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Impact of Construction Claims on Public Building Projects Performance in Abuja

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Building construction projects in Nigeria are characterized by contractual claims, which remain a challenge in terms of time and cost performance, thereby triggering the need for effective construction claims management in the construction industry. The study is aimed at assessing the impact of contractual claims on the performance of public building projects with the view to establishing strategies for effective management of contractual claims in public building construction projects. A pro forma was used to collect archival data on the impact of contractual claims while a self-administered structured questionnaire was used to gather information on the strategies for managing contractual claims. A total of 122 respondents were considered and the questionnaire was self-administered, of which 105 were retrieved. The data was analysed using paired sample t-test, mean item score, correlation and exploratory factor analysis. The results showed that contractual claims have significant impact on cost and time performance of construction projects with a cost overrun of 16.8% and time overrun ranging between 31% - 866% with p-value of 0.037. The study concluded that improved projects performance can only be achieved if contractual claims are eliminated. It is therefore recommended that stakeholders should improve on contractual procedures in order to eliminate avoidable omissions or changes during construction through effective communication and application of new technologies.

Keyword: Contractual claims, Projects performance, Public buildings.

Introduction

Construction industry is the sector of the Nigerian economy that engages in preparations of lands, construction of buildings and civil engineering works (Olufemi, 2013). The industry is considered as the backbone of every other sector as it accounts for about 15% of the national product of most developing countries and offers the motivating force essential for supporting financial buoyancy (Alintah-Abel & Nnadi, 2015). The industry adds an average of 5% to the annual Gross Domestic Product (GDP) and an average of about 1/3 (one-third) of the overall fixed capital investment (Omole, 2000). Construction activities dictate the route of an economy and the industry is described as a leading economic sector (Alintah-Abel & Nnadi, 2015). There by calling for proper utilization and management of the industry.

Construction projects are set of tasks embarked upon to produce a facility, within a well-defined scope, quality, schedules and estimates. However, in some projects, claims are encountered which may be in form of variation, delay in completion time, fluctuation or poor workmanship upon completion (Yadeta, 2014). Claims are hardly evitable in building projects and may arise before or after the contracts are signed (Ibbs *et al*., 2001). Construction claims are considered as the source of disruptions and unpleasing events by project participants in the construction industry (Ho and Liu 2004). Contractual Claims require clarifications of all that makes up a construction contract, from the scope, to what constitutes disruptions and allowable delays. Construction project is considered to be successful and achieve its objectives

when it is completed within schedule, estimated cost and quality as predicted at the planning stage (Odediran & Windapo, 2014).

Contractual claim is a common problem in building and civil engineering construction projects (Yadeta, 2014). Contractual claim on construction project has negative effects on projects such as delay, dissatisfaction and disputes that often lead to acrimonious relationship amongst stakeholders with attendant overruns both in cost and time of construction of projects. These negative attributes have brought about poor performance of projects, loss of client confidence in consultants, added investment risks, inability to deliver value to clients, and disinvestment in the construction industry (Eshofonie, 2008). Several studies had been conducted on the causes of claims, impacts of variation and claims management processes. However, there exists a gap on strategies for managing contractual claims in the building industry. Thus, this paper is aimed at assessing the impact of contractual claims on the performance of public building projects, with a view to formulating strategies for effective management of contractual claims.

Literature Review

Claims in Building Construction Contract

Claims on construction projects involve the stakeholders and are of key importance to make arrangement for uncertainties that may affect the performance of construction projects. Each project has uncertainties linked with it; the degree of the particular risk will manifest itself on a given time in the project (Shapiro, 2007). Construction stakeholders are fully aware that claims cannot be avoided or resolved easily, claims come as a result of risk not well managed in construction project but when these risks are identified early and managed by appropriate methods, they will at least be controlled within some allowable range to avoid contractual claims (Nguyen, 2014). The most common type of contractual claims arises from express terms of a contract (Simon *et al.,* 2007). Contractual claim may arise from any or all of the following: variation, fluctuation, loss and expense as well as extension of time (Simon *et al.*, 2007). Nothing is more constant than contractual claim during the course of a construction project, despite the best efforts of all participants during the planning, implementation and administration of the contract, claims will almost certainly occur and can be damaging to any project, if not considered collectively by all the stakeholders involved in the construction projects (Arain & Pheng, 2005). Sunday (2010) asserted that the complexity of the construction industry due to different stakeholders involved makes it differ from other industries. This complexity gives rise mostly to unwanted situation like contractual claims with their attached effects, and the more the claims on a project, the greater the likelihood that they become time consuming and costly in construction projects (Mohamed, 2001). In building construction projects, claims may be initiated either by the contractor or the client, which are entitled to payment for work including any loss incurred by either party at the course of carrying out the project and may also be entitled to claim for additional time and or money (Murdoch & Hughes, 2008). Contractors' claims may be described as requests for the reimbursement for additional costs resulting from certain employer or employer's agent's acts, which delay or disrupt the contractors progress, and which otherwise would not be recoverable under the contract (Cunningham, 2014). Though typical construction projects are not only contractual but complex and lengthy in nature, given these variables, emanating issues give rise to disputes amongst parties (Ojo, 2013). When commencing construction, contractors justifiably expect that all necessary project documents are not only correct but in place, adequate and received timely (Bryan, 2005), but in real sense, they are not actually so. Hence, Glover (2007) opined that due to the characteristics of construction project and environment, disruptions do occur; which warrant contractors to request for reimbursements.

Construction Project Performance

The goal of any project is greatly influenced by success rate of performance. It is seen as "the degree of attaining certain undertakings" (Project Management Institute, 2004). It relates with approved bounds objectives which form the projects bound (Chitkara, 2005). From the project management perspective, it is about satisfying the requirements of the clients and the prospects of a project. Yates and Eskander (2002) viewed a successful work as the work being completed without delay, within estimate, scope and quality. Thomas *et al.* (2002), Naoum, *et al.* (2004), Josephson and Lindstrom (2007) identified several means for measuring project performance, many of which were directed towards cost, time and quality. Ling (2004) asserted that the performance of a construction work is multi-tasking which may include cost per unit, speed in construction and delivery and satisfying client need.

Claim management and project performance

The success of managing construction project cannot be economically attained forcefully but requires the creation of environments that will inspire self-motivation and brings in teamwork spirit that is significant to effective project execution. According to Keane (1994), claims management is a process of employing and organising available resources to advance a claim from documentation and analysis through preparation and presentation, to negotiation and settlement. However, Bramble and Callahan (1992) posited that the essence of claims management is to guarantee that the project owner pays a fair price for meddling in the contractual process of executing construction work. This assertion underscores the submission of Harris and Scott (2001) who argued that the conditions leading to the occurrence of claims on construction projects cannot be totally eliminated on many of the contracts; however, strategies to minimise their effects should be more readily recognised by the stakeholders in the construction industry. Although Harris and Scott (2001) stated that the occurrence of claims will continue on construction projects unceasingly because of the inability of the project designer's to make provisions for unforeseen circumstance that may likely occur and influence the performance projects. This indicates that variations or likely changes to construction contracts are almost inevitable as work progresses (Oyewobi *et al*., 2016). This will invariably lead to increase in cost of construction works, thus the need for adjustment in payment to contractor which often forms the basis of claim occurrence on construction projects. Nonetheless, in managing claims, Levin (1998) homogenised the process of management and listed among others: the need to identify and recognise the causes of claims; systematic and accurate documentation; analysis of time and cost impacts. The focus of this paper is on the analysis of the impacts of claims on time and cost performance of construction projects; and through literature review, it has been established that claims exhibit impact on cost and time performance of construction projects. However, the magnitude of the impact is yet to be ascertained. Although previous studies such as Sharafadeen *et al.* (2015) and Obiegbu (2012) reported that the impacts of claims on construction project performance can be minimised through adequate and proper communication among parties involved in the contract, good contract management, good owner financing capacity for the payment of completed works, and design modifications during construction.

Research Methodology

The study focused on government owned public buildings executed in Abuja within the last ten years and whose records are available for study. Abuja houses several parastatals and agencies, with Federal Capital Development Authority (FCDA) central to the development of public buildings. The public buildings considered were those executed by the Public Building Department of FCDA. A total of 120 building projects were identified, a pro forma was used for collecting the archival data while a purposive sampling was used in

selecting 44 building projects that their claims were ascertained and agreed. The strategies for managing contractual claims were identified through extensive review of literature which was later developed into questionnaire that was self-administered to 122 respondents identified to have supervised or executed construction works under FCDA which included clients, consultants and contractors. The developed structured questionnaire consisted of two parts; part one contained demographic questions; part two was on contractual claims management strategies. The questionnaire was rated on a five-point Likert type scale ranging from strongly disagree (1) to strongly agree (5). The data was analysed using Mean Item Score, spearman's correlation, Paired sample t-test and explorative factor analysis. Out of the 122 questionnaires administered, 105 (86%) were returned and fit for analysis. Mean Item Score was used to rank the identified strategies for contractual claims management, spearman's correlation showed the degree of agreement among the clients, consultants and contractors groups in terms of their views to the study factors, Paired sample t-test was used to test the significance difference between the final and initial cost – time and explorative factor analysis was carried out to explore the overall data and determine the factors and clusters of factors measured by the questionnaire. The questionnaire was tested for reliability using Cronbach coefficient alpha (α). The test results indicated the Cronbach coefficient alpha value for the strategies for managing contractual claims was 0.948. This exceeds the cut-off of 0.70 (Zikmund, 2009; Ogwueleka, 2011) indicating that the variable constructs were highly reliable and free from random errors.

Data Analysis and Discussion

Table 1 presents the demographic data of the respondents. 56% were members of the Nigerian institute of quantity surveyors, while 44% were probationer members of the Nigerian institute of quantity surveyors. And the respondent's background presents the following results; project Q/S 24%, Project managers 33%, Construction managers 10% and Supervisors 33%. While working experience of respondents presents 32% of respondents had less than 5 years' experience, 44% had 5-10 years' experience and 24% had 10 years' experience and above. This shows that the respondents involved in the study had requisite knowledge that was adjudged to be good enough for this study considering the years of experience and professional status.

Table 1: General Demographic Characteristic of Respondent

Characteristic	Frequency	Percentage (%)
Professional Qualification		
Fellow	0	0
Member	59	56
Probationer	46	44
Background		
Project Q/S	25	24
Project Manager	35	33
Construction Manager	10	10
Supervisors	35	33
Experience		
Less than 5 years	34	32
5-10 years	46	44
10 years and above	25	24

Source: Researchers Analysis (2017)

Cost Performance on Public Building

Table 2 presents the result of a paired sample t-test conducted to measure the significant difference in the final cost and initial estimate of the public buildings. The output gave an average mean of 157,856,936.00 with t-value at 2.754 and p-value at 0.03 at 95% confidence level. The p-value shows that there is significant difference between the final construction cost and initial estimate. This means that a large proportion of the variance of the final cost is predictable from the knowledge of the initial estimate.

Further analysis in Table 3 shows that all the 44 completed building projects experienced cost overrun ranging between 14% - 22%. On the average, all the projects experienced cost deviation of 16.68%. the findings from the study is in consonance with the study reported by Omoregie and Radford (2006), which established a cost increase of 14% of the studied projects. A similar finding was reported by Memon *et al.* (2012) on construction projects in Malaysia which also experienced cost overrun in the range of 5 -10%. The results reported in this paper shows that cost overrun is not only peculiar to the Nigerian construction industry but a global issue and this is corroborated by Flyvbjerg (2002) who conducted a global research on construction projects and concluded that 9 out of 10 projects had cost overrun of 50% - 100%. However, the National Institute of Building Science (2013) established that a deviation in cost acceptable to be in the range of 2-3% on construction project. This implies that more efforts are required in managing construction projects with a view to minimizing cost overruns on public projects.

Time Performance on Public Building

Table 4 present the result of a paired sample t-test conducted to measure the significant difference in the final time and initial time of the public buildings. The output gave an average mean of 42.86 with t-value at 2.67 and p-value at 0.03 at 95% confidence level. The p-value shows that there is significant difference between the final construction time and initial estimated time. This means that a large proportion of the variance of the final cost is predictable from the knowledge of the initial estimate.

Table2: Paired Sample T-Test for Cost of Claims on Public Buildings.

Paired Samples Test

			Paired Differences					t	df	Sig. (2-tailed)
		Mean	Average Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Pair 1	final cost	1105719056	157856935	151657016	57320964.36	17597588	29811 6283	2.754	6	0.033
	Initial cost	94786 2120								

Table 3 Project Cost

S/N	Ref.	Project Title	Initial Contract Sum	Final Contract Sum	% Increase
1	4	Model Office complex	55,632,336.23	64,416,389.32	16%
2	5	Advanced E-Learning Centre	1,303,301,846.21	1,509,086,348.24	16%
3	6	library complex + offices	2,610,811,446.81	3,023,044,833.15	16%
4	8	female hostel	320,000,000.00	365,000,000.00	14%
5	10	Wasa Resettlement FCT. Lot D69 and A9.	64,152,441.15	77,953,075.36	22%
6	11	Residence of the speaker house of representative	924,701,193.16	1,064,014,331.47	15%
7	12 to 49	Mass Housing Resettlement projects FCT. (prototype)	1,356,435,579.14	1,636,518,417.10	21%

Table4: Paired Sample T-Test for Time of Claims on Public Buildings.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Average Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	Df	Sig.
Pair 1	Final time	71.7143	42.85714	42.44380	16.04225	3.60317	82.11111	2.672	6	.037
	Initial time	28.8571								

(2-tailed

Further analysis in Table 5 shows that all the 44 completed building projects experienced time overrun ranging between 30% - 86%. This result was in line with the findings of Aghimiem and Awodele (2017), who posited that projects in Nigeria may experience time overrun between 17% and 86%. These results underscored the findings reported by Odeyinka and Yusif in 1997 (21 years ago) which argued that 58% time overrun was observed on construction projects studied in Nigeria. Also, Omoregie and Radford (2006) established that time performance in the construction industry is very challenging due to projects not being completed as scheduled which makes time overrun to continue unabated.

Table 5: Project Time

S/N	Ref.	Project Tittle	Project Duration	Commencement. Date	Completion Date	% Completion	Extension of Time	% of Delay
1	4	Model Office complex	12 months	May. 2011	May. 2013	100	12 months	100 %
2	5	Advanced E-Learning Centre	3 years	Dec. 2010	Nov. 2014	100	11 months	30%
3	6	Library complex + offices	3.5 years	Feb. 2010	May. 2015	100	29 months	69%
4	8	Female hostel	52 weeks	May. 2015	Dec. 2016	100	28 weeks	53%
5	10	Wasa Resettlement FCT. Lot D69 and A9.	12 weeks	Jun. 2011	May, 2015	100	104 weeks	866 %
6	11	Residence of the Speaker house of representative	3 years	2010	2014	100	12 months	33%
7	12 to 49	Mass Housing Resett. projects FCT. (prototype)	12 weeks	2006 -2010	2008 – 2013	100	104 weeks	866 %

Strategies for Managing Contractual Claims

Table 6 presents the mean ranking of the strategies for contractual claims management, they are adequate use of professionals should be employed, ensure adequate and proper communication during construction, avoid design modification, ensure control during planning and implementation phase and ensure suitable procurement method ranked 1st, 2nd, 3rd, 4th and 5th respectively. These are in tune with the studies of Sharafadeen (2015) and Obiegbu (2012), who asserted that the identified factors can greatly influence project performance either positively or negatively depending on their implementation. Also, Maina (2012) pointed out that integrated contract procurement enhances better project performance in terms of risk control, cost and time overruns.

Comparing perceptions of professionals on the Strategies of contractual claims

The findings from Table 7 show the Spearman's rank correlation revealed a strong positive correlation among the different groups of respondents. This indicates that the respondents have the same view as regard the strategies for managing contractual claims.

Table 6 : Strategies for Managing Contractual Claims

Strategies for managing contractual claims	Client means	Rank	consultant Mean	rank	Contractor Mean	rank	Overall Mean	Rank
Adequate use of professionals should be employed	5	2	4.77	1	4.86	1	4.88	1
Ensure adequate and proper communication amongst party	4.86	5	4.74	2	4.66	3	4.75	2
Avoid design modification during construction	4.94	3	4.52	6	4.56	5	4.67	3
Ensure control during planning and implementation phase	4.71	9	4.71	3	4.6	4	4.67	4
Ensure suitable procurement method	5	1	4.45	8	4.53	6	4.66	5
Good contract management	4.71	8	4.57	5	4.66	2	4.65	6
Good client financial capability	4.71	7	4.48	7	4.46	10	4.55	7
Project document should be interpreted correctly	4.43	14	4.68	4	4.53	8	4.55	8
Establish quality control measures	4.77	6	4.37	10	4.46	9	4.53	9
Resources should be correctly determined and allocated	4.29	15	4.4	9	4.53	7	4.41	10
Built good team spirit	4.71	10	4.34	11	4	13	4.35	11
Enough materials should be provided	4.6	12	4.28	13	4.13	12	4.34	12
Functional site layout must be assessed and provided	4.43	13	4.31	12	4.2	11	4.31	13
Encourage self- motivation	4.71	11	3.84	15	3.6	15	4.05	14
Partial payment during construction should be avoided	4.89	4	3.88	14	3.86	14	4.21	15

Table 7: correlation test Comparing perceptions of professionals on the Strategies

Respondents	**Rho(P_{cal}) = 1 – $\frac{6x(\sum di^2)}{N x (N^2 – 1)}$**	**Relationship**
Client versus Consultant	0.980	Strong
Consultant versus Contractor	0.995	Strong
Client versus Contractor	0.972	Strong

Factor analysis reporting the three cluster strategies of contractual claims on Table 8

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO) was tested with the data for the strategies for managing contractual claims, returning a value of sampling adequacy 0. 855. This is considered sufficient to conduct a factor analysis as any value above 0.6 (the cutoff point) is considered acceptable (Eiselen *et al.*, 2007). The *p*-value of Bartlett's test of sphericity (represented by "Sig"), indicates a measure of the multivariate normality of the set of distributions. According to George and Mallery (2003), a significant value < 0.05 indicates that the data does not produce an identity matrix and are thus acceptable for factor analysis. This set of data returned a significance value of 0.000, indicating that the data was acceptable for factor analysis.

Effective Coordination: Ten items were loaded onto this factor, as presented in Table 8, with a variance of 35.015%. The strategies identified agreed with the studies of Sharafadeen *et al.* (2015), Jimoh (2012) and Yng *et al*. (2002) who stated that the above findings will help in managing contractual claims. In a related development, Maina (2012) emphasised that integrated contract procurement enhances better project performance in terms of risk control, cost and time escalations.

Effective Communication: Three items were loaded onto this factor, as presented in Table 8, with a variance of 22.966%. This agreed with the study of Obiegbu (2012), Yng *et al*. (2002) and Sharafadeen *et al*. (2015) that postulated that the above strategies will help curtail claims and promote project performance.

Effective Resource Utilization: Two items were loaded onto this factor, with a variance of 20.929%. The study of Obiegbu (2012) was in line with the submission.

Table 9 present average factor loading for the strategies of managing contractual claims, the grouped strategies should be collectively assessed for better public project performance. The strategies are ranked in their order of importance, it shows that effective communication cluster with average factor loading of 4.60 is very crucial to the attainment of the study goal as such due consideration should be given to it. Effective coordination and utilization of resources clusters with average factor loadings of 4.50 and 4.30 respectively should not be over looked as collective implementation of the strategies will yield an effective time and cost performance in public building projects.

TABLE 8: Strategies Cluster for contractual claims management.

Cluster Factor Groupings Factor	Factor Loadings	Eingen Values	% of Variance	Mean	Communalities extraction
Effective Coordination		**9.4**	**35.015**		
Adequate use of professionals should be employed	0.724			4.88	0.817
Avoid design modification during construction	0.778			4.67	0.712
Ensure suitable procurement method	0.784			4.66	0.91
Good contract management	0.582			4.65	0.781
Good client financial capability	0.597			4.55	0.758
Establish quality control measures	0.645			4.53	0.808
Built good team spirit	0.602			4.35	0.826
Enough materials should be provided	0.531			4.34	0.575
Partial payment during construction should be avoided	0.849			4.21	0.862
Encourage self- motivation	0.739			4.05	0.584
Effective Communication		**1.327**	**22.966**		

Ensure adequate and proper communication amongst party	0.743			4.75	0.885
Ensure control during planning and implementation phase	0.861			4.67	0.881
Project document should be interpreted correctly	0.785			4.55	0.752
Effective Resource Utilization		**1.1**	**20.929**		
Resources should be correctly determined and allocated	0.902			4.41	0.803
Functional site layout must be assessed and provided	0.67			4.31	0.883
		78.91%			

Table 9: Average Factor Loading

Strategies (Clusters)	Average Factor Loading	Rank
Effective Communication	4.60	1
Effective Coordination	4.50	2
Effective Utilization of Resources	4.30	3

Conclusion and Recommendations

The study assessed the impact of contractual claims on the performance of public building projects with the view to evolving strategies for effective management of contractual claims in public building construction projects. The study concluded that contractual claims impact public projects in terms of cost and time performance, with cost increase averaging16.68% and time increase of 31% - 86%. The findings show that high level of professionalism is needed in handling construction projects in order to reduce occurrences of claims especially the avoidable claims. Based on the findings of the research, the study recommends that all parties to the project should ensure effective communication, coordination within the project, and effective utilization of resources on public building projects.

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