EVALUATION OF ARTISANS DEPLETION IN NIGERIAN CONSTRUCTION INDUSTRY

BY

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SPS/15/MCE/00005

A THESIS SUBMITTED TO THE DEPARTMENT OF CIVIL ENGINEERING, BAYERO UNIVERSITY, KANO. IN PARTIAL FULFILMENT OF THE REQUREMENTS FOR THE AWARD OF M.ENG (CONSTRUCTION MANAGEMENT)

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DECLARATION

I declare that this research titled **Evaluation of artisans depletion in Nigerian construction industry** is the result of my own research except as cited in references, under the supervision of **Dr. DAHIRU ALHASSAN.**

The project has not been accepted for any degree and is not concurrently submitted in candidature of any other degree and the source of information has been duly acknowledged by means of references and quotations.

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CERTIFICATION

The research titled **Evaluation of artisans depletion in Nigerian construction industry** by Abdulaziz Dayyabu meets the regulation governing the award of the degree of Master of Engineering in Civil Engineering (Construction Management and Technology) of Bayero University, Kano and is approved for its contribution to knowledge and literary presentation.

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APPROVAL PAGE

This research has been examined and approved as meeting the requirements of the Department of Civil Engineering, Bayero University, Kano for the award of degree of MASTER OF ENGINEERING (M.Eng Civil Engineering) Construction Management and Technology.

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DEDICATION

This project thesis is dedicated to Almighty Allah (SWT), the only One God lacking partner and fraternity. To my beloved mother and father for their labour, prayers, support and encouragement.

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Praise be to Allah the Creator of all, the Lord of all. May the peace and blessing of Allah (SWT) be upon His noble Prophet Muhammad (PBUH), the highest of Prophets, upon his pure Al (Progeny), and upon all of those who had the honour of being Companions (Ashab) to him.

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ABSTRACT

Artisans in construction industry play a very crucial role to the survival and growth of the industry as they are mostly engaged in the practical realization of construction projects. As a country endowed with skilled manpower, construction industry occupies a significant position and plays a major role in its economic development. Palpable and consistent depletion in technical apprenticeship and artisanal practice affect the growth and development of Nigerian construction industry. This study aimed at evaluating the depletion with a view to proffering some recommendations that may end or bring the problem under control. The study used spread of four hundred and fifty questionnaires to the supply side, represented by construction firms from nine Local Government Areas (LGAs) of Kano state. Statistical techniques were used to ascertain the depletion. Relative Importance Index (RII) was used to identify the factors influencing the depletion and Severity Index (SI) to obtain the effects and implications of the consistent depletion for Nigeria's future development. The study affirmed the depletion of skilled labour in Nigerian construction industry especially iron benders, carpenters and plumbers. No clear cut career path for artisanship with ARII value of 0.1632, poor remuneration of skilled craftsmen ARII of 0.1582, youth mentality to get-rich-quick with ARII value of 0.1534, lack of government commitments ARII value of 0.1496 and unconducive business environment with ARII of 0.1458 were found to be the prime causes of the depletion. The findings also revealed that national economic retardation with ASI value of 0.5618, influx of foreign workers ASI of 0.5477, project cost overrun ASI of 0.5382 and time overrun with ASI of 0.5188 are the anticipated consequences if the problem persists. In order for the Nigerian construction industry to effectively tackle the challenge of craft skills shortages, and accomplish its objectives and discharge its obligations; it is imperative for the sector to develop a dynamic and effective strategy of harnessing available human resources by mobilizing the youth population and re-directing their focus towards choosing construction related crafts as careers instead of scavenging for 'white-collar' professions which are insufficient and difficult to come by in most cases. Government should develop national schemes for the rehabilitation of vocational education and adequately equip the Nigerian vocational education centres with relevant teaching aids.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Construction industry occupies a significant position and plays a major role in the economic development of any nation (Idoro, 2011). The construction industry in Nigeria has been noted to contribute significantly to its overall development. Building and construction sector is one of the top five sectors used in measuring the National Gross Capital Formation (NGCF) and the Gross Domestic Product (GDP) of any country and its effect on every other sectors, makes it a significant front for sustainable development (Isa et al, 2013). More significantly, human resources have been observed to be central to the performance of the construction industry of most nations (Lerman,2013). Odediran and Babalola (2013) similarly, observed that availability of manpower in both qualitative and quantitative terms is very crucial and constitutes the second largest single component of resource input required by the construction industry. The study also opined that manpower required for construction varies from professionals like Architects, Builders, Engineers, Quantity Surveyors, Urban and Regional Planners, Estate Managers to construction craftsmen like bricklayers/masons, carpenters, welders/iron-benders, house painters, plumbers, electricians and others with their helpers or labours. Bamisile (2004) observed that in spite of advancementin technology, plant and equipment and in particular robotics, the construction industry is one of the few that still relies on the skills of artisans.

Odediran and Babalola (2013) observed that the types of manpower mostly needed in large quantity for housing construction in Nigeria and globally are artisans and labourers. The craftsmen in the construction industry 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 frontline managers (supervisors); fulfilling the role of interpreting the company policies into practical realization of the organizational goal of employer (Abiola, 2004).

National Heritage Training Group (NHTG, 2005) has established among developed countries that traditional building crafts skills are some of most priced asset of the construction industry in the past handed down from generation to generation, but now threatened by decline. It was further observed that the shortage of skilled craftspeople has highlighted the need for strong action to prevent further erosion of construction skills base.

A study by Eneh (2010) in south east Nigeria revealed a palpable decrease in technical apprenticeship practice and artisanal product and services. The study observed that the various trades'artisans under study are aging and younger ones are not taking over from them, generating the fear and concern that, in the next two decades artisans may completely disappear from the development landscape of the country. Ogbeifun (2011) in a study in South Africa noted that the dearth of skilled artisans in the construction industry is because the public sectors are not too active in training artisans, while the informal sectors' approach is not coordinated.

For the construction industry in Nigeria to be able to effectively contribute to economy, it has to parade competent hands in its operations. Hence, the need to train younger operatives has become imperative so as to meet its responsibility in the economy.

Securing and sustaining the interests of the youth generation in acquiring construction related crafts-skills in Nigeria has been a daunting problem which if not adequately addressed; will aggravate crafts skills shortages(Salami et al, 2011). The construction sector

is a large entity with diverse specialities which together make major contribution to national economic activity (Oyegokeet al, 2009).

Nigeria as a developing country and the most populated black African nation with an estimated population of nearly 150 million people of which according to CIA (2011) estimate, the youth population constitute over half of the total population. Despite this pool of active and vibrant human resources, crafts skills shortage persists in the construction sector and much has not been accomplished in the area of channeling the useful resource to contributing to overall economic development of the nation.

This project thus sets out toascertain the extent of this depletion in construction artisans, identify the factors militating against the interests of the Nigerian youth population in acquiring construction related crafts skills and thus causing the decline,obtain the effects of such decline on the Nigerian constructionindustry and examine the implications for the future development of Nigeria as a whole with the view to determining the strategies for effectively securing and sustaining their interests in choosing and getting trained to acquire employable skills in construction crafts thus, reversing the trend and forestalling the imminent dangers.

1.2 Statement of the Research Problem

Artisans in Nigeria are aged and continuously aging, while younger people are not taking their places (Eneh, 2010). The rapid disappearance of artisans in construction industries shows the level of country under development, since construction industry in Nigeria is labour intensive and it's the second highest employer after agriculture of the nation work force, it also account for over 40% of the country's Gross Capital Formulation (GCF)(Isa et al, 2013).

While accepting the fact that some previous works (such as Eneh. 2010) has been done in the area of decline in artisanal apprenticeship, however, all the sample populations were based on artisans in various Nigerian trades, and not specific to construction artisans.

As a consequence, the magnitude of this problem thus requires an evaluation in order to find solution.

1.3 Aim and Objectives of the Research

1.3.1 Aim

This research aim at evaluating the depletion of artisans in Nigerian construction industry with a view to ascertain the current status of artisanal practice in Nigerian construction industry.

1.3.2 Objectives

To achieve the above mentioned aim, the following objectives need to be observed;

1. To examine the depletion of artisanal practice in Nigerian construction industry
2. To identify the factors influencing the depletion of artisans in Nigerian construction industry
3. To examine the effects and implications of the depletion for Nigeria's future development

1.4 Significance of the Research

Having realized the negative impact of the consistent depletion of artisans in construction sector, the need for a study of this nature cannot be overemphasized. It is hope that its findings and recommendations could eliminate or minimize the depletion in order to enhance artisanal practice and productivity in Nigerian construction industry. This will directly be part of what could be positive influence on our construction industries as well as

national economy (steady production of competent skilled crafts, qualitative project delivery, reduce project cost overrun, reduce unemployment rate, etc.),towards becoming a developed nation.

1.5 Scope and Limitation of the Study

1.5.1 Scope

The research area is limited to Kano state, to enable effective management of the study. Only; (1) construction artisans, (2) professionals in construction industry and (3) youth among individuals was used as respondents to the research.

1.5.2 Limitations

In order to achieve the aim of this research and to keep it within the scope of time, it's limited to the finding of extent, causes and effects of artisan's depletion in Nigerian construction industry as well as its implications to the future from three senatorial districts of Kano state.

CHAPTER TWO

LITERATURE REVIEW

2.1 An Overview of Artisanal Practice in Construction Industry

Construction industry has a strong connection with other sectors of the economy and the increase in the construction activities will have positive impact on the wealth of the country (Ogunsemi and Aje, 2005). Availability of manpower in both qualitative and quantitative terms is very crucial and constitutes the second largest single component of resource input required by the construction industry (Sanniand Alabi, 2008). Manpower required for construction varies from professionals like Architects/ Planners, Quantity Surveyors, Builders, Engineers to building artisans like bricklayers/masons, carpenters, welders/iron-benders, painters, plumbers, electricians and the allied professionals and trades.

The former could be described as formal manpower requirement because their operations are regulated by the government in terms of level of operations/activities to carry out, forms/conditions of engagement and remuneration while the latter is described as the informal players or workers whose activities are not regulated by the government although very crucial and form the core of construction works. The functions of each of the players are sets of activities to be performed at different stages of any construction projects. The formal players (professionals) activities are knowledge-based or knowledge-driven (less labour intensive) while the informal players (artisans) activities are labour intensive which requires forms of physical efforts/energies to be carried out. The extent of activities to be carried out by various informal players is imperative, hence the need for it assessment. The informal construction workers/artisans considered under this study include bricklayers/masons, carpenters and iron benders.

2.1.1 Construction Artisans

2.1.1.1 Bricklayers/Masons

In construction projects/works, bricklayers/masons construct walls, partitions, fireplaces, chimneys, and other structures from brick, block, and other masonry materials such as structural tile, concrete cinder, glass, gypsum and terra cotta (AGCNH, 2011). According to Occupational Outlook Handbook (2011)brick masons, block masons, and stonemasons are often called bricklayers. They create, build and repair walls, floors, partitions, fireplaces, chimneys, and other structures with brick, precast masonry panels, concrete block, and other masonry materials. In Nigeria, they are often called bricklayers or masons whose works include block laying, concreting, plastering, flooring and other works made from cement, sand and aggregates.

2.1.1.2 Carpenters

Carpenters, on the other hands erect wood framework in buildings; build forms for concrete; and erect partitions, studs, joints, drywalls, and rafters. Associated General Contractors of New Hampshire (AGCNH, 2011).

Some carpenters construct docks, work with large timbers, and drive piles to support the foundations of buildings and bridges. According to Occupational Outlook Handbook (2011) carpenters construct, erect, install, and repair structures and fixtures made from wood and other materials. Carpenters are involved in many different kinds of construction, from the building of highways and bridges to the installation of kitchen cabinets. They then join the materials with nails, screws, staples, or adhesives. In Nigeria, carpenters are trained skilled artisans that deal with wood works and the allied products such as plywood et al. Carpenters make formworks to concrete at foundation and superstructure levels. They

construct roof, doors and windows with their frames, wardrobes, kitchen cabinets, ceiling noggins, and other furniture works.

2.1.1.3 Electricians

Electricians layout, install, and test electrical service and electrical wire systems used to provide heat, light, power, air conditioning, and refrigeration in homes, office building, factories, hospitals, and schools. They also install conduit and other materials, and connect electrical machinery, equipment, and controls and transmission systems. Associated General Contractors of New Hampshire (AGCNH, 2011).

Electricians install and maintain all of the electrical and power systems for our homes, businesses, and factories.

They install and maintain the wiring and control equipment through which electricity flows. They also install and maintain electrical equipment and machines in factories and a wide range of other businesses. Electricians specializing in construction primarily install wiring systems into factories, businesses, and new home (Occupational Outlook Handbook, 2011). In Nigeria, electricians are skilled artisans trained to carry out wiring of building structure. They lay cable either surface or conduit; lay pipes for conduit, fix electrical fittings and accessories, build and repair electrical appliances. They also construct, generate and distribute power within a community (rural electrification).

2.1.1.4 Iron Benders

According to Associated General Contractors of New Hampshire (AGCNH, 2011) structural iron workers erect the steel framework for large industrial, commercial, or residential buildings, bridges, and metal tanks. They erect, bolt, rivet, or weld the fabricated structural metal members that support the structure during and after construction. Some iron

workers, called rodmen, set steel bars (rebar) or steel mesh in forms to strengthen concrete buildings, bridges, and highways. Other ironworkers called Ornamental Iron Workers install and assemble grills, canopies, stairways, iron ladders, decorative iron railings, posts, and gates. Occupational Outlook Handbook (2011) also confirmed that structural and reinforcing iron and metal workers place and install iron or steel girders, columns, and other construction materials to form buildings, bridges, and other structures. They also position and secure steel bars or mesh in concrete forms in order to reinforce the concrete used in highways, buildings, bridges, tunnels, and other structures. Ironworkers also structural metal, steel frames and assemble the cranes and derricks that move structural steel, reinforcing bars, buckets of concrete, lumber, and other materials and equipment around the construction site. Iron workers also connect steel columns, beams, and girders. In Nigeria, iron workers are called iron benders whose works include cutting, erecting and assembling iron works such as iron rods in construction of lintels, upper floor beams, steel roof trusses, burglary proof, etc.

2.1.1.5 Painters

According to Occupational Outlook Handbook (2011), painters prepare the surfaces to be coated, so that the paint will adhere properly. This may require removing the old coat of paint by sanding, wire brushing, burning, or water and abrasive blasting. Painters also fill nail holes and cracks, sandpaper rough spots, and wash walls and trim to remove dirt, grease, and dust. Painters apply paint, stain, varnish, and other finishes to buildings and other structures. They select the right paint or finish for the surface to be covered, taking into account durability, ease of handling, method of application, and customers' wishes. In Nigeria, painter on a new works ensure that surface to be painted are smooth for paint application while on the old work remove all existing paints, stains and materials to the

surface before paint application. They select the best type, colour and quality of paint to be used by their client on any job.

2.1.1.6 Plumbers

Plumbers are skilled craftsmen who install, repair and alter pipe systems that carry gases, water and other liquids required for sanitation, storm water, industrial production, and other uses.

They install plumbing fixtures, appliances, bathtubs, basins, sinks, showers, and grease line systems. They work from blueprints and working drawings to determine materials required for installation. They cut and thread pipe using pipe cutters, cutting torches, and pipe threading machines. Plumbers may have to work indoors or outdoors on a ladder or scaffold, underground in a trench, a crawl space under a building, or in the unfinished basement of a new building. Associated General Contractors of New Hampshire (AGCNH, 2011).

Plumbers, pipe layers, pipefitters, and steamfitters install, maintain, and repair many different types of pipe systems. Plumbers install and repair the water, waste disposal, drainage, and gas systems in homes and commercial and industrial buildings. Plumbers also install plumbing fixtures—bathtubs, showers, sinks, and toilets—and appliances such as dishwashers, waste disposers, and water heaters (Occupational Outlook Handbook, 2011). In Nigeria, they are called plumbers whose works include laying of pipes for waste and water supply into the building. They fix all appliances such as water closet, wash hand basin, water heater (cold/hot), bath, shower tray, etc.

2.1.2 Definition of Artisan

An artisan (from italia: artigiano) is a skilled manual worker who crafts items that may be functional or strictly decorative, including furniture, clothing, jewelry, household items and

tools. The term is also used to refer to the craft of hand-making food products, such as bread, beverage and cheese. Artisans traditionally work in media, such as wood, ceramics, glass, common and precious metals, basketry, textiles, esparto grass and leather. Merchants and artisans organized are servants of the rulers. Artisans employ creative thinking and manual dexterity to produce their goods. They were dominant producers of food before the Industrial Revolutions of the 18th and 19th Century Europe and North America respectively.

The term, artisan, was applied in medieval times to those who made things or provided services-not to unskilled labourers. Artisans of the middle ages were divided in to two distinct groups: those who operated their own businesses (masters) and those who did not (journeyman and apprentices). The master artisans were influential among the artisans and enjoyed a higher social status in their communities. In modern sense, many people erroneously regard the two groups as workers.

2.1.3 Artisan under Engineering Family

The Council for the Regulation of Engineering in Nigeria (COREN) Recognizes four cadres in engineering professional practice in Nigeria, they are:

1. Craftsmen/Artisans → Technical Colleges
2. Technicians → Ordinary National Diploma (OND)
3. Technologist → Higher National Diploma (HND)
4. Engineers → Bachelor in Engineering (B. Eng)

2.1.4 Characteristics of Artisans

All artisans share the following core characteristics:

1) Fun-loving, optimistic, realistic and focused on the here-and-now

2) Priding themselves in being unconventional, bold and spontaneous

3) Making playful mates, creative parents and troubleshooting leaders

4) Excitability, trusting their impulses, wanting to make a splash, seeking stimulation, prizing freedom and dreaming of mastering action skills.

Artisans have the natural ability to excel in any of the art, not only the fine arts (such as painting and sculpting), or the performing arts (such as music, theatre and dance), but also the athletic, military, political, mechanical and industrial arts, as well as the art of the deal in business.

Artisans are most at home in the real world of solid objects that can be made and manipulated and of real-life events that can be experienced in the here-and-now. Artisans have exceptionally keen senses and love working with their hands. They seem right at home with tools, instruments and vehicles of all kinds and their actions are usually aimed at getting them were they want to go and as quickly as possible. Thus, artisans will strike off boldly down roads that others might risky or impossible, doing whatever it takes, rules or no rules, to accomplish their goals. This devil-may-care attitude also gives the artisans a winning way with people and they are often irresistibly charming with family, friends and co-workers.

Artisans want to be where the action is; they seek out adventure and show a constant hunger for pleasure and stimulation. They believe that variety is the spice of life and that doing things that are not fun or exciting is a waste of time. They are impulsive, adaptable, competitive and believe the next throw of the dice will be the lucky one. They can also be generous to a fault, always ready to share with their friends from the bounty of life. Above all, artisans need to be free to do what they wish, when they wish. They resist being tied or

bound or confined or obligated; they would rather not wait, or save, or store, or live for tomorrow. In the artisan view, today must be enjoyed, for tomorrow never comes.

2.1.5 Depletion of Artisans

Darren et al. (2012) consider artisans depletion to occur when the demands for workers for a particular occupation is greater than the supply of personnel who are qualified, available and willing to work under existing market conditions, and if the supply is greater than demand then there is a surplus. Awe (2006) contributed that a depletion may be evident only in particular specialization in an occupation, it does not have to be across the whole occupation. In addition, it may also be restricted to particular locations. He put forward that overtime the market might adjust in a number of ways, including price and or quality adjustment, and the imbalance clears. In practical work, shortages have always been interpreted or even defined directly in terms of difficulties in filling vacancies.

Ajagbe et al (2011) suggested that employers may report depletion of particular workers, or difficulties in filling vacancies, either because there are not enough of them or else those who are available do not possess skills deemed necessary by employers, such as computer literacy. Shortage of the first type is quantitative while those of the second type are qualitative. In competitive labour market employers accept candidates whose skills do not match the ideal. However, from the perspectives of the employers depletion occur, but from the perspective of the market the positions were filled and hence no shortage exists. Conversely, in a slack labour market if over-qualified people fill positions then the market may not show an imbalance.

2.1.6 Benefits in availability of artisans for construction industry

Artisans constitute about 30-35% of the population and create much the beauty, grace, fun

and excitement the rest of the people enjoy in life. Artisanship and technical skills and services are critical to the development of nations. Skills acquisition is a key to grassroots empowerment (Akosile, 2007). Adaptive skills develop both the personality and manipulative skills capability of youth (Abassa, 2003; Unoarumi, 2009). They rescue street youth, ghetto youth and the destitute from gangsterism, drug abuse, crime/violence and other vicious involvements (Umar, 2008) that mar the social, cultural and economic development of countries.

Artisan is an entrepreneur, willing and able to make business risk for gainful purposes. He has a strong desireto be independent, to work at something he enjoys (rather than settle for the security of a steady income), to operate at his pace and for prestige and to be recognized (Eneh, 2007a). An entrepreneur, according to Joseph Alois Schumpeter (1883-1950), is an economist and political scientist, disturbs the equilibrium of the stationary state, is the prime cause of economic development and is responsible for the innovation and technical change of a nation, as well as makes things work in the economy of the country (Dees, 2004).

In line with this theory, it is the entrepreneurs, such as artisans and technical services providers, including fine art workers, performing artists, caterers, printers, metal workers, wood workers, auto workers, garment workers, construction workers, electrical/electronic workers and others, that drive the economic development of the nation.

2.1.7 Consequences for consistent depletion of artisans

Labour is a major component of construction work in Nigeria. Unlike in developed economies such as the UK, USA and Germany where operations on construction sites are highly mechanized. Construction work in Nigeria is low tech and labour intensive. Solomon

et al. (2012) defined productivity as the amount of products or services produced compared to the amount of goods or labour used to produce them. In construction, labour productivity is better known as labour output and is measured as the amount of work done over a period of time. Olomolaiye and Ogunlana (1989) observed that production outputs in key building companies in Nigeria were lower than they ought to be. Reasons for this were linked to inefficient methods, lack of appropriate tools and poor supervision. This agrees with a study carried out by Alinaitwe et al. (2007) which ranked incompetent supervisors and lack of skills of the workers as the two most significant causes of low productivity of construction workers in developing countries.

2.1.7.1 Poor Workmanship

Several authors including (Aniekwu and Okpala, 1988; Kolawole & Frank, 1999; Medugu et al, 2011; Dantong et al, 2011; Bilau et al. 2014) agrees that poor workmanship is one of the problems that the Nigeria construction industries are facing as the use of incompetent craftsmen lead to poor workmanship. Poor workmanship could result to rework due to incompetent craftsmen, though there are many factors that leads to poor workmanship, but that would not be discussed, only rework which result to cost and time overruns in project delivery process and has become a cankerworm within the Nigeria construction industry.

2.1.7.2 Rework

Rework in construction projects is referred to as the unnecessary effort of redoing a process or activity that was incorrectly implemented in the first instance (Ekambaram, 2006; Abdullah et al, 2012). In construction projects, rework which lead to cost and time overruns can result from an array of factors such as poor workmanship by incompetent craftsmen, errors, omissions, failures, changes, poor communication and poor coordination. To some

extent, the level of rework in construction projects would be depend on external factors such as excessive workload, market conditions for instance, increased defects and from limitations on the availability of competent subcontractors (Adamu et al, 2011; Dai et al, 2009; Enshassi et al, 2007).Rework and wastages are considered as non-value adding endemic symptoms that could adversely affect the performance, productivity and ultimately profit margins (Ekambaram, 2006; Abdullah et al, 2011). Some Previous studies indicated that the costs of rework in poorly managed projects can be as high as 25% of contract value and l0% of the total project costs (Abdullah et al, 2012).

2.1.7.2.1 Significance of Reducing Rework

Durdyev and Mbachu (2011) posit that project rework occurrences adversely impact project performance in such areas as costs, time and stakeholder satisfaction. Hanna et al. (2008) finds that the direct impact of rework on project management transactions include (a) additional time to rework (b) additional costs for covering rework occurrences (c) additional materials for rework and subsequent wastage handling (d) additional labour for rework and related extensions of supervision.

2.1.7.3 Time overruns

Ijigah et al, (2012) opine that time overrun is one of the causes resulting from rework which adversely affect performance, productivity and ultimately profit margins. The problem of project time overrun is of international concern. As numerous studies related to causes of time or cost overruns have been conducted worldwide and mostly in developed countries (Ijigah et al, 2012). According to Hewage and Ruwanpura (2006), Ibeanu (2006) and Kazaz et al, (2008) time overrun is the extension of time beyond planned completion dates usually traceable to contractors. Ugwuja (2010) defined it as the time lapse between the agreed

estimation or completion date and the actual date of completion. Odesola and Idoro*(*2014*)* describe time overrun as the time during which some part of construction project is completed beyond the project completion date or not performed as planned due to an unanticipated circumstance. Time overrun affects the project owners, contractors and other project participants. Project owners may be affected through lost benefits that could have accrued from the completed facility, while contractors may have to spend more on labour and plant, pay penalties as per the contract or even lose other profitable contracts because resources for the next job are tied up on delayed projects (Lawal et al, 2008; Odesola et al, 2012; Olatunji et al, 2007)

2.1.7.4 Cost Overrun

Odesola et al (2012) and Ijigah et al (2012) posit that cost overrun is also one of the causes resulting from rework which adversely affect the performance, productivity and ultimately the profit margins of the construction work. Awe et al (2010) contributed that rework also triggers claims for extra costs and time wasted in redoing or repairing defects by direct impacts of rework on project management transactions which include (a) additional time to rework (b) additional costs for covering rework occurrences (c) additional materials for rework and subsequent wastage handling (d) additional labour for rework and related extensions of supervision manpower (Oyelere, 2007; Wang, 2008; Awe et al, 2009)

Since, master artisans are entrepreneurs, who drive the economic development of the nation, national development will be retarded with disappearing artisanship and technical skills and services that are critical to development. Similarly, grass root empowerment will suffer with diminution skills acquisition, which is key to this empowerment. Development of both the personality and manipulative skill capability of youth will suffer with

diminishing adaptive skills. Thus, street youth, ghetto youth and the destitute will no longer be rescued from gangsterism, drug abuse, crime/violence and other vicious involvements that mar the social, cultural and economic development of countries (Eneh, 2010).

2.1.8 Causes of construction artisans depletion in Nigeria

The challenge in depletion of artisanal practice is a critical threat to the economic health of many nations around the globe. Medugu et al (2011) mentioned that skilled labour shortage impact different areas of construction activities and impact on time, cost and quality of work. He opined that this may also endanger the achievement of financial prosperity for which such projects are conceived. Nigeria as a country undergoing economic reform needs a productive, competent, and flexible workforce to further her economic growth. Dantong et al,(2011) however uncovered that skilled craftsmen shortage is not a shortage of workers rather it is a shortage of adequately trained, skilled, and productive workers available for certain jobs. Attar et al (2012) pointed out some reasons attributed for such shortage as lack of training and retraining, an aging workforce, and the construction industry that does not appeal to young, potentially qualified manpower. Furthermore, an increasingly poor image over the last couple of decades has discouraged young people from seeing the construction industry as a viable career path. Ankrah (2007) sees this as the most pressing issue in the nation's construction sector which is already having serious implications for both businesses and the economy generally. In view of these, there is an urgent need of up-skilling construction skilled craftsmen in order to address the issues of poor workmanship.

According to Bustani (2011), the quality and availability of skilled workforce is considered an important factor towards the effectiveness of the construction sector. However, various reports have indicated the existence of shortages and poor quality of craftsmen in the

Nigerian construction industry (Dantong et al,2011). Some reasons attributed for such shortages includes; aging of skilled craft workers in the industry, decline in the number of new entrants into skilled trades, poor finding and ineffective state of vocational education and training/ retraining system in the country. Others include: poor image associated with construction labour as work done by less intelligent people, lack of commitment by government and the construction industry towards skills training. In addition the development, introduction of new technologies and materials requiring higher skills among others (Darren et al,2012).

2.1.8.1 Lack of Organization Training and Retraining of Skilled Craftsmen

Training for capacity building is central to sustain economic growth and development because human capital is the greatest asset of any organization (Long et al, 2012a; Long et al, 2012b). Surprisingly, most construction firms in Nigeria are very narrow, because they seem to focus on the financial gains forgetting the people that make the job and money. Dantong (2007) posit that these are among the multiple problems of craftsmen training as most construction firms in Nigeria hardly discuss about how to improve the workforce but on how the workforce will improve them. Onuka et al (2012) portends that the absence of craftsmen training and retraining program in an organization often manifests tripartite problems if incompetence, inefficiencies and ineffectiveness. Therefore, without a training policy provided by an organization the tripartite problems earlier mentioned will be imminent. The author suggests that training and development should be viewed as veritable tools that help to improve the outdated nature of the construction industry in to a modern construction industry through updating of staffs and manpower development.

2.1.8.2 Aging of Skilled Workforce in the Industry

This is one of the greatest challenges currently facing the construction industry, as the current average age in trained craftsmen and artisans in the sector is between 45-50 years and fewer skilled workers are available to replace the aging workforce. Dantong et al, (2011) believes that if this trend is not checked, in the nearest future craftsmen and artisans that really worth their onion would have gone into extinction.

2.1.8.3 Rapid Change in technology

The construction industry all over the world is experiencing rapid changes in technology. Dubem et al, (2012) views this reason is not far-fetched because of the ever increasing sophistication in this age of computer technology which has made it compulsory for organization to meet changing situations with globalization in the construction industry and client demand. Okuntade (2014) highlighted that the construction industry all over the world have been adapting to the sporadic change in technology with skills acquisition program to meet demands. Despite this change most construction companies in Nigeria are yet to adapt to this trends. This however, hast these has great constraints and influence on the workforce (Dubem et al, 2012). For the construction industry to be able service the economy, it has to parade competent hands in its operation, which includes credible consultants and contractors with qualified and competent craftsmen (Dantong et al, 2011).

2.1.8.4 Poor Remuneration of Skilled Craftsmen

This is a major reason the construction industry is having problems of attracting and retaining skilled workforce. In Nigeria, there is no regulation guiding minimum wage for construction workers. Fagbenle (2004) put forward that different wages are paid in across the country. This issue prompt construction worker to pursue other career or migrate to

where they will be better remunerated. The nature of the construction industry is a contributing factor that makes it difficult for construction workers to join trade union. This informs the reason wages cannot be jointly negotiated, as it is in the case in government establishment. The workers in turn do not work with full loyalty in this respect (Fagbenle, 2004).

2.1.8.5 Lack of Motivation of Skilled Craftsmen

Human potential is boundless but it requires motivation in order to excel (Fagbenle, 2004; Dubem et al, 2012). Motivation is an art of inspiring someone to work (Solomon et al, 2012). Ironically, majority of construction firms in Nigeria do not motivate their skilled workforce for improved productivity. Since lack of motivation has always resulted to high staff turnover in the industry. Fagbenle (2004) opine that motivation of skilled workforce can be achieved in many ways, but whatever method is adopted, it must be realized that economic rewards must be among the chief consideration. It is therefore necessary that a sound wage policy is laid down with well-structured incentive and bonus plan. Ugheru (2006) finds that other considerations to aid motivation include: financial incentives, promotion, job security, welfare package, and participation in decision making and among others.

2.1.8.6 Lack of Appeal to Young, Potentially Skilled Workers

The construction industry lacks appeal to young, potentially skilled workers which increasingly give poor image associated with construction labour as work done by less intelligent craftsmen (incompetent craftsmen). Darren et al, (2012) thinks this is due to the inefficiencies which lead to poor workmanship that result to rework that brings about cost and time overrun. Poor image and career paths over the last couple of years has discouraged

young people from seeing the construction industry as a viable career path. According to Awe (2006) the Nigerians youth no longer show interest in skill acquisition unlike the case in developed countries such as the UK where reports indicate that demand from young people for apprenticeships is outstripping the number of training places available in the industry.

Eneh (2010) opined the following as the attributes in decline for technical apprenticeship in Nigeria;

1) Increasing quest for formal education
2) To get-rich-quick mentality for youth
3) Unconducive business environment
4) To indolence
5) Lack of respect for artisans and technicians in the society and;
6) Lack of patronage

2.2 The Nigerian Construction Industry/Environment

The Nigerian construction Industry has experienced changes over the years since the oil boom of the early seventies, both in terms of volume and complexity of work. Projects such as construction of roads, buildings, bridges, dams, sewage plants, has been executed on large scales (Adeniji, 1994). Because most of the technology of construction comprises of both local and imported, there is a need for the training, development and constant supply of indigenous manpower to acquire, use and adapt the available technologies (Nwagwu, 2004; Onjewu, 2005). It has been observed that in most of the less developed countries, the stock of skilled manpower has not been able to match the level of economic activities and development. Such shortages in manpower have been experienced in many urban areas

where massive unemployment is accompanied by shortage of relevant skilled craftsmen in the building trades such as bricklayers, block layers, carpenters, plasterers (Akindoyeni, 2005; Obiegbu, 2005). In Nigeria in the past, apprentice systems were widespread throughout all occupations; the trainee provided service to the teacher over a period of years and eventually 'ends- up' on his own. By the 1970s, education experts were strategizing on how the system could be integrated into the more formal schooling of the young; but the question remained unresolved. Eventually, over time the interest dwindled; and until the present time apprenticeships and vocational training schemes for the construction trades are still completely inadequate in terms of the numbers produced and the quality of skills imparted (Esu and Junaid, 2008). Abdulgafaru (2003) submits that some difficulties encountered in personnel development in the Nigerian construction industry include:

1) Mobility of construction personnel within the industry such that skilled men trained by the public organizations are constantly hired by private sector.
2) The un-organized nature of trade unions and trade organizations and their attitude to training.
3) The general level of education in the country which is an important factor in determining impartation and comprehension of skills.
4) Migration of skilled workers to richer markets.
5) Shortage of indigenous technical personnel.
6) Construction in rural and urban areas because it required retraining of manpower and because it introduces fluctuation in the supply of the main construction resource.
7) The big, establishment and mostly foreign construction organizations do not identify with the global manpower policy of the countries in which they operate. It is

imperative therefore, that efforts are directed at tackling the manpower development challenges, and more particular, those that relates to training and education of the construction site skilled operatives.

2.2.1 Professionals in building construction projects

2.2.1.1 The Architect

An Architect is one who possesses, with due regard to aesthetic as well as practical considerations, adequate skill and knowledge to enable him (i) to originate, (ii) to design and plan, (iii) to arrange for and supervise the erection of such buildings or other works calling for skill in design and planning as he might, in the course of his business, reasonably be asked to carry out or in respect of which he offers his services as a specialist. Architects are licensed professionals trained in the art and science of building design who develop the concepts for structures and turn those concepts into images and plans. Architects create the overall aesthetic and look of buildings and other structures, but the design of a building involves far more than its appearance. Buildings also must be functional, safe, and economical and must suit the needs of the people who use them. Architects consider all these factors when they design buildings and other structures. Architects may be involved in all phases of a construction project, from the initial discussion with the client through the entire construction process. Associated General Contractors of New Hampshire (AGCNH, 2011).

Their duties require specific skills-designing, engineering, managing, supervising, and communicating with clients and builders.

2.2.1.2 Engineers

The Engineers are vital professionals in the building construction industry; they are of

different discipline with each having distinct responsibilities and roles. They are:

2.2.1.2.1 The Civil Engineer

It is important to first provide a formal definition highlighting the role of a civil engineer. A civil engineer is responsible for using their civil engineering background to plan and oversee various construction efforts in many different areas of this field. Associated General Contractors of New Hampshire (AGCNH, 2011). They will apply civil engineering principles to ensure that structures are constructed in the safest, sturdiest manner.

General Responsibilities of a Civil Engineer

A civil engineer engages in many general responsibilities on a daily basis. These responsibilities are a crucial part of their job and enable the civil engineer to engage in their profession to the best of their ability. One general responsibility of the civil engineer is to analyze various factors concerning a construction job. The civil engineer will analyze the proposed site location as well as the entire construction job which is to be completed at such a site. They will analyze the process for completing the construction job every step of the way.

The civil engineer must also plan the construction project that will be taking place in conjunction with the results they found due to their analysis of the proposed project. During the process and at the end, the civil engineer must inspect the product to ensure that all rules, regulations and guidelines have been explicitly followed.

2.2.1.2.2 The Electrical Engineer

An Electrical Engineer requires thorough knowledge of electrical design and engineering techniques, as well as CAD and graphics skills. Responsible to plan and conduct independent work requiring judgment in the evaluation, selection, application and adaptation

of engineering techniques, procedures and criteria. Devise new approaches to problems, and prepare or modify drawings, specifications, calculations, charts and graphs, and monitor work for compliance to applicable codes, accepted engineering practices and standards.

Typical duties will include but not be limited to the preparation and/or modification of the following:

1. Electrical drawings, specifications, calculations, charts and graphs.
2. Project controls, cost estimates, quantity take-offs and manpower requirements for proposals, forecasts and change orders.

2.2.1.2.3 The Mechanical Engineer

According to Occupational Outlook Handbook (2011) Mechanical engineers makes research, design and develop machinery and systems for heating, ventilating and air-conditioning, power generation, transportation, processing and manufacturing. They also perform duties related to the evaluation, installation, operation and maintenance of mechanical systems that produce, transmit or consume power or employ heat energy.

Typical duties will include but not be limited to the preparation and/or modification of the following:

i. Conduct research into the feasibility, design, operation and performance of mechanisms, components and systems
ii. Prepare material, cost and timing estimates, reports and design specifications for machinery and systems
iii. Design power plants, machines, components, tools, fixtures and equipment; Supervise and inspect the installation, modification and commissioning of mechanical systems at

construction sites or in industrial facilities

iv. Develop maintenance standards, schedules and programs and provide guidance to industrial maintenance crews

v. Investigate mechanical failures or unexpected maintenance problems

vi. Prepare contract specifications, cost estimates and evaluation of tenders

vii. Supervise technicians, technologists and other engineers and review and approve designs, calculations and cost estimates

2.2.1.2.4 The Quantity Surveyor

A Quantity Surveyor is a construction industry professional who specializes in estimating the value of construction works and can also be referred to as a "Cost Engineer" or "Cost Planner", although this terminology is mainly used on overseas contracts (Occupational Outlook Handbook, 2011).

The term quantity surveyor derives from the role taken in quantifying the various resources that it takes to construct a given project, such as labor, supervision, plant and materials.

Roles and responsibilities of Quantity Surveyor

Prior to Construction:

i. Preparation of Feasibility Studies

ii. Estimating to define project budgets

iii. Analysis of the effect of design changes on the project budget

iv. Cost planning to refine the budget as the design documents develop

v. Preparation of Bills of Quantities to assist in the tender process

During Construction:

i. Provision of cost control services during construction
ii. Assessment of the contractor's progress claims
iii. Assessment of variation and delay claims
iv. Procurement of subcontractors and labor to carry out specialist trade works
v. Negotiation and settlement of accounts
vi. Regular forecasting and cost reporting
vii. Regular negotiation and agreement of payments for works carried out

2.2.1.2.5 The Project Manager

The services offered by Project Managers vary considerably, as do the qualifications and experience of the people putting themselves forward for this role. There is no defined group of services for them to undertake and only a limited number of contracts for their performance. Associated General Contractors of New Hampshire (AGCNH) (2011).

The qualifications and experience of people practicing as Project Managers may stem from the professional side of the construction industry, as in Architects, Quantity Surveyors or Engineers, or may emanate from the contracting side, such as in the management teams of major main contractors.

The package of services offered may include providing, through others, all the design and consultancy services required for the project, with or without coordinating or chasing up the administration and supervision of any relevant construction main or sub-contract(s). In other cases, a Project Manager may simply exist as an additional tier of advice and administration between the Architect/Engineer on one hand and the Employer on the other, in other words act as the Employer's agent in all contractual matters, sometimes including

the engagement and briefing of the Architect, the Quantity Surveyor and other consultants.

2.2.1.2.6 The Builder

A Builder is the professional at the center of the physical construction of buildings. The role of a builder in building development process in general, is to construct the building. The builder does this by taking charge of the activities on a building construction site in translating designs, working drawings, schedules and specifications into a physical structure (Occupational Outlook Handbook, 2011).

The builder uses his production management expertise, coupled with the necessary resources such as money, manpower, materials, and machineries, in the site execution of building projects. The builder's expertise in Building production management is the main professional input that he renders on building projects. In constructing buildings, a Builder performs the following roles:

i. Carry out Buildability and Maintainability analysis
ii. Prepare Production Management Documents
iii. Manage the production process on site.

2.3 Relevance of technical skills acquisition in Construction Industry

Medugu et al (2011) reported that training for construction craftsmen's creates opportunity to acquire relevant skills for greater productivity. They authors argued further that training of this group of personnel are imperative to the construction industry because it has been confirmed that training improve productivity. However, they assert that improvement if achieved will endure the survival and growth of an enterprise of which construction is one. Dantong et al (2011) supported that training in order way round equips individual to be current and relevant with necessary skills and knowledge to be self-reliant, which remains

oriented and creation of job opportunities. Odesola and Idoro (2014) summaries major values of training as:

Increased Productivity: Increase in skill usually results in an increment in both quantity and quality.

Heightened Morale: Possession of needed skills helps to meet such basic human needs as security and ego satisfaction.

Reduced Supervision: Trained employees can perform with limited supervision.

Reduced Accidents: More accidents are caused by deficiencies in people than by deficiencies in equipment and working conditions, proper training reduces the accident rate.

Increased Organization Stability and Flexibility: The ability of an organization to sustain its effectiveness despite the loss of key personnel can be developed only through creation of a reservoir of trained replacements. In addition flexibility is the ability to adjust multiple skills to permit their transfer to jobs where demand is greatest. However, the biggest organizational asset is trained and motivated personnel.

2.3.1 Technical and Vocational education and training

Onjewu (2005) reviews that the earliest moves towards Technical and Vocational Education and Training (TVET) in Nigeria could be traced to as far back as 1936, when Yaba Higher College was established. The 1950s saw the establishment of the technical institutes at Kaduna and Enugu, then in the 1980s, those in Ibadan and Auchi. At independence, it was noted that Nigeria's education was more biased towards the traditional literacy and academic subjects resulting to lack of respect for manual and technical achievement. Hence the Ashby commission in 1960 made recommendations for the strategic development of technical and

commercial education leading to the award of the City and Guilds London Institute (CGLI) and the Royal Society of Arts (RSA). Conscious efforts for the formulation of a national program on TVET in Nigeria commenced in 1962 with a seminar organized by the Federal Ministry of Education (FME) and sponsored by USAID. Despite these efforts, not much progress was made, hence in 1969, a National curriculum conference was held where TVET was given additional attention resulting in the formulation of the National Policy on Education (NPE), published in 1977, and revised in (1981, 1998 and 2004). A blueprint on the NPE was published in 1978-79 in which much attention was given to technical education with focus on issues like the pattern of technical education, training of artisans, craftsmen and technicians/technologists beginning at secondary schools level, training of technical teachers, encouraging women into technical education, and a clear path or avenues for advancement from one level to another. The 6-3-3-4 education and training scheme was a product of the NPE which provides for 6 years primary education, a 6 year secondary education which runs in two segments of 3 years each for the junior secondary school (JSS) and senior secondary school (SSS), and a 4 year university undergraduate program. At the JSS level, the training in integrated science and introductory technology are provided to equip learners both academically and vocationally. Further developments led to the establishment of more technical colleges and Polytechnics in order to increase graduates of basic crafts and technicians.

The National Board for Technical Education (NBTE) was established in 1977 to coordinate and advise on all aspects of technical education outside the universities' scheme. The NBTE, in order to ensure that the technical education scheme is tailored to address local skill needs, phased out the complex multiplicity of foreign crafts qualifications. These were

then replaced with the new National Technical Certificate (NTC) and National Business Certificate (NBC) along with their advanced levels. Consequently a special examination body, National Business and Technical Examination Board (NABTEB), was established in 1995 with the sole aim of administering the technical and business examinations. However, it has been proved by Grey Longe Commission (1992) that the nation's efforts on technical education had only concentrated on the production of high level manpower to the detriment of the production of low and middle level manpower mostly needed for national development and technological advancement. Awe (2004) observed that a critical analysis of the above model reveals that emphasis on training of craftsmen is embedded in the Technical College curriculum, but there is no specified path or formal centers for Vocational Training. The present orientation in most Technical Colleges shows that the focus is the preparation of students for further education in tertiary institutions. The National Policy on Education, section 4, clause 22. States that students who complete Junior Secondary school shall be streamed into the Senior Secondary, the Technical College, an out-of-school vocational center; an apprenticeship scheme in the ratios of 60:20:10:10% respectively (FGN, 2004).

The reality of what is obtainable presently indicates that, the number of Technical colleges available is grossly inadequate to absorb 20% of the junior school graduates due to the enormous capital needed to finance the practical contents of the instruction. Many of the then prestigious 'trade center's later named 'Technical Colleges' are now becoming glorified secondary schools due to under-funding and gross reduction, if not total elimination, of the practical work contents in their instructional modes. The vocational training and apprenticeship schemes specified by the NERDC is left uncontrolled and

without regulation, these aspects of manpower training are mainly left to individuals or companies; the majority of who prefer to engage experienced hands rather than get involved in the difficult, expensive and time wasting ventures of training and developing new operatives. The National Open Apprenticeship Scheme (NOAS) introduced by the National Directorate of Employment (NDE); though a good policy and more in the right direction needs to be vigorously pursued in a more organized manner; in order to meet the immediate and future much needed manpower of the nation.

2.3.2 Problems of Vocational education and training in Nigeria

Nigerian seemingly well-structured and closely monitored educational system should normally have enabled and encouraged the nation to produce sufficient number of seasoned craftspeople to meet the needs of the local industries and the challenges in the global economy but the reverse seems to be the case.

Bolaji (2007) notes that the Nigerian educational policy has not been capable of providing the needed manpower development to stir the nation's socio-economic exigencies left by the colonial masters. The policy issue though seems well laid-out but non-directional due to incessant changes. It has become a tradition to abandon policy mid-stream.

Okafor (2000) observes that there is total decline in the quality of training facilities at all levels of Nigerian education system. Many technical and vocational training institutions do not have the necessary facilities for effective teaching and learning.

Odia and Omofonmwan (2007); and Olaitan and Essien (1998) identify lack of necessary facilities such as tools and adequate workshops to hinder in-depth practical instruction. Akindoyeni et al (2005) highlighted reduced emphasis on skills instruction due to poor

funding and a misdirected focus. The industrialization of the nation is being delayed due to the inefficiency of the technical education system.

Akpan (1999) submits that technical and applied skills would not be effectively acquired by mere reading of handout and pictures of simulated tools and equipment.

Oni (2007) advocates the need for proper funding of technical and vocational education. Acute shortage of suitable, trained and qualified vocational teachers is another identified bane of Nigeria Technical and Vocational Education (Aina and Okorie, 2000).

Other challenges of the Nigerian vocational educational system as identified by Oranu (1998) include problems related to curricular which include inadequate emphasis on pre-vocational subjects at the primary and junior secondary levels, shortfall in recruitment and exodus of teachers, low student morale, examination-oriented approaches to curricular implementation and inadequate political will.

The general orientation of the Nigerian educational system seems to lay more emphasis on paper qualification than on acquisition of marketable skills; hence that trainees concentrate on accumulation of qualifications at the expense of acquisition of skills. Since the era of oil boom of the early seventies, the Nigerian construction industry has experienced progressive transformation both in terms of complexity and quantity of projects. Vast construction projects such as buildings, roads, dams, bridges, sewage and power plants has been executed (Adeniji, 1994; Akindoyeni, 2005).

Since construction technology involves both local and imported, it is imperative that workers are constantly trained and developed locally to acquire and adapt the available technologies (Nwagwu, 2004;Onjewu, 2005).

2.3.3 Skill and skills acquisition practices

Skill is defined as the necessary competencies that can be expertly applied by a worker based on dexterity, practical knowledge, theoretical knowledge and social ability (Wachira et al, 2008). Grugulis (2007) observed that skill which is possessed through qualification, experience and expertise enables a worker to fulfill the tasks associated with his respective occupation. Eneh (2010) also opined that the acquisition of vocational and technical skills enhance the relevance and functionality of an individual, promote their economic survival and vibrancy thereby playing a crucial role in the development of a society. Skills according to Usman et al, (2012) can be acquired through different forms of training- defining training as giving teaching and practice to a person or persons in order to bring him or her to a desired standard of behavior, efficiency or physical condition. Several skill acquisition practices have been identified by researchers as follows: trade group training, apprenticeship program (e.g. NDE), development training, on-the-job training, self-keeping approaches, sponsor system, time release training, action research, in-house training, vestibule schools, special courses, written materials and lecture method. Others are conference/workshop method, remedial training, role playing, job rotation, apprenticeship and coaching, sensitivity training, transactional analysis and sink or swim training (Eneh, 2010; Usman et al, 2012; Ikediashi et al, 2012; Iro et al, 2013).

2.3.4 Critical knowledge requirements of construction artisans

According to Vokes and Brennan (2013) the skill acquisition processes lead to the development of some productive knowledge necessary for certain skill behavior of workers. These critical kinds of knowledge also referred to as the elements of competence, ability and behavior determines how effective a worker can carry out a task assigned to him. Some of the critical knowledge identified by previous studies are: accuracy and precision,

timeliness/time allocation competence, continuity/sustainability awareness, speed and efficiency competence, foundational competence, practical competence, creative competence, situational awareness, integration/reflexive competence, cross-discipline awareness, work development & promotion ability, teaching competence, communication competence, resource allocation competence, collaboration and team working ability, waste avoidance and minimization ability, leadership/control competence, safety consciousness, negotiation competence, flexibility and adaptability competence (Scottish Further Education Unit, 2005; Vokes and Brennan, 2013).

CHAPTER THREE

METHODOLOGY

3.1 Research Methods and Design

This chapter describes the methods employed in achieving the objectives set out in the introductory part of this study. It deals with methods adopted in data collection and analysis. It also involves the procedures through which data for the research was collected, analyzed and techniques used to collect relevant information concerning the research. These include; location of the study area, questionnaire design (draft questionnaire and pilot study), sampling procedure, administration of the questionnaires and analysis of the responses obtained from the respondents.

3.2 The Study Area

The study area for this research was Kano state in the North West of Nigeria from the part of the Northern region. It borders withKatsina state to the north-west, Jigawa state to the north-east, Bauchi state to the south-east and Kaduna state to the south-west. It has the total population of 11,058,300 most of which are hausas, other ethnic groups constitute smaller proportion of the population (2011 Census). The state is the second largest in Nigeria after Lagos base on the preliminary census figure and ranking (2011 Census).

Kano state is divided in to three senatorial districts including Kano Central which is made up of 15 Local Government Areas, Kano North 14 Local Government Areas and Kano South with 15 Local Government Areas comprising a total of 44 (LGAs).

Kano state was chosen for this study because it is one of the most entrepreneurial, economic and commercial state in Nigeria. Therefore, people in the state engage in construction and business activities more often than other states in the North (2011 Census).

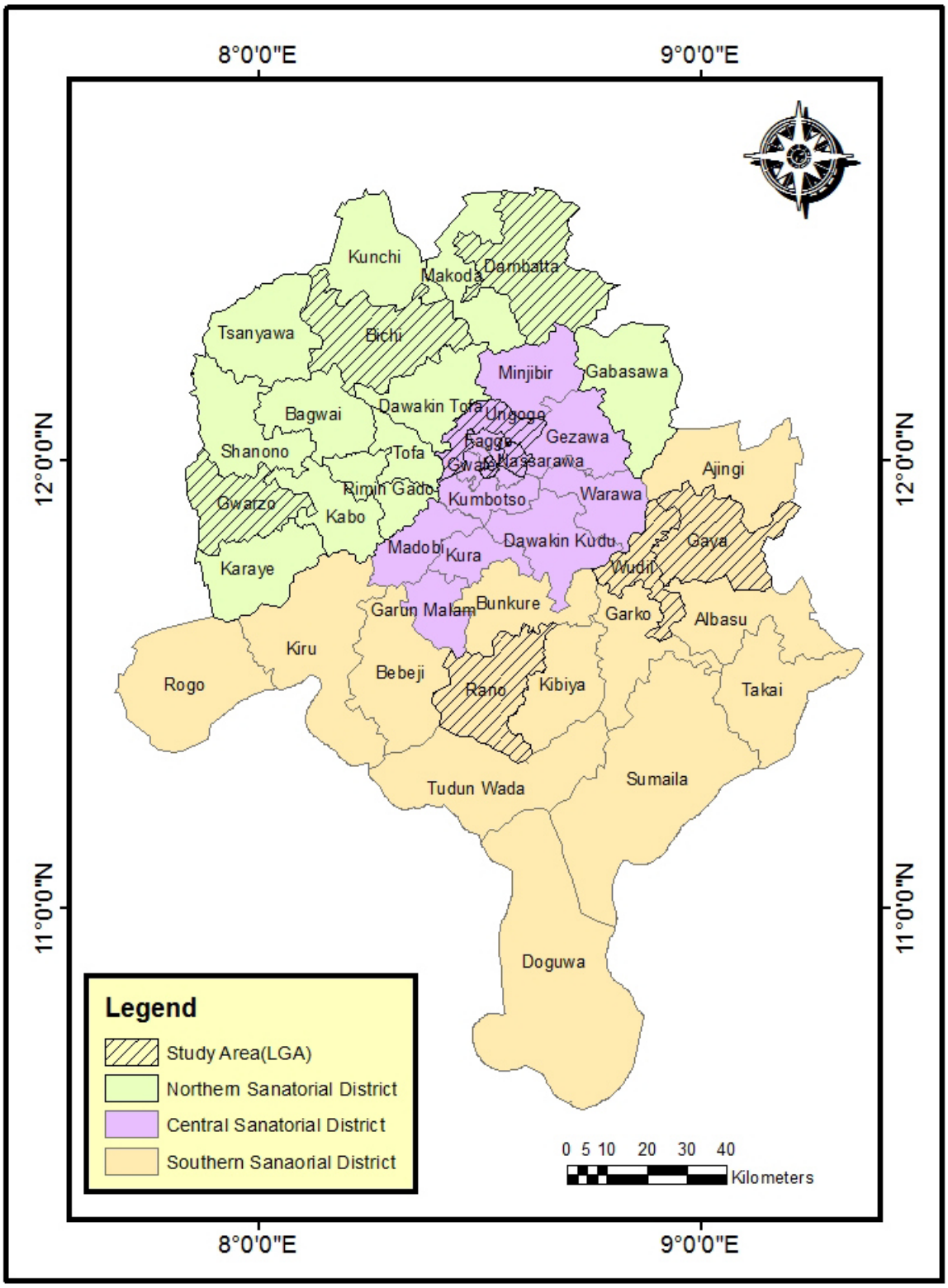

Figure 3.1 Map of Kano state with it is respective local government areas and selected areas of study

Kano state is one of the most loved cities in terms of business, economic and construction advantages in the country (2011 Census). Figure 3.1 shows three senatorial zones of Kano state with three selected local government areas from each zone representing the study area.

3.3 Questionnaire Design

Being the questionnaire as the instrument for this study, two stages were followed in it is development before the final one produced. The stages are; draft questionnaire for preliminary survey and pilot study for the preparation of the structured questionnaire.

3.3.1 Draft questionnaire for preliminary survey

The draft questionnaire evolved as a result of a literature review that has been carried out in conjunction with interviews conducted with some participants in the construction industry. Both of them (literature review and interviews) gave insights of the pattern employed in drafting the questionnaire. The questionnaire was divided in to four sections (Section A, B, C and D). Section A was designed to collect respondent's information such as characteristics, qualifications, age, sex and so on; blank space and boxes were provided for the respondents to fill-in the information. Section B was designed to ascertain the current status of the artisanal practice in Nigerian construction industry, such as respondent's years of apprenticeship, period of training, years of experience, the number of apprentices trained by respondents 10years ago and the number of apprentices who are currently undertaking training under the same respondent. While section C and D dealt with questions that bear directly with the relevant data for the research as to find out the real causes and effects or implications of artisanal depletion in Nigerian construction industry in the future. For questions in section C of Table 1, five-point Likert scale was used, ranging from strongly agree to strongly disagree. It was from the five-point Likert scale that respondents ticked to indicate their responses on

the causes of depletion. While section D of Table 2, three-point scale was used, ranging from very severe to not severe on the effects and future implications for artisan's depletion in Nigerian construction industry.

The drafted questionnaires were reproduced and used for the pilot study to enumerate the causes and effects of artisan's depletion in Nigerian construction industry from both unskilled youth and participants in the construction industry. It was also used to check the validity of the instrument in the field.

3.3.2 Pilot study for structured questionnaire

Ten copies of the drafted questionnaires were produced and distributed among professionals in building construction and unskilled youths. Both the professionals and unskilled youth were given five each. The result was assessed. The questionnaires were improved upon based on the information from the pilot study. This was the last stage of the process of the development of the structured questionnaires (See appendix A).

3.4 Study population and Sample size

3.4.1 Study population

The population of this study consists of artisans in the construction industry comprising masons, carpenters, iron benders, plumbers and others. The theoretical population of the study could not be defined because of lack of reliable statistics and demographic characteristics of the population in terms of their level of education. Hence, a purposive sampling technique was adopted to select artisans operating from the three senatorial districts of Kano state.

Three local government areas were selected from each senatorial district which gave a total of 9 Local Government Areas representing approximately 20% of the study area. From Kano central, Kano municipal, Nasarawa and Ungogo local governments were selected. Bichi,

Gwarzo and Danbatta local governments were selected from Kano North. While, Gaya, Rano and Wudil local governments were selected from Kano South.

The three Local Government Areas (LGAs) from each senatorial district were selected because, they are the first three developing Local Government Areas in the Ranking Order in terms of economic and construction activities from their respective zones and for the whole state (2011 Census).

3.4.2 Sample size

For a population that is large and unknown, Cochran (1963) developed the equation below to yield a representative sample for proportions.

$$n_r = \frac{4pq}{d^2} \quad \text{..... (3.1)}$$

Which is valid where n_r is the required sample size, p is the proportion of the population having the characteristics, q is 1-p and d is the degree of precision. For unknown proportion of the population P=0.5 which assumes maximum heterogeneity. Furthermore, we desire a 95% confidence level and ±5% precision. The resulting sample size is demonstrated in the equation below.

$$n_r = \frac{4pq}{d^2} = \frac{4(0.5)(0.5)}{(0.05)^2} = 400 \text{ minimum number of questionnare distribution}$$

Therefore, a total number of 450 questionnaires were distributed among construction artisans from these three senatorial districts having 50 copies each local government making 150 per senatorial district.

3.5 Administration of the questionnaire

A total number of 450 questionnaires were distributed among construction artisans from these three senatorial districts of Kano state having 50 copies each Local Government Area.

20 copies was distributed among masons for each Local Government Area making 180 copies for the whole population, 10 copies to carpenters for each Local Government Area making 90 copies for the whole state, 10 copies to the iron benders for each Local Government Area making 90 copies for the entire population, 5 copies to the plumbers for each Local Government Area making 45 copies for the whole population and 5 copies to the other artisans such as; electricians, painters, tillers etc. for each Local Government Area making 45 copies for the whole population. Table 3.1 shows the distribution of the research tool (questionnaire) per senatorial district.

The questionnaires distributed were collected after six weeks from the date of distribution. The literate respondents needed no assistance in the completion of the questionnaire. While the illiterate ones however were helped to complete the questionnaire by translating the questions (in Hausa language) and assisted by selecting the answers for their chosen responses. A total of 382 questionnaires were returned which represent 85% effective response rate. While the remaining 68 were not returned after several reminders and follow-ups. Table 3.2 shows details of responses for each Local Government Area.

Table 3.1 Distribution table of questionnaires per senatorial districts

Senatorial Districts	**Artisans**					**Total**
	Masons	Carpenters	Iron Benders	Plumbers	Others	
Kano North	60	30	30	15	15	150
Kano Central	60	30	30	15	15	150
Kano South	60	30	30	15	15	150
Total	**180**	**90**	**90**	**45**	**45**	**450**

Source: Field work

Table 3.2 Details of responses for each Local Government Area

Senatorial Districts	LGAs	No. Distr.	% No. Distr.	No. Returned	% No. Returned
	Bichi	50	11.11	48	10.67
Kano North	Gwarzo	50	11.11	39	08.67
	Dan Batta	50	11.11	43	09.56
	Kano Municipal	50	11.11	44	09.78
Kano Central	Nasarawa	50	11.11	36	08.00
	Ungogo	50	11.11	42	09.33
	Gaya	50	11.11	38	08.44
Kano South	Rano	50	11.11	45	10.00
	Wudil	50	11.11	47	10.44
Total	**9**	**450**	**100**	**382**	**84.89**

Source: Field work

3.6 Techniques for Data Analysis

The data used in the study were analyzed using both statistical and analytical techniques using Statistical Package for Social Sciences (SPSS). The statistical techniques used are frequencies and percentages to ascertain the current status of the artisanal practice and productivity in Nigerian construction industry. While the analytical techniques are severity and relative importance indices.

3.6.1 Severity and Relative Importance Indices

The main task of any scientific study is to establish the level of influential factors and rank them according to their severity or importance indices (Mandenhall et al 1993). Assafa (1995) continued that the factor with biggest values of severity/relative importance index rating becomes the most severe/importance and consequently, one should consider them as being the major influential factors.

Based on this ground, Relative Importance Index (RII) was adopted for analyzing the factors influencing the depletion of artisans in Nigerian construction industry. The analysis was carried out for each group of respondents, namely: masons, carpenters, iron benders,

plumbers and other major artisans in Nigerian construction industry. Five point likert scale was adopted for the relative importance index in transforming the relative indices to (strongly agree, agree, neutral, disagree and strongly disagree) based on the questionnaire designed as described by Chan and Kumaraswamy (1997).

Severity Index (SI) was employed to examine the effects and implications of the consistent depletion of artisans in Nigerian construction industry. These effects were obtained from the survey which forms the basis for designing questionnaire to seek the respondent's agreement. Three point scale was adopted in transforming the relative indices (very severe, severe and not severe) as on the questionnaire designed by Kamin et al (1998).

The indices are used to determine the rank (R) of each item. Hence, the Relative Importance Index (RII) and Severity Index (SI) calculated for each item as described by Lim and Alum (1995) are given below:

Relative Importance Index (RII) as defined by Kamin et al (1998) is computed as:

$$\text{Relative Importance Index (RII)} = \frac{5_{n1} + 4_{n2} + 3_{n3} + 2_{n4} + 1_{n5}}{AxN} \quad \text{.....(3.2)}$$

Where; $n_{1=}$number of respondents for strongly disagree

$n_{2=}$number of respondents that always disagree

$n_{3=}$number of respondents for neutral agreement

$n_{4=}$number of respondents that always agree

$n_{5=}$number of respondents for strongly agree

$A =$ highest weight (i. e. 5 in this case)

$N =$ total number of respondents

Severity Index (SI) is computed using the formula:

$$\text{Severity Index (SI)} = \frac{\sum IF}{N} \quad \text{..... (3.3)}$$

Where; I = importance of the item

F= frequency of occurrence

N= number of cases

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Data Presentation

The responses of the respondents from the questionnaire are tabulated and summarized in Tables 4.1- 4.13 which are also discussed in the light of relevant literature and reports of earlier students. Tables 4.1- 4.4 shows the background and demographic information of the respondents. While Tables 4.5- 4.9 reports the current status of artisanal practice in Nigerian construction industry from the respondent's responses. Similarly, critical factors influencing the artisanal depletion in Nigerian construction industry were identified from the questionnaire survey, presented and tabulated for the analysis of the perceptions of the respondent's agreement (Table 4.10 and Appendix 2). Furthermore, the effects and implications of the consistent depletion of artisans in Nigerian construction industry were equally sourced from the questionnaire surveyed and presented in tabular form with the aim of analyzing the respondent's agreement (Table 4.11 and Appendix 3).

4.2 Data Analysis and Discussion

Data obtained from the respondents were analyzed and discussed under this section

4.2.1 Demographic and background information of the respondents.

An analysis of the demographic data assisted in ensuring that all variables that may have an influence on the appropriateness of the data have been analyzed. Tables 4.1-4.4 present all the analysis of demographic variables of the respondents.

Table 4.1 Type of trade/craft of artisans

Description	Frequency	Percentage (%)
Masons	152	39.79
Carpenters	72	18.85
Iron benders	80	20.94
Plumbers	40	10.47
Others	38	9.95
Total	**382**	**100.0**

Source: Field work, 2017

Table 4.1 shows the type of trade for the respondents that were surveyed for this study, most engaged artisans was masons/bricklayers (39.79%), followed by iron benders (20.94%), carpenters (18.85%), plumbers (10.47%) and others (9.95%)

Table 4.2 Academic/training qualifications of artisans

Description	Frequency	Percentage (%)
None	42	10.99
PSLC	170	44.50
S.S.C.E./GTC	84	22.00
OND	50	13.09
N.C.E.	28	7.33
HND	8	2.09
Degree	0	0.00
Total	**382**	**100**

Source: Field work, 2017

Table 4.3 Relevance of respondent's academic/training qualifications to construction industry

Description	SSCE/GTCs		OND		NCE		HND		Total	
	Freq	%	Freq	%	Freq.	%	Freq.	%	Freq.	%
Construction Related	31	37	16	32	4	14	0	0	51	30
Non Construction Related	53	63	34	68	24	86	8	100	119	70
Total	**84**	**100**	**50**	**100**	**28**	**100**	**8**	**100**	**170**	**100**

Source: Field work, 2017

Table 4.2 shows academic/training qualifications of artisans. Only (2.09%) of the artisans were Higher National Diploma (HND) holders, (7.33%) were National Certificate in Education (NCE) holders, (13.09%) holds Ordinary National Diploma (OND), (22%) were Secondary School Certificate (SSCE) and Government Technical Colleges (GTCs) holders. Holders of the Primary School Living Certificate (PSLC) constitutes (44.5%) of the artisans. After obtaining PSLC they underwent apprenticeship in construction to

acquire the technical skills for their self-employment. 10.99% had no any qualification. No university degree holder was found among the artisans. This agrees with earlier reports that the curricula of the Post-Independent Nigerian education system were aimed at products to replace the departing colonial white-collar workers in the 1960s. The implication of this is that a higher percentage has only Primary School Living Certificates and might not be able to take down instructions pass to them by the supervisors accurately.

Table 4.3 Shows relevance of respondent's academic/training qualifications to construction industry. None of Higher National Diploma (HND) holder qualification is construction related, only HND in Public Admin, Arabic and others, but they were spread across various construction activities and serves as craftsmen/artisans. 14% of National Certificate in Education (NCE) holders were technically oriented, since they have acquire job skills from there colleges with NCE Technical Certificates who are liable to practice as technicians under engineering family as recognized by Council for the Regulation of Engineering in Nigeria (COREN) but still practicing as craftsmen, while 86% holds NCE in English Language, Primary Education, Biology etc. Holders of Ordinary National Diploma (OND) in relation to construction constituted only 32% who are also eligible to practice as technicians as recognized by COREN under engineering family, while 68% holds OND in Art, Science and Education but they enter in to artisanal practice in construction for their self-establishment. 37% of SSCE/GTCs holders underwent Government Technical Colleges (GTCs) and some holds Government Trade Certificates (GTC) who are purely practicing their profession as artisans since they had acquired technical skills from their colleges. They were mainly in to carpentry, plumbing and

electrical works, but none have yet registered to serve as cadre under engineering family with COREN, while 63% underwent Government Colleges and obtained only Senior Secondary School Certificate (SSCE) and also served as technical service providers in construction.

This shows high rate of desertion, malpractice in profession and abnormalities in artisanal practice and productivity in Nigeria's construction industry. Worse still, 11% of the entire respondents who had no any qualification and those with only Primary Living Certificate (PLSC) which constituted 46% of the whole population were engaged in construction activities and serves as craftsmen in different trades. Thus, violating the rules governing the professional practice set by Council for the Regulation of Engineering in Nigeria (COREN).

In general, only 8% of the respondents are eligible to serve or practice as craftsmen/artisans in construction industry on normal ground, 5% to serve as technicians while 87% were no longer qualified to take any part in construction activities based on COREN in professional practice regulation.

Table 4.4 Sex, age distribution and marital status of respondent

	Sex		Age Distribution				Marital Status		
	Male	Female	Under-20 years	20-40 years	41-60 years	Above 60 years	Single	Married	Separated
Frequency	382	0	8	103	240	31	111	237	34
Percentage (%)	100	0	2	27	63	8	29	62	9

Source: Field work, 2017

100% of the respondents are male (Table 4.4). This shows that women are not taking part in construction artisanal practice as their life trade. Only 2% of the respondents were under 20years of age, 27% were aged between 20 and 40years, 63% were aged between 41 and 60years and 8% were above 60years of age as shown in Table 4.4. Since the

respondents were technical service providers, the findings shows that younger people were keeping away from technical apprenticeship in construction as careers. The highest figure (63%) belongs to artisans of 41-60 age brackets, who joined in the professions decades ago. New entrants were minimal. Similarly, the second highest figure (27%) belongs to people of 20-40 age brackets. The whooping gap (from 63% down to 27%) between these two classes indicated that artisans were retiring too young (between 41 and 60years of age) from their careers. Again, those belongs to 41-60 age brackets and those with above 60 years of age constituted 71%and are no longer youth rather than aged or elders based on the statistical closer examination made by National Bureau of Statistics (NBS, 2014) on Nigerians,which says; people with less than 15years are children, 15-39years are youth, 40-59 adults and 60+ aged or elders. 29% were singled, 62% were married and 9% were separated (Table 4.4).

4.2.2 Depletion of technical apprenticeship in Nigerian construction industry.

The analysis of artisanal practice and depletion of technical apprenticeship was carried out to ascertain the current status of the artisanal practice and productivity in Nigerian construction industry based on the respondent's responses from the 9 selected Local Government Areas of kano state. The findings are presented in table 4.5-4.9

Table 4.5 Apprenticeship period of the respondents

Apprenticeship	Masons		Carpenters		Iron benders		Plumbers		Others		Total	%
period	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**Freq.**
1970 – 1980	128	84	59	82	69	86	31	78	30	79	**317**	83
1980 – 1990	15	10	12	17	11	14	7	18	5	13	**50**	13
1990 – 2000	7	5	1	1	0	0	1	2	2	5	**11**	3
2000 – 2010	2	1	0	0	0	0	1	2	1	3	**4**	1
2010 – 2017	0	0	0	0	0	0	0	0	0	0	**0**	0
Total	**152**	**100**	**72**	**100**	**80**	**100**	**40**	**100**	**38**	**100**	**382**	**100**

Source: Field work, 2017

Most of the apprenticeship training of the respondents (83%) took place within the period of 1970 – 1980, followed by 1980 – 1990 (13%), 1990 – 2000 (3%), 2000 – 2010 (1%)

and 0% from 2010 to date. This gave a clear picture of appalling depletion in artisanal practice and technical apprenticeship in Nigerian construction industry. Considering the magnitude of the depletion with respect to respondent's trade, iron benders scares more than any other tradeswith zero production of competent iron benders since1990, followed by carpenters and plumbers. While others such as masons, electricians, tillers, painters etc. are found to be partially depleted.

Table 4.6 Respondents durations of apprenticeship

Years of	Masons		Carpenters		Iron benders		Plumbers		Others		Total	%
Entrepreneurship	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**Freq.**
0 – 5	129	85	65	90	78	98	35	88	35	92	**342**	89.53
6 – 10	21	14	6	8	0	0	4	10	1	3	**32**	8.38
11 – 15	2	1	1	2	2	2	1	2	2	5	**8**	2.09
Above 15	0	0	0	0	0	0	0	0	0	0	**0**	0
Total	**152**	**100**	**72**	**100**	**80**	**100**	**40**	**100**	**38**	**100**	**382**	**100**

Source: Field work, 2017

None of the artisans passed 15years in apprenticeship, very few (2.09%) had sufficient patience for apprenticeship between 11 and 15years. A low fraction (8.38%) had managed to pass through apprenticeship between 6 and 10years, while the highest fraction (89.53%) had apprenticeship for between 0 and 5years to acquire the technical skills for their self-establishment.

Table 4.7 Duration of respondent's entrepreneurship (Years of experience)

Years of	Masons		Carpenters		Iron benders		Plumbers		Others		Total	%
entrepreneurship	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**Freq.**
Less than 5	1	1	0	0	0	0	2	5	1	2	**4**	1.05
6 – 10	10	7	0	0	0	0	1	2	4	11	**15**	3.93
11 – 15	29	19	14	20	0	0	6	15	5	13	**54**	14.14
16 – 30	52	34	21	29	0	0	5	13	6	16	**84**	21.99
Above 30	60	39	37	51	80	100	26	65	22	58	**225**	58.90
Total	**152**	**100**	**72**	**100**	**80**	**100**	**40**	**100**	**38**	**100**	**382**	**100**

Source: Field work, 2017

Those who had been in artisanal practice for less than 5years constituted only 1.05% of the artisans, 3.95% had been there for between 6 and 10years, 14.14% had been there for between 11 and 15years, 21.99% had been there for between 16 and 30years and 58.90%

had been there beyond 30years. Thus the youngest breeds of the artisans constituted 5%, while the older breeds constituted 95% of practicing artisans. Worse still, those who had been in the practice for above 20 years (who should have actually retired) were of greater fraction (58.90%) than those in the practice for between 16 and 30years (21.99%), which was also greater than the fraction (14.44%) for those in the practice for between 11 and 15years. The fraction further decreased to 3.95% for those in the practice for between 6 and 10years and 1.05% for those in the practice for 5years and below. Generally, this shows a graphical depiction of artisanal depletion in construction sector. Considering the respondent's trade, iron benders experienced serious decline compared to other trades, almost 100% of them had been in artisanal practice for over 30years, followed by plumbers, carpenters, masons then other trades.

Table 4.8 Number of apprentices trained by respondents last 10years

No. of apprentices	Masons		Carpenters		Iron benders		Plumbers		Others		Total	%
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**Freq.**
0 – 5	143	94	72	100	80	100	39	98	36	95	**370**	96.86
6 – 10	8	5	0	0	0	0	1	2	2	5	**11**	2.88
11 – 15	1	1	0	0	0	0	0	0	0	0	**1**	0.26
16 and above	0	0	0	0	0	0	0	0	0	0	**0**	0.00
Total	**152**	**100**	**72**	**100**	**80**	**100**	**40**	**100**	**38**	**100**	**382**	**100**

Source: Field work, 2017

About 96.86% of the artisans have had between zero and 5 apprentices in the past 10years, 2.88% managed to have between 6 and 10 apprentices and only 0.28% had between 11 and 15 apprentices in the past 10years. Generally, there was a serious depletion in the number of apprentices produced or trained by the experienced artisans looking at the fraction (96.86%) of the respondents who trained only between 0 to 5 apprentices in the last decade. Taking the respondent's trade in to cognizance, iron benders and carpenters trained no or less than 5 apprentices last 10years, hence, deplete more upon than masons, plumbers and others such as electricians, tillers painters etc.

Table 4.9 Number of apprentices now in training under respondents

No. of apprentices	Masons		Carpenters		Iron benders		Plumbers		Others		Total	%
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**Freq.**
None	143	94	72	100	80	100	39	96	36	95	**370**	96.86
1 – 2	7	5	0	0	0	0	0	0	1	5	**8**	2.09
3 – 4	2	1	0	0	0	0	2	4	0	0	**4**	1.05
5 and above	0	0	0	0	0	0	0	0	0	0	**0**	0.00
Total	**152**	**100**	**72**	**100**	**80**	**100**	**40**	**100**	**38**	**100**	**382**	**100**

Source: Field work, 2017

Almost all artisans had no apprentice during survey. Only 2.09% had between 1 and 2 apprentices and 1.05% had between 3 and 4 apprentices, mainly masons/bricklayers, plumbers and other trade (electricins). Further probing revealed that the apprentices hardly lasted 6 months in training, only to quit (field work, 2017).

4.2.3 Factors influencing depletion of artisans in Nigerian construction industry.

The analysis of factors influencing depletion of artisans in Nigerian construction industry was carried out to demonstrate how much the top ranked is more important than the next and so on using relative importance indices as described in chapter three (Appendix 2 and Table 4.10). The factors were obtained initially from the pilot study using draft questionnaire and later put in to the structured questionnaire asking respondents to rate the factors on a 1-5 likert scale

Table 4.10 Relative importance indices (RII) and Ranks (R) of factors influencing depletion of artisans in Nigerian construction industry.

Factors		Relative Importance Index for the Responses (RII)					Weighted average for responses (ARII)	Rank (R)
		Ma	Ca	Ir	Pl	Others	Average	
a.	Youth Mentality to get rich-quick	0.3047	0.1450	0.1576	0.0853	0.0743	0.1534	**3**
b.	Unconducive business environment	0.2850	0.1414	0.1524	0.0822	0.0670	0.1458	**5**
c.	Youth indolence or laziness	0.2518	0.1068	0.0827	0.0330	0.0820	0.1025	**9**
d.	Lack of respect for artisans in the society	0.2319	0.1120	0.1157	0.0759	0.0613	0.1194	**6**
e.	Lack of patronage	0.1680	0.0843	0.1000	0.0482	0.0539	0.0909	**10**
f.	Lack of vocational education and training systems in the country	0.1743	0.0827	0.0890	0.0351	0.0414	0.0845	**11**
g.	Aging of skilled crafts men in the industry	0.2503	0.0681	0.1272	0.0623	0.0555	0.1127	**7**
h.	Lack of government commitment toward skills training young	0.3021	0.1408	0.1555	0.0817	0.0681	0.1496	**4**
i.	Lack of commitments by stakeholders in construction industry towards skills training	0.1571	0.0670	0.0812	0.0330	0.0403	0.0757	**12**
j.	Introduction of new techniques and materials requiring higher skills	0.1424	0.0565	0.0665	0.0304	0.0346	0.0661	**13**
k.	Poor remuneration of skilled craftsmen	0.3084	0.1492	0.1634	0.0916	0.0785	0.1582	**2**
l.	Lack of incentives and motivation of skilled craftsmen	0.2152	0.0759	0.1230	0.0503	0.0843	0.1097	**8**
m.	No clear cut career path	0.3204	0.1529	0.1681	0.0942	0.0806	0.1632	**1**

Notes: Ma = masons, Ca = carpenters, Ir = iron benders and Pl = plumbers

Table 4.11 Analysis of Variance (ANOVA) for the respondent's (Masons, carpenters, iron benders, plumbers and other construction artisans) responses in the factors influencing depletion of artisans in Nigerian construction industry.

Factors		Diff. btw group	Diff. Within group	df (N-1)	Critical value (F)	Sig. Diff. (Sig)	Rank (R)
n.	Youth Mentality to get rich-quick	38.250	11.750	24	2.325	0.092	**3**
o.	Unconducive business environment	42.833	07.167	24	1.573	0.237	**5**
p.	Youth indolence or laziness	46.833	03.167	24	7.395	0.411	**9**
q.	Lack of respect for artisans in the society	43.667	06.333	24	4.925	0.325	**6**
r.	Lack of patronage	35.333	14.667	24	1.205	0.481	**10**
s.	Lack of vocational education and training systems in the country	30.833	19.167	24	0.965	0.543	**11**
t.	Aging of skilled crafts men in the industry	40.583	09.417	24	2.155	0.383	**7**
u.	Lack of government commitment toward skills training young	40.000	10.000	24	1.333	0.136	**4**
v.	Lack of commitments by stakeholders in construction industry towards skills training	30.833	19.167	24	0.662	0.691	**12**
w.	Introduction of new techniques and materials requiring higher skills	28.000	22.000	24	0.764	0.770	**13**
x.	Poor remuneration of skilled craftsmen	42.250	07.750	24	1.817	0.008	**2**
y.	Lack of incentives and motivation of skilled craftsmen	37.833	12.167	24	1.280	0.388	**8**
z.	No clear cut career path	38.500	11.500	24	1.116	0.004	**1**

i. No clear cut career path

The result shows that no clear cut career path was found to be the most influencing factor that leads to the depletion of artisans in Nigerian construction industry. (Average Relative Importance Index ARII = 0.1632 and less Significant Difference in respondents agreement of 0.004). Masons, Iron benders and Carpenters rated the factor very high. The study shared the same opinion with Oseghale, et al (2015) that no clear cut career path was among the major reasons youth are not getting in to artisanal practice in Nigerian construction industry.

ii. Poor remuneration of skilled crafts men

Poor remuneration of craft skilled men was rated by all categories of respondents as the second most influencing factor attributed to the depletion of artisans in Nigerian construction industry with computed ARII of 0.1582 and 0.008 Significant Difference in respondents agreement. Masons, Iron benders and Carpenters rated this factor as the most significant attribute to the depletion of artisans in Nigerian construction industry. The result is in line with the perception of Fagbele (2004) that there is no regulation guiding minimum wage for construction workers. Hence, paid anyhow.

iii. Youth mentality to get-rich-quick

Youth mentality to get-rich-quick was ranked as the third most factor influencing depletion of artisans in Nigerian construction industry (ARII = 0.1534 and Significant Difference = 0.092). Result in Table 4.10 revealed that the major responses to the factor include: Masons, Iron benders and carpenters. This indicate that the factor has direct bearing to the decline of artisanal practice in Nigerian construction industry. Indeed, the result is in agreement with the perception of Eneh (2010) that to get-rich-quick mentality for youth is one of the major attribute in the decline of technical apprenticeship in Nigeria.

iv. Lack of government commitments toward skills training for young

The result in Table 4.10 has revealed that lack of government commitments toward skills training for young became the fourth most significant reason for depletion of artisans in Nigerian construction industry with computed ARII value of 0.1496 and Sig. Diff. of 0.136. All categories of respondents believed that lack of government commitment affect the productivity and apprenticeship of artisans in Nigerian construction industry.

v. Unconducive business environment

Unconducive business environment was determined to be the fifth most influencing factor with computed ARII of 0.1458 and 0.237 significant differences in respondent's agreement. The result of the analysis shows the importance of this factor as all respondents rated it very high (RII = 0.30, 0.14, 0.16, 0.08 and 0.07) for Masons, Carpenters, Iron benders, Plumbers and others respectively. This clearly shows a strong correlation with Eneh (2010) findings on the causes of decline in technical apprenticeship in Nigeria.

vi. Introduction of new technologies and materials

Finally, the result in Table 4.11 revealed that introduction of new technologies and materials requiring higher skills became the least factor influencing the depletion of artisans in Nigerian construction industry with ARII value of 0.0661 and Significant difference in respondents agreement of 0.325. All respondents rated this factor very low. This shows that introduction of new technologies and a material does not adversely affect the productivity and technical apprenticeship of artisans in Nigeria's construction industry.

4.2.4 Effects and implications of consistent depletion of artisans in Nigerian construction industry for future development.

Effects and implications of consistent depletion of artisans in Nigerian construction industry were analyzed to figure out the most severe implications in future if the problem persists. The effects were obtained initially from the pilot study and later included to questionnaire asking respondents to rate them on a 1-3 scale. The effects were tabulated and analyzed using Severity Index (SI) as described in chapter three shown in appendix 3.

Table 4.12 Severity Indices (SI) and Ranks (R) of effects and implications of consistent depletion of artisans in Nigerian construction industry.

	Effects and Implications	Severity Indices for Responses (SI)					Weighted average for respondents (ASI)	Rank (R)
		Ma	Ca	Ir	Pl	Others		
a.	Leads to national economic retardation	1.1518	0.5052	0.5942	0.2775	0.2801	0.5618	**1**
b.	Suffering of grass root empowerment	0.4555	0.2801	0.2592	0.1309	0.1385	0.2628	**12**
c.	Leads to influx of foreign workers	1.1283	0.4948	0.5707	0.2723	0.2723	0.5477	**2**
d.	Leads to unemployment	0.4058	0.2042	0.1440	0.1414	0.1021	0.1995	**13**
e.	Falling down of both the personality and manipulative skill capability of youth	1.0890	0.4454	0.5157	0.2382	0.2461	0.5068	**5**
f.	Leads to gangsterism by street youths, ghetto youth and destitute	0.5550	0.2775	0.2644	0.1545	0.1309	0.2765	**11**
g.	Drug abuse	0.6230	0.3560	0.3848	0.2356	0.1309	0.3461	**8**
h.	Crime/violence and other vicious involvements that mar the social, cultural and economic development	1.0445	0.3979	0.4738	0.2120	0.2225	0.4701	**7**
i.	Project cost overrun	1.1204	0.4791	0.5576	0.2696	0.2644	0.6382	**3**
j.	Project time overrun	1.1047	0.4529	0.5314	0.2487	0.2565	0.5188	**4**
k.	Poor quality of finished structure	1.0785	0.4241	0.5000	0.2225	0.2382	0.4927	**6**
l.	Leads to break down of law and order	0.6047	0.2670	0.2749	0.1387	0.1335	0.2838	**10**
m.	Decline of economic survival and vibrancy	0.7958	0.3351	0.2199	0.1099	0.2670	0.3455	**9**

Notes: Ma = masons, Ca = carpenters, Ir = iron benders and Pl = plumbers

Table 4.13 Analysis of Variance (ANOVA) for the respondent's (Masons, carpenters, iron benders, plumbers and other construction artisans) responses in the effects of consistent depletion of artisans in Nigerian construction industry.

Effects		Diff. btw group	Diff. Within group	df (N-1)	Critical value (F)	Sig. Diff. (Sig)	Rank (R)
n.	Leads to national economic retardation	30.000	00.000	14	0.000	0.000	**1**
o.	Suffering of grass root empowerment	25.500	04.500	14	0.433	0.846	**12**
p.	Leads to influx of foreign workers	28.500	01.500	14	5.182	0.101	**2**
q.	Leads to unemployment	25.500	04.500	14	0.436	0.846	**13**
r.	Falling down of both the personality and manipulative skill capability of youth	23.000	07.000	14	1.314	0.426	**5**
s.	Leads to gangsterism by street youths, ghetto youth and destitute	20.000	10.000	14	0.545	0.801	**11**
t.	Drug abuse	25.000	05.000	14	0.833	0.665	**8**
u.	Crime/violence and other vicious involvements that mar the social, cultural and economic development	25.333	04.667	14	0.905	0.637	**7**
v.	Project cost overrun	26.000	04.000	14	2.600	0.185	**3**
w.	Project time overrun	29.500	00.500	14	4.538	0.353	**4**
x.	Poor quality of finished structure	18.167	11.833	14	0.853	0.607	**6**
y.	Leads to break down of law and order	23.500	06.500	14	0.603	0.769	**10**
z.	Decline of economic survival and vibrancy	19.500	10.500	14	0.743	0.681	**9**

i. National economic retardation

Retardation of the nation's economy was found to be the most severe implication in consistent depletion of artisans in Nigerian construction industry (ASI value of 0.5618 and 0.000 Significant Differences in respondent's agreement). Audu and Haruna (2013) noted that artisans contribute 60 percent of Nigeria's Gross Domestic Product (GDP), which is one of the significant fronts for sustainable economy and development of a nation. Hence, national development will be retarded with disappearing artisanship and technical skills in construction industry that are critical to development.

ii. Influx of foreign workers

Influx of foreign workers was ranked as the second most sever effect of artisanal depletion in Nigerian construction industry with ASI value of 0.5477 and Significant Differences in respondent's agreement of 0.101 as shown in Table 4.12 and 4.13. Thus, the result indicates that continuous depletion of construction artisans will leads to influx of noncitizens in construction activities.

iii. Project cost overrun

Project cost overrun was ascertained as one of the most severe implication of consistent depletion of artisans in Nigerian construction industry. The result of the analysis reflects the true perception of all respondents on the effect with ASI value of 0.5382 and Significant Differences in respondent's agreement of0.158. This clearly shows a strong correlation with (Abdullah et al 2012) that unavailability and incompetent craft skilled workers in construction project is an array of factor which causes poor workmanship and rework. Hence, leads to cost overrun.

iv. Project time overrun

Project time overrun was believed to be the fourth sever effect with persistent depletion of artisans in Nigerian construction industry (ASI value of 0.5188 and Sig. Diff. of 0.353 from Table 4.13). The result is in agreement with (Ijigah et al 2012) that insufficient craft skilled workers in construction projects leads to time overrun resulting from rework which adversely affect performance, productivity and ultimately profit margin.

v. Falling down of both the personality and manipulative skill capability of youth

Falling down of both the personality and manipulative skill capability of youth was identified as the fifth most sever effect among the future implications of artisanal

depletion in Nigerian construction industry. The result in Table 4.12 and 4.13 revealed that masons, iron benders and carpenters rated this implication very high with Average Severity Index (ASI) value of 0.5068. From the generality of respondent's agreement this effect became the fifth severe in ranking order with Sig. Diff. of 0.426. This indicates that declining of technical apprenticeship in construction sector will leads to diminishing of manipulative and personality of youth. Therefore, the finding is in line with Eneh (2010) that unemployment will no longer be addressed if adaptive skills cease to provide youth with self-sustaining job skills.

vi. Unemployment

The result in table 4.12 revealed that unemployment became the least severe effect among the implications of persistent depletion of artisans in Nigerian construction industry with ASI value of 0.1995 and 0.607 Significant Differences in respondent's agreement. All the respondents rated this effect very low. Although, it was noted by Eneh (2010) that unemployment will no longer be forestalled with continuous decline in technical apprenticeship and artisanal services. Only breakdown of law and order will be expected in such a situation.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study *"Evaluation of artisans depletion in Nigerian construction industry"* affirmed thedepletion in the production of competent skilled labour in Nigerian construction industry especially iron benders, carpenters and plumbers. 86% of iron benders, 82% of carpenters and 72% of plumbers were trained 35years and beyond. Iron benders and carpenters had no any apprentices entirely during survey. Generally, 83% of the sampled population were trained between 30 and 40years ago, the youngest breed of the artisans constituted 5%, while the oldest breeds 95% of practicing artisans who should have actually retired. In the past 10years very few people (0-5 number, constituting 96.86%) trained as apprentices, who had sufficient patience to train for 5years and above, others prefer stress-free means of making living. Almost all artisans had no apprentices during survey, excepting a few masons/bricklayers and plumbers. Worse still, only 8% of the respondents are eligible to serve or practice as craftsmen/artisans in construction industry on normal ground, 5% to serve as technicians while 87% were no longer qualified to take any part in construction activities based on Council for the Regulation of Engineering in Nigeria (COREN) recommendations in professional practice. This shows high rate of desertion, malpractice in profession and abnormalities in artisans production, practice and apprenticeship in Nigerian construction industry.

The most significant factors influencing depletion in the rate of apprenticeship and available skilled labour in Nigerian construction industry as shown in Table 4.10 and 4.11 includes;

1) No clear career path with ARII value of 0.1632 and 0.004 Significant Differences
2) Poor remuneration of skilled craftsmen with ARII of 0.1582 and 0.008 Sig. Diff.
3) Youth mentality to get-rich-quick, ARII of 0.1534 and Significant Differences in respondent's agreement of 0.092
4) Lack of government commitment toward skilled training for young, ARII of 0.1496 and 0.136 Sig. Diff. in respondents agreement
5) Unconducive business environment with computed ARII of 0.1458 and Significant Differences in respondent's agreement of 0.237

The study also revealed the most severe effects and implications of consistent depletion of artisans to Nigerian construction industry in future which include;

1) National economic retardation with ASI value of 0.5618 and Significant Differences in respondent's agreement of 0.000
2) Influx of foreign workers with ASI value of 0.5477 and 0.101 Sig. Diff.
3) Project cost overrun with computed with ASI value of 0.5382 0.185 Sig. Diff.
4) Project time overrun, ASI value of 0.5188 and Significant Differences in respondent's agreement of 0.353
5) Falling down of both the personality and manipulative skills capability of youth, ASI value of 0.5068 and 0.426 Significant Differences

Similarly, based on age group as categorized by NBS, the findings reveals aging workforce in construction artisans as over 70% of the artisans were above 40years old. Hence aged or adult no more youth, whereas entrance of young people of between 15-30years in to the construction trades were very low.

5.2 Recommendations

It is not unusual for artisans to deplete in construction industry, but it is anti-development to fail to address the situation. In recognition of the important role of construction artisans in the development of a nation, it is recommended that:

1) Trade union should be made specific to construction workers, so that wages can be negotiated with respect to their allocated minimum wage.
2) Stakeholders should evolve skill acquisition policies which involves public-private partnership in developing relevant skills which promote productive knowledge and high level of competences and a sufficient quality of skilled workers to match skills supply with the demand of the construction industry.
3) Based on the factors which influences the depletion of artisans in Nigerian construction industry, government should develop national schemes for the rehabilitation of vocational education and adequately equipped the Nigerian vocational education centers with relevant teaching aids.
4) Based on the findings on respondents academic/training qualifications, the professional bodies; Nigerian Society of Engineers (NSE), Council for the Regulation of Engineering in Nigeria (COREN) should enact enabling legislation that will make it mandatory for any interested individual in construction to obtain at least minimum and relevant qualification in his area of interest as recommended before he/she recognized as technical service provider, especially at craft level (craftsmen/artisans) in construction sector.

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APPENDIX 1 (a)

INTRODUCTION TO QUESTIONNAIRE

BAYERO UNIVERSITY KANO

Faculty of Engineering

Civil engineering Department

M.Eng Construction Management

Dear Respondent,

Evaluation of Artisans Depletion in Nigerian Construction Industry

I am a post graduate student of the department of civil engineering, Bayero University Kano undertaking an M.Eng research. I wish to request for your participation in this study by completing this questionnaire. The research is being undertaken to find out from artisans, unskilled youths and professionals as to what extent is the depletion of artisans affecting the Nigerian Construction Industry. The questionnaire is divided into four sections (A-D). Section A was designed to obtain background information of the respondents, Section B to examine the current status of the artisanal practice and productivity in Nigerian construction industry, Section C was made to determine the factors influencing the artisanal depletion in Nigerian construction industry and Section D to obtain the effects and implications of artisans depletion in Nigerian construction industry.

Please, note that the data obtained from you will be treated with strict confidence and will be used for research purposes only. Be assured that NO record(s) would bear your name or company's name.

Thank you very much for your valuable time.

Yours Sincerely,

AbdulazizDayyabu.

(08032980208)

APPENDIX 1 (b)

QUESTIONNAIRE FORM

SECTION A: BACKGROUND INFORMATION OF THE RESPONDENT

Please respond to the following by either writing in the blank space provided or ticking the appropriate box.

1. Which of the following best describes your designation?

   Mason☐ Carpenter ☐Iron bender☐ Plumber ☐ Others ☐

2. What is your Highest Qualification?

   Non ☐PSL.Cert☐ SSC/GTC ☐ OND ☐ NCE☐HND ☐ Degree ☐Others or any informal Qualification, Please Sspecify……

3. Is your academic/training qualification construction related?
   Yes ☐ No ☐

4. What is the name of your Company/Firm?(Optional)

Name: ……

5. Sex. M☐ F☐

6. Marital Status. Single ☐Married ☐ Separated ☐

7. How old are you now?

   Under 20 years ☐ 21-40 years ☐ 41-60 years ☐ Above 60 years ☐

SECTION B – ARTISANAL PRACTICE & DEPLETION OF TECHNICAL APPRENTICESHIP

1. During which period were you trained?

   1970-1980 ☐

   1980-1990 ☐

   1990-2000 ☐

   2000-2010 ☐

   2010-2017 ☐

2. How many years it took you to become fully skilled?

   0-5 ☐ 6-10 ☐ 10-15 ☐ Above 15 ☐

3. How many years have you been practicing your trade to date?

   Less than 5 ☐ 6-10☐ 11-15☐16-30☐ Above 30☐

4. How many apprentices have you trained last 10 years?

   0-5☐

   6-10 ☐

   11-15 ☐

   16 and above ☐

1. How many apprentices are currently undertaking training under you?

   Non ☐

   1-2 ☐

   3-4 ☐

   5 and above ☐

SECTION C– FACTORS INFLUENCING DEPLETION OF ARTISANS

Below are some of the major factors influencing the **depletion** of artisans in Nigerian construction industry. Using the five point Likert scale. **Please, tick the appropriate column** to indicate the extent of your agreement or disagreement with the following statement.

Relative importance: SA-Strongly agree, **A**- Agree, **N**- Neutral, **SD**-Strongly disagree, **D**-Disagree

Table 1: Factors influencing Depletion of Artisans in Nigerian construction industry.

Factors	Relative Importance				
	SA	**A**	**N**	**D**	**SD**
a.Youth mentality to get-rich-quick					
b. Unconducive business environment					
c. Youth indolence or laziness					
d. Lack of respect for artisans in the society					
e. Lack of patronage					
f. Lack of vocational education and training system in the country					
g. Aging of skilled craftsmen in the industry					
h. Lack of government commitment toward skills training for young					
i. Lack of commitment by stakeholders in construction industry toward skills training					
j. Introduction of new technologies and materials requiring higher skills					
k. Poor remuneration of skilled craftsmen					
l. Lack of incentives and motivation of skilled craftsmen					
m. No clear cut career path					

Please state and specify Any Other influential factor from your experience Not mentioned here……

……

SECTION D– EFFECTS AND IMPLICATIONS OF ARTISANS DEPLETION

Below are questions related to the effects of depletion of artisans in Nigeria Indicate the severity of artisans depletion in Nigerian construction industry by **ticking the appropriate column** using these scale: **VS**- very severe, **S**- severe, and **NS**- Not Severe.

Table 2: Effects of Artisans Depletion in Nigerian construction industry

Effects of Artisans Depletion	**Severity Scale**		
	VS	**S**	**NS**
a.Leads to national economic retardation			
b.Suffering of grassroots empowerment			
c.Leads to influx of foreign workers			
d. .Leads to unemployment			
e.Falling down of both the personality and manipulative skill capability of youth			
f.Leads to gangstersim by street youth, ghetto youth and destitute			
g.Drug abuse			
h.Crime/Violence and other vicious involvements that mar the social, cultural and economic development			
i.Project Cost Overrun			
j. Project Time Overrun			
k. Poor Quality of finished Structure			
l.Leads to breakdown of law and order			
m.Decline of economic survival and vibrancy			

Please state and specify from your experience Any Other effects Not mentioned here

……

……

……

……

……

……

Thank you very much for your valuable time.

APPENDIX 2

Table 4.10 Factors influencing depletion of artisans in Nigerian construction industry.

Factors	Masons					Carpenters					Iron Benders					Plumbers					Others				
	Relative Importance					Relative Importance					Relative Importance					Relative Importance					Relative Importance				
	SA	A	N	D	SD	SA	A	N	D	SD	SA	A	N	D	SD	SA	A	N	D	SD	SA	A	N	D	SD
a. Youth Mentality to get rich-quick	59	39	31	15	8	27	21	13	8	3	31	19	16	8	6	23	6	5	3	3	16	7	7	5	3
b. Unconducive business environment	45	43	33	19	12	24	22	15	6	5	29	18	17	7	9	20	7	7	2	4	14	6	6	4	8
c. Youth indolence or laziness	40	36	25	11	40	13	11	13	21	14	4	5	13	21	37	1	2	3	7	27	1	3	7	9	18
d. Lack of respect for artisans in the society	24	37	36	12	43	14	14	15	14	15	11	12	23	15	19	16	10	3	5	6	11	6	7	3	11
e. Lack of patronage	11	20	31	43	47	6	5	13	24	24	8	8	18	19	27	7	4	3	6	20	9	3	7	6	13
f. Lack of vocational education and training systems in the country	9	14	35	33	61	2	7	22	14	28	5	7	14	21	33	1	4	2	7	26	2	4	6	9	17
g. Aging of skilled crafts men in the industry	41	13	46	31	21	1	6	12	24	29	16	17	16	16	15	8	7	9	8	8	7	7	8	3	13
h. Lack of government commitment toward skills training young	59	36	33	15	9	25	22	11	9	5	30	18	17	9	6	21	7	4	3	5	14	6	5	8	5
i. Lack of commitments by stakeholders in construction industry towards skills training	3	9	32	45	63	1	3	10	23	35	3	6	12	21	38	1	2	3	7	27	1	3	8	10	16
j. Introduction of new techniques and materials requiring higher skills	1	3	29	49	70	1	1	2	25	43	0	3	6	27	43	11	1	9	2	8	2	1	1	15	19
k. Poor remuneration of skilled craftsmen	60	41	30	14	7	29	22	12	7	2	34	20	15	6	5	28	5	3	2	2	18	8	6	4	2
l. Lack of incentives and motivation of skilled craftsmen	13	41	32	20	46	1	4	22	13	32	15	16	17	13	19	1	7	11	9	12	18	12	4	3	1
m. No clear cut career path	64	44	31	10	3	32	21	11	7	1	36	22	13	5	4	29	6	2	2	1	18	10	6	2	2

Source: Field work, 2017

APPENDIX 3

Table 4.12 Effects and future implications in consistent depletion of artisans in Nigerian construction industry.

Effects and Implications of the depletion	Masons			Carpenters			Iron benders			Plumbers			Others		
	Frequency of Severity			Frequency of Severity			Frequency of Severity			Frequency of Severity			Frequency of Severity		
	VS	S	NS	VS	S	NS	VS	S	NS	VS	S	NS	VS	S	NS
a. Leads to national economic retardation	139	10	3	54	13	5	68	11	1	30	6	4	32	5	1
b. Suffering of grass root empowerment	3	16	133	9	17	46	0	19	61	1	11	28	11	12	15
c. Leads to influx of foreign workers	132	15	5	51	15	6	61	16	3	28	8	4	30	6	2
d. Leads to unemployment	1	1	150	2	2	68	2	16	17	0	14	26	0	1	37
e. Falling down of both the personality and manipulative skill capability of youth	122	20	10	39	20	13	47	23	10	19	14	6	23	10	5
f. Leads to gangsterism by street youths, ghetto youth and destitute	17	26	109	6	22	44	1	19	60	5	9	26	2	8	28
g. Drug abuse	10	66	76	20	24	28	21	25	34	16	18	6	2	8	28
h. Crime/violence and other vicious involvements that mar the social, cultural and economic development	111	25	16	28	24	20	35	29	18	14	14	11	17	13	8
i. Project cost overrun	130	16	6	47	17	8	58	17	5	27	9	4	27	9	2
j. Project time overrun	126	18	8	41	19	12	51	21	8	22	12	5	26	8	4
k. Poor quality of finished structure	118	24	10	34	22	16	44	23	13	16	14	9	21	11	16
l. Leads to break down of law and order	2	75	75	7	6	49	2	21	57	1	11	28	3	7	28
m. Decline of economic survival and vibrancy	75	2	75	13	30	29	1	2	77	1	0	39	27	10	1