DETERMINANTS OF TECHNICAL CAPABILITIES AMONG ARTISANS IN BUILDING CONSTRUCTION INDUSTRY IN LAGOS STATE, NIGERIA

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Abstract- ***Housing is one of the basic necessities of life alongside with food and clothing. Building a good house that meets the needs and aspirations of house owners requires excellent technical know-how of artisans. This study therefore examined the determinants of technical capabilities of artisans with a view to recommending to the stakeholders in building construction industry, the best way to improve technical capabilities of artisans in the study area. Multi-stage sampling technique was used to sample artisans, using 210 sets of questionnaires, out of which 179 sets were retrieved and found to be analyzable. This represents a response rate of 85.2%. While demographic characteristics of the respondents were processed using the frequency counts, percentages and mean, their technical capabilities were captured with the use of Ordered Logistic Regression. Results showed that about 59.8% of the sampled artisans were Nigerians, out of which only 26.3% of them were certificated by the appropriate government agencies. Both internal (wald = 7.63) and external (wald = 7.39) factors significantly influenced artisans' technical capability in the study area.***
Keywords: Artisans, Building Construction, Technical Capability

I. INTRODUCTION

The building construction industry in any nation is a complex sector because it comprises large number of parties such as owners (clients), constructors/artisans, consultants and other regular stakeholders (Enshassi, Mohamed and Abushaban, 2009). Despite the complexity of the industry, it plays a major role in the development and achievement of society's goals. It is one of the largestindustries and contributes about 10% to the Gross National Product (GNP) in industrialized countries (Navon, 2005). Technical Capability (TC) is a process of assembling or accumulating necessary skills among artisans in the building construction sector of any nation. The sector is very important because it is expected to provide high quality buildings not only for economic growth of a nation but also for ensuring aesthetic beauty of a country. It confers product leadership and competitive advantage on individuals, firms and nations. Thus, for the rapid economic growth and development of any nation, the technical capability of artisans must grow like crops, or increase like manufactured goods (Marcelle, 2003).

Technical Capability naturally resides in individuals with the inclination, training and experience which enable them to cope with certain portion of the overall body of useful knowledge called technology (Tandon, Chakraborty and Shroff, 2012). This is usually acquired within an institution or organization. These institutions or organizations as described by Enos (1991) are bodies that bring the individuals with different talents and skills together through which they could express their potentials. This integrating institution may be a capitalist firm, a family enterprise, a co-operative, a commune or a state-owned agency. The outcome of this process is seen as the most vital component being the driving force that could propel the skilled individuals in an organization to fully exploit their talents. Therefore, technical capability of the artisans in building construction industry is very important while looking at the various importance of housing to human society.

In spite of the importance accorded to housing as enunciated above, access to decent housing has been a challenge as the technical capabilities of the artisans particularly in developing countries like Nigeria has been described by extant scholars to be abysmally low, while compared to those in developed countries (Oruwari, Jev and Owei 2002). According to Siyanbola, Egbetokun, Olamide, Aderemi and Sanni (2012), one of the most significant challenges that developing economies have to face in relation to the attainment of competitive advantages in key economic sectors, especially in the construction industry is the technical competence of major stakeholders in the industry. The United Nations (2005) noted that despite the increasing globalization of technology, the involvement of developing countries in producing new technologies and

innovations is almost negligible across all sectors.

A review of extant literature has affirmed an increased number of building collapse in Nigeria (Isaac, 2012). Similarly, Ayedun, Durodola and Akinjare (2012) examined the causes of building collapse in Nigeria and discovered that there was a positive correlation between poor qualities of input resources for building construction and increased reported cases of building collapse. For instance, a two-storey building collapsed along IyaGbogbo Street in the Alimosho Local Government Area of Lagos State in November, 2007. Also, a six-storey building along Imam Ligali Street in the Lagos Island of the state was reported to have collapsed in 2006. Equally, two sets of five-storey buildings in the Lagos Mainland were reported to have collapsed in 2005 (Adegboroye, 2006). The aftermath of these incidences left fifteen people injured and one person died. In 2014, the National Emergency Management Agency (NEMA) confirmed the reported death of 50 people at the six-storey building that served as Foreign Guest House of the Synagogue Church of All Nations, Ikotun, in the Alimosho Local Government Area of Lagos State.

In each of these cases, investigations usually reveal structural failures which are always linked to poor project planning and poor quality of workmanship (Oloyede, Omoogun and Akinjare 2010). Also, John, Faremi and Lawal (2016) have attributed frequent building collapse in Lagos State to poor project performance in the construction industry which they directly attributed to low technical capability of indigenous artisans practicing in the industry. Kuroshi (2015) also noted that artisans/craftsmen in the Nigerian building construction industry lack the necessary knowledge, skills and experience required to undertake their duties competently. With numerous scholarly writings on building constructions in areas where there has been frequent building collapse like Lagos State, little or none of these articles have been directed to address determinants of technical capability of artisans working in building construction industry, especially in Lagos State, Nigeria. Hence, the need for this study.

The study therefore assessed the various factors that influenced artisans' technical capability in building construction industry with a view to unravelling both the promoters and the inhibitors of technical know-how in building construction industry.

II. LITERATURE REVIEW

Faridi and El-Sayegh (2006) reported that shortage of manpower, poor supervision and poor site management, unsuitable leadership; shortage and breakdown of equipment and among others in the construction industry contribute to construction delays in the United Arab Emirates. Hanson, et al, (2003) examined causes of client dissatisfaction in the South African building construction industry and found that conflict, poor workmanship and incompetence of contractor/artisans to be among the major factors which negatively impact on project performance. Mbachu and Nkando (2007) established that quality and attitude to service are some of the factors constraining successful project delivery in South Africa.

These studies and several others have been undertaken to assess factors influencing artisans' performance in the building construction industry, and these studies have identified a myriad of factors responsible for poor performance in building construction sector in developed countries such as Canada (Jergeans, 2009), United Kingdom (Chan, 2002), New Zealand (Durdyev and Mbachu, 2011) and in developing countries such as Nigeria (Olomolaiye, *et al.*, 1987), Ameh and Osegbo, 2011; Adamu, *et al.*,2011), Indonesia (Kaming, *et al.*, 1997; Alwi, 2003), Malaysia (Kadri, *et al.*, 2005) Palestine (Enshassi, *et al.*, 2007), Kuwait (Jarkas and Bitar 2012); Thailand (Makulsawatudom and Emsley, 2001) and Uganda (Alinaitawe, *et al.*, 2007). These scholars broadly classified factors influencing artisans' performance into external and internal factors. The internal factors that negatively affect

performance according to the scholars include material shortages, lack of work experience, lack of surveillance on workers, misunderstanding between artisans and foremen, drawings and specification alterations during project execution, payment delay, inspection delay during working hours, workers' disloyalty, working seven days per week without holiday and tools/equipment shortage. Equally, Makulsawtudom and Emsley (2001) who carried out their study on Thailand, identified factors such as lack of materials, supervision delays (instruction time), lack of tools and equipment, rework, absenteeism and interference as major factors capable of affecting artisans' performance. Kaming, *et al.,* (1997) identified lack of materials, rework, absenteeism, interference due to work mismanagement and lack of equipment and tools, as factors inhibiting craftsmen's performance in the Indonesian building construction industry. In a comparative assessment of artisans' productivity problems in Indonesia, Nigeria, United Kingdom and United States, Kaming, *et al.,* (1997) observed that lack of materials is a common problem in the four examined nations. In the study on Nigeria, Olomolaiye,*et al.,* (1987) identified problems such as lack of materials, lack of tools, duplicated efforts (repeated work), instruction delays, absenteeism,and incompetence of foremen, among others, to have negatively affected the performance of artisans. Also, a later study undertaken by Adamu (2011) revealed that a number of factors such as low wages; which was ranked the highestwere among factors influencing artisans' performance, which was closely followed by lack of materials as well as unfriendly working atmosphere at construction sites.

The technical skill acquisition for artisans, also known as technical education is enshrined in the Nigerian national policy on education. This is simply defined as qualitative technological human resources development programmes directed towards a national pool of skilled and self-reliant craftsmen/artisans, technicians and technologists in technical and vocational education fields (Okoye and Arimonu, 2016). In addition to general education, technical education involves the study of technologies and related sciences for the acquisition of practical skills, attitudes, understanding and knowledge, relating to occupations in various sectors of economic and social life (FGN, 2004). Technical education is a form of education which is primarily focused on preparing people for employment in recognized occupations (Okoro, 1993; Momoh, 2012;Okoye and Arimonu, 2016). Okoye, Ezeokonkwo and Ezeokoli (2016) define it as a post-basic education in form of vocational training programme with the major purpose of producing artisans. Vocational or technical education is a form of training designed for various categories of artisans, which involves general knowledge in addition to technical skills in related occupations, usually acquired through practical transmission of skills and know-how, leading to attitude modification and understanding in respect of appropriate trades in various sectors of economy (Tappin, 2002; UNESCO, 2005). David (2008) views vocational and technical education as a skill-based programme, designed for sub-professional in the educational ladder; as it is usually based on a specific vocation, therefore, knowledge or skills acquired prepares the trainees for higher responsibility and enhances such artisans' performance in the field of work. To be specific, vocational or technical education is meant to facilitate the acquisition of practical and applied skills as well as basic scientific knowledge of artisans. According to Uwaifo (2007), technical education is the training programme designed for technically-oriented individuals who are expected to be initiators, facilitators and implementers of technically-developed products of any nation. This training is aimed at enhancing the performance of Nigerians on the need for them to be technically-literate that could eventually lead to a self-reliance and sustainability of any nation. He argues that technical education is expected to contribute to various sectors of the economy, especially in electrical and electronics, metal work, mechanical/automobile, building, and woodwork technology, among others. He

submitted that technical education as a practical-oriented progarmme, is expected to make a unique contribution to the development of any nation, because of its content and approach.

Training programmes for artisans are instruments for improving performance in the building construction sector (John *et al.,* 2016). This is because artisans such as carpenters/joiners, bricklayers, plumbers, electricians, iron benders, painters and tillers require up-to-date knowledge to undertake their various trade activities (Dantong*et al.,* 2011). Benenome (2010) posits that continuous advancements in science and technology in the past decades have rendered a number of ways in which activities are carried out in the building construction industry to be obsolete; therefore, there was a need for constant trainings for all the practitioners in the sector, especially for the operatives, such as artisans and other stakeholders. Essentially, Onuka*et al.,* (2012) observed that the absence of staff training programmes in the building construction industry often manifests tripartite problems of incompetence, inefficiency and ineffectiveness. They argued that with the increased predicted level of output in the Nigerian construction industry, it was going to be difficult for the industry to boast of competent workforce to meet its rising skills demand for building construction works and services. The World Bank (2012) ranked Nigeria as the fifth largest infrastructural stock in Africa, with the average growth rate of capital stock, which was put at about 12% per annum, since year 2000. Therefore, artisanship knowledge and services are crucial to the development of any nation; including Nigeria and this can only be acquired through grassroots empowerment (Njoku, 2007). Such efforts, according to experts are capable of rescuing street and ghetto youths, especially the homeless and unemployed from drug abuse, gangsterism, crime/violence and other social vices (Abassa, 2003; Umar, 2008 and Undiyanudeye, *et al.*, 2015). This is because it has been argued that in any society, artisanship skills are primarily acquired through five media, namely; apprenticeship scheme,vocational training centres, education institutes, accumulated career experiences and short-training courses (Encyclopedia.com, 2003). Technical training,otherwise known as apprenticeship scheme, is an age-long indigenous approach to human capital development efforts, which usually has a long-term effect on schooling and out-of-schooling programmes (Obidi, 1995). Bamisile (2004) argues that according to Nigerian Education Policy, artisans in the Nigerian building construction industry are generally certified through trade cadre, vocational training institutes and technical colleges. This set of individuals was usually examined at the end of the apprenticeship period by the City and Guilds of London Institute (CGLI) and Trade Test Certificate of the Federal Ministry of Labour and Employment, until recently when such responsibility was transferred to the National Board for Technical Education (NBTE).

According to Oranu (1992), the history of the Nigerian technical education system cannot be discussed without referring to the various examinations and their regulatory bodies. Through their syllabi, three examination bodies dictated the curriculum content and method of evaluation. For instance, the Royal Society of Arts (RSA) and the City and Guilds of London Institute (CGLI) started and controlled the craft-level technical education, through the conduct of examinations incommercial and technical-based subjects. Later, the West African Examination Council (WAEC), a multi-national examining body which was established in 1952 to conduct examinations for candidates in West Africa, comprising; Gambia, Ghana, Liberia, Nigeria and Sierra-Leone;was given the mandate to conduct technical examinations alongside the Royal Society of Arts and City and Guilds of London Institute.Following the Nigerian independence in 1960, West African Examination Council assumed the responsibility of acting as the agent of Royal Society of Arts and the City and Guilds of London Institute. The objectives of both examination bodies were to certify students in

technical institutions (formerly trade and vocational centres); however, only the theoretical aspects of their training were examined by City and Guilds of London Institute and Royal Society of Arts. According to Awe (2012), by the virtue of the fact that only theoretical aspect of the training was examined by these bodies, it was noted that their curricula were not structured to meet the specific developmental needs of Nigeria. In addition, the trainees were given scanty general education to supplement their chosen trades. In December 1972, the West African Examination Council (WAEC) took over the conduct of these examinations from the Royal Society of Arts (RSA) and City and Guilds of London Institute (CGLI). Within this structure, the federal government approved that the certification of the City and Guilds of London Institute (CGLI) and Royal Society of Arts (RSA) be replaced with a qualification known as the Federal Crafts Certificate (FCC) hitherto issued to the graduates of technical colleges. The Federal Crafts Certificate incorporated practical aspects of the trades examined by the City and Guilds of London Institute and Royal Society of Arts. After the take-over of the responsibilities of City and Guilds of London Institute (CGLI) and Royal Society of Arts (RSA) in 1978, the West African Examination Council introduced practical sessions into its examinations. However, more general education was not introduced into the curriculum of various trades offered in the technical colleges; thus, the graduates of these colleges were unable to secure admission in tertiary institutions. For this reason, the image of technical education remained tarnished as a programme for academically-weak students. Thereafter, the National Council on Education (NCE) approved the national curricula and module specifications proposed by the National Board for Technical Education (NBTE) for technical/commercial studies certificate programmes in technical colleges in 1985, with the objective of reforming the technical education in Nigeria, which includes: the mandatory inclusion of general courses in English language and communication, mathematics, integrated physical science and social studies into the technical education curriculum; enrolment of industrial staff and other categories of itinerant craftsmen/artisans at the technical colleges to take specific trade modules relevant to their fields; integration of trade theory and practice in form of trade calculation and trade science into the curriculum. Further to the restructuring, the National Business and Technical Examination Board (NABTEB), was established in 1992 and it introduced a new scheme in 1995 to replace the 1985 reform. To this end, the National Business and Technical Education Board was charged with the responsibilitiesof conducting technical and business examinations, hitherto conducted by the Royal Society of Arts (RSA), City and Guilds of London Institute (CGLI), which were later transferred to the West African Examination Council (WAEC) in Nigeria. The body based its examinations on two parallel syllabi –National Business and Technical Examination (NABTEB) modular curriculum and the modified West Africa Examination Council (WAEC) syllabi and offers examinations in four trade areas, which include construction trades, engineering trades, miscellaneous trades and business studies. One of the main objectives of the National Business and Technical Examination Board(NABTEB) was to make qualification of the body; the National Technical Certificate (NTC) equivalent to that of the Senior Secondary School Certificate, so that the graduates of technical colleges could secure admission into relevant tertiary institutions, such as polytechnics and universities. In order to achieve this novel feat, the National Business and Technical Examination Board (NABTEB) syllabus in the area of building construction was structured to cover six basic areas, namely; bricklaying and concrete work, carpentry and joinery, draughtsmanship and craft practice, machine woodworking, building/engineering drawing as well as plumbing and pipe fitting. For the purpose of certifying candidates, the NABTEB examinations are broken down into three thematic areas of multiple choice, essay and practical sessions. For, practical session, the

candidates are expected to carry out practical demonstration of the appropriate aspects of the syllabus that is examined within six and half hours. To ensure effectiveness of the examination,candidates are not issued with the question papers until the date of the practical examination. However, a list of materials and other requirements for the practical are sent to the institutions, at least, one month before the date of the practical examination. At the end, candidates are awarded the National Technical Certificates, based on a six-point grading scale of 'A' to 'F'.

This development, was therefore, meant to remove the previously observed problem of low esteem accorded to the graduates of technical colleges who could not enrol for further education due to inadequacies in the content of their theoretical education. General education subjects and related trade subjects are now made compulsory to all candidates in consonance with their chosen trades. In line with this development, the National Joint Admission and Matriculation Board (JAMB) has since accepted the National Technical Certificate (NTC) and the National Business Certificate (NBC) as being adequate for the purpose of enrolling for courses in the various higher institutions across the country. To this end, the Nigerian seemingly well-structured and closely monitored educational system should normally have enabled and encouraged the nation to produce sufficient number of seasoned craftsmen/artisans to meet the needs of the local building construction industry and to rise to the challenges in the global economy. Unfortunately, the reverse seems to be the case as noted by(Bolaji, 2007). According to him, the Nigerian technical educational policy has not been able to provide the needed manpower required for its development and to stirits socio-economic exigencies. He argues that that the nation's technical educational policy seems well laid-out, but lacks direction due to incessant changes and high level of internal inconsistencies. Okafor (2000) also observes that there is a total decline in the quality of training facilities at all levels of Nigerian educational system; especially in the area of technical and vocational training.Equally,most technical and vocational training institutes across Nigeria do not have the necessary facilities for effective teaching and learning; as necessary facilities such as tools and adequate workshops that could engender in-depth practical instructions were non-existent (Odia and Omofonmwan, 2007).

III. METHODOLOGY

The study was conducted in Lagos State, Nigeria. The choice of Lagos State as a study area was conceived out of the fact that frequent building collapse was regularly reported in the state. This calls for research into the factors that influence artisans' technical competence in the building construction sector of the state. The study was limited to registered artisans such as bricklayers, electricians, painters, plumbers, carpenters, ceramic tilers and iron-benders that were registered by the Lagos State Ministry of Employment and Wealth Creation.

Multi-stage sampling technique was employed for the study. The first stage involved stratification of all the twenty (20) Local Government Areas (LGAs) in Lagos State into low, medium and high residential density zones. This was done in line with Oyetola and Babatunde (2008) and Nabegu (2010) whosesubmissionsaffirmed that Local Government Areas (LGAs) with population of 20-10,000 persons/$km^2$to be low density zone and those with population of 10,001-20,000 persons/km^2as medium densityzone, while those with 20,001 and above was regarded as high density areas.At the second stage, one Local Government Area was selected from each of the residential density zones, through balloting without replacement. This is in line with the work of Mosi (2001) that carried out similar study in Philippines Island. On account of this, Eti-Osa, Lagos Mainland and Shomolu Local Government Areas were selected for the study. At the third stage, systematic sampling technique of every 10^{th} artisan in the compendium of artisans compiled by the Lagos State Ministry of Employment and Wealth Creation was selected.

In all, 210 artisans were sampled using a structured questionnaire, out of which 179 copies were retrieved and found analysable, representing 85.2%. Data collected were analysed with the use of Ordered Logistic Regression and described with mean frequency and percentages.

IV. RESULTS AND DISCUSSION

Nationality of Artisansin the Building Construction Industry

Evidence in Table 1 shows the distribution of respondents along nationality and ethnic divides. As indicated in the table, 59.8% of the respondents were Nigerians, while 40.2% were of other nationalities other than Nigerian. This study shows that quite a substantial number of the artisans practising in the study area were in-migrant artisans. This study conforms with the findings of Olanipekun and Nunayon (2017) who discovered that migrant craftsmen from three major countries in West Africa, namely; Togo, Benin Rebulic and Ghana were mostly empolyed on Nigerian construction sites and were commonly used in the trades of ceramic tiling and interlocking blocks laying. They noted that the dexiterity of indigenous craftsmen at cutting corners and their inability to be diligent while performing their responsibilities, not keen at improving their training, alcholism and drug abuse were the major factors responsible for the preference of the in-migrant craftsmen in these trades by the professionals and house sponsors in the Nigerian building construction industry.

Furthermore, Dantong, Lakjeb and Dessah (2011) noted that the influx of the Togolese and Beninese artisans into the Nigerian building construction industry has led to almost total extinction of indigenous manpower development programmes in Nigeria, because most house sponsors preferred to patronise the in-migrant artisans due to their sound technical know-how and their technical efficiency in performing their tasks. They observed that the technical abilities of these in-migrant artisans are nothing more but the training programmes enjoyed in their home countries, as against the almost total neglect of such training programmes provided in Nigeria, especially through trade cadre, vocational training institutes and technical colleges, in which the trainees of these institutions were made to take examinations of the City and Guide Institute of the Great Britain and Trade Test of the Federal Ministry of Labour and Employment; leading to the award of certification of competence which were indeed embraced in the 1970s and 1980s but have almost gone into oblivion. The study is also consistent with the work of Ihua-Maduenyi (2015) who reported that over 500,000 Chinese artisans were currently engaged in various building construction activities across African countries, Nigeria inclusive. Equally, Afolabi, Emeghe, Oyeyipo and Ojelabi (2016) ascerted that professionals in the Nigerian construction industry prefer in-migrant craftsmen to indigenous artisans as the latter were noted to have had technical skill shortages, low quality of job delivery and skill mismatch.

With emphasis on the three major tribes in Nigeia, it was observed that about 73.8% of the Nigerian artisans were of the Yoruba extraction, while the remaining 17.8% and 8.4% were Igbos and Hausas respectively.

Different Categories of Artisans in the Building Construction Industry

Table 1 provides information on the different categories of artisans surveyed in this study. As indicated in the table, house painters recorded 25.7%. Next to this in proportion were the plumbers who recorded 22.3%. Also, electricians constituted 16.2% and this was closely followed by both bricklayers and carpenters that recorded 15.6% each, while iron-benders constituted 4.5%. This finding shows that various artisans are found in the building construction industry and each of them has specific roles to play in building construction sector; starting from the land excavations to the final building completion. The result is in consonant with the work of Adenuga, Soyingbe and Ajayi (2007) who worked on the selected safety measures of construction companies in Lagos State, Nigeria. The authors documented that numerous artisans are found in

the building construction industry, with specific roles, although some of them may be knowledgeable in more than one trade. Also, Adewale, Siyanbola and Siyanbola (2014) reported high level of competence among artisans in the Nigerian building construction industry, but recorded increasing reduction in the number of apprentices and low rate enrolment of students in building related skills at the technical colleges and vocational centres. Equally, Bokinni (2005) observed that the artisans found in building construction industry in Nigeria possessed some special skills that enable them to undertake complex buildings construction activities that meet the needs of the house sponsors. This implies that artisans in the building construction industry cannot be under-rated in terms technical capability, despite their low educational qualifications, while compared to the professionals in the building construction industry. They tend to depend on a lot of tacit knowledge.

Table 1: Distribution of Artisan in the Building Construction Industry

Nationality	Frequency	Percentage (%)
Nigerian	107	59.8
Non-Nigerian	72	40.2
If Nigerians, tribes		
Yoruba	79	73.8
Igbo	19	17.8
Hausa	9	8.4
Categories of Artisans		
Bricklayers	28	15.6
Electricians	29	16.2
Plumbers	30	16.7
Carpenters	28	15.6
Painters	37	20.6
Iron Benders	9	5.0
Ceramic Tilers	18	10.0

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V. TECHNICAL CAPABILITY OF ARTISANS

The technical capability of artisans was measured under investment, operational, innovation and linkage. Table 2 presents investment capability of artisans in the study area. Technical capability of artisans was captured with 3-point rating scale with a grand mean score of 2.0 as benchmark, using 4 indicators of investment technical capability. Evidence in the table shows that about 108 (60.3%) of the artisans indicated that they had ability to recognize and purchase modern tools. and about 42 (23.5%) never had ability to do that. About 112 (62.6%) of the artisans indicated that they could give accurate estimate of building materials needed, while only 17 (9.5%) couldn't give accurate estimate. On the determination of estimated cost of building projects, analysis revealed that most of the artisans 115(64.3%) indicated that they could just give estimated cost of building projects. Also, about 72 (40.2%) of the artisans couldn't raise funds for training and workshops, 66 (36.9%) indicated that they could raise funds for training

and workshops. The grand mean score of 1.95 is an indication that investment capability among the artisans surveyed in this study was low.

For the operational capability, results revealed that about 116 (64.8%) of the artisans indicated that they had ability to work and learn from colleagues with improved and up till date skills, while very few 12 (6.7%) never had such skills. Also, about 91 (50.0%) of the artisans indicated that they had ability to effectively use building materials, while about 135 (75.5%) of the artisans indicated that they could translate building plans to built-up structures. Furthermore, bout 69 (38.5%) of the respondents indicated that they could complete building projects timely in line with the expectation of the building project sponsors, while about 111 (62.0%) and 68 (38.0%) revealed that they were able and just able, respectively to determine the optimum lot size of building materials required for building projects. The grand mean score of 2.39 indicated that artisans in the study area had high operational technical capability.

The high technical capability of the artisans in the area of operational and innovation capabilities in the study may be supported by the earlier findings of Bokinni (2005) who reported that artisans in the building construction industry possessed some skills that made them to perform efficiently in their chosen trades and professions. This makes them to be technically competent, hence, their high level of technical capability that was established in this study, especially in areas of operational and innovation technical capabilities. Similarly, Singh and Bhanushali (2012) who conducted a study in Ahmedabad City in India reported that artisans in that study area had high operational technical capability in construction sector of the economy. This high operational capability was attributed to their regular involvement in building construction activities as well as exposure to new techniques and therefore knowledgeable about challenges faced in complex building construction activities. Also, Afolabi, Ojelabi and Oyeyipo (2018) in their work titled " integrating construction craft skill acquisition in the built environment curriculum using a competence based education approach" recommended that the National Vocational Qualification Framework (NVQF) policies currently being used for training and retraining indigenous artisans in the Nigerian building construction industry be extended to tertiary institutions to assess and license students in the building construction related fields in order to enhance their self-employment potentials, increase their business opportunities and ensure their employability.

Table 2: Technical capabilities of artisans

Investment Capability	Unable	Just Able	Able	Mean	Chi Square
Ability to recognize and purchase modern tools	42(23.5)	29 (16.2)	108(60.3)	2.41	
Ability to estimate building materials needed	17 (9.5)	50 (27.9)	112 (62.6)	2.48*	
Ability to determine cost of building projects	28 (15.6)	115 (64.3)	36 (20.1)	1.43	12.84*
Ability to raise funds for training and workshops	72 (40.2)	138 (77.1)	66 (36.9)	1.49	
Grand mean				1.95	
Operational Capability	Unable	Just Able	Able	Mean	
Ability to work and learn from colleagues with improved and up till date skills	12 (6.7)	51 (28.5)	116 (64.8)	2.52*	
Ability to use building materials effectively	11 (6.1)	77 (43.1)	91 (50.8)	2.42*	
Ability to translate building plans to built-up structures	19 (10.6)	25 (13.9)	135 (75.5)	2.53*	51.71**
Ability to execute aesthetics building	21 (11.7)	27 (15.1)	131 (73.2)	2.50*	
Ability to timely complete building projects	15 (8.4)	95 (53.1)	69 (38.5)	1.64	
Ability to determine optimum lot size of building materials required		68 (38.0)	111 (62.0)	2.71	
Grand mean				2.39	
Innovation Capability	Never	Sometimes	Often	Mean	
Ability to repair broken down tools and equipment	15(8.5)	69 (38.5)	95 (53.0)	2.94*	
Ability to detect and fix constructional defects	51(28.5)	35 (19.5)	93 (52.0)	2.87*	
Ability to seek for and make use of improved construction techniques from the internet	12 (6.7)	72 (40.2)	95 (53.1)	2.62*	2.19
Ability to imitate improved construction process as demonstrated on video platforms	35(19.6)	56 (31.3)	88 (49.1)	2.09	
Ability to carry out modifications on existing buildings, where necessary		49 (27.4)	130 (72.6)	2.65*	
Grand mean				2.63	
Linkage Capability	No linkage	Weak linkage	Strong linkage	Mean	
Linkage with registered/well-established building construction companies	92 (51.4)	45 (25.1)	42 (23.5)	1.19	
Linkage with research institutes	33 (18.4)	81 (45.3)	65 (36.3)	1.74	
Linkage with fellow artisans that had worked with well-established construction firms	52 (29.1)	97 (54.2)	30 (16.7)	1.51	44.71**
Linkage with immigrants artisans	64 (35.8)	43 (24.1)	72 (40.1)	2.17	
Grand mean				1.65	

VI. DETERMINANTS OF TECHNICAL CAPABILITY OF ARTISANS

Evidence in Table 3 shows that internal (wald = 7.63) and external (wald = 7.39) factors, were found to have influenced artisans' level of performance in the building construction industry at 0.05 significant level. This implies that internal factor such as desire for information on building materials, desire for acquisition of new skills in building construction, experiences

acquired through training on-the-job and experiences acquired as apprentice, experiences acquired working with well-established building construction firms, interaction with immigrant artisans, and among others, were variables under internal factors that promote artisans' level of performance. Equally, variables such as accessibility to appropriate technologies, favourable government policies in buildings construction activities, regularity of performing building construction tasks, increased competition in building construction industry, and among others could equally enhance their performance.This result is consistent with the work of Alinaitive, Mwakali and Hansson (2007) who argued that on-the-job training, favourable government policies in the building construction industry and increased competition in the sector must have positively influenced workers' performance in Uganda's building construction industry. Also, Afolabi, *et.al*. (2018) reported that availability of equipment and materials as well as regularity of performance building construction activities influenced the productivity of artisans in the Lagos State building construction industry.

Table 3: Results of Ordered Logistics Regression Showing the Relationship BetweenFactors Influencing Performance and Artisans' Level of Quality of Workmanship

Regressor	Low					High				
	B	Std. Err	Wald	Sig	Exp (B)	B	Std. Err	Wald	Sig	Exp (B)
Inernal	0.58	0.21	7.63**	0.02	1.79	1.69	0.91	3.45*	0.05	5.42
External	2.61	0.96	7.39*	0.03	13.59	2.36	1.49	2.51	0.28	10.59

-2 loglikehood = 125.261, Nagelkerke = 0.32
**Significant at 1%
*Significant at 5%
Dependent variable: Artisans' Workmanship= Low (0) and High (1).

VII. CERTIFICATION OF ARTISANS IN BUILDING CONSTRUCTION INDUSTRY

One of the major strategies put in place by the federal government at ensuring high level of competence among artisans in the Nigerian building construction industry was the certification of the qualified artisans in form of City and Guilds certificate of Great Britain and the Trade Test certificate of the Federal Ministry of Labour and Employment for deserving and competent artisans that meet the requirements for certification after examinations and practical appraisal of their level of competence. Table 4 shows the distribution of respondents who were aware of this government policy as well as those who had taken appropriate steps to be certificated. The analysis shows that majority (94.4%) of the respondents were aware of the certification schemes of the government, while 5.6% were not aware of the existence of any form of certification in the Nigerian building construction industry. Among those who were aware of the existence of certification schemes in the industry, 26.3% were actually certificated, while the remaining 73.8% were not yet certificated. About 31.3% out of this set of respondents who were not certificated stated that they refused to be certificated because such certificates are only required by government agencies for employment purposes. Another 19.6% of the respondents argued that it was too expensive to obtain such certificates, 18.4% of them reasoned that such certification was not required for them to be engaged and indeed not needed to perform assigned duties, while 4.5% noted that the process of obtaining such certification was too cumbersome.

The findings showed that majority of the sampled artisans were aware of the certification scheme, but only few were certified due to that fact that there are no strong enforcement strategies that

prevent people from engaging in building construction activities in Nigeria without being certificated; though there is a subsisting certification body in the country. Bello (2016) reported that the Nigerian Institute of Building (NIOB), having, identified inadequate skilled artisans in the Nigerian construction industry as the major problem facing the sector; therefore, resolved to upgrade the skills of the various artisans in the industry, through seminars and workshops in order to improve their theoretical and practical knowledge and to certify those who are found competent at the end of the training sessions.

There is no doubt that the enforcement of certification in the construction industry may increase artisans' technical capability, as reported by Singh and Bhanushali (2012) who indicated that artisans in India must compulsorily undergo three months training programme after the completion of their apprenticeship scheme, under registered professionals to meet their certification requirements. If this strategy is adopted in Nigeria, it may further enhance the technical capability of artisans, practicing in the building construction sector. Hence, they would be able to deliver better quality building projects to the house sponsors

Table 4: Distribution of Artisans by the Certification Obtained

Variable	Frequency	%
Are you aware of any certification bodies	169	94.4
If yes, have you ever obtained any form of certification	47	26.3
Reasons for not obtaining certification		
They are not made compulsory before one be engaged	33	18.4
Such certifications are only required by government agencies	56	31.3
The cost of obtaining them is too high	35	19.6
The process of obtaining any of them is too cumbersome	8	4.5

VIII. CONCLUSION AND RECOMMENDATIONS

Based on the finding, majority of artisans was Nigerian although, significant proportions of them were foreigners from neighbouring countries. Various categories of artisans such as painters, carpenters, electricians, bricklayers, iron-benders among others were identified as veritable stakeholders in the building construction industry in the study area with specific roles. Apart from the fact that majority of the artisans had awareness of certification; only very few of them were certified. Among those who were not certified, it was reported that certification was only required by government agencies. Both internal and external factors were the significant determinants of artisans' technical capability. It was revealed that internal variables such as acquisition of information on building materials, acquisition of skills and among others should be encouraged through regular training, as these formed the internal factors that influenced technical capability. Also, information sharing in building construction industry and favourable government policies should be encouraged with a view to increasing artisans' technical know-how in building construction industry.

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