calendar; weak leadership; funding; insecurity; unstable academic calendar; and acute shortage of trained qualified teachers. The analysis of the industry survey findings indicates several factors that hinder the effectiveness and efficiency of workforce training within the industry to include: The influencing factors that determine the technicians' and the project managers' behaviour towards technicians' honesty/integrity and safety within the industry. Findings of the research industry survey analysis reveal the effectiveness of skills training and development method for technicians in terms of vocational education and training. The polytechnic/colleges of technology, university education, and technical teachers' college, informal and formal apprentice training method, technical colleges of science and technology, senior and junior secondary schools, and trade centres were outlined as the various skills training in Nigeria based on the survey findings.

However, formal apprenticeship training seems to be more effective since it is a combined training of both the practice on site with the theories in a classroom. The creation of the formal apprenticeship training method within the context was aimed to run formal apprenticeship training programme through the vocational training institutes (VTIs) the science and technical colleges (STCs), vocational innovation and enterprise institutes (VIEIs).

Furthermore, findings of this investigation reveal that young people within the Nigerian context were not showing much interest in construction related work as a choice of profession. Participants' perceptions on these issues revealed that it was due to the negative images portrayed on the industry. The key issues regarding the younger generation's interest on this profession were detailed in Chapter Five (5.3.6).

3. To determine the gaps in the actual technicians' skills and knowledge required to enhance the industry performance

The identified factors were categorised into various forms with different impacts on the subject under investigation. These influencing factors identified have great impacts on TVET, which created a huge skills gap within the industry. These challenges have deprived the workforces/learners of acquiring quality skills, knowledge on the work and workforce competences and performance. The workforce/learners are expected to acquire quality skills and knowledge for a competent job done within the industry, because adequate training has been denied due to the factors identified. The required skills identified in the study need to be integrated through effective networks with educationist/trainers regularly, filling knowledge gaps through effective learners training, encouraging school leavers to enrol in learning activities through adequate incentive provision within the context.

For the essence of this current study, technical skills and proper knowledge and a bit of managerial knowledge are needed for the workforce skills enhancement. These required skills are interpersonal skills, project management skills and enterprise or innovation skills required for the development and enhancement of the technician skills in the industry.

4. To develop a conceptual framework for improving the quality of technician's skills in the Nigerian Construction Industry

The proposed research framework development was based on the IDEF0 modelling process concept in achieving the research aim and objectives. The research framework proposed for training and skills development for technicians in the Nigerian construction industry was structured based on the current issues concerning inadequate workforce skills in the industry. The proposed framework focuses on a two-dimensional (**2D**) approach; the *columns* denote the criteria, which are assessed at the key levels. The framework identified four key areas, which are the input stage of the framework that all the inputs components are processed and transformed into the output stage of the framework. The input stage (**Developing the technician skills**) of the framework is the **Prior/Preceding,** which is the stage that the current technician skills are being established for future challenges. The second stage (**Developing the technicians skills sets**) of the proposed framework is the control stage where the component of the framework controls the input components into the framework that are being processed, which lead to an effective and competent outcome. The third stage (**Assessing the application of technician skills**) of the framework process is the stage that the final products are being examined within the context of the construction industry in line with the organisational objectives. At this stage of the proposed framework, competency and performances are being determined within the context in line with organisational settings or key objectives. The proposed framework will enhance workforce skills effectively within the Nigerian construction industry to be more competent to gain an edge over its competitors in the global construction market.

5. To validate the developed framework

The validation of the developed framework involves several professionals selected from construction related organisations in Nigeria. Project managers, Architectures, Building & Civil Engineers, Quantity surveyors, Trainers/Educationist formed the group that agreed on the possible usefulness of the proposed framework for skills development of the technicians to minimise the skills gaps and shortages. Based on the framework validation process, it was obvious that the framework proposed application can be practically implemented, which may in proper ways achieve the potential or purpose of the research.

The proposed framework will be suitable for effective training and skills development of construction workforce at the technicians' levels within the industry for its future

development. This will upgrade the technicians' skills quality to be competent in the global construction market. The usefulness of the framework within the context is paramount to the suggested and targeted groups, which are basically the unqualified technical students, school leavers that want to pursue construction related works as a career/profession. This framework suggests that government policies/strategies and resources, effective teaching and learning, curriculum development, stakeholders and partners agencies, immediate communities, communication skills, the learners' culture, specific skills, behavioural factors with technicians' motivation to be transformed for workforce/leaner' skills enhancement.

8.3 Major contributions and implications

The important contributions of the current framework of the study were discussed at the various levels within organisational settings.

8.3.1 Academic contributions:

The reviewed of the extant literature covers the key words, which are training and education, skills development, skills shortages, skills gaps, technicians, construction industry, skilled workforce, stakeholders, organisational settings, effective training, trainers, workforce challenges, performance output, educationist, trainee, and evaluation output. This was one of the key contributions of the current research in the field of training and skills development within the Nigerian construction industry. This addresses the issues of skills gap within construction related organisation in Nigeria. Previous related research studies paid less attention to training and skills development towards addressing the skilled workforce shortages/skills gap in Nigeria. This was through the determination of the negative impact of artisan inadequate training. However, the degree and dimension of these impacts are yet to be fully established. This study determines an in- depth understanding on the negative impact of inadequate workforce training and skills development and the degree of these impacts on the industry development. This current investigation on these impacts covered all the six geopolitical zones of the country, unlike the previous studies. Usefulness of this study to scholars/academics was the contribution towards knowledge and skills upgrades on the workforce training by filling the gaps within the existing workforce on the need for suitable training.

Furthermore, the proposed framework could serve as a means of theory-building based on the needs for workforces/learners' training and skills growth within organisational settings. Based on this study's objectives, an integrated body of precise knowledge within construction related organisations was brought together for the actualisation of this research. The reviewed literatures were on training and skills development concept in construction related organisations, workforce skill shortages, workforce training needs, skills gap within organisational settings, management of construction, skills, and knowledge assessment. In the cause of this study, a lot of issues raised leading to skills gap within the context that were critical and required immediate consideration. The need for immediate attention was to fill the existing skill gaps within the industry to improve the workforce skills quality and performance within the context through the developed proposed framework.

8.3.2 Contribution to practice

- The developed framework can be employed not only within construction context, but it may also serve as an effective and sufficient tool within related industries in Nigeria. This proposed framework implementation may be of the greatest benefit in coordinating and amending the workforce/learners' training and skills enhancement within incompetent organisational settings towards its workforce skills upgrades. This may not be within the Nigerian alone; it may be relevant to any other country with similar challenges and most especially within the African context. The framework will serve as a protocol/guideline for effective training of workforce skills enhancement at the technicians' levels. The key areas should be observed for the training within the construction industry for its future growth:
- The proposed framework can help in identifying the needed skills for workforce within organisational settings in line with the organisational objectives. Workforce training is systematic in nature towards the achievement of the organisational objectives. Hence, effective training and skills development programmes must be conducted under the supervision of an expert within the field.
- Selection of employees within an organisation for training shall be conducted based on the identified problem/issue and the need to save costs because training is usually expensive, but its benefits are unquantifiable.

- Trainee motivation is paramount in effective training, which can be through fit or appropriate provision of incentive measures within organisations.

8.4 Recommendations

Inadequate workforce/learners' training experienced within the construction industry in Nigeria was also due to the irregularities and commitment of the regulatory bodies in charge of control. These regulatory bodies' commitments were totally ineffective in discharging the duties assigned to overcome the challenges. This created a huge gap that calls for prompt action due to the detrimental effect caused on the various training institutions within Nigeria.

8.4.1 Recommendations for practice

This current research suggests that need for the Nigerian government to ensure an adequate and a working body that regulates, supervise, licenses, and monitors in a precise and developmental service effective needs of workforce/learners' training.

Hence, recommendations for practice are further highlighted based on the research objective.

- This study finds that trainee's opinions should be considered towards adequate training before trainer's opinions. The workforce/learner's choice towards training determines its performance within the learning context. Hence, workforce training within organisations should be subjective based on workforces/learners' opinion and not objective based on trainers' and management objectives.
- Management commitment within organisations should be considered with topmost priority on workforces/learners' training. The emphasis should be based on the commitment towards effective training and skills upgrades by ensuring training activities cover training strategies based on organisational settings.

8.5 Limitations of the research

In every successful research in organisational settings, there are certain constraints that the researcher faces in the investigation process, which are limitations that needs to be addressed. Hence, this study limitations are outlined as follows.

- This study was limited to the construction industry in Nigeria and the research findings are limited to the industry alone. Further investigations are recommended within other related industries in Nigeria within the African continent.
- The study employs a mixed method that involves quantitative and a qualitative approach of enquiries for the research data collection process in the Nigerian construction industry. Therefore, the validity and reliability of the study's findings based on other construction related organisations within the Nigerian context was one of the research key limitations. However, adequate pathways were established in describing the research phenomenon, research analysis and the choices of the participants' selection for the research findings generalisation to other construction industries in Nigeria.
- Notwithstanding this study contributes towards encompassing the workforce training and skills development literature in construction industry. However, the study is limited to the skilled workforce alone within Nigerian context.
- In addition, there were restrictions in having access to some research documents on TNA and technical issues due to the pandemic (COVID-19) outbreak. This led to the national lockdown and the researcher was working at home, where lots of technical issues were experienced and the researcher was infected by the virus too.
- Finally, this current study limitation is the difficulty encountered in generalising the study findings of the workforce that are sector specific within the industry.

8.6 Recommendation for further research

The technicians identified during this investigation in Section 2.15 of Chapter Two were the masons, bricklayers, electricians, plumbers, etc that form the main part of the skilled workforce within the industry.

- This study focused on limited number of skilled professions in the construction industry that comprises of many professions in different sectors. The study focus was on few workforces at the technicians' levels. Therefore, further investigation into different levels of the workforce within the industry is recommended.
- This study focuses on a certain group of the workforce at the technicians' level in the construction industry in Nigeria. Further research studies at the management levels within the same context is paramount.

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Appendices

Appendix A

Ethical Approval

14 November 2018

Abdulkadir Ganah / Mukdem Mark Dabok
School of Art, Design and Fashion
University of Central Lancashire

Dear Abdulkadir / Mukdem

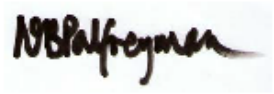
Re: BAHSS Ethics Committee Application
Unique Reference Number: BAHSS 601

The BAHSS ethics committee has granted approval of your proposal application 'Training and Skills Development Model for Building Construction Industry in Nigeria'. Approval is granted up to the end of project date.

It is your responsibility to ensure that

- the project is carried out in line with the information provided in the forms you have submitted
- you regularly re-consider the ethical issues that may be raised in generating and analysing your data
- any proposed amendments/changes to the project are raised with, and approved, by Committee
- you notify EthicsInfo@uclan.ac.uk if the end date changes or the project does not start
- serious adverse events that occur from the project are reported to Committee
- a closure report is submitted to complete the ethics governance procedures (Existing paperwork can be used for this purposes e.g. funder's end of grant report; abstract for student award or NRES final report. If none of these are available use e-Ethics Closure Report Proforma).

Yours sincerely



Nick Palfreyman
Deputy Vice-Chair
BAHSS Ethics Committee

* for research degree students this will be the final lapse date

NB - Ethical approval is contingent on any health and safety checklists having been completed and necessary approvals gained as a result.

Appendix B1

PARTICIPANT'S INFORMATION SHEET

Research Title: "A Training and skill development framework for construction technicians' in Nigeria"

About the researcher

Mukdem Mark Dabok is currently a Research Student (MPhil/PhD) at the Grenfell Baines institute of Architecture, University of Central Lancashire, undertaking research entitled "A Training and Skill Development Framework for Construction Technicians' in Nigeria".

Invitation to participate in this research

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Please do not hesitate to ask questions if there are any areas of the study you are unclear about or if you would need more information. Take time to decide whether you wish to take part.

Aim and objectives of the research

The research aim is to develop a training and skills development model to improve the quality of workers' skills in the building construction industry in Nigeria.

To achieve the proposed research aim, the following objectives are formulated;

MPhil Objectives:

- **To conduct critical reviews of literature on worker's skills acquisition and training needs within the context of the Construction Industry.** This objective will provide a deeper understanding on the review of the extant literature to determine the current workers' skills acquisition and training needs within the context of the Construction Industry globally.
- **To critically assess the current workers' skills acquisition and training in the Building Construction Industry in Nigeria.** This objective will give a full knowledge on the concept of the workers' skills, upon which the skills of the workers within the Building Construction Industry will then be assessed through the analysis of the reviewed literature.

- **To identify and categorise the challenges and barriers that negate growth in the workers' skills of Building Construction in Nigeria**. After a critical review of the literature on the Construction Industry in Nigeria, the barriers that negate the growth in the workers' skills will then be analysed and evaluated. This will give the researcher the understanding to provide guidelines that will enhance the workers' skill.

  PhD Objectives:
- **To develop a conceptual model that will improve the quality of workers' skills in the Nigerian Building Construction Industry**. A model will be developed based on the findings of the literature survey and the outcome of objectives 2 & 3.
- **To evaluate the developed model that will improve the quality of workers' skills in the Nigerian Building Construction Industry**. This stage of the research will be using experts' judgement to assess the suitability of the developed model.

Why you have been invited to participate in this research?

You have been invited to participate in this research because you have been identified as one of the active participants (stakeholder) who have the responsibilities for the wealth of knowledge and experience you have within the construction industry. Your experience will contribute valuable information to this research.

What will the research involve?

This involves conducting interviews with Project Managers/Site Managers or Technical trainers and educationists (Trainers). The interview will facilitate the collection of detailed information related to training and skills development with the construction industry.

The data collected from the participants will be used in the development of a conceptual model of training and skill development for the Nigerian construction industry. This will improve the quality of workers within the industry. The interview will be recorded and will be used for later analysis.

Do I have to take part?

Your participation is entirely voluntary. If you do wish to participate, you will be given this information sheet to keep and given the opportunity to ask the researcher any questions you have regarding the study. During the study, if there be any aspect that you are unhappy with, you have the right to withdraw at any time, without giving a reason and without any negative consequences. This will include the withdrawal of any data collected from you. All information used will be anonymous.

Can I withdraw my data after my participation?

Yes. Participants may request that their data should not be used even after they have taken part in the interview. However, it will not be possible to withdraw anonymous participant's information after the final analysis has been completed.

What are the possible risks or cost of taking part?

There are no known or anticipated risks to you as a participant or out of pocket costs related with this research.

What are the possible benefits of taking part?

There are no direct benefits to you in this research. However, your participation will provide in-depth information that will enables the researcher to develop a conceptual model. This will contribute to the wider knowledge or development of workers' skills within the construction industry. Most importantly, the research will improve the performance of the workers and hence compete with global construction market.

What happens when the research study stops?

You will not be contacted or required to participate in any further assessments or interviews regarding this study.

Will information about me be kept confidential?

All the information that we collect about you during for this research will be kept strictly confidential. All identifying information will be stored on a password protected document on the University computer and deleted at the end of the study. The data will be kept for 5 years and will then be destroyed. The confidentiality of the data collected for the purpose of this research by both questionnaire and interview is assured, and none of the information provided can or will open you up to any prosecution. In other words, the information provided for this research cannot be used to trace the original source; for this reason, name, house/flat number, street name, office address and many others that can be used to trace one are not required in this research.

What if there is a problem?

If you have any complaints about the study or how you have been treated in the study, please in the first instance contact the researcher or supervisory team using the details provided. They will do their best to answer your questions. If you do not receive a satisfactory response,

concerns should be addressed to the University Officer for Ethics at the OfficerForEthics@uclan.ac.uk. Information provided should include the study name or description (so that it can be identified), the principal investigator and the substance of the complaint.

What should I do if I want to take part?

All you need to do is indicate your interest to participate to the researcher by mailing MMDabok@uclan.ac.uk. You will then be contracted to agree a time that is convenient for you to be interviewed.

What will happen to the results of the research study?

The information collected will be analysed and validate the results of the statistical analysis and confirm the conceptual model. The findings of the study will be reported in a thesis and submitted to a journal and used for conference presentations. None of the data collected will be used for commercial purposes.

Who is organising the research?

The research is being conducted at PhD level at the Grenfell Baines Institute of Architecture, University of Central Lancashire.

Who is funding this study?

This research is funded by the Petroleum Technology Development Fund (PTDF).

Who has reviewed the study?

The University of Central Lancashire Ethics Committee (BAHSS) have reviewed and approved this study.

Thank you for taking the time to read about the study, if you have any questions about this research or interviews, please do not hesitate to ask.

Contact Details

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Questionnaire and interview questions

REF: Training and Skills Development Framework for Technicians within the Nigerian Building Construction industry.

Questionnaire for technicians

Please answer the following questions by ticking the most suitable answer in each of the enclose brackets below.

Part A: General Information

1. What is your present Job title?

Electrical Technician	☐ 1
Mechanical Technician	☐ 2
Supervisory Technician	☐ 3
Technician	☐ 4
Operation Technician	☐ 5
Others	☐ 6

2. What is the current level of your education?

Primary School	☐ 1
Secondary School	☐ 2
Higher Institutions	☐ 3
Vocational	☐ 4
Others	☐ 5 Please specify _____

3. How long have you been working in this industry?

0 -5years	☐ 1
6 -10years	☐ 2
11 -15years	☐ 3
16 -20years	☐ 4
21 & above	☐ 5

4. What is the size of your Industry?

Micro Industry (1 – 9) people	☐ 1
Small Industry (10 – 49) people	☐ 2
Medium Industry (50 – 249) people	☐ 3
Large industry (250 and above) people	☐ 4

5. What is your age range? 18 – 34 ☐ 1 35 – 44 ☐ 2 45- 64 ☐ 3 61 and above ☐ 4

6. what is your gender? Female ☐[1] Male ☐[2]

Part B: The Nigerian Vocational Education and Training process

5. The various training methods are outlined below to improve the quality of workers' skills in the Nigerian construction industry. From your wealth of experience, please indicate the extent to which this method is satisfactoryy or dissatisfactoryand that the method is most appropriate or more effective for construction workers (Apprenticeship) over the years within the construction industry.

	Very satisfied 5	Satisfied 4	OK 3	Dissatisfied 2	Very dissatisfied 1
Informal apprentice training method					
Technical colleges					
Trade centres					
Science and technology colleges					
Senior secondary school					
Junior secondary school					
Technical teachers' colleges					
Polytechnic/colleges of technology					
University Education					
Other, please specify					

7. To what extent do you agree or disagree from your wealth of experience is the most appropriate training method for apprenticeship related construction work in Nigerian construction industry?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Informal apprentice training method					
Formal apprenticeship (classroom instruction combines with practical site work).					
Technical colleges					
Trade centres					
Science and technology colleges					
Senior secondary school					
Junior secondary school					
Technical teachers' colleges					
Polytechnic/colleges of technology					
University Education					
Others, please specify					

8. Please indicate the extent to which the issues listed below negate the growth of the effectiveness of Technical/Vocational Education and Training (TVET) in

producing the competent skilled workers of construction related trades in the construction industry in Nigeria.

Challenges within the context of Nigerian construction industry

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Poor funding of TVET in Nigeria					
Ineffectiveness of training models					
Insufficient facilities for training					
Defective training/ instructional methods					
Non-participation of construction industry private sector					
Absence of practical instructions in TVET curriculum					
Government lack of commitment to TVET.					
Abandonment of TVET policies					
Shortages of qualified TVET teachers					
Unwillingness of trainees to acquire in-depth vocational knowledge.					
Others, please specify					

8. How will you rate the effects of training problems mentioned above on the needed competent and confident apprenticeship skills to the Nigerian construction industry?

	Very serious 5	Somehow serious 4	Moderately serious 3	Less serious 2	No effect 1
With regards to the quality/standard of skilled labour supplied					
With regards to the quantity/number of skilled labour supplied					
Please any other relevant clarification is appreciated.					

9. How will you rate the severity of the Nigerian skills training problems mentioned in question 8 above on the quality or standard of work of each of the construction Trades listed below?

	Very serious 5	Somehow serious 4	Moderately serious 3	Less serious 2	No effect 1
Bricklayers, Block layers and Stonemasons					
Concreters					
Carpenters and Joiners					
Painters and Decorators					
Wood workers/Machinists					
Plumbers, pipe-layers, pipefitters and steamfitters					
Plasterers and stucco Masons					
Sheet metal workers					
Structural reinforcing work/welder					
Electricians					
Glazier					
Roofers					
Terrazzo skilled workers					
Construction labourers					
Others, please specify					

10. To what extent, from your experience, do you agree or disagree with the mentioned reasons below that Nigerians youth is not developing interest in construction related skills.

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Hazardous nature of construction site related works					
Poor rate of pay for site workers					
Lack of recognition for skilled workers					
Lack of respect for skilled workers					
Government do not encourage skill acquisition for construction workers					
No clear-cut career path for craftsmen					
The youths lack adequate guidance and counselling to take to skill acquisition					
There is no adequate forum to mobilise the youth for skill acquisition					
Construction site work is view by the youths as a task that is too difficult					
Construction site work is view by the youth as too degrading					
The youths' generation are lazy and hence unwilling to acquire skills					
Too much emphasis on general/ secular education					

It is too expensive to receive vocational training					
Lack of adequate provision for safety of construction site workers					
Lack of incentive/encouragement from political leaders					
Absent of health and safety training from the vocational education curriculum					
Lack of job security in the construction industry					
Others, please specify					

Possible strategies to workforces' skills enhancement

11. Below are the possible strategies listed or ways by which the youth in Nigeria could be motivated to have interest in skills' acquisition to improve the quality of workers within the construction industry. Please, from your wealth of experience, indicate to which extent you agree/disagree on each of the points mentioned.

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
Make skills and vocational training free					
Make craftsmen wages attractive					
Make skills trainees earn while they learn					
Ensure dignity for labour for craftsmen					
Make general education practical/skills oriented					
Accord recognition to skills/vocational education					
Make skills instruction mandatory in junior secondary school					
Make skills instruction mandatory in senior secondary school					
De-emphasize non-skilled general education					
Properly fund technical/vocational education					
Make career guidance and counselling mandatory at junior secondary school level					
Make career guidance and counselling mandatory at senior secondary school level					
Improve on job security in the construction industry					
Others, please specify					

12. The effective possible strategies that could address or enhance the challenges or issues of skilled shortages in the construction industry in Nigeria are mentioned below.

Please, from your wealth of experience, indicate the extent to which you agree or disagree on each of the points listed.

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Adopt multi-skilling method for new skills/vocational trainees					
Mobilize unskilled youth for skills training					
Re-introduce the apprentice scheme and make it effective					
Make secondary education and skill-based					
Make general education practical/skills oriented					
Accord recognition to skills/vocational education					
Make skills instruction mandatory in junior secondary school					
Make skills instruction mandatory in senior secondary school					
De-emphasize non-skilled general education					
Properly fund technical/vocational education					
Make career guidance and counselling mandatory at junior secondary school level					
Group sub-contractors for purpose of training apprentices					
Improve on job security in the construction industry					
Re-train the existing craftsmen					
Establish special apprenticeship training centres					
Others, please specify					

13. Listed below are various possible agencies that assist with the quality assurance and benchmarking of the construction industry skills/craftsmen training standards. From your experience, please indicate the extent to which you agree/disagree with the points listed

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Organised construction industry sector					
Construction labour unions					
Federal government labour ministry					
State government education ministry					
Local government education board					
National board for technical education					
Main contractors/construction companies					
Construction industry professional bodies					
Vocational training institutes					
Sub-contractors firms					
Apprenticeship/skills training board					
Construction industry training board					
Others, please specify					

14. To what extent do you agree or disagree for the following most possible management of construction site problems?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Technical problems					
Poor communication					
Shortage of skills workers					
Management problems					
Others, please specify					

15. To what extent do you agree or disagree with the following possible indicators to assess the training needs?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Development of the employees' skills					
To meet new changes in work setting					
Organisational problems					
Career development					
Others					

16. In what way does training impact the outcomes in your company?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree. 1
Productivity and efficiency					
Increasing job satisfaction					
Decreasing staff turnover rate					
Increasing profitability					
Decreasing absenteeism rate					
Others, please specify					

17 If you have any other comments or suggestions concerning the training needs' analysis, please state them below.

……

……

Thank you so much for your cooperation.

REF: Training and Skills Development Framework for Technicians' within the Nigerian Building Construction industry.

Questionnaire for trainers and educationist (Trainers)

Please answer the following questions by ticking the most suitable answer in each of the enclose brackets below.

Part A: General Information

1. Position of the respondent: _____
2. What is your age range?

18 – 30 ☐ 1
31 – 40 ☐ 2
41- 50 ☐ 3
51 – 60 ☐ 4
61 and above ☐ 5

3. What is your gender? F ☐ 1 M ☐ 2
4. What is your present Job title?

Electrical Technician ☐ 1
Operation Technician ☐ 2
Mechanical Technician ☐ 3
Supervisory Technician ☐ 4
Others ☐ 5
Please specify. _____

5. What is the current level of your education?

Primary School ☐ 1
Higher Institutions ☐ 2
Secondary School ☐ 3
Other, please specify _____ ☐ 4

6. How long have you been working in this industry?

0 -5years ☐ 1
6 -10years ☐ 2
11 -15years ☐ 3
16 -20years ☐ 4
21 & above ☐ 5

7. What is the size of your Company?

Micro Industry (1 – 9) persons ☐ 1
Small Industry (10 – 49) persons ☐ 2
Medium Industry (50 – 249) persons ☐ 3
Large industry (250 and above) persons ☐ 4

Part B: Training Analysis within the construction industry

8. Does your company have its own training centre?

Yes ☐ 1 No ☐ 2 I don't know ☐ 3

9. Does your company have a department/division/unit/section for training affairs?

Yes ☐ 1 No ☐ 2 I don't know ☐ 3

10. If Q 8 is yes, which department/division/unit/section is responsible for construction industry employees training?

A. Personnel Department ☐ 1 C. Product Department ☐ 3

B. Financial Department ☐ 2 D. Others, please specify ☐ 4

_____

11. How long have you been acting as training needs analysis/assessment?

A. 1 – 2 years ☐ 1 B. 3 – 5years ☐ 2

B. C. 6 – 10 years ☐ 3 D. Over 10 years ☐ 4

12. Have you received any training during your employment?

Yes ☐ 1 No ☐ 2 I don't know ☐ 3

If your answer is No, go to question 20.

13. What is your opinion about the training courses you have attended?

A. I have found the training:

Excellent ☐ 1 Very Good ☐ 2

Good ☐ 3 Poor ☐ 4

B. For me, in my current job, this training has been:

Extremely useful ☐ 1 Useful ☐ 2

Useful to some extent ☐ 3 Useless ☐ 4

C. I have found that the training objectives were:

Achieved ☐ 1 Achieved to some extent ☐ 2

Not achieved ☐ 3

14. Could you please indicate which of the following would you be able to perform?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
I can carry out questionnaires and Interviews for TNA					
I can conduct interviews and questionnaire to gather data about training programme effectiveness					
I can test trainees' performance as a result of training					
I can use various statistical tools to analyse the evaluation results					

15. Indicate the most appropriate statement describing your company's efforts in the training process:

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
Company has succeeded in identifying your needs trainings					
Training helps to know the business requirements of the company					
The company has provided a favourable environment for training					

16. Do you agree with any of the following statements?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
The company have a clearly defined strategy relating to human resource Development					
The company have a specific budget and a clear ongoing plan for training and Development					
Top management is committed to supports and provides all the facilitation to training and development activities					
Executive managers are facilitating the management of training and development Activities.					
Others, please specify _____					

17. These are the processes that are carried out during Training Needs Analysis. Which one(s) have you performed?

	(√)	
Document the problem	☐	1
Plan the needs analysis	☐	2
Conduct the analysis	☐	3
Report findings	☐	4

investigate the problem	☐	5
Select technique	☐	6
Analyse the data	☐	7

18. How relevant is the training needs identification in your organisation? Please tick (√) as applicable.

Not important 1	Slightly Important 2	Moderately Important 3	Important 4	Very important 5

19. How satisfied are you with the training programmes?

Very satisfied 5	Satisfied 4	Neutral 3	Dissatisfied 2	Very Dissatisfied 5
☐	☐	☐	☐	☐

20. In what way does training impact its outcomes in your company?

	Never 1	Rarely 2	Sometimes 3	Very Often 4	Always 5
Productivity and efficiency					
Increasing job satisfaction					
Decreasing turnover rate					
Increasing absenteeism rate					
Increasing profitability					
Other, please specify_____					

21. Do you have any further comments about the training Needs analysis?

.....

.....

……

Thank you so much for your cooperation.

REF: Training and Skills Development Model for Technicians within the Nigerian Building Construction Industry.

Questionnaires for Project managers/Site managers

Please answer the following questions with a ticking the most suitable answer in each of the enclose brackets below.

Part A: General Information

1. Position of the respondent: _____
2. What is your age range?
   - 18 – 34 ☐ 1
   - 35 – 49 ☐ 2
   - 50- 59 ☐ 3
   - 51 – 60 ☐ 4
   - 61 and above ☐ 5
3. What is your gender? F ☐ 1 M ☐ 2
4. What is your present Job title?
   - Project Manager ☐ 1
   - Site Manager ☐ 2
   - Supervisory Manager ☐ 3
   - Operational Manager ☐ 4
   - Others, please specify _____
5. What is the current level of your education?
   - Primary School ☐ 1
   - Secondary School ☐ 2
   - Higher Institutions ☐ 3
   - Others, please specify ☐ 4
6. How long have you been working for the company?
   - 0 -5years ☐ 1
   - 6 -10years ☐ 2
   - 11 -15years ☐ 3
   - 16 -20years ☐ 4
   - 21 & above ☐ 5
7. What is the size of your Company?
   - Micro Industry (1 – 9) people ☐ 1
   - Small Industry (10 – 49) people ☐ 2
   - Medium Industry (50 – 249) people ☐ 3
   - Large industry (250 and above) people ☐ 4

Part B: Training analysis process.

8. Does your company have its own training centre?

Yes ☐ 1 No ☐ 2 Not sure ☐ 3

9. Do you identify the training needs for your subordinates before their nomination to the training course?

Yes ☐ 1 No ☐ 2 Not sure ☐ 3

10. If Q 8 is yes, what method did you use to gather data about your subordinates training needs?

	(√)
Collection of information by training experts	☐ 1
Conducting interviews with candidate	☐ 2
Discussion with direct subordinates about their training needs	☐ 3
Analysis of functional tasks	☐ 4
Analysis of technical reports	☐ 5
Lists of training needs	☐ 6
Performance report	☐ 7
Others please specify	☐ 8

11. If Q 8, is "NO" which department/division/unit/section is responsible for employees' training?

	(√)
Personnel Department	☐ 1
Financial Department	☐ 2
product Department	☐ 3
Others please specified	☐ 4

12. In which of the following have you acted as an analyst of training needs?

	Tick (√)
Part of committee of training needs	☐ 1
Part of training programmes committee	☐ 2
General manager	☐ 3
Executive manager	☐ 4
Others	☐ 5

13. Do you agree with any of the following statements?

	Strongly agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
The company have a clearly defined strategy relating to human resource Development					
The company have a specific budget and a clear ongoing plan for training and Development					
Top management is committed to supports and provides all the facilitation to training and development activities					
Executive managers are facilitating the management of training and development Activities.					
Others, please specify _____					

14. Who is responsible for formulating training plan and policies in your Company?

	(√)
Top management (chairman, or other members)	☐ 1
Middle management (functional managers)	☐ 2
Department or division of Training and development	☐ 3
Department or division of human resource	☐ 4
Others, please specify _____	☐ 5

Reason behind training within the organisation

15. How often does your organisation use the following during training?

	Never 1	Rarely 2	Sometime 3	Very often 4	Always 5
Questionnaires					
Interviews with employees					
Group interviews with managers and supervisor					
Through a job description for individuals					
Determination through training committee					
Performance appraisal information					
Performance appraisal information					
Direct observation					

16. When is training provided for employees in your company? Please tick the most appropriate.

	Never 1	Very Rarely 2	Rarely 3	Occasionally 4	Very Frequently 5	Always 6
When employees are newly recruited						
On new working methods						
On new equipment						
Creation of new jobs						
Compliance with legislation and regulations						
When performance appraisal assessment shows some gap						
When employees are upgraded to fill new positions						
Based on the results of training needs analysis						
When requested by top management						
When requested by employees.						
Other, please specify						

Difficulties in conducting training within the organisation

17. What are the barriers hindering effective training needs analysis of trainees?

	(√)
Inability to describe fully their training needs	☐ 1
Performance appraisal does not indicate individual's training needs	☐ 2
Top management is only interested in the result of the training	☐ 3
There is no written job description for employees	☐ 4
Questioning on poor performance cause to discomfort for employees	☐ 5
Others, please specify	☐ 6

18. What are the difficulties and serious challenges of training needs analysis?

	Never 1	Rarely 2	Sometimes 3	Very Often 4	Always 5
Lack of specialise employees to conduct the TNA					
Lack of long-term plan for developing human resource					
Some senior managers do not believe in the importance of training					
Absence of job description to compare job requirement					
There is no specific body responsible for training					
Training objectives are not clear					
A lack of standards to application of systems and regulations					
Lack of motivation among employees					
Instrumentality and Nepotism					
Lack of long-term planning for HRD					
Employees' recruitment and selection were not in the right place					
Employees leave the company after training					
The unwillingness of most managers to send their staff for training					
Lack of experience of training officials					
Lack of precise performance standards for the typical worker					
Lack of Participation of heads of workers in the TNA					
Dependence online superiors in the identification of needs					
Others, specify					

Indicators for training identification within the organisation

19. In what way do you do you agree with the following indicators methods during training needs assessment within your organisation?

	Strongly agreed 5	Agreed4	Neutral 3	Disagree 2	Strongly disagree 1
Questionnaires					
Interviews with employees					
Examination work					
Assessment					
Competitive analysis					

20. In what way do you do you agree with the following indicators identified based on the investigation?

	Strongly agreed 5	Agreed 4	Neutral 3	Disagree 2	Strongly disagree 1
Low profitability					
Poor performance of employees					
Workforces' dissatisfaction					
Low morale of employees					
Poor image of the industry to younger generation					

21. Do you have any further comments about the training Needs analysis?

……
……

Thank you so much for your cooperation.

Dear Sir/Madam,

REF: A Training and Skills Development Conceptual Framework for Construction Technicians within the Nigerian Context.

Mukdem Mark Dabok, a Postgraduate Research student attached to the Grenfell Baines Institute of Architecture, University of Central Lancashire, is undertaking a research project to investigate the issue concerning ineffectiveness of current knowledge and skills development of the workers in the Nigerian construction industry. By participating in this study, you will be assisting the researcher to come up with innovative solution for skills development training methods for construction workers.

The interviews will be conducted within a period of two weeks and would be appreciated if you give the researcher an appointment within two weeks of initial first contact to conduct the interview.

It should be noted that the results of this research are purely for academic purposes, hence information or data gathered from your organisation would be regarded as strictly confidential. This should be noted that participation is voluntary, and the findings of the study will be reported in a thesis and submitted to academic journals and for conference presentations. Findings from this research will be made available upon request.

If you have any queries, please do not hesitate to contact Mukdem Mark Dabok;

- Mobile – +447774897366
- Email – MMDabok@uclan.ac.uk.
- Telephone – 01772 874215

Many thanks in advance for your support and time invested for the achievement of this research.

Yours sincerely,

Dr Abdulkadir Ganah
Director of Studies
Grenfell Baines Institute of Architecture,

University of Central Lancashire

Preston PR1 2HE

Email: aganah@uclan.ac.uk

Interview questions.

SECTION A - Introduction

Participant's personal information (Project Managers).

1. What is your position in this industry?
2. How long have you been working in this industry?
3. What role do you play regarding technicians' skills upgrade in the construction industry?

SECTION B – Project management practice

Identification of Technicians ability to handle stress, interpersonal skills, goal setting within the Nigerian Construction Industry

Q4a. What organisational structure concerning workers' training is in use within your company?

Q4b. How does your company set organisational goals concerning workers' training**?**

Q4c. What are the steps or procedures used in your organisation to accomplish these goals?

Q4d. How does your organisation handle construction mistakes/errors in your place of work? Can you please explain with examples?

Q4e. As a Project Manager, please tell me how your employees work effectively under pressure within your Industry?

Technicians' integrity/honesty, safety within the construction industry

Q5a. As a Project manager within the construction industry, what is the response of your workers to meet strict construction project deadlines?

Q5b. How does your organisation handle meeting tight deadlines?

Q5c. If you knew something was unsafe but it meant getting the job done, how would you instruct your workers on this?

Technicians' motivation and values within the construction industry

Q6a. How does your organisation motivate its employees during construction activities?

Q6b. What incentives does your organisation have in place for school leavers and young people towards training as technicians in construction related work?

Q6c. How would your organisation teams in different working scenarios handle economic downturn concerning workers' payment?

Workers/ technicians' skills, teamwork development training

Q7a. What effective strategies do you think should be adopted to tackle technicians' skill challenges in your industries?

Q7b. From your wealth of experience and knowledge as a Project Manager within your industry, what are the common skills training methods available to employees in the past years and at the present time? Which ones are the best and why?

Q7ci. Can you explain with examples of how your organisation works as a team?

Q7cii. How do you resolve conflicts in teams and maintain team dynamics at work?

Q8a. How often do you meet to review and update project plans?

Q8b. How often do you rely on sub-contractors and to what extent?

Q8c. What kind of communication tools do you use during the construction process, i.e. communication gadgets and tools used on site?

SECTION A

Interviewee information (Technicians').

1. What is your position in the industry?
2. How long have you been working with this industry?
3. What role do you play on improving technicians' skills in this construction industry?

SECTION B

Technicians' honesty/integrity and safety within construction industry

Q4a. During construction works, how would you meet up with strict construction deadlines?

Q4b. If you knew something was unsafe when carrying out a task, but it meant getting the job done, what would be your action?

Analytical skills/problem solving or difficult situation within the workers in the industry

Q5a. If you come across any difficult situation within the industry, how would you handle it?

Q5b What have you found to be the difficult part of being a member, not leader of a team? How did you handle this?

Thank you

SECTION A

Interviewee information (Trainers/Educationist)

1. What is your position in the industry?
2. How long have you been working with this industry?
3. What role do you play on improving technicians' skills in this construction industry?

SECTION B

Construction workers' decision-making during construction related work.

Q4a. Tell me about a time when you had to decide without all the information you needed within the industry. How did you handle it?

Q4b. Give me an example of a time when you had to be quick in coming to a decision within the industry. What obstacles did you face?

Q4c. What is the most difficult decision you have ever had to make at work? How did you arrive at your decision? What was the result?

Communication skills among construction workers within the industry

Q5a. Give me an example of a time when you were able to successfully communicate with another person even when that individual may not have personally liked you (or vice versa). How did you handle the situation?

Q5b. Describe a situation where you had a conflict with another individual, and how you dealt with it. What was the outcome? How did you feel about it?

Thank you

REF: A Training and Skills Development Conceptual Framework for Construction Technicians within the Nigerian Context.

Dear Participant,

You are invited to participate in the validation process of the current research proposed framework for construction technicians within the Nigerian construction industry. This validation will clarify the objectives of the framework, which when used will improve the quality of the workforce of construction technicians within the context of the Nigerian construction industry.

This validation is in two parts, Part 1 is the completion of the questionnaire and Part 2 is an interview with the researcher. By participating in this validation exercise, you will be assisting the researcher to come up with innovative solution for skills development training methods for construction workers. The framework validation will be conducted within a period of two weeks and would be appreciated if you give the researcher an appointment within two weeks of initial first contact by phone.

It should be noted that the results of this research are purely for academic purposes. Hence, information gathered from your opinions would be strictly confidential. Participation in this research is voluntary, and the feedback from the validation interview will be reported in a thesis and scholarly/academic publication e.g. conference and journals. Findings from the validated framework will be made available upon request.

Thank you for your support and time invested for the achievement of this research. Please, if you have any information, you contact me on any of the contacts below.

Yours sincerely,

Mukdem Mark Dabok.

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Validation Invitation Sheet and Structured Questionnaire on proposed Framework

A Training and Skills Development Conceptual Framework for Construction Technicians within the Context of the Nigerian Construction Industry.

In line with the current research objective, validation of the developed framework through structured questionnaire is to determine the relevance, clarity, reality, and reliability of the framework within the context of the construction industry in terms of workforce training and skills development in Nigeria.

The validation questionnaire is divided into six (6) sections as follows;

Relevance and usefulness of the research framework to construction industry

Determination of the selected participants' perceptions on the relevance and usefulness of the developed framework for construction technicians in the construction industry.

	Strongly agree 5	Agreed 4	Neither agree nor disagree 3	Disagree 2	Strongly disagree. 1
To what extent do you agree that the developed framework can impact on the performance and behaviour of construction technicians?					
To what extent do you agree with the link between the different components of the framework is logical, and relevant to the construction industry?					
To what extent do you agree that the institutional control revealed within the framework influences training of construction technicians?					
To what extent do you agree with the usefulness of the developed framework in its main format for improving technicians' skills within the industry?					

Credibility and design of the research framework for workforce training

Determination of the selected participants' views on credibility and design of the proposed framework for construction technicians within the construction industry.

	Strongly agree 5	Agreed 4	Neither agree nor disagree 3	Disagree 2	Strongly disagree. 1
To what extent do you agree with the structure of the developed framework and its application?					
To what extent do you agree with the understanding and effectiveness of the framework within the learning environment context?					
To what extent do you agree that the mechanism function of the framework has an influence on the input and output components of the technicians training within the context of the construction industry?					

Quality or key skill types needed for trainees within the industry

Determination of the selected participants' views on the technicians required skills as revealed in the proposed framework for the construction industry.

	Strongly agree 5	Agreed 4	Neither agree nor disagree 3	Disagree 2	Strongly disagree. 1
To what extent do you agree that the skills requirements can be improve through the developed framework for construction technicians?					
Technical skills					
Interpersonal skills					
Project management skills					
Conceptual skills					
Enterprise skills					
Business skills					

Explanatory sufficiency or self-explanatory of the proposed framework

	Strongly agree 5	Agreed 4	Neither agree nor disagree 3	Disagree 2	Strongly disagree. 1
To what extent do you agree with the proposed framework self-explanatory in terms of the inputs, outputs components effectiveness for construction technicians?					
To what extent do you agree with the strategy applied in achieving the outcomes?					

Determination of the selected participants' views on framework explanatory sufficiency or self-explanatory for the trainers of the industry.

Current technical areas of proposed framework

Determination of the selected participants' perceptions on the developed framework for technicians of the construction industry.

	Strongly satisfied 5	Satisfied 4	Neither satisfied nor dissatisfied 3	Dissatisfied 2	Strongly dissatisfied 1
How satisfied are you with the proposed framework input components?					
How satisfied are you with the proposed framework mechanism components?					
How satisfied are you with the role of the institutional control in the proposed framework?					
How satisfied are you with role of sustainable issues in the proposed framework?					
How satisfied are you with role of ethical issues in the proposed framework?					

Continuous improvement of the proposed framework

Determination of the selected participants' perceptions on the continuous improvement of the developed framework for construction technicians within the construction industry.

	Strongly satisfied 5	Satisfied 4	Neither satisfied nor dissatisfied 3	Dissatisfied 2	Strongly dissatisfied 1
How satisfied are you with the key performance indicators role in the proposed framework?					
How satisfied are you with evaluation output and its components in the proposed framework?					
How satisfied are you with the role of the entire proposed framework?					

Appendix C

Proposed Training and Skills Development Framework for Construction Technicians in Nigeria (TSDCF)

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
A. Input Functions *This section of the framework determines the key levels or criterion of the framework within the context of an organisational settings. At this stage, the key levels/criterion and their components are determined and outlined.* • Government policies and resources • Stakeholders • Workforce/learner Strategies • Curriculum development • Training and development • Partner agencies • Environmental resources • Financial resources • Unqualified technical students • School leavers that wants to pursue	***Introduction*** *This is the stage of the framework at which policies/strategies, actions at which government directives are defined and clarity sorted within the context. These requirements occur before activities can happens in the whole framework.* **Education system category (class)** At this stage of the developed framework, the system of general education is clearly defined in terms of its year of entry, the duration of the training and as well the mode of	***Introduction*** *This is the stage at which the workforce or the learner competency has been determined or examined in line with the organisational goal settings to achieve a positive output.* *At this stage of the system, learners are being prepared for the task ahead and competency is most important.* **Education system category (class)** At this stage of the framework, the Entry requirement for higher institution is determined in line with the learning objective. A- Level and O- Level,	***Introduction*** *The stage of the framework that develop the critical skills of the workforce and competency is being examined as well to fully prepared the learner for the task ahead. Clarity on the workforce/ learner performance environment is as well defined within the organisational goal settings.* **Education system category (class)** At this stage of the framework, the learner's duration and completion of studies is based on the of entry level and the course duration.	***Introduction*** *At this stage of the framework, the performance of the trained technicians (i.e. graduates) in terms of their competency using agreed performance key indicators within the context of the organisational goal settings.* Competing for work within the context of the organisations. • Graduate youth population • Technical and vocational students • Improved technicians within the organisational settings • Effective trainers • Effective learners within the

Criteria (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
construction as a choice of career • Mature students • Learner's culture • Specific skills • Ability and knowledge • Immediate community • Workforce communication skills • Effective teaching and learning • Training providers • Time management skills • Process of embedding new behavioural patterns • Behavioural factors to Technicians motivation and values • Behavioural factors that influence Technicians integrity • Behavioural factors and its impact on technicians' training	qualification at the end of the training programme. Four (4) years into higher institution and above depending on the course and mode of entering the system. This is the stage of the framework or level at which policies/actions, strategies at which government directives are defined and clarity sorted within the context. This is in line with what is required before an activity can occur or happen in the whole framework. In addition, this stage of the framework focuses on the learner's participation culture or principles and decision making within the context of organisational	A minimum of five (5) credit unit at not more than two sitting for both WAEC and NECO examinations. National diploma (ND), Higher National Diploma (HND). Minimum base line of the entry requirements for either remedials studies or direct entry. This is level or the stage at which the workforce or the learner competency has been determined or examined in line with the organisational goal settings to achieve a positive output. At this stage of the system, learners are prepared for the task ahead and competency is most important. • Unqualified technical students • School leavers those want to pursue construction as a choice of career • Apprenticeship	For remedials studies, the duration of the training is 5 years. For direct entry is four years duration and above. Direct entry with diploma and matured students are determine by senior management team and the duration is three years. **First year** – Strengthening of basic module of sciences and technology **Second year**- start-up of specialism in construction related modules **Third year**- part of practical application of principles and theory from second year. (Industrial attachments, teaching practice)	organisational setting Graduates or qualified technical or technicians with different level of division based on their competency - Work appraisal - By keeping in touch with the institution

Criteria / (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
	goal settings during training. Hence, improving the leaners skills and degree of competency at work based on the decision making and choice by the learner at work.	Government policies and resources	**Fourth year** – Specialisation in special technical area and communication skills. - Each year will have a minimum of eleven (19) modules split into first and second semesters. This stage of the framework determines the critical skills of the workforce and competency is being examined as well to fully prepared the learner for the task ahead. A clarity on the workforce/ learner performance environment is as well determine in line with the organisational goal settings. • Unskilled youth • Unqualified technical students • Technical and vocational students of secondary schools • School leavers • Stakeholders • Trainers • Government policies and resources	

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
B. Mechanism Function (Instruments): *This is the level of the framework at which the inputs components are transform into the output components of the desired organisational settings are determined within the context.* • Documentation • Processes • Learning resources • Innovation • Communication • Duration • Effective teaching and learning environment • Organisational structure • Human resource management • Partner agencies • Environmental resources • Financial resources • Group Debate	*Introduction* *These are the strategies at which the available processes, procedures, tools, resources, innovation, and equipment as required for the next stage of the framework by which the process is been performed to achieve the desirable output are clearly defined.*	*Introduction* *Learning modules within the context of training organisation, learning aims and objectives, learning programmes within the learner's ability and competencies as well as the necessaries processes within the context for skills enhancement for the technicians.* *Mentoring programmes are formal training may also serve as key to development plans to sustain the learner's skills enhancement.* Organisation workforce may serve as an instructional material for learners in terms of demonstration. In line with this mechanism, more examples of the learning resources are listed below.	*Introduction* *At this stage of the model, workforce continuous improvement is examined through course assessments and feedback which are encouraged within the context. This is in line with the framework objective. This implies that following are given due consideration.* Formative assessment using like quiz and Summative assessment using • Course assessments of the learner • Examinations • Interviews • Learners' coursework design • Learners field trips both within and outside the organisational settings	*Introduction* *Workforce competencies are developed at this stage of the system through the learning objects within practical engagements of graduates' students in the various built environment organisations with engagement with their logbook (timesheet).* Qualification, level of work attainment, newsletter to get them engage, give talks to new entrants within the system to get acquainted to the system, induction on the start of the program. Feedback from industry or industrial partners and stakeholders **National Universities Commission (NUC)-**

Criteria (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
Process of embedding new behavioural patterns	**Entry training courses** At this stage of the framework, the entry courses of the learner based on the curriculum is determine within the organisational context of the learner	• videos/DVDs • Study Units • Useful Web links • Power point presentations • Report and Publications • other useful resources • white board • Quiz • Microsoft forms **Entry training courses** At this stage of the framework, the following courses are covered for the learning at this stage of the learners' learning skills based on the designed curriculum. • Mathematics • English language • Introductory technology (Basic technology) • Integrated science (Basic	• Learners work placement • Learners teaching practice • Learners' industrial attachment Awarding body of the organisation • National Universities Commission (NUC) • National Commission for Colleges of Education (NCCE) **Entry training courses** At this stage of the framework, the following courses are covered for the learning at this stage of the learners' learning skills based on the designed curriculum. **Entry requirement at this level** At this stage of the framework, the entry requirement level of the learner within the context is determined within the context as the learner is	accredited and approve universities education programmes. Their operations are under the guidelines of federal ministry of education. National Commission for Colleges of Education (NCCE)-

Criteria / (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
	Entry requirements At this stage of the framework, the entry level of the learner within the context is determined and identify based on the curriculum designed within the learning context of the organisational settings. ***National examination (Secondary level):***	**Entry requirement at this level** At this stage of the framework, the entry requirement level of the learner within the context is determined within the context. ***National examination (Secondary level):*** General certificate of examination (GCE)- Replaces Senior School certificate examination (SSCE) SSCE exams in May/June while GCE around Nov/Dec A maximum of nine (9) subjects are registered for the examination and a minimum of seven (7) is allow for the examination. Both the two exams are generally of the same standard and are control by the same	prepared to be a competent and certified graduate. Higher education is within the control and management of the federal government and the state-owned higher institutions are control by the government of the various state of the federation. Federal ministry of education coordinates the education policies and procedure. **Vocational Education and Training Post-Secondary** • National Vocational Certificate (NVC) • National Innovation Diploma (NID) • Monotechnic, Polytechnics and Colleges of Education (MPCE) **Higher Education and Training** • University Matriculation Examination (UME) • Ordinary National Diploma (OND)	Higher Education and Training • National Certificate of Education (NCE) • Technical Teachers Certificate (TTC) • Bachelor's Degree (BSc) • Postgraduate Diploma (PGD) • Master's Degree • Master of Philosophy • Doctor of Philosophy

Criteria (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
	Communication at this stage of the framework Develop an interpersonal communication and learners/ workforce skills coordination within the organisational context.	body call the West African Examination Council (WAEC) Mathematics and English language are registered as two compulsory subjects during the exams. **Tertiary Education** Technical Vocational Education National Commission for Colleges of Education **(NCCE) –** Three credits point as spelt out in this document. **Lower and Upper secondary schools**	• Higher National Diploma (HND)/ Full Professional Diploma/National Certificate of Education (NCE)/Technical Teachers Certificate (TTC) National Education Research and Development Council (**NERDC)** to coordinate educational research programmes- provision of vital information regarding the Nigerian educational problems. National Board for Technical Education (**NBTE**) – control the standardised minimum guide curricula for technical/Vocational education and training, polytechnic, technical colleges, and other technical institutions in Nigeria. Establish communication mechanisms	Important training courses for the learners, • Health and Safety courses in construction • Human Resources Compliance courses in construction training • Business compliance courses in construction • Soft skill courses in construction

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
C. Institutional Controls: *At this stage of the framework, the non-engineered instrument, such as an administrative or legal control, which helps to minimise the potential for human exposure to, is determined within the context of the organisational settings.* • **Regulatory Agency** - NUC- National University Commission - NCCE- National Commission for Colleges of Education - ITF- Industrial Training Fund - FMOE – Federal Ministry of Education - SME- State Ministry of Education - FMLP- Federal Ministry of Labour and productivity	*Introduction* *At this stage of the framework, Different institutional stakeholders' requirements will influence the strategies and policies of the awarding educational body from their own interest which needs to be taken on board.*	*Introduction* *At this stage of the process in the framework, the necessaries arrangements are put in place to ensure that the curriculum are properly design in line with the required skills by the learner* *National Commission for Colleges of Education* ***(NCCE)*** *– coordinate non degree teachers' education in Nigeria. West African Examination Council* ***(WAEC)*** *and the National Examination Council* ***(NECO)****- coordinates the Junior School Certificate Examination* ***(JSCE)*** *and Senior School Certificate Examination* ***(SSCE)****.* *National Business and Technical Examination Board (NABTEB) – coordinate the National Technical Certificate (NTC), the National Business Certificate (NBC) Examinations.*	*Introduction* *Things that will influence the design of a curriculum and assessment as address in the learning outcomes and objectives at each level of the technician training (think).* The quality of the trainee influences the processes of curriculum design within an organisational setting.	*Introduction* *This is the stage at which feedback from employers particularly stakeholder seated at the board of directors of the various colleges.* *Setting up employers' staff liaison meeting to capture industry standard.*

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
- VEEB- Vocational Education Examination Board - VTIs – Vocational Training Institutes - APSEB - Apprenticeship - Scheme Examination Board - NABTEB – National Business and Technical Examination Board -		When modules or lesson plans are designed by either building or incorporating to a achieve the require objective At this stage of the process in the framework, the necessaries arrangements are put in place to ensure that the curriculum are properly design in line with the required skills by the learner. • Principle and purpose – Set out the intent of the curriculum • Entitlement and enrichment – Develop the learners' entitlement • Breadth and balance – Develop the require skills or content of the curriculum • Teaching narrative – Plan the delivery of	At this stage of the framework, factors that influences the design of the learner's curriculum within a certain organisation may be determine as follows. • Application of recent technology • The application of the learners and the trainee cultural background within the context of the learning system • Socioeconomic background of the learner or learner status • Social forces within the learning system Furthermore, at this stage of the process, the designed of the curriculum should be able to meet the learners following objectives • All learners' needs must be made as	At this stage of the framework development, knowledge gain and experiences, passion and interest and the creativity are achieved in line with the objectives of the current study. This will lead to development and performances of the industry and its competency in the global construction market.

Criteria / (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
		the learners curriculum • Available resources – Sources high quality resources to deliver your curriculum • Review and evaluate – decide what work well and where is room for improvement	require by the global standard • Develop based on the skills required by the learner for its competency within the context • Aim at conceptual understanding • Aim at demonstrating what has been learned within the context practically in the real world • Demonstrate how learners from other industries do • Develop intellectual growth • Covered detail and appropriate assessment in line with the organisational setting	
D. Safety Regulation *This stage of the framework determined the formal advice that are legally enforced on*	*At this stage of the framework, it determines the healthy and sustainable learning, working as well as healthy environment for*	*At this stage of the framework, commitment, course-plotting, working groups, action planning, delivery, assessment which forms part of the*	*At this stage of the framework, supportive working and learning contexts with effective health quality, welfare services, appropriate*	At this stage, performance of the organisation is boosted and tremendous increase in productivity within the context.

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
health issues within the context are determined. At this stage of the framework, regulations made by the government on health and safety at work are determined within the context. - Consumer product Safety Commission (CPSC) - National Agency for Food and Drug Administration and control (NAFDAC) - National Environmental Standard and Regulations Enforcement Agency (NESREA) - Nigerian Marine Administration and Safety Agency (NIMASA)	*learning within the context for the trainee concern* *At this stage of the framework, the multidisciplinary cross-cutting comprising of health and sustainable development within the context of the curriculum, knowledge exchange* *At this stage of the framework, the contribution to the health,*	*implementation and operational/effective planning* *within the context are determined at this current level* *At this stage of the framework, the development of the organisation and as well the management, high visibility innovative health related schemes or plans are given due consideration at this stage.* *The policy and planning, peer education, impact assessment campaigning within the context are clearly determined in line with the organisational context. This level of the*	*range of widely used learning facilities within the context* *At this stage of the framework, an increased understanding of commitment to sense of personal responsibility for health and sustainable development among the learners/trainees and the trainers within the context* *At this stage of the framework, the institution level of commitment is strengthened to practice*	Furthermore, the organisation capability is strengthened towards making a great contribution to a pursuit of the range of services through the improvement of trainees and students recruitment in line with the organisational goal settings within the context. Reduction on the institutional impacts of both the trainees and trainers health and environmental sustainability with the context.

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
- Environmental Protection Agency (EPA) - Equal Employment Opportunity Commission (EEOC) • *Scheme Evaluation Feedback* • Possible Agencies that assist with the quality assurance and benchmarking - **CLU** (Construction Labour Union) - **OCIS** (Organised construction industry sector) - **NCITB** (Nigerian Construction Industry Training Board) - **VTIs** (Vocational Training Institutes) - **ACIPBs** (Allied Construction Industry Professional Bodies) - **NBTE** (National Board for Technical Education) - **NCATB** (National Construction Apprenticeship Training Board)	*wellbeing and sustainability of local, regional, national, and global communities are clearly determined at this stage* *At this stage of the framework, the strategic at which the trainee skill will be enhanced within the context of the organisational settings are determined* *At this stage of the framework, the*	*framework has to do with the range of methods within the context.* • Make skills trainees earn while they learn • Make general education practical/skills oriented • Make skills instruction mandatory in senior/junior secondary school • De-emphasize non-skilled general education • Properly fund technical/vocational education • Improve on job security in the construction industry • Accord recognition to skills/vocational education • Make skills trainees earn while they learn • Make general education	*corporate responsibility and to lead for health and sustainability in local, regional, and global partnership within the context is determined* • Adopt multi-skilling method for new skills/vocational trainees • Re-introduce the apprentice scheme and make it effective • Make secondary education and skill-based • Make general education practical/skills oriented • Group sub-contractors for purpose of training apprentices • Improve on job security in the construction industry	• Attainable organisational goal settings • Improved workforce performances • Organisational performance development

Criteria (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
- **FMLP** (Federal Government Ministry of Labour and Productivity) - **LEDs** (Local Government Education Boards) - **SEBs** (State Government Education Board	*effectiveness of the strategies to enhance performances is clearly defined and must be in line within the context of the organisational goal settings*	practical/skills oriented • Make skills instruction mandatory in senior/junior secondary school • De-emphasize non-skilled general education		
E. Effective strategies *This level of the framework determined the resources allocated achieve a certain plan and deliver the expected target after undergoing the necessary checks.* - Make skills and vocational training free - Make craftsmen wages attractive - Ensure dignity for labour for craftsmen - Make career guidance and counselling	*Introduction* *At this stage of the framework, the effectiveness of the strategies to enhance performances is clearly defined and must be in line within the context of the organisational goal settings*	*Introduction* *At this stage of the framework, the available strategies, and resources to achieve the organisational settings are determine within the context* - Make skills and vocational training free - Make craftsmen wages attractive - Ensure dignity for labour for craftsmen - Implementation of a workforce learning system	*Introduction* *At this stage of the framework, the available strategies, and resources to achieve the organisational settings are determine within the context* - Make career guidance and counselling mandatory at junior /senior secondary school level - Mobilize unskilled youth for skills training	*Introduction* *At this stage of the framework, the available strategies, and resources to achieve the organisational settings are determine within the context are evaluated to see if the organisational goals or targets are made within the context.*

Criteria / (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
mandatory at junior /senior secondary school level - Mobilize unskilled youth for skills training		- Development of a workforce learning paths for each workforce within the context	- The of data for a better decision marking within the context - Think processes, Not Events - Ask workforce for input and feedback within the context	
F. Sustainable Issues *This stage of the framework determines the decision making which does not have a negative impact on the current organisational settings and the future goal settings within the context. In line with this key objective, sustainability impacts on a wide range of ecological and human issues, related to natural resources commitment to human and wellbeing within the organisational settings* - Social and economic issues, and environmental, - Environmental quality (EQ),	*At this stage of the framework, the impact of any of the environmental issues on the economy are determined within the context of the organisation*	*As there are unlimited wants and limited resources there will always be scarce resources within the learner's environment* *For a stable learning environment, there must be replacement or renewable resources that are been used that may run out in few times* *At this stage of the framework, the learner inability to access digital technology is determined within the context*	*At this stage of the process, the Learning environments and industries are destroyed by floods because of global warming,* *At this stage of the framework, the issues regarding the idea that resources and services should be made using the available resources that can be replaced – this could be raw materials or energy*	*At this stage of the framework, the pillars of the sustainability are achieved within the organisational settings. These pillars of the sustainability are Human, social, economic and environment known as the four pillars of the environment* *At this stage of the framework, the sustainable components are determined within the context* - *Human sustainability*

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
- *Fauna and flora (Plants and Animals),* degradation, - Water pollution, - material depletion, - waste management, - fire disasters, Deforestation, - Soil erosion and flooding - Ozone layer Depletion - Poverty and youth unemployment - Advancing the circular economy - Government action - Climate change (performance and Monitoring) - Climate change (meaningful and disclosures) - Holistic thinking and Action		*With the recent technology, digitalization is key to every successful organisation, inadequate recent technology is making it very difficult for education system to function properly* • To ingenerate sustainable science and education • To strengthen co-ordination and collaboration between different levels of education for sustainable development • To mitigate information and knowledge gaps between different parts of the world • Issue of mainstreaming all educational policies, taxonomy, and programmes towards sustainable development	*requirements that has a negative impact on the learners within the context.* • To ingenerate sustainable science and education • To strengthen co-ordination and collaboration between different levels of education for sustainable development • To mitigate information and knowledge gaps between different parts of the world • Issue of mainstreaming all educational policies, taxonomy, and programmes • towards sustainable development	- *Social sustainability* - *Economic sustainability* - *Environment sustainability*

Criteria (Levels)	Stage 0 Strategic view	Stage 1 Existing (Developing the technician skills sets)	Stage 2 Prior/Preceding (Developing the technician skills or Prior technicians)	Stage 3 Post (Assessing the application of technician skills)
G. Ethical Issues *This is the stage of the framework, which decision marking, scenario, or activities, that creates a conflict within the organisational moral principles with those of the society. They are sometimes legally dangerous due to solving the issues that might fill the gap of a certain law within the context* - Corruption and adhering to rules and regulations - Safety and security issues - Unfair labour and business - Unfair competition - Conflict of interest - Inflation of bills - Professional incompetence - Poor work delivery - Fraud - Professional misconduct	*Introduction* *At this stage of the framework, Corruption and* *Adhering to rules and regulations* *Safety and security issues clearly determined within the context of the organisational settings for its future development.*	*Introduction* *At this stage of the framework, the learner inability to access digital technology is determined within the context* Establishing ethical (ethical motivation within the context) *At this stage of the framework, Ethical sensitivity, which is the interpretation of a particular situation, recognition of ethical issues, awareness of what actions are possible and the effect on the parties' concern has been determined at this stage of the framework* *With the recent technology, digitalization is key to every successful organisation, inadequate recent technology is making it very difficult for*	*Introduction* *At this stage of the framework, the ethical components are determined within the context* - *Ethical sensitivity* - *Ethical judgement* - *Ethical Motivation* - *Engaging in ethical behaviour* **Measuring competitiveness** • Institutions (Public and Private) • Infrastructure • Health and primary education • Higher education and training • Market efficiency (goods, labour, financial) • Technological readiness • Business difficulty	*Introduction* *At this stage of the framework, the ethical components are determined within the context* - *Ethical sensitivity* - *Ethical judgement* - *Ethical Motivation* - *Engaging in ethical behaviour* **Measuring competitiveness** • Promoting and Basic education improvement • Infrastructural development • Macro economy growth • Health and primary education development • Higher education and training improvement

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
- Intimidation and kickbacks - Choice of instructor/Teacher - Issues of discipline - Ethnic and social diversity - Grading - Gender and social inequality - Lack of Digitalization - Politics in Higher Education - Vast and Varied syllabus lacking relevance - Discrimination and Harassment - Unrealistic and conflicting goals - Questionable use of company technology		*education system to function properly*	• Innovation Most of the sustainable and ethical issues are incorporated into module are embedded into the learning outcome.	• Reorientation of the existing Education at all levels to Address Sustainable Development • Developing Public understanding and Awareness of sustainability • Training and development
H. Key Performance Indicator (KPI). *This is the stage of the framework that determine the set of quantifiable measurements used to gauge the organisational overall*	*Introduction* *This is the stage at which the system set organisational goals to achieve it targeted objectives by tracking its progress to fulfil the needs*	*Introduction* *At this stage of the system, the learners, or the workforces within the organisational focuses on all levels towards achieving a certain goal which is in line with the organisational goal settings.*	*Introduction* *At this stage of the framework, the trainee performance indicator is determined at this level of the organisational settings through the following.* • Examination work	*Introduction* *At this stage of the framework, the information that is in line with the organisational learning objectives based on the learners performance is*

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
long-term performance. This stage of the framework precisely helps the organisation in the determination of its strategic, operational achievement, financial resources determination with those competitive organisations. *At this stage of the framework, KPI is determined based on an acronym SMART for its measurement.* I. **S** Specific **J. M** Measurable K. **A** Attainable L. **R** Relevant M. **T** Time-Bound	*of its stakeholders. At this point, measurables values are determined on how effectively, on how the system is achieving its objectives. This KPI can be carried out in an effective way using the acronym SMART as a guide.*	• Technical skills • Practical skills • Communication skills • Transferable skills • Trainee Behavioural skills • Questionnaires • Interviews with Trainees • skill profitability • Time Proficiency • Reliability • Validity • Knowledge/Skill Retention	• Assessment for the trainees • Observation • Work placement • Employee Engagement • Net Promoter Score • Stakeholders Satisfaction • Test scores during training • Test scores after training • Evaluation of applied learning plans • Course completion and certification • Influence on performance KPIs • Overall utilisation rates • Course completion rates • Pass/fail rates/Average score for quizzes and test • Percentage of employees' • satisfaction with the training	*clearly determined. This stage determined the information on the learning in line with learning goals or learning outcomes within the context.* Feedback of the analysis of KPI result to one of the previous stages of the model

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
J. Outcomes: *This is the stage of the framework at which the organisational wants or needs to achieve in line with the global construction market* • Competent Technicians Graduates • Improved technicians and better performances • Competent and employable technicians • Training impact evaluation • Performance output • Training evaluation • Trained Practitioners and technicians for construction related organisation • Career Development • Trainers recruitment reactions • Achieving organisational goal settings	*Introduction* *This is the level at which those components from the input stage are processed to give a positive results or outcome, which are clearly defined within the context of the system.* *At this stage of the framework, the measurable goal settings of the trainee or learner is determined in line with the research objectives to the expected positive result within the context.* *This stage of the framework determines the trainee or the learner's success, or failure of the strategy used or adopted for the training within the context and future recommendation can be determine as well.*	*Introduction* *At this stage of the framework, the outlined input components within the context are being determine based on the objectives of the organisational setting, which is in line with the outlined below.* *At this stage of the framework, the determination of the measurable goal settings of the organisation will be based on the objectives of the organisational settings.* • Self-assessment questionnaires • On the Job observation • Focus group perceptions • Informal feedback from peers and managers • Actual job performance	*Introduction* *At this stage of the framework, workforce competency within the organisational settings is determined based on the organisational settings which is in line with the global construction market performances.* *At this stage of the framework, the determination of the measurable goal settings of the organisation will be based on the objectives of the organisational settings.* • Productivity and efficiency • Increasing job satisfaction • Increasing turnover rate • Increasing profitability • Achieving construction goal settings	*Introduction* *At this stage of the framework, workforce competency within the organisation is evaluated based on the organisational settings which is in line with the global construction market performances. Hence, workforces' performances within the context is confirm based on the following outlined.* • Productivity and efficiency • Increasing job satisfaction • Increasing turnover rate • Increasing profitability • Trained practitioners and technicians for construction related organisations • Better quality skills and output

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
• More technicians graduate • Greater or higher productivity • Uniformity of procedures • Creation of inventory of skills • Higher morale • Less supervision			• Improved workforce skills and industry performances	• Job creation for the younger generation and unemployment reduction • Construction industry development and the nation economy growth
K. Output Evaluation *This is the stage of the framework key objectives that determine the evidence of the learning activities within the organisational setting which, were clearly performed as planned within the organisational goal setting.* • Competent technicians' graduates • Effective training providers • Improve workforce behavioural pattern	*Introduction* *At this stage of the developed framework, the output of the workforce training and skills development is determined to ensure that the organisational goal settings are achieved.*	*Introduction* *At this stage of the framework, learners behavioural aspect within the context is being determine in line within the organisational settings.*	*Introduction* *At this stage of the framework, the learner's commitment towards the learning process is determined in line with the institutional regulatory guidelines.*	*Introduction* *At this stage of the framework, the direct product of the all the learning activities within the context are clearly determined.* *At this stage, the outcome of the activities becomes the major quantitative measurement in the evaluation plan to be monitored.* • More competent technicians graduate within the context

Criteria / **(Levels)**	**Stage 0** **Strategic view**	**Stage 1** **Existing (Developing the technician skills sets)**	**Stage 2** **Prior/Preceding (Developing the technician skills or Prior technicians)**	**Stage 3** **Post (Assessing the application of technician skills)**
• Improve technicians' graduates • Construction industry development • Job creation for the younger generation within the context • Improved workforce skills and the industry performances • Training providers • Trainers' recruitment	*At this stage of the framework evaluation of the learner performances is key or paramount.*	*At this stage of the framework, behavioural factors to motivation and values, learners' integrity are being determine within the context as the learners are prepared for the task ahead.*	*At this stage of the framework, the various qualifications and grades of the learners are determined in line with their performances*	with various qualifications • Improved business performances within the industry and construction market • Trainers and workforce recruitment and retention within the context • Strengthening workforce skills and abilities towards the economic growth of the nation. • Reduction in unemployment and massive increase in job creation or job availability within the context of the industry • Positive contribution within the sector are enhanced while the negative ones are reduced drastically

Appendix C2: The TSDF framework component details are as follows:

Input component of the TSDF.

Developing the Technician Skills	
WSTD Regulations Construction Workforce Scheme Training and Development	In line with the effectiveness of the technicians training skills development, there is need for assigning responsibilities to specific interested groups. The developed model therefore recommends the construction industry professional bodies, associations, and government agencies to utilize the services of the various person relevant in the construction industry skills training.
Regulatory body	In line with this research objectives to improve the workforce's skills within the context of the construction related organisation, there is need to assign responsibilities to specific interest groups Professional body in the field of construction to ensure that skills training of the workforces within any construction related organisation as a priority Government agencies to utilise the services of the skilled workforce to the subject of construction skills training
Evaluation of workforces	Determination of workforce skills and ability Improved knowledge skills and ability Competencies/ abilities enhancement Quality of production within the organisation
Organisational structure	Adequate or appropriate arrangement of workflow in line with the inherent impact on the organisation's business and operational activities as follows; Adequate or appropriate arrangement of workflow in line with the following; Workforce communication, Delegation of authority within the industry Relationship within the context of the organisation Inherent impact on the organisation's business Operational activities.
Public and Parastatal/Agencies	• Recommended the public and parastatal and agencies to collaborate in construction sector craft training skills implementation • Adequate financial allocation for the technicians' training • Physical infrastructures • Training facilities
Private organisations, individual employers	• Creation of skilled workforce training schools • Skilled workforce sponsorship for more knowledge • Provision of skilled workforce essential tools for training • Enabling environment for skilled workforce training and work practicing • Creation of private vocational education training centres for young people

	• Regular organisation of workshops for the skilled workforce for both the existing and the newly recruited workforces within the organisation • Encouraging a regular continuous professional development (CPD) workshop for the skilled workforce • Unskilled young people should be recruited into the construction related organisations
Immediate communities	• Enabling environment for skilled workforce training and work practicing within the communities • Creation of communities' vocational education and training centres for young people within the communities
Government	• Adequate policy reforms on the technicians' training • Adequate financial allocation for the technicians' training • Physical infrastructures • Training facilities
Training providers	• Experience and qualify teachers • Adequate management team • Conducive learning environment
Parents/guidance	• Motivation through moral support • Funding through financial support
Safety measures	• Inadequate or poorly organised occupational health services within the sector • Management attitude towards the workforces is inadequate and unacceptable • Government policy on safety measures is ineffective in construction related works • Non-payment of workers compensation under the health and safety policy
Barriers (influencing factors)	• Inadequate funding of Technical Vocational Education and Training (TVET). • Ineffective training/instructional model • Shortages of qualified TVET teachers/instructors • Insufficient facilities for training • Absence of practical instructions in TVET curriculum • Government lack of commitment to TVET • Abandonment of TVET policies • Non-participation of contraction industry private sector • Unwillingness of trainees to acquire in-depth vocational knowledge • Inadequate commitment of Project manager on technicians' training • Absence of modern training facilities in TVET • Absence of effective training and skills framework
Possible strategies	• Make skills and vocational training free • Make craftsmen wages attractive • Make skills trainees earn while they learn

	• Ensure dignity for labour for Craftsmen • Make general education practical/skills oriented • Accord recognition to skills/Vocational education • Make skills instruction mandatory in junior secondary school • De-emphasize non-skilled general education • Properly fund technical/vocational education • Make career guidance and counselling mandatory junior secondary school level • Make career guidance and counselling mandatory senior secondary school level • Improve on job security in the construction industry
	• **Developing the Technician Skill Sets**
Training providers, Institutions of learning	• Employment of effective learning methods and teaching • Monitoring and effective supervision of teachers • Balancing of practical and theory in the training process • Preparation of trainees for standard assessment • Maintenance of good collaboration with parents and the immediate community
Government	• Access provision for new entrants • Effective regulation and maintenance of standards • Regular curricula review for relevance in the industry • Efficient monitoring • Scholarship for new entrants • Leadership development for colleges' management • Integration of vocational into the university system
Workforce practices	• Recruitment and retention strategies, skills, and process ability for each competency of workforce, • Innovation management of the workforce • Skills and ability of each workforce competency
Trainees	• Commitment to trainers • Adequate time to skills acquisition
Employers	• Scholarship for the existence and newly entrants • Funding skills acquisition programmes • Provision of on-the-job training for employees
Individual learning	• Develop learning plan • Focus on the areas of deficit or deficiency
Require skills for the technicians'	• Communication and interpersonal skills • Networking and building relationships • Ability to learn

	• Time management skills • Critical thinking and problem-solving skills • Long learning and information management skills • Entrepreneurship skills • Leadership skills
Blockwork, concreting group	• Block-Laying, Bricklaying and Stone Masonry's trade • Plastering/Rendering and Stucco Masonry's crafts (wall and floor finishing trades) • Block making and concreting trade • Terrazzo/Marble flooring trades • Tilling Trade- (Floor and Wall Tilling)
Woodcrafts and roof work group	• General Carpentry Trade and Joinery Trade • Wood Turners and Machinists Trades • Roof and ceiling cladding Trades (Roof tilers, long span aluminium roofers and Asbestos roofers) • Upholstery/Furniture work Trades • Glazing and wall cladding Trades
Painting, decoration, and exterior land scaping crafts	• Painting, and Paper-hanging Crafts • Interior Decorating Crafts • Exterior Land scaping and paving crafts
Construction services crafts group	• Electrical installation and maintenance trade • Plumbing and Pipe-laying and maintenance craft • Air conditioning (cooling)/Refrigeration and maintenance crafts • Lifts Installation and maintenance craft
Construction Plants Craft Group	• Concrete work and piling plant operators' crafts (concrete mixing machines, concrete and steel-piling equipment operator). • Excavating and earth moving plant operators • Construction plants mechanics and maintenance craft

Technicians' performance output	
Evaluation of Workforces	• Improved knowledge skills and ability • Competencies/ abilities enhancement • Quality of production within the organisation
Workforce Practices	• Employability improvement • Increased in the number of technicians' graduates • Focusing on learning activities
WTSD Regulatory Agencies	• Improving programme quality of construction craft training and skill development scheme through reliability and accountability • Improving the construction sector apprenticeship scheme and promoting the
Trainers Recruitment	• Designed of the appropriate criteria for trainers' recruitment within the sector • Appropriate criteria for the selection process should include a suitable practical site work experience • At lease a minimum qualification of NCE (Technical); HND in Building or • A minimum of National Vocational Diploma (NVD) with a teaching qualification example, technical teachers' certificate (TTC) • Postgraduate certificate in education (PGCE) • National advance vocational certificate (NAVC) or • NABTEB's Advanced Vocational Certificate (ANTC) with at least a year post qualification site work experience). • Trainers should be enlisted only if they fulfil the selection criteria
Recruitment Committee	• Training needs and objective identification • Design a training programme • Implement a training programme • Evaluate a training programme
Performance Output	• Setting out performance target • Conducting reviews of performance • Work discussion with the focus on the areas for enhancement
Career Development	• Career opportunity • Motivation of an individual as a career person • Individual counselling and guidance on the career
IMPACTS (Output evaluation)	
TRAINING IMPACT	• Better competitiveness in the society • Construction industry development • The Nation's economy growth • Skills needed for a better performance
EVALUATION	• More workforces are recruited within construction related organisation

	• Better competitiveness in the society • Determination of workforce competencies • Critical skills for the performances
Motivation	• Increased in the technicians' pay rate (income) • Reduction of poverty most especially among the young people within the society
CONTEXT	
Political	• Stability of the government • Leaderships quality in the political class • The level of corruption within the context • Bureaucracy within management of education
Economic	• High rate of unemployed youths • High rate of poverty within the context • Competition within construction market • Education policy
Social	• High population growth rate • Poor image of the technicians or societal perception on skilled workforce • Perception of young people on construction related organisation • Societal attitude towards importation of artisan services
Legal	• Employment/recruitment regulations • Discrimination against vocational qualifications
Technological	• Basic infrastructures level within the context • Rapid technological changes
Ethical	• Ethical recruitment practices • Maintenance of standards

Appendix D

Appendix D1: Training providers for construction workers

	Response scores in percentage %					Mean Value	SD	Pearson correlation	Rank
	VS	S	OK	DS	VD				
Polytechnic/ Colleges of Technology	63.5	25.4	6.3	4.8	0.0	4.48	.820	.623	1
Technical Teachers College	41.3	44.4	7.9	4.8	1.6	4.19	.895	.545	3
Technical colleges	4.8	76.2	17.5	1.6	0.0	3.84	.515	.456	7
Science and technology colleges	46.0	30.2	19.0	4.8	0.0	4.17	.908	.545	4
Formal apprentice training method	4.8	90.5	4.8	0.0	0.0	4.00	.311	.473	5
Informal apprentice training method	9.5	79.4	9.5	1.6	0.0	3.97	.507	.590	6
University Education	49.2	30.2	12.7	7.9	0.0	4.21	.953	.489	2
Senior Secondary School	9.5	19.0	69.8	1.6	0.0	3.37	.679	.376	8
Junior Secondary School	11.1	15.9	66.7	6.3	0.0	3.32	.758	.384	9
Trade centres	9.5	12.7	60.3	17.5	0.0	3.14	.820	.283	10

Appendix D2: Effective training to facilitate workers' skills

	Response scores in percentage %					Mean Value	SD	Pearson correlation	Rank
	SA	A	N	DA	SD				
Polytechnic/ Colleges of Technology	77.6	18.4	4.1	0.0	0.0	4.73	.820	**.566**	**1**
University Education	73.5	24.5	2.0	0.0	0.0	4.71	.953	.566	2
Technical Teachers College	53.1	42.9	4.1	0.0	0.0	4.49	.895	.529	3
Informal apprentice training method	20.4	12.2	55.1	12.2	0.0	3.37	.507	.175	4
Technical colleges	14.3	76.2	6.3	3.2	0.0	4.02	.515	.377	5

Appendix D3: Analysis of Barriers of skilled workforce training

	Response scores in percentage %					Mean Value	Pearson correlation	SD	
	SA	A	N	DA	SD				Rank
Poor funding of TVET in Nigeria	68.3	27.0	1.6	3.2	0.0	4.60	440	.685	**1**
Ineffective training /instructional models	14.3	76.2	9.5	0.0	0.0	4.05	411	.490	3
Shortages of qualified TVET teachers	25.4	68.3	6.3	0.0	0.0	4.19	440	.535	2
Insufficient facilities for training	9.5	65.1	20.6	4.8	0.0	3.79	458	.676	7
Ineffectiveness of training models	4.8	19.0	65.1	6.3	4.8	3.13	458	.793	8
Absence of practical instructions in TVET curriculum	9.5	20.6	54.1	11.1	4.8	3.19	445	.931	5
Government lack of commitment to TVET	25.4	57.1	12.7	4.8	0.0	4.03	256	.761	4
Abandonment of TVET policies	6.3	44.4	46.0	3.2	0.0	3.54	415	.668	9
Non-participation of contraction industry private sector	25.4	54.0	12.7	4.8	3.2	3.94	527	.931	5
Unwillingness of trainees to acquire in-depth vocational knowledge	11.1	4.8	7.9	57.1	19.0	2.32	527	1.175	10

Appendix D4: Skilled workforce training challenges on quantity and quality

	Response in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	VS	S	OK	DS	VD	V	V	V	D	
With regards to the quality/standard of skilled labour supplied	20.6	30.2	44.4	4.8	0.0	2	5	3.67	.861	.784
With regards to quantity of number of skilled labours supplied	14.3	17.5	25.4	42.9	0.0	2	5	3.84	.515	

Appendix D5: Analysis of severity of skills training problems on work standard practices in the building construction industry

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	VS	SS	MS	LS	NE	V	V	Value	D	
Bricklayers, Block layers and stonemason	15.9	7.9	69.8	6.3	0.0	2	5	3.33	.823	
Concreters	7.9	23.8	36.5	31.7	0.0	2	5	3.08	.938	
Carpenters and Joiners	6.3	49.2	41.3	3.2	0.0	2	5	3.59	.663	
Painters and Decorators	4.8	25.4	42.9	27.0	0.0	2	5	3.08	.848	
Wood Workers/ Machinists	11.1	6.3	41.3	39.7	1.6	1	5	2.86	.981	.784
Plumbers, Pipe - layers, pipefitters, and steamfitters	4.8	69.8	12.7	7.9	4.8	1	5	3.62	.888	
Plasterers and stucco Masons	3.2	25.4	46.0	20.6	4.8	1	5	3.02	.889	
Sheet metal workers	4.8	23.8	23.8	46.0	1.6	1	5	2.84	.971	
Structural reinforcing work/ welder	6.3	19.0	30.4	44.4	0.0	2	5	2.87	.942	
Electricians	1.6	9.5	50.8	33.3	4.8	1	5	3.30	.775	
Glazier	11.1	20.6	49.2	17.5	1.6	1	5	3.22	.924	
Roofers	7.9	57.1	20.6	12.7	1.6	1	5	3.57	.875	
Terrazzo skilled workers	6.3	20.6	49.2	22.2	1.6	1	5	3.08	.867	
Construction labourers	11.1	7.9	11.1	11.1	58.7	1	5	2.02	1.431	

Appendix D6: Young people's interest in construction works

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	V	V	V	D	
Hazardous nature of construction site related works	11.1	42.9	6.3	12.7	27.0	1	5	3.02	1.453	.784
Poor rate of pay for site workers	73.0	22.2	4.8	0.0	0.0	3	5	4.68	.563	
Lack of recognition for skilled workers	7.9	74.6	11.3	6.3	0.0	2	5	3.84	.653	
Lack of respect for skilled workers	6.3	71.4	12.7	9.5	0.0	2	5	3.75	.718	
Government do not encourage skill acquisition for construction workers	6.3	73.0	14.3	4.8	1.6	1	5	3.78	.706	
No clear - cut career path for craftsmen	4.8	7.9	76.2	6.3	4.8	1	5	3.02	.729	
The youths lack adequate guidance and counselling to take to skill acquisition	27.0	61.9	4.8	6.3	0.0	2	5	4.10	.756	
There is no adequate forum to mobilise the youth for skill acquisition	9.5	11.1	71.4	7.9	0.0	2	5	3.22	.728	
Construction site work is view by the youth as too difficult	3.2	14.3	6.3	69.8	6.3	1	5	2.38	.923	
Construction site work is view by the youth as too degrading	7.9	4.8	6.3	76.2	4.8	1	5	2.35	.953	
The Youths generation are lazy and hence unwilling to acquire skills	4.8	7.9	12.7	20.6	54.0	1	5	1.89	1.193	
Too much emphasis on general /secular education	7.9	11.1	65.1	14.3	1.6	1	5	3.10	.797	
It is too expensive to receive vocational training	1.6	27.0	61.9	7.9	1.6	1	5	3.19	.669	
Lack of adequate provision for safety of construction site workers	11.1	69.8	7.9	9.5	1.6	1	5	3.79	.826	
Lack of intensive/encouragement from the vocational education curriculum	25.4	61.9	6.3	3.2	3.2	1	5	4.03	.861	
Absent of health and safety training from the vocational education curriculum	27.0	55.6	9.5	4.8	3.2	1	5	3.98	.924	
Lack of Job security in the construction industry	74.6	14.3	3.2	6.3	1.6	1	5	4.54	.947	

Appendix D7: Analysis of Possible strategies which may be exploring to motivate youths in Nigeria to develop interest

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	V	V	V	D	
Make skills and vocational training free	48.9	26.5	20.4	4.1	0.0	2	5	5.12	1.013	.948
Make craftsmen wages attractive	14.3	32.7	20.4	8.2	24.5	1	5	3.63	1.510	
Make skills trainees earn while they learn	20.4	28.6	14.3	10.2	26.5	1	5	3.65	1.614	
Ensure dignity for labour for Craftsmen	6.1	0.0	14.3	20.4	26.5	1	5	3.57	1.581	
Make general education practical/skills oriented	24.3	16.5	18.4	16.3	24.5	1	5	3.49	1.609	
Accord recognition to skills/Vocational education	36.3	28.4	20.4	13.3	1.6	1	5	3.51	1.502	
Make skills instruction mandatory in junior secondary school	46.9	28.5	20.4	4.1	0.0	2	5	5.12	1.013	
Make skills instruction mandatory in senior secondary school	14.1	32.8	20.4	8.2	24.5	1	5	3.63	1.510	
De-emphasize non-skilled general education	20.2	28.8	14.3	10.2	26.5	1	5	3.65	1.614	
Properly fund technical/vocational education	20.1	0.1	0.4	20.4	26.5	1	5	3.57	1.581	
Make career guidance and counselling mandatory Junior secondary school level	48.5	16.8	18.4	16.3	0.00	2	5	3.49	1.609	
Make career guidance and counselling mandatory Senior secondary school level	16.2	20.5	20.4	14.3	28.6	1	5	3.51	1.502	
Improve on job security in the construction industry	71.9	26.6	1.4	1.1	0.0	3	5	5.12	1.013	

Appendix D8: Analysis on possible strategies for producing needed craftsmen to address skills shortages

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	V	V	V	D	
Adopt multi-skilling method for new skills /vocational trainees	27.9	21.8	42.9	7.4	0.0	2	5	4.40	1.197	.954
Mobilise unskilled youths for skilled training	12.9	28.6	51.4	7.1	0.0	2	5	4.13	.931	
Re-introduce the apprentice scheme and make it effective	20.7	11.4	57.1	10.7	0.0	2	5	4.21	1.020	
Make secondary education and skill-based	17.1	12.9	55.7	7.1	7.1	1	5	4.26	1.059	
Make general education practical/skills oriented	17.1	12.9	45.7	18.6	5.7	1	5	4.17	1.103	
Accord recognition to skills/Vocational education	25.6	15.7	41.4	15.7	1.6	1	5	4.06	1.250	
Make skills instruction mandatory in junior secondary school	67.3	21.4	2.9	7.1	1.3	1	5	4.40	1.197	
Make skills instruction mandatory in senior secondary school	4.3	28.6	51.4	7.1	8.6	1	5	4.13	.931	
De-emphasize non-skilled general education	15.7	11.4	57.1	10.0	5.7	1	5	4.21	1.020	
Properly fund technical/vocational education	17.1	12.9	55.7	7.1	7.1	1	5	4.26	1.059	
Make career guidance and counselling mandatory Senior secondary school level	22.8	12.9	45.7	18.6	0.0	2	5	4.17	1.103	
Group sub-contractors for purpose of training apprentices	25.7	17.2	41.4	15.7	8.6	1	5	4.06	1.250	
Improve on job security in the construction industry	24.3	21.4	42.9	7.1	4.3	1	5	4.40	1.197	
Re-train the existing craftsmen	4.3	28.6	51.4	7.1	8.6	1	5	4.13	.931	
Establish special apprenticeship training centres	20.7	11.8	57.5	10.0	5.7	2	5	4.21	1.020	

Appendix D9: Possible Agencies that assist with quality assurance and benchmarking

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	V	V	V	D	
Organised construction industry sector	11.1	79.4	6.3	3.2	0.0	2	5	3.98	.553	.691
Construction labour unions	7.9	85.7	3.2	3.2	0.0	2	5	3.98	.492	
Federal government labour ministry	30.2	61.9	6.3	1.6	0.0	2	5	4.21	.626	
State government education ministry	1.6	7.9	42.9	44.2	3.2	1	5	3.62	.812	
Local government education board	20.6	42.9	27.0	7.9	1.6	1	5	3.73	.937	
National board for technical education	66.7	19.0	6.3	3.2	4.8	1	5	4.40	1.071	
Main contractors/ construction companies	6.3	31.7	49.2	7.9	4.8	1	5	3.27	.884	
Construction industry professional bodies	4.8	44.4	39.7	7.9	3.2	1	5	3.40	.834	
Vocational training institutes	9.5	60.3	20.6	7.9	1.6	1	5	3.68	.820	
Sub- contractors' firms	4.8	17.5	41.3	34.9	1.6	1	5	2.89	.882	
Apprenticeship/skills training board	6.3	42.9	39.7	11.1	0.0	2	5	3.44	.778	
Construction industry training board	3.2	58.7	30.2	6.3	1.6	1	5	3.56	.736	

Appendix D10: Most possible management of construction site problems in Nigeria

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	Value	Value	Value	D	
Technical Problem	20.6	76.2	3.2	0.0	0.0	3	5	4.60	.685	
Poor communication	28.6	65.1	1.6	4.8	0.0	2	5	4.05	.490	.701
Shortage of skills workers	11.1	57.1	19.0	12.7	0.0	2	5	3.79	.676	
Management problems	25.4	63.5	4.8	1.6	4.8	1	5	2.32	1.175	

Appendix D11: Possible indicators

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	Value	Value	Value	D	
Development employees' skills	36.5	58.7	4.8	0.0	0.0	3	5	4.32	.563	
To meet new changes in work setting	4.8	36.5	58.7	4.8	0.0	2	5	3.46	.692	
Organisational problems	12.7	65.1	17.5	4.8	0.0	2	5	3.86	.692	
Career development	63.5	25.4	3.2	7.9	0.0	2	5	4.44	.894	

Appendix D12: Analysis of possible training impact

	Response scores in percentage %					Min	Max	Mean	Std	Cronbach's Alpha
	SA	A	N	DA	SD	Value	Value	Value	D	
Productivity and efficiency	28.6	63.5	4.8	1.6	1.6	1	5	4.16	.723	
Increasing job satisfaction	7.9	85.7	3.2	1.6	1.6	1	5	3.97	.567	
Decreasing staff turnover rate	4.8	14.3	31.7	42.9	6.3	1	5	2.68	.964	
increasing profitability	19.00	52.4	20.6	7.9	0.0	1	5	3.83	.834	
Decreasing absenteeism rate	4.8	17.5	38.1	38.1	1.6	1	5	2.86	.895	

Appendix D13: Analysis of training needs within the industry

	Response scores in percentage %					Mean Value	Std D	Cronbach's Alpha
	Yes	**No**	**I don't know**	**Min Value**	**Max Value**			
Processes that are carried out during training needs analysis. Which one have you performed								.882
Document the problem	42.9	55.1	2.0	1	3	2.11	1.325	
Plan the needs analysis	27.1	60.8	12.1	1	3	2.11	1.325	
Conduct the analysis	15.7	70.2	14.1	1	3	2.11	1.325	
Report findings	7.1	70.5	23.4	1	3	2.11	1.325	
Investigate the problem	5.7	65	29.3	1	3	2.11	1.325	
Analyse the data	1.4	80.6	18.0	1	3	2.11	1.325	
Relevant of training needs identification in your organisation? Please tick as applicable								
Not important	1.4	90.6	8.0	1	3	2.11	.834	
Slightly important	2.9	96.0	1.1	1	3	2.11	.834	
Moderately important	10.0	85.5	4.5	1	3	2.11	.834	
Important	48.6	40.5	11.9	1	3	2.11	.834	
Very important	37.1	53.9	9.0	1	3	2.11	.834	

Appendix D14: Analysis of Satisfaction with the training

	Response scores in percentage %					Mean Value	SD	Cronbach's Alpha
	VS	S	N	DS	VD			
Productivity and efficiency	35.7	50.0	11.4	1.4	1.4	4.17	.734	**.896**
Increasing job satisfaction	34.3	47.1	12.9	5.7	0.0	4.10	.837	
Decreasing turnover rate	40.0	32.9	11.4	14.3	1.4	3.96	1.109	
Increasing absenteeism	20.4	12.2	55.1	12.2	0.0	4.01	1.148	
Increasing profitability	51.4	35.7	5.7	5.7	1.4	4.30	.922	

Appendix D15: Analysis of Training needs within the industry

	Response scores in percentage %					Mean Value	SD	Rank
	Yes	**No**	**I don't know**	**Min Value**	**Max Value**			
Training centre in industry	55.7	27.1	17.1	1	3	1.61	.767	2
Dept/section for training affairs	64.3	20.0	14.3	1	3	1.53	.793	3
If yes, which dept/unit/section is responsible for construction industry employees training								
Personal Department	61.4	22.9	15.7	1	3	1.73		1
Financial Department	15.7	61.4	22.8	1	3	1.73		1
Product Department	61.3	22.7	15.9	1	3	1.73		1
Others	11.4	61.4	27.2	1	3	1.73		1
Experience as acting as analysis								
1 - 2years	81.4	10.1	8.5	1	3	1.29	1.062	4
3 - 5years	11.4	80.1	8.5	1	3	1.29	1.062	4
6 - 10years	4.3	88.6	7.3	1	3	1.29	1.062	4
Over 10years	2.9	89.0	8.1	1	3	1.29	1.062	4

	Response scores in percentage %					Mean Value	SD	Rank
	Yes	**No**	**I don't know**	**MV**	**MV**			
Please, select the most appropriate statement if you agreed?								
The company have a clearly defined strategy relating to human resource development	38.6	32.9	29.5	1	3	1.63	.854	2
The company have a specific budget and a clear ongoing plan for training and development	22.9	70.1	7.0	1	3	1.63	.854	2
Top management is committed to support and provide all the facilitation to training and development activities	15.7	40.2	44.1	1	3	1.63	.854	2
Executive managers are facilitators of training and development activities	2.9	45.1	52.0	1	3	1.63	.854	2
Have you received any training during your employment	55.7	36.4	7.9	1	3	1.37	.543	3
In which of the following areas of training								
Methods of training needs analysis	40	45	15	1	3	2.00	.873	1
How to plan the training	45.7	44.5	09.99	1	3	2.00	.873	1
Methods to evaluate training programmes	8.6	91.4	0.0	1	3	2.00	.873	1
How to deliver the training	4.3	95.7	0.0	1	3	2.00	.873	1
To design training programmes	1.4	98.6	0.0	1	3	2.00	.873	1

Appendix D16: Analysis of Training outcomes within the industry.

	Response scores in percentage %						Mean Value	SD	Rank
	No of respondent	Yes	No	I don't know	Min Value	Max Value			
I have found the training									1
Excellent	159	20	45	35	1	3	2.10	.764	1
Very good	159	54.3	35.7	10	1	3	2.10	.764	1
Good	159	21.4	48	30.6	1	3	2.10	.764	1
Poor	159	4.3	5.7	90.9	1	3	2.10	.764	1
I have learned from this training									
To a great extent	159	30	35.6	34.4	1	3	2.0	.636	2
To some extent	159	57	20	23	1	3	2.0	.636	2
To a little extent	159	12.9	50	37.1	1	3	2.0	.636	2
For me in my current job, this training has been									
Extremely useful	159	21.4	60.2	19.4	1	3	2.0	.622	2
Useful	159	64.3	34.6	1.1	1	3	2.0	.622	2
Useful to some extent	159	14.3	55.6	30.1	1	3	2.0	.622	2
I have found that the training objectives were									
Achieved	159	47.1	20.8	32.1	1	3	2.0	.555	2
Achieved to some extent	159	50	20.5	29.5	1	3	2.0	.555	2
Not achieved	159	2.9	60.8	35.3	1	3	2.0	.555	2

Appendix D17: Analysis of Training needs within the industry

	Response scores in percentage %					Mean Value	Std D	Rank
	Yes	No	I don't know	Min Value	Min Value			
Could you please indicate which of the following you would be able to perform								
I can carry out questionnaires and interviews for TNA	38.6	42	19.4	1	3	2.0	.622	1
I can conduct interviews and questionnaire to gather data about training programme effectiveness	52.9	27.9	10.2	1	3	2.0	.762	1
I can test trainees' performance as a result of training	8.6	60.2	30.2	1	3	1.63	.762	2
Indicate the most appropriate statement that describes your company's efforts in training process								
Company has succeeded in identifying your training needs	47.1	23.8	29.1	1	3	2.0	.762	1
Training helps to know the business requirements of the company	45.7	35.2	29.1	1	3	2.0	.762	1
The company has provided a favourable environment for training	4.3	60.5	35.2	1	3	2.0	.762	1

Appendix D18: Reasons behind training of employees within the industry

	Response scores in percentage %					Mean Value	SD
	SA	A	OK	DA	SD		
When employees are newly recruited	41.4	21.4	22.9	7.1	4.3	4.40	1.197
On new working method	4.3	28.6	51.4	7.1	8.6	4.13	.931
On new equipment	15.7	11.4	57.1	10.0	5.7	4.21	1.020
Creation of new jobs	17.1	12.9	55.7	7.1	7.1	4.26	1.059
When performance appraisal assessment shows some gaps	17.1	12.9	45.7	18.6	5.7	4.17	1.103
Compliance with legislation and regulation	15.7	15.7	41.4	15.7	8.6	4.06	1.250