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Technical Capability of Artisans in Building Construction Industry: empirical evidence from Lagos State, Nigeria

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Abstract

The study assessed the technical capability of artisans in the building construction industry in Lagos State with a view to unraveling the technical-know-how of artisans in the industry for sustainable quality building construction in the study area. Multi-stage sampling technique was used to select 210 artisans in three local government areas using the compendium of artisans compiled by the Lagos State Ministry of Employment and Wealth Creation. A total of 179 copies of completed questionnaire were retrieved representing 85.2% return rate. Data obtained were analysed with the use of frequency counts, percentages and means, while Multinomial Logistic Regression was used to show the determinants of technical capability among the sampled artisans. The findings showed that artisans in the study area were still in their economically active age of less than 60 years. About 96.4% of the artisans were male and 62.0% of the artisans were trained through apprenticeship schemes. The results of Multinomial Logistic Regression showed that effective use of building materials ($\beta = 3.17$); aesthetic appearance of constructed buildings ($\beta = 5.11$), and ability of the artisans to determine the optimum lot size of building materials used ($\beta = 4.26$) were the significant determinants associated with high technical capability of artisans. The artisans' technical capability was adjudged to be high in the area of operational and innovation capabilities but was low in investment and linkages.

Keyword: Artisans, Technical Capability and Building Construction

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INTRODUCTION

Housing is one of the basic human needs in addition to food and shelter. It embraces all social services and utilities such as good road network, electricity, potable water supply, health services, recreational facilities, educational services, among others, that make neighborhood a livable environment. Housing has a profound influence on the welfare of mankind and it is used to measure physical, economic and historic evidence of civilization all over the world (Abumere, 1987). The United Nations (2000) describes housing as the physical environment in which the family as the society's basic unit develops. According to the United Nations Center for Human Settlements (1997), access to housing is a basic human right that should be made available to all individuals across the world. The provision of decent housing is a function of the building construction sector of a country.

The building construction industry plays an important role in the economy of any nation as activities in the sector are vital to the achievement of socio-economic growth and development of any nation, as these activities provide shelter, infrastructure and employment (Oladinrin, Ogunsanmi and Aje, 2012). The building construction sector is one of the 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 sector, makes it a significant front for sustainable development (Mosaku, Kehinde and Kuroshi, 2006). The successful delivery of any building project has many important components and one of the major contributors is the artisans. Artisans occupy a sensitive position in the building construction industry (Olanipekun and Nunayon, 2017). They are a significant unit of human resources needed on any given building construction project delivery (Kazaz and Ulubeyi, 2017). This is because unlike in the developed economies, such as the United Kingdom, United States of America and Germany, where operations on construction sites are highly mechanized, construction activities and operations in Nigeria are low-tech and highly labour intensive (Bilua, Ajagbe, Kigbu and Solanke, 2015). Thus, artisans are needed in various stages of the building construction process (Ajagbe and Ismail, 2014).

Historically, since the erection of the first house on earth, artisans have been the life-wire of building construction work and for the provision of infrastructure for human habitation and transportation (Chukwuji, 2012). Hickson and Ellis (2014) noted that this set of stakeholders in the building construction industry is very important in building project delivery because they significantly determine the outcome of construction work. It has been pointed out that artisans play a very crucial role in the survival and growth of the building construction industry as they are mostly engaged in the practical realization of building construction projects (Medugu, Majid, Bustani, Bala, Abdullahi and Mbamali 2011; and Bilau, Agbaje, Kigbu and Solanke, 2015). However, their technical capability in a country like Nigeria is largely unknown in literature considering the low technological advancement in most developing countries. Oluwale, Ilori and Oyebisi (2013) described technical capability as the ability to make effective use of skills, knowledge and technical know-how in efforts to assimilate, use, adopt, and improve existing practices in the industry. These are among the areas where artisans can build their skills in order to contribute to a sustainable housing sector in Nigeria.

Although, many studies like Ayedun, Durodola and Akinjare (2012), Adegboroye (2006), Oloyede, Omoogun and Akinjare (2010) and John, Faremi and Lawal (2016) among others have been carried out in the areas of building construction and causes of building collapse in Lagos State, Nigeria, there seems to be a dearth of research in the area of technical capability of artisans in the building construction industry. Therefore, this study was conducted to analyze artisans' technical capability in the building construction industry with a view to unveiling the technical competence of artisans in Lagos State, Nigeria.

According to Braverman (1994), an artisan is an individual who has the ability to manipulate skillfully the tools and materials of a craft or trade. This is because an artisan is expected to have some skills such as individual thinking capability, knowledgeable of his craft and trade; some of which are reducible to words, but most importantly takes place through the physical act of production and normally manifested in the creation or production of objects (Rameezdeen, *et. al.*, 2000).

The United Nations (1959) noted that technical capability of artisans is usually acquired in a mixture of formal knowledge, tacit knowledge, physical and mental skills contextual awareness, innovation and personal creative autonomy. While assessing the importance of artisans to the Sri-Lanka's building construction industry, Rameezdeen *et. al.,* (2002) argued that the features of artisans in the country's building construction industry include clear division of labor, high creativity and increased environmental concerns.

Technical capability has been differently defined. According to Lall (1992) it means the skills and knowledge needed to effectively absorb, master and improve the existing knowledge and to create new ones. Existing literature has provided several leads about the various factors that can be expected to contribute to the build-up of technical capability. These factors according to Hoffman, *et al.* (1998) and Wignaraja (1998) include the knowledge and skills possessed by an entrepreneur(s) and his workforce which they obtain through earlier experience, new skills acquired in the course of interaction within themselves and those obtained through introduction of new technologies.

The building construction industry, like other aspects of industrial development, has been experiencing severe and prolonged shortage of manpower not just in terms of quantity of labour force, but also quality (COOA, 2005; Connor, 2006). This, according to these authors is already putting the world's growing economy at risk. Magar (2007) who examined the impact of the building construction industry on the Indian economy opines that this sector of the country's economy was prepared to spend so much money to raise production capabilities higher, but the shortage of skilled workforce would necessitate skillful project management and innovative solutions to prevent bottlenecks. The study observed the irony of how the nation of about one billion people could be challenged by shortage of trained/skilled manpower in its building construction industry. According to the study, the country's building construction industry having been rated as the largest employer of labour, and realizing the need for skilled vocational workers, had begun collaboration with academic institutions to either train their workers for plumbing and masonry type work, or to set up in-house training programmes.

Sooi (2007) reports that the building construction industry in Malaysia is grappling with unfilled positions in the building construction sector and suggested that the immediate solution to the problem would be the importation of the right talent from abroad. The Chartered Institute of Building (CIOB, 2008) in its report on skilled manpower shortage in the building construction sector in the United Kingdom (UK) posits that the problem that was experienced in the industry would continue to be a major challenge in the country. The report predicts that this issue is likely going to get worse as the demand for building construction work increases. The UK building construction industry according to the report, is suffering from a significant shortage of skilled manpower. The Academy of Social Sciences in Australia (ASSA, 2008) asserts that Australia's growing labour requirements cannot be met by the native workforce despite the current high levels of immigration. The logical conclusion from the evidence as contained in the report is that Australia's future labour requirements, especially in the building construction industry, would depend more on immigration.

Nigeria requires the services of skilled workforce in various building construction sites. The nation is developing with growing population and its attendant housing needs (Awe, Stephen and Griffith, 2015). At present, the demand for artisans such as bricklayers, carpenters, plumbers, painters, among others, is far above supply (Akindoyeni, 2005; National Heritage Training Group (NHTG), 2005; Obiegbu, 2005). The present locally organized apprenticeship scheme which was a major provider of craftsmen is fizzling out. The aged and experienced tradesmen would rather prefer their descendants to become well-educated professionals than to take to their trades (Oluwale, Ilori and Oyebisi, 2013). Equally, Oluwale, Jegede and Olamade (2013) in their research titled "technical and vocational skills depletion in Nigeria and the need for policy interventions" discovered that majority (85.0%) of the sampled population of trained artisans in both building construction and automobile industries had abandoned their original occupation and have drifted into commercial motorcycle transportation business or other more rewarding ventures as findings showed that they make at least twice the income they could make in their former trades per day.

Ahadzie (2011) examined the performance of building contractors in the Kumasi Metropolitan Authority's projects in Ghana and discovered that the constructed buildings of the authority did not meet the expected standard because the artisans engaged in the building projects performed unsatisfactorily due to their low technical competence as well as the use of inferior building materials. Also, Tengan *et al.* (2014) carried out a study on the factors responsible for low quality housing delivery by small scale contractors (SSC) in Ghana and discovered some unwholesome practices such as kickbacks, lack of co-ordination between building plan designers and artisans, poor monitoring and feedback as being responsible for poor housing delivery. Also Offei-Nyako, *et al.* (2014) investigated the availability of artisanal skills such as carpentry, masonry, painting, plumbing, steel crafting and tile installation in the building construction industry in Kumasi, Ghana, using a combination of questionnaire survey and interviews to gather data. Using Soofi's relative importance technique to analyze their data, they found that shortage of skilled labour was one of the most consistent problems that adversely influenced poor performance in that sector of the economy. The scholars concluded that lack of interest by the youths to take up trades such as masonry and carpentry as professions must have been responsible for the low technological advancements in the building construction industry in Ghana.

RESEARCH METHODOLOGY

A multi-stage sampling procedure was used to sample artisans for the study. The first stage involved stratification of Lagos State into low, medium and high residential density zones. 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 the Philippines. The third stage, involved systematic sampling of every 10^{th} artisan in the compendium of artisans compiled by the Lagos State Ministry of Employment and Wealth Creation. This technique was continually used until the required number of respondents was obtained. At the end, 210 artisans were sampled. However, 179 copies of questionnaire were retrieved and found analyzable. This forms about 85.2% response rate. Data collected were analyzed with both descriptive and inferential statistics such as frequency counts, percentages, mean and Multinomial Logistic Regression. Data were collected on the demographic characteristics of artisans working in building construction industry such as age, gender, form of training, and educational attainment among others.

Also, technical capabilities of artisans were measured using investment capability with five variables such as ability to recognize and purchase modern tools, ability to estimate building materials needed etc. These were measured on a 3-point rating scale of unable, just able and able. These scales were scored 1, 2 and 3, respectively. A grand mean score of 1+2+3 = 6/3 = 2.0 was obtained. Those who scored above 2.0 were rated as able to carry out the particular task on the technical capability indicators for investment and operations. Similarly, for innovation capability, variables such as ability to repair broken down tools and equipment, ability to detect and fix constructional defects among others were measured using a 3- point rating scale. Never was scored 1 point, sometimes scored 2 points and often scored 3 points. This was operationalized as given above for the investment and operational capabilities.

For the linkage capability, it was measured on a 3-point rating scale of no linkage which was scored 1 point, weak linkage scored 2 points and strong linkage scored 3 points. For the categorization of technical capability, Equal Interval Approach (EIA) as used by Ajayi (2008) was employed using the technical capability scores. For example, 21 variables were used to measure technical capability on a 3-point rating scale. Therefore, the maximum obtainable score was 3 x 21 = 63 points while the minimum was 1 x 21 = 21. The range was calculated as 21-63 = 42 and this value obtained were divided into 3 since three categories (high, moderate and low) were targeted. The value 14 obtained was used for the categorization as follows by adding it to the minimum value to obtain the range for low: 21+14= 35. Hence, artisans who scored between 21-35 were rated as having low technical capability; those who scored between 35 and 49 were rated moderate in their technical capability while those who scored between 49 and 63 were regarded as having high level of

technical capability. These categories were used for multinomial logistic regression while moderate level was used as a baseline equation.

RESULTS AND DISCUSSION

Table 1 presents the distribution of artisans based on their demographic characteristics. About 26.3% of the artisans were within the age bracket of 41 and 50 years, while 22.9%, 18.4%, 12.8%, 7.8%, 6.7% and 5.0% were in the age groups of 51 and 60 years, 31 and 35 years, 36 and 40 years, 60 years and above, 25 and 30 years and 20 and 24 years respectively. The findings show that majority (92.2%) of the artisans were less than or equal to 60 years of age, while only 7.8% of them were above 60 years. The implication of this finding is that artisans in the building construction industry in the study area were in their productive age. This means that they still had the strength required to effectively carry out operations in building construction activities.

The economically active age of 60 years and below has been documented in many scholarly articles across several academic disciplines. For example, the study of Adeyemo and Olatunji (2004) observed that at the age of 60 years and above, the strength to engage in productive ventures may have been drastically reduced and entrepreneurial spirit may not be strong enough to carry out strenuous activities that are associated with the tasks of artisans in most African countries. Similarly, Alinaitwe, Mwakali, and Hansson (2007) submitted that age was a major factor that determined artisans' productivity in the building sites in Uganda, while Chan (2002) also opined that artisans' productivity tends to decrease with an increase in age. In the same vein, Oluwale, Ilori and Oyebisi (2013) found that no mechanic was above 60 years of age in their study conducted in the Southwestern Nigeria. The fact that building construction activities could be strenuous explains its relationship with age.

Gender participation reveals that majority (96,4%) of the respondents were males, while a much lower percentage (3.6%) were females. This finding is consistent with the work of Jimoh, Oyewobi, Adamu and Badeje (2017) who observed that the building construction industry is a male-dominated industry, globally, with very poor female representation in every facet of building construction work.

The study argued that women were observed to have had a lot of challenges in the building construction industry, ranging from lack of self-confidence to compete with their male counterparts, to insecurity in the midst of men to execute their assigned tasks. The domestic and reproductive roles of women, especially in Africa, may also prevent them from engaging in physically-demanding activities, like building construction. In addition, gender perception towards construction activities could also be a factor that inhibits women from participating in building construction, as reported by Agapiou (2002). In a study of the perceptions of gender roles and attitudes toward work among male and female operatives in the Scottish construction industry, it was found that women viewed construction works as strenuous and exclusively for men. Similarly, Bagilhole, Dainty and Neale (2000) submitted that women only play service roles in building construction activities and that their proportion to that of men is usually insignificant.

On the form of training acquired by the artisans, majority (62.0%) of the respondents were trained through apprenticeship scheme, while 17.3%, 12.8% and 7.8% were trained at technical institutes, vocational centres and polytechnics, respectively. On-the-job training, also known as apprenticeship scheme, has been widely accepted as the best form of skill acquisition in the building construction industry, both in developed and developing countries. Ogbeifun (2011) stressed that this form of artisanal training scheme is usually introduced and implemented through the adoption of progressive implementation of construction processes, by commencing work from areas requiring low skill demands to areas of high skill demand. The study reported that this principle hinges on the collaborative efforts of the key project stakeholders and facilitates on-site training. Consultants actively guide the contractor on the construction processes to achieve the training objectives. The study added that this principle is widely used in construction sites in the United Kingdom and in the development of infrastructure in the tourism industry of South Africa.

Table 1: Distribution of Artisans Based on the Demographic Characteristics

Variable	Frequency	Percentage (%)
Age (years)		
20-24	9	5
25-30	12	6.7
31-35	33	18.4
36-40	23	12.8
41-50	47	26.3
51-60	41	22.9
Above 60	14	7.8
Gender		
Male	168	94.0
Female	11	6.0
Form of training		
Apprenticeship	111	62
Technical institutes	31	17.3
Vocational centres	23	12.8
Polytechnics	14	7.8
Highest academic qualification obtained		
Primary school leaving certificate	69	38.5
Junior secondary school certificate	17	9.5
WAEC/GCE	58	32.4
ND/NCE/HSC	12	10.6
HND/B.Sc/B .Tech/B.Eng	19	6.7
Others specify	4	2.2
No of years for Training		
1-2 years	22	12.3
3-4 years	122	68.2
5-6 years	23	12.8
Above 6 years	12	6.7

On the level of educational attainment of the respondents, 38.5% had primary school leaving certificates, 32.4% were secondary school certificate holders, 10.6% had national diploma/national certificate of education/higher school certificates, while a lower proportion (6.7%) had acquired higher national diploma/bachelor's degrees. The finding implies that a significant proportion of the artisans had primary and

secondary education. This educational attainment of the artisans may be useful in skills acquisition for complex building construction projects as education has been identified as a correlate of skill acquisition (Lingard and Lin, 2004; Howells, James and Malik, 2004).

Also, the findings conform to the study of Unduyaundeye and Otu (2015) who worked on entrepreneurship skills acquisition and the benefits among undergraduate students in Nigeria. It was reported that academic performance has a strong relationship with the entrepreneurial spirit among students in tertiary institutions in Nigeria. This may be applicable to artisans as those with higher educational qualifications may likely perform better than those with lower qualifications in the construction of building projects. Hence, technical capability of artisans may therefore, be enhanced by their level of educational attainment.

As regards the length of training of the artisans, the study reveals that 68.2% of the artisans spent between 3-4 years to be trained, while 12.8%, 12.3% and 6.7% spent 5-6years, 1-2years and above 6 years respectively. The findings show that craftsmanship training in building construction could be achieved within three years. This means that between 3 and 4 years of training, any artisan in the building construction sector is capable of having some technical expertise in any aspect of building construction. The finding agrees with earlier studies (Oluwale, Ilori and Oyebisi, 2013; Uchendu, Osim and Odigwe, 2015). The former found that the modal age range for apprenticeship in the auto-mechanic industry in Southwestern Nigeria was between 3 and 4 years. The latter argued that polytechnics across Nigeria should adopt the system of training of craftsmanship in a fashion similar to apprenticeship scheme by providing for 2-3 years of practical skills exposure and knowledge acquisition programmes in workshops/laboratories for the trainees of technical fields of endeavour in order to achieve sustainable job creation for economic growth and development, especially in a developing country like Nigeria.

Technical Capability of Artisans

The technical capability of artisans was measured under investment, operations, innovation and linkage. Table 2 presents investment capability of artisans in the study area. Technical capability of artisans was captured on a 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 the ability to recognize and purchase modern tools and about 42 (23.5%) did not have ability to do that. About 112 (62.6%) of the artisans indicated that they could give accurate estimates of building materials needed, while only 17 (9.5%) couldn't give accurate estimates. On the determination of estimated cost of building projects, analysis revealed that 115 (64.3%) of the artisans 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, and 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 operational capability, results revealed that about 116 (64.8%) of the artisans indicated that they had the ability to work and learn from colleagues with improved and up-to-date skills, while very few 12 (6.7%) did not have such skills. Also, about 91 (50.0%) of the artisans indicated that they had the 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, 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.

Under innovation technical capability, analysis shows that 95 (53.0%) of the artisans had the ability to repair broken down tools and equipment, while 15 (8.5%) indicated that they did not know how to carry out such repairs on broken down tools and equipment. It was also revealed that about 93 (52.0%) of the artisans had the ability to detect and fix constructional defects, while 51 (28.5%) claimed not to have such ability.

Table 2: Technical Capabilities of Artisans

Investment capability	**Unable**	**Just Able**	**Able**	**Mean**
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
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				
Ability to work and learn from colleagues with improved and up-to-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*
Ability to execute aesthetics on buildings	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 and make use of improved construction techniques from the internet	12 (6.7)	72 (40.2)	95 (53.1)	2.62*
Ability to imitate improved construction processes 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
Linkages with registered/well-established building construction companies	92 (51.4)	45 (25.1)	42 (23.5)	1.19
Linkages with research institutes	33 (18.4)	81 (45.3)	65 (36.3)	1.74
Linkages with fellow artisans that had worked with well-established construction firms	52 (29.1)	97 (54.2)	30 (16.7)	1.51
Linkages with immigrant artisans	64 (35.8)	43 (24.1)	72 (40.1)	2.17
Grand mean				**1.65**

**Grand Mean≥ 2.0 = High Technical Capability*

The high technical capability of the artisans in the area of operational and innovation capabilities in the study area 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 the 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 (2017) 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 building construction related fields in order to enhance their self-employment potentials, increase their business opportunities and ensure their employability.

Determinants of Technical Capabilities of Artisans

Table 3 presents the results of the Multinomial Logistic Regression showing the determinants of technical capability of the artisans. The dependent variable in this study was the technical capability which in this case was categorized into three categories of low, high and very high. In the output, very high category was used as a baseline equation. Based on the results, it was observed that effective use of building materials ($\beta =$ 3.17); aesthetic appearance of constructed buildings ($\beta = 5.11$) and ability of the artisans to determine the optimum lot size of building materials used ($\beta = 4.26$) were the attributes that significantly influenced high technical capability of the artisans.

The findings show that the ability of artisans to skillfully master the use of basic building construction tools has positively influenced high level of technical capability of the artisans in the study area. It could be deduced from the findings that technical capability of an artisan is influenced by his ability to skillfully make use of his basic tools. Based on these findings, an individual who is noted to have the capability to skillfully make use of his tools is likely to have higher level of technical capability than his counterpart who was noted not to have had such tacit knowledge, required in handling his working tools. This implies that artisans found in the study area were dominated by highly skillful individuals, who have the tendency to have a high level of operational capability. In addition, being able to deliver aesthetic/appealing building projects was found to significantly determine their level of operational technical capability. This implies that artisans with the ability to construct buildings that are attractive to the general public in view of their high quality of decorative attributes may be adjudged to be technically competent. In the same vein, effective use of building materials was also significant in determining the level of technical capability of the artisans.

The implication of this is that artisans with the ability to effectively make use of building materials are bound to deliver building projects at the most reasonable cost possible. Therefore, this is an indication of high level of operational technical capability. Lastly, ability to determine the optimum lot size of building materials required at any point in time was found to be significantly related to high level of operational technical capability. This means that artisans who are knowledgeable in determining the lot size of building materials required are likely to determine the average cost of building projects. Such artisans must have been involved in regular engagements in building construction activities and are bound to be exposed to contemporary developments in their various areas of specialization. The -2 Log likelihood value of 167.530 and Nagelkerke value of 0.776 imply that the variables chosen for the models were appropriate as they were found to have generated value that was large enough which was in line with the opinion of Kolibáčová (2014) who stated

that the causal relationship between employee's competency and employee's performance is a linear relationship.

Table 3: Results of Multinomial Logistic Regression Showing the Determinants of Technical Capability among the Artisans

Variable	B	Low Std. Dev	Wald	Sig	Exp (B)	B	High Std. Dev	Wald	Sig.	Exp (B)
Effective use of materials	3.88**	1.98	1.96	0.01	1.9	3.17**	1.15	2.76	0.01	2.91
Translation of plans to structures	2.26	1.72	1.32	0.17	0.85	1.40	1.9	0.74	0.31	0.4
Aesthetic appearance	1.39*	0.88	1.57	0.05	2.35	5.11**	1.58	3.23	0.01	2.24
Timely completion	-2.33	2.27	1.03	0.17	0.72	1.32	1.01	1.31	0.71	0.47
Determine the optimum lot size	-2.58**	0.69	2.58	0.01	3.98	4.26**	1.85	2.30	0.01	1.69

-2 Log Likelihood = 167.530; Nagelkerke = 0.776
**Significant at 5%; **Significant at 1%*

Also, the findings were consistent with the work of Kashiwagi and Massner (2000) who posited that artisanal skill acquisitions in building construction industry is influenced by their regular engagement in building construction activities. Similarly, Saha (2003) reported that engagement in other occupations and regular training programmes are major factors influencing operational technical capability among artisans in building construction projects. This high level of competence according to him implies regular involvement in training programmes, as this is bound to increase skills and knowledge stocks of individuals. In the same vein, Fagbenle and Oluwunmi (2010) and Adebayo (2000) also emphasized the importance of operational technical capability in the building construction industry. Though, these scholars reported low level of technical competence among artisans in the Nigerian building construction industry, they however, noted that the incessant building collapse in Nigeria may be as a result of direct impact of low level of technical competence of the major stakeholders in the industry. Therefore, the above identified determinants of technical capability are very crucial in ensuring that artisans' competence is enhanced.

CONCLUSION

Good housing is part of the basic necessities of life and this is one of the criteria used to measure poverty levels by the United Nations' set standards all over the world. One of the key determinants of good housing is the technical capability of the artisans that are engaged at the various stages of building construction projects. The finding showed that artisans in the building construction industry in Lagos State are still in their economically active age and that the profession is male dominated. Most of them had apprenticeship scheme form of training, which spanned between 3 and 4 years, on the average. Most of the artisans had primary and secondary school education. Artisans' technical capability was adjudged to be high in the area of operational and innovation technical capability, but have low technical capability in investment and linkage. Effective use of building

materials, ability to deliver aesthetics in building constructed and ability to determine the optimum lot size of building materials were the determinants associated with high technical capability of artisans. It is therefore recommended that technical institutions in the building construction industry are urged to establish good relationships and linkages with similar institutions abroad, as this will promote cross-fertilization of ideas and enhance technological transfer among artisans. This will have a significant effect on the artisans working in the building construction industry in Lagos State. By doing this, the technical institutions will have access to new developments, embark on exchange of programmes, and other numerous benefits that may be available at those institutions whose technical programmes are being exchanged.

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