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CHALLENGES FACING CONTRACTORS IN THE EXECUTION OF PUBLIC BUILDING PROJECTS AND THEIR IMPACT ON PERFORMANCE

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ABSTRACT

In the Nigerian construction industry, many challenges are being faced by the contractors in the execution of public building projects; these challenges have not been investigated properly and their impacts on cost, time, quality and client satisfaction have not been thoroughly examined. Therefore, this study evaluates the challenges facing contractors in the implementation of public building projects in Nigeria and whether these impact on performance. The objective of the study is to suggest strategies for improved project performance. A quantitative research approach was adopted for the study, employing a cross-sectional survey of 128 construction professionals who are directly involved in the execution of public building projects in Nigeria. Questionnaires were self-administered to the respondents and 79 responses were retrieved and found valid for analysis, representing a response rate of 62%. The data obtained were analysed using a mean item score and regression analysis. The findings indicate that difficulties in obtaining financial aid, delayed payment by the client and poor leadership skills of the project manager are topmost challenges facing the contractor in the execution of public building projects. It is concluded that these challenges have significant impacts on the performance of the projects. The challenges can be managed through prompt payment by clients, proper planning and scheduling of the project, and fixing a ceiling on the interest on funds borrowed. The study recommends that clients should timely honour interim certificates and avoid too many variations. Contractors are advised to raise finance from the bank to solve the immediate cash flow problem and to repay such loans as soon as they receive payment from the clients.

Keywords: Contractor Development, Cost Performance, Interim Certificate, Leadership, Project Performance

1. INTRODUCTION

Development of a Construction sector is pivotal to the National economy of any country or society. It encompasses growth in both private and public sector. Availability of Infrastructural facilities described the quality of life and also defined the standard of living of any society (Eriksson, 2013). The development of the infrastructural facilities largely hinges on the quality of the construction industry which can be public or private enterprises driving. The government used the sector to run many germane projects of high capital intensive such as airports, rail, roads (Othman et al., 2006). Also, projects like school building, hospitals. The complexity of construction industries lies in the variety of clients involved which

includes private or public, sub-contractors and main-contractors, international companies, specialists, low technology firms, civil engineers, civil engineers and many construction professionals interconnected in the industry (Ofori, 2010; Adamu & Bioku, 2011; Pandey, et al., 2017; Fewings & Henjewele, 2019).

Based on its activities, the construction sector has two major sub-division areas, these are; civil engineering and building. The building industry provides for human habitation, such as houses, offices and industrial buildings, while civil engineering works focus on environmental supportive and infrastructural facilities, such as roads, bridges, dams, airports, railways and others. The construction industry possesses its own risk and uncertainties that require effective management skill. These risks can be categorized into the internal and external affecting construction process. The construction industry is besieged with a complexity of interdependencies and uncertainties (Hashim et al., 2012), these make it challenging to have any prospect of achieving the project objectives. There is also a widespread perception that Nigerian contractors are typified by poor performance and underperformance.

Numerous obstacles are facing Nigeria which ranges from the epileptics power supply, unavailability of materials locally, inadequate of local skilled labour coupled with unethical practices such as bribery and corruptions among clients (Dantata, 2008). Effectiveness and efficiency in the construction sector depend on the timely completion of the project as it creates value for money invested on the project. However, construction projects are a derived demand which implies a set of activities to produce unique goods or services. Effectiveness and efficiency execution of a public project is of primary concern to residents of any nation. The transparency in public projects procurement influences government popularity, governance effectiveness and posterity of a Country. Due to the nature of public projects as it shows the direction of the country. It also consumes a greater proportion of government revenue, its alter environmental development as the production of infrastructural facilities come with a greater cost and also with major benefits for all residents of the country (Dada, 2007). The term successful is given to construction projects only when its completion is timely, minimal budget cost relative to the economic or social benefits derived from it, resources allocation, safety rules and essential quality (Muir, 2005; Owolabi et al., 2014).

Despite the significant contribution of the construction sector in the economy of Nigeria, the performance of contractors raises a cause for concern amongst client groups and other participants (Ihua, 2006). The construction organizations are beset with perennial difficulties of project delays, projects exceeding budgeted cost, and projects abandoned or discontinued due to Nigerian contractors underperformance (Famakin & Ojo, 2013; Omopariola et al., 2019). As a result, most public sector clients are noted to prefer engaging the services of foreign contractors because of their ability to deliver construction projects to time, cost and quality requirements (Famakin & Ojo, 2013). The poor performance of Nigerian contractors is linked to a myriad of challenges and problems that stimulate or create obstacles during the execution of building projects.

There is widespread awareness of poor performance and underperformance amongst Nigerian construction business organisations. The Nigerian construction organisations have been challenged to ameliorate its performance as a result of poor project performance in terms of being over budget, missing deadlines, unsafe construction and client dissatisfaction, low productivity, and causing dissatisfaction to other stakeholders, among other problems (Aibinu & Jagboro, 2002; Tunji-Olayeni et al., 2012). The responsibility of achieving success in the implementation of a construction project is largely dependent on the contractor's ability. Contractors are habitually condemned for underperformance regarding lack of technical know-how, shortage in managerial skills and planning, insufficient financial management, and deficiency in adaptation to modern innovations (Iyer & Jha, 2005; Chilipunde, 2010; Hagstedt & Thideman, 2013; Agwu & Emeti, 2014, Omopariola & Windapo, 2019), which may eventually lead to bankruptcy and even project abandonment

(Ugochukwu & Onyekwena, 2014; Omopariola et al., 2017). Sani (2008) reported that parties to a contract are often confronted with a challenge greater than the actual construction process, namely the greater challenge of time, payment, and economy-related matters during the execution of construction projects.

In the same vein, Mhando et al. (2017) established that contractors are affected by variations which include alteration of scope or strategy by the customer, design discrepancies by consultants and weather conditions. However, numerous researches have been carried out on the execution of public building projects, but most of this research was too general, with little attention drawn to the challenges affecting contractors during the execution of public building projects in Nigeria, and their impact on construction cost performance. Also, most of these studies centred mainly on the impact of the time and cost performance challenges facing contractors. Project performance consists of other indicators, such as quality and client satisfaction which are important to project performance assessment. By evaluating the challenges facing contractors in the implementation of public building projects in Nigeria, as well as their effect on cost, time, quality, and client satisfaction, the study will assist professionals, policymakers, academicians and researchers in managing and improving construction project performance.

This research aims to evaluate the challenges facing contractors in the execution of public building projects in Nigeria and whether they impact on performance, so that project performance may be improved in the future. To do this, the paper, first of all, presents a review of the Nigerian construction industry, contractor performance and challenges, followed by the research methodology used, research findings and discussions, and lastly, conclusions and recommendations.

2. LITERATURE REVIEW

2.1 Overview of the Nigerian construction industry, contractor performance and challenges

2.1.1 The Nigerian construction industry

The construction sector in Nigeria has played a huge part to the national economy and is regarded as one of the largest of its kind in Africa (Aje et al., 2009; Odediran et al., 2012). Thus, it is considered one of the leading economic factors which have significantly supported the country's national economy, with regard to gross production and employment. Government is responsible for about 75% of infrastructural development in Nigeria (Oke et al., 2013). Most contracting enterprises in the Nigerian construction industry are mostly small and medium-sized enterprises. According to Aniekwu (1995), Nigerian construction market comprises 78% domestic firms and 22% foreign firms respectively. The larger domestic construction businesses are relatively small enterprises, compared to most foreign firms which are large enterprises (Adams, 1997). The Nigerian construction industry is dominated by foreign contractors, and most of the construction work is carried out by multinationals in the construction industry (Adams, 1997).

The construction industry in Nigeria has witnessed an overwhelming expansion in construction as it is dominated by foreign firms that undertaken significant proportion of contracting construction works, with only a few indigenous firms (Idoro, 2009). Olayiwola (2008) opined that there are are several unfinished and abandoned projects which litter the environment, and which are owned by the government and public corporations in Nigeria, and noted that this was caused by a lack of steadiness in government policies, inadequate strategic co-operation plans and planning strategies.

2.1.2 Nigerian contractors and performance in the construction industry

The contractor is answerable for transforming the proposal into practicality and the delivery of the construction project. The contractor is one of the vital stakeholders and a building expert in the execution and delivery of construction projects. Contractors expedite their professional skills and services to carry out construction work in exchange for financial rewards, and to minimize risk on the owner who is burdened with the occupational risks (Harris & McCaffer, 2005; Usman et al., 2012; Ugochukwu & Onyekwena, 2014). Their responsibility also focuses on the design and organization decisions, construction project implementation, closeout and resuscitation, and the maintenance of existing amenities according to the client and project objectives (Oyegoke, 2006; Babatunde et al., 2010). The selection of a skillful and qualified contractor is an imperative task faced by a construction owner who wishes to accomplish productive construction project outcomes (Fong & Choi, 2000). The contractors are those persons or firms who execute the assigned project.

Previous studies by Uduak (2006) and Ibrahim (2012) highlights that the performance of construction projects managed by local contractors in Nigeria has been applauded as being better, and some researchers concluded that they can still deliver complex, large and highly technical construction projects (Ibrahim, 2012). Whereas other researchers stated that construction projects undertaken by Nigerian indigenous contractors are faced with problems of project abandonment, time overruns, and poor management skills (Muazu & Bustani, 2004; Odediran et al., 2012; Oladimeji & Ojo, 2012). This was as a consequence of the incapability and failure on the part of the indigenous construction firms, in the areas of financial efficiency, inventions, and dynamism, among others (Olugboyega, 1998). A huge proportion of these numerous construction firms in the Nigerian construction industry are affiliates of European, North American and Asian construction companies. The selection, preference and dependance for engaging foreign building and construction contractors in the Nigerian construction industry, as compared with other local contractors, is mostly based on the indigenous contractors' deficiency in project technicality (Idoro, 2007). Numerous other indigenous contractors also entered the Nigerian construction firm lacking technical know-how and some without any prior experience of building or civil engineering work.

Adams (1997) posits that foreign building and construction companies dominate important construction projects in most underdeveloped countries because of deficiencies in a home-grown construction capacity. Also, Chen et al (2007) noted that indigenous construction firms in the African continent do not signify a strong source of competition and are linked to a lack of financial and technical capability. In a similar vein, Oseni (2002) and Ogbebor (2002) opine that foreign construction firms dominate the Nigerian construction industry on the grounds that indigenous contractors cannot be saddled with complex, large and highly technical construction projects. The Nigerian home-grown contractors are assumed to be mostly inept and inexperienced (Awoyinfa, 1991; Adams, 1997; Ogbebor, 2002), and for this reason, the Nigerian government still lacks confidence in indigenous contractors (Akintunde, 2003).

2.1.3 Challenges facing contractors in the construction industry

Previous studies have identified numerous factors globally affecting the performance of contractors, which are synonymous with the challenges faced especially by contractors in the execution of public building projects in Nigeria. The various publications by these researchers were reviewed, to theoretically derive the challenges facing contractors in the construction industry; based on the literature review, the following challenges were identified, as presented in Table 1,

Table 1. Challenges facing contractors in project implementation

N	Challenges facing contractors	References
1	High-interest rates from commercial banks	Ugochukwu & Onyekwena (2014); Kulemeka et al., (2015); Mafimidiwo & Iyagba (2015); Ilori & Omopariola (2018).
2	High cost of plant and equipment	Adams (1997); Fugar & Agyakwah-Baah (2010); Mafimidiwo & Iyagba (2015); Ogunde et al., (2016); Ilori & Omopariola (2018).
3	Inadequate incentives from the government to emerging contractors	Mafimidiwo & Iyagba (2015); Ogunde et al., (2016).
4	Difficulty in obtaining financial aid	Adams (1997); Chilipunde (2010); Fugar & Agyakwah-Baah (2010) ; Laryea (2010); Ihua & Siyanbola (2012); Ugochukwu & Onyekwena (2014); Mafimidiwo & Iyagba (2015); Ogunde *et al.*, (2016); Ilori & Omopariola (2018), Omopariola et al., (2019).
5	Multiple taxation	Nesan (2005); Ihua & Siyanbola (2012); Hagstedt & Thideman (2013); Agwu & Emeti (2014); Kulemeka et al., (2015).
6	Unavailable resources	Chilipunde (2010); Ihua & Siyanbola (2012); Hagstedt & Thideman (2013); Agwu & Emeti (2014); Omopariola & Windapo (2019).
7	Poor cash flow	Wasi et al., (2001); Agwu & Emeti (2014); Ugochukwu & Onyekwena (2014); Gambo & Said (2014); Mafimidiwo & Iyagba (2015); Omopariola & Windapo (2019).
8	Unfavourable business environment	Iyer & Jha (2005); Laryea (2010); Gambo & Said (2014); Mafimidiwo & Iyagba (2015).
9	Poor planning arising from incompetent personnel/staff	Adams (1997); Wasi, et al., (2001); Laryea (2010); Ugochukwu & Onyekwena (2014); Mafimidiwo & Iyagba (2015).
10	Poor communication	Adams (1997); Wasi, et al., (2001).
11	Delayed payment by clients	Adams (1997); Fugar & Agyakwah-Baah (2010); Mafimidiwo & Iyagba (2015); Ilori & Omopariola (2018).
12	Lack of management skills	Wasi, et al., (2001); Iyer & Jha (2005); Fugar & Agyakwah-Baah (2010); Hagstedt & Thideman (2013); Agwu & Emeti (2014); Mafimidiwo & Iyagba (2015); Ogunde et al., (2016).
13	Lack of motivation of workers/ shortages of skilled labour	Adams (1997); Hagstedt & Thideman (2013); Mafimidiwo & Iyagba (2015).
14	Project manager leadership skills	Iyer & Jha (2005).

In this study, particular attention will be paid to challenges from financial, infrastructural, managerial, and human resource perspectives, the main elements of which are difficulty in obtaining financial aid, delayed payment by clients, lack of management skills, high cost of plant and equipment, inadequate incentives from government to emerging contractors, unavailability of resources, poor cash flow, poor planning arising from incompetent personnel/staff, lack of communication skills, and motivation of workers.

2.1.4 Performance measures in construction

Highly competitive and intense changes in the construction industry are driving construction managers to improve the performance of their firms. This is in line with Luu et al. (2008) who stated that performance measurement is at the heart of ceaseless improvement. Performance is not just about efficiency but achieving desired results. According to Ankrah & Proverbs (2005), performance can be considered as an assessment of how well individuals, groups of individuals, organisations or systems have done, in pursuit of a specific goal.

Several attempts have been made in the construction industry to develop measures for construction project performance in order to meet improvement targets. Haponava & Al-Jibouri (2009) stated that the objective of using performance indicators is to evaluate the performance of one or more aspects of the project. Table 2 shows a summary of the performance measures used on construction projects based on previous literature review (KPI groups).

Table 2. Summary of Performance Measures used on construction projects (KPI groups)

S/N	Performance Measures	References
1	Cost	Nudurupati et al., (2007); Ugwu & Haupt (2007); Ali (2010); Cha & Kim (2011); Eriksson & Westerberg (2011); Chan & Chan (2012).
2	Time	Nudurupati et al. (2007); Ali (2010); Cha & Kim (2011); Eriksson & Westerberg (2011); Chan & Chan (2012).
3	Quality	Nudurupati et al., (2007); Ugwu & Haupt (2007); Ali (2010); Cha & Kim (2011); Eriksson & Westerberg (2011); Chan & Chan (2012).
4	Client satisfaction	Nudurupati et al., (2007); Ali (2010).

Eriksson & Westerberg (2011) observed that the three traditional criteria, such as cost, time and quality, are fundamental standards by which to measure construction project success and are used by a majority of experts and professionals in the building construction industry. For this study, performance measures of cost, time, quality and client satisfaction will be used in evaluating the performance of public building projects in the study area. The adoption of these performance measures represents the data collected from the questionnaire survey

2.1.5 Methods of mitigating challenges facing contractors in the execution of construction projects

Despite the numerous challenges faced by the contractors, previous research has suggested different ways of mitigating these challenges faced by contractors in the execution of construction projects. Mafimidiwo & Iyagba (2015) suggested that in order to manage these challenges and improve the performance of the projects, the following strategies are to be given adequate consideration, fixing a ceiling on the interest rate of borrowing, partnership with bigger, more experienced firms, adoption of modern construction methodology and adoption and use of local building materials, and having a non-adversarial culture of dispute resolution, like negotiation and mediation. In another study by Ogunde et al. (2016), the use of ICT, access to bank loans, incentives for site operatives by motivating employees, and sufficient government patronage are preferred ways to mitigate challenges faced by the contractors in order to improve performance.

3. RESEARCH METHODOLOGY

This study sought to evaluate the challenges facing contractors in the execution of public building projects in Nigeria. This study adopted a quantitative research approach involving a cross-sectional survey method. The data used for this study were collected via a well-structured questionnaire which was self-administered to construction professionals in the consulting, contracting and client organisations, who are involved in the execution of public building projects in Lagos State, Nigeria. Lagos state was chosen for the study because of its characteristics as a major hub of construction activity in Nigeria.

The questionnaire was divided into two main sections. In section A of the questionnaire, the respondent was asked to fill in the space provided with their general information. In section B of the questionnaire, the respondent was asked to rate the variables for challenges facing contractors in the execution of public building projects, impacts of these challenges on the performance of building projects and ways of mitigating these challenges for better

performance. A five-point Likert scale with value 5 = highest to 1 = least was used in obtaining the respondent's level of agreement with challenges and solutions proffered in the questionnaire. A total of 128 questionnaires were administered to the contractors that were registered on the Lagos State Tender Board List, through a purposive sampling technique. The choice of purposive sampling was informed by the non-availability of an authoritative sampling frame of public building projects in the study area. Seventy-nine completed questionnaires were retrieved and found valid for analysis, representing a response rate of 62%, which is satisfactory and in line with previous research by Odeyinka et al. (2008) with 52% and by Yasamis et al. (2002) with a 54% response rate. Analysis of the collected data was done using the mean item score and regression analysis.

4. FINDINGS AND DISCUSSION

The data collected and analysed are presented in the following sub-sections.

4.1. Background information of the respondents

Results in Table 3 show the background information of the respondents. The results reveal that the highest percentage of the respondents were respondents from a contracting organisation (48.1%), followed by the consulting sector, (25.3%) while percentage response from the government parastatal is 26.6%. The most represented professionals are builders and architects with 31.7% and 25.3% respectively. The engineers and quantity surveyors are equally represented by 21.5%. Regarding academic qualifications, 19.0% hold an HND, 35.4% and 31.7% hold B.Sc /B. Tech and M.Sc /M. Tech respectively, while 13.9% hold a PGD.

Furthermore, apart from the encouraging educational qualification of the respondents, the analysis of the respondents' professional qualifications showed that they were all professionally qualified, with 100% of the respondents having attained corporate membership status of their various professional bodies. The respondents have a combined average of 9.1 years of work experience in the built environment and have also participated in an average of 10 public building projects. This gave an indication that the respondents were experienced, and that data provided by the respondents would be reliable.

4.2 Challenges facing contractors in the execution of public building projects

In the analysis of challenges facing contractors in the execution of public building projects in Nigeria, a list of factors was extracted from the existing literature and care was taken to avoid repetition. Therefore, the refined factors were provided for the respondents to rank based on the level of their agreement with the identified variables. Results in Table 4 show the ranking of the challenges using the Mean Item Score. Table 4 shows that the challenges with a high occurrence on public building projects are, difficulty in obtaining financial aid, delayed payment by the clients, lack of management skills, the high cost of plant and equipment, lack of incentives from the government to emerging contractors, unavailability of resources, and poor cash flow. As shown in the table, the challenges with medium occurrence are poor planning arising from incompetent personnel/staff, poor communication skills, and lack of motivation of workers. These findings suggest that contractors handling public building projects are facing difficulties in obtaining financial aid, which is affecting their cash flow, cost of hiring plant, and management of labour.

Table 3. Background information of the respondents

Categories	Classification	Frequency	Percentage
Category of respondent's organisation	Contracting	38	48.1
	Government	21	26.6
	Consulting	20	25.3
	Total	**79**	**100.0**
Profession	Builder	25	31.7
	Architect	20	25.3
	Quantity Surveyor	17	21.5
	Engineer	17	21.5
	Total	**79**	**100.0**
Academic qualification	B.Sc/B.Tech	28	35.4
	M.Sc/M.Tech	25	31.7
	HND	15	19.0
	PGD	11	13.9
	Total	**79**	**100.0**
Professional qualification	NIOB	25	31.7
	NIA	20	25.3
	NIQS	17	21.5
	NSE	17	21.5
	Total	**79**	**100.0**
Years of Experience	1-5 years	29	36.7
	6-10 years	22	27.8
	11-15 years	13	16.5
	16-20 years	6	7.6
	Above 20 years	9	11.4
	Total	**79**	**100.0**
Number of public building projects involved	1-5	8	10.1
	6-10	34	43.1
	Above 10	37	46.8
	Total	**79**	**100.0**

Table 4. Challenges facing contractors in the execution of public building projects

Challenges	Mean	Rank
Difficulty in obtaining financial aid	4.61	1
Delayed payment by clients	4.33	2
Lack of management skills	4.27	3
The high cost of plants and equipment	4.15	4
Lack of incentives from the government to emerging contractors	4.15	5
Unavailability of resources	4.10	6
Poor cashflow	4.09	7
Poor planning arising from incompetent personnel/staff	3.93	8
Poor communication skills	3.74	9
Lack of motivation of workers	3.43	10

4.3 Impacts of challenges facing contractors on the performance of public building projects

Regression analysis was conducted to determine the impact of the challenges facing contractors on the cost of public building projects (see Table 5). Table 5 presents a significant regression equation [F (1, 0.718) = 24.84; p = 0.00 (<0.05)] with an R^2 value of 0.75. The R^2 value of 0.75 indicates that there is a positive and strong relationship between the challenges facing contractors and the cost of public building projects. It also shows that 75% of the variation in the cost of public building projects can be explained by the challenges facing

contractors. At a p-value of 0.00, there is significant evidence to suggest that the challenges facing contractors have a strong impact on the cost of public building projects.

Table 5. The impact of the challenges facing contractors on the cost of public building projects

Regression statistics							
Multiple R				0.869733			
R Square				0.756435			
Adjusted R Square				0.725989			
Standard Error				0.170104			
Observations				10			
	Df		*Df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	Regression	1	0.718916	0.718916	24.84543	0.001073
Residual	8	Residual	8	0.231484	0.028936		
Total	9	Total	9	0.9504			
	Coefficients		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.317877	Intercept	0.317877	0.756676	0.420097	0.68547	-1.42702	2.062775
X Variable 1	1.015418	X Variable 1	1.015418	0.203714	4.984519	0.001073	0.545652	1.485184

4.4 The impacts of the challenges facing contractors on the time of public building projects

Regression analysis was conducted to determine the impact of the challenges facing contractors on the time of public building projects (see Table 6). Table 6 presents a significant regression equation [F (1, 0.698) = 22.20; p = 0.00(<0.05)] with an R^2 value of 0.73. The R^2 value of 0.73 indicates that there is a positive and strong relationship between the challenges facing contractors and the time of public building projects. It also shows that 73% of the variation in time of public building projects can be explained by the challenges facing contractors. At p-value of 0.00, there is significant evidence to suggest that the challenges facing contractors have a strong impact on the time of public building projects.

Table 6. The impacts of the challenges facing contractors on the time of public building projects

Regression Statistics						
Multiple R		0.857386				
R Square		0.735111				
Adjusted R Square		0.701999				
Standard Error		0.177395				
Observations		10				
	Df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	0.698649	0.698649	22.20127	0.001518	
Residual	8	0.251751	0.031469			
Total	9	0.9504				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.944092	0.6679	1.413523	0.195211	-0.59609	2.484273
X Variable 1	0.866273	0.183851	4.711823	0.001518	0.442312	1.290234

4.5 The impacts of the challenges facing contractors on the quality of public building projects

Regression analysis was conducted to determine the impact of the challenges facing contractors on the quality of public building projects (see Table 7). Table 7 presents a significant regression equation [F (1, 0.628) =15.65; p=0.00(<0.05)] with an R^2 value of 0.66. The R^2 value of 0.66 indicates that there is a positive and strong relationship between the challenges facing contractors and the quality of public building projects. It also shows that 66% of the variation in the quality of public building projects can be explained by the

challenges facing contractors. At p-value of 0.00, there is significant evidence to suggest that the challenges facing contractors have a strong impact on the quality of public building projects.

Table 7. The impacts of the challenges facing contractors on the quality of public building projects

	Regression Statistics					
Multiple R						
R Square		0.813513				
Adjusted R		0.661804				
Square		0.619529				
Standard Error		0.200444				
Observations		10				
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	0.628978	0.628978	15.65489	0.004197	
Residual	8	0.321422	0.040178			
Total	9	0.9504				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.445791	0.920697	0.484189	0.641229	-1.67734	2.568921
X Variable 1	1.019413	0.257647	3.956626	0.004197	0.425278	1.613549

4.6 The impacts of the challenges facing contractors on client satisfaction in public building projects

Regression analysis was conducted to determine the impact of the challenges facing contractors on client satisfaction in public building projects (see Table 8). Table 8 presents a significant regression equation [F (1, 0.518) = 9.62; p = 0.01 (<0.05)] with an R^2 value of 0.54. The R^2 value of 0.54 indicates that there is a positive and strong relationship between the challenges facing contractors, and client satisfaction in public building projects. It also shows that 54% of the variation in client satisfaction in public building projects can be explained by the challenges facing contractors. At p-value of 0.00, there is significant evidence to suggest that the challenges facing contractors have a strong impact on client satisfaction in public building projects. The result shows that the impact of the challenges facing contractors on public building projects is more pronounced on cost and time than on quality and client satisfaction.

Table 8. The impacts of the challenges facing contractors on client satisfaction in public building projects

	Regression Statistics					
Multiple R		0.738953				
R Square		0.546051				
Adjusted R Square		0.489307				
Standard Error		0.232226				
Observations		10				
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	0.518967	0.518967	9.623128	0.014619	
Residual	8	0.431433	0.053929			
Total	9	0.9504				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1.98181	1.955468	-1.01347	0.340502	-6.49113	2.527506
X Variable 1	1.727011	0.55672	3.102117	0.014619	0.443212	3.010811

4.7 Methods of mitigating challenges faced by contractors in the execution of public building projects

The analysis of the methods of mitigating challenges faced by contractors in the execution of public building project in Nigeria is presented in Table 9. These were presented to the respondents as solutions to the identified challenges facing contractors in construction project implementation. As presented in Table 9, all the identified methods of mitigating challenges faced by contractors in the execution of public building projects were indicated by the respondents as very significant. This result suggests that contractors require prompt payment, proper planning, local building materials, motivated workers, and modern construction methods in order to mitigate the challenges they face on public building projects.

Table 9. Methods of mitigating challenges faced by contractors in the execution of public building projects

Methods of mitigating challenges	Mean
Prompt payment by clients	4.68
Proper planning and scheduling of project	4.64
Fixing a ceiling on the interest on funds borrowed by the government	4.51
Adoption of modern construction Methodology	4.48
Adoption and use of local building materials	4.43
Availability of well-trained professionals	4.42
Proper site management	4.37
Availability of plant and equipment	4.27
Effective communication	4.27
The adequate motivation of workers	4.22
Government patronage of emerging contractors	4.12

5. DISCUSSION OF FINDINGS

It emerged that the most significant challenges facing contractors in the execution of public building projects are difficulty in obtaining financial aid, delayed payment by clients, lack of management skills, high cost of plant and equipment, lack of incentives from the government to emerging contractors, unavailability of resources, and poor cash flow. The implication of the difficulty in obtaining financial aid and the delay in payment to the contractor is that it restrains the cash flow of the contractor, which will ultimately affect the timely delivery of construction projects. Similarly, the lack of management skills and lack of proper coordination of work and activities of other participants may lead to poor quality of work. The result concurs with the findings of Laryea (2010), Ihua & Siyanbola (2012), Gambo & Said (2014), Mafimidiwo & Iyagba (2015), Ogunde et al. (2016) and Omopariola et al. (2019) where these factors are considered as major challenges to the ability of contractors to perform to expectations. The finding of the study is also in agreement with the studies of Nesan (2005), Fugar & Agyakwah-Baah (2010) and Ugochukwu & Onyekwena (2014) and Omopariola et al (2017) in which payment-related problems of most contractors are found to be due to financial constraints in terms of late payment of monies due to contractor, limited options available from the banks and high lending interest rates. The finding is also consistent with the finding of earlier research by Wasi et al. (2001), Odediran et al. (2012) and Agwu & Emeti (2014) who found that management skill and planning have the most significant influence on the continued survival of construction firms.

This high impact of the challenges facing contractors in the execution of public building projects within project budget and on time has resulted in most of the problems affecting construction projects handled by Nigerian indigenous contractors. These findings are in line with earlier studies by Muazu and Bustani (2004), Odediran et al. (2012), Oladimeji & Ojo (2012) and Olugboyega (1998).

The study also revealed that the identified challenges facing contractors in the execution of public building projects can be mitigated through prompt payment by clients, proper planning and scheduling of projects, fixing a ceiling on the interest of funds borrowed by the government, adoption of modern construction methodology, adoption and use of local building materials and availability of well-trained professionals. The finding of the study is in agreement with Mafimidiwo & Iyagba (2015) whose study identified the following ways to reduce the challenges facing small contractors, the government ceiling on the interest rate of funds borrowed, the adoption of modern construction methodology and adoption and use of local building materials. The finding also concurs with Ogunde et al. (2016) whose research showed that the use of ICT, access to bank loans, incentives for site operatives by motivating employees, and sufficient government patronage would improve performance.

The study brings about a better understanding of the challenges faced by contractors in the execution of building projects and the methods used in mitigating the challenges towards achieving better building project performance. This study adds to the existing and growing number of literature and reference materials on building project delivery challenges facing contractors, especially in Nigeria. The study also launches a platform for future research on challenges facing contractors and project performance in the Nigerian construction industry. The research acknowledges that building projects with minimal challenges will have better performance.

The study provides empirical evidence on the challenges facing contractors and their impact on public building project performance. The study was limited to all types of public building projects (residential/housing, commercial, educational buildings) and no analysis was made on the basis of privately-owned buildings. Some of the variables employed for the assessment of constructs may not have been exact. However, some of the variables and constructs used in this study have theoretical backing and have also been validated empirically in previous research. However, this is not an assurance that the measures used are faultless. The study encountered some challenges in the administration and retrieval of the research questionnaires as the respondents were reticent.

6. CONCLUSION, IMPLICATION AND RECOMMENDATION

This research evaluates the challenges facing contractors in the execution of public building projects in Nigeria, through the identification of various challenges facing contractors, the impact of these challenges on project performance and preferred methods of mitigating the challenges encountered there. The research findings show that difficulty in obtaining financial aid, delayed payment by clients, lack of management skills, high cost of plant and equipment, lack of incentives from the government to emerging contractors, unavailability of resources and poor cash flow are major challenges facing contractors in the execution of public building projects in Nigeria. The findings further show that most of these challenges are perceived by the respondents to have a significant impact on time, cost, quality performance and client satisfaction outcomes. But the impacts on cost and time were found to be higher compared to the impact on quality and client satisfaction. These challenges facing contractors in the execution of projects can be addressed using all the means of mitigation identified in the study. Based on these findings, the study concludes that contractors in Nigeria face numerous challenges in the execution of public building projects and these challenges have considerable impacts on the performance of construction projects. It, therefore, becomes imperative for contractors and other stakeholders to devise strategies in handling these challenges in order to improve performance.

The findings of this study have both practical and theoretical implications for the clients and contractors. First, they extend the body of knowledge on the impact of challenges facing contractors on the performance of public projects in Nigeria. Second, they provide information to project stakeholders on the challenges that impact on performance such as

client satisfaction and project quality. The study, therefore, recommends that clients and consultants should promptly make payment to contractors, the government should give assistance in the area of getting access to financial aid and reduction in lending interest rates. The study further recommends that contractors should raise finance from the bank to solve immediate cash flow problems and repay such loans when payments are received from the clients.

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