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RESEARCH ARTICLE

RESPONSIVENESS OF CONSTRUCTION PARTICIPANTS TO BUILDING COLLAPSE IN LAGOS STATE, NIGERIA

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ABSTRACT

Purpose - The purpose of this paper is to investigate the factors influencing the responsiveness of construction participants to building collapse in the Nigerian construction industry. There has been a general type of response to incessant menace of building collapse among construction participants which is, playing the blame game. This is worrisome considering its attendant psychological effect on the affected persons and cost implications to the industry at large. Design/methodology/approach – Literature review conducted identified forty-nine (49) factors that can influence the responsiveness of construction participants to building collapse, which were employed to design a questionnaire survey. Data collected were analysed using descriptive statistics, mean score, Kruskal–Wallis test of ANOVA and multivariate techniques such as factor analysis. Findings - The descriptive and empirical analysis showed disparity of ranking of the 49 factors among the groups studied. There was statistically significant difference ($\rho < 0.05$) in 35 representing 71.4% of the factors influencing the responsiveness of participants in the construction industry to building collapse while the remaining 28.6% was not significantly different. Therefore, irrespective of the individuality of response from each group of construction participants, they still demonstrated a reasonable level of agreement in their responses to the factors influencing the responsiveness. Among the significant factors based on the mean score rankings are quality of materials, availability of experienced professionals, adequate enforcement of building code, design and specifications changes, financial capability of clients and budget allocation for building projects. Through factor analysis, the study categorized the forty-nine factors influencing the responsiveness of participants in the construction industry into six general factors. The factors are: client related; project procurement related; economic management related; ethical values related; construction management related and policy management related. Practical implications - The investigation into the factors influencing the responsiveness of participants is with a view to mitigating continuous occurrences of building collapse in Lagos State, and Nigeria as a whole. This is a very useful information on the roles and duties of all construction professionals and other stakeholders in the construction industry. Also, stakeholders in the academia can carry out a review of the curriculum for tertiary institutions based on the information on factors influencing responsiveness of construction participants. Originality/value - The study was able to categorise all the forty-nine factors into six basic groups using the factor analysis, and this could be used to develop measures for mitigating occurrences of building collapse. hence, it has successfully provided insightful knowledge base regarding the basic factors influencing the responsiveness of participants in the construction industry to building collapse, especially in Lagos State, Nigeria.

KEYWORDS

Building collapse, Construction, Nigeria, Participants, Responsiveness Paper type - Research paper

1. INTRODUCTION

The construction industry has impacted greatly on other types of industries around the world. This is evident since various activities taking place worldwide require enclosures to perform optimally (Babalola, 2015). In this view, some researcher noted the importance of the construction industry based on its immense contribution to the economic growth of any nation (Tanko et al., 2017). Most importantly, the construction industry is at the forefront of building products for diverse purposes. This is done by engaging the services of qualified construction professionals. Various activities are being carried out by different categories of people who are directly or indirectly involved in the construction process. These include construction professionals, clients (public and private), contractors, and some independent concerned groups, among others. It is an indispensable industry as various activities it undertakes, contribute to the sustenance of the economic growth of nations (Windapo and Rotimi, 2012; Tanko et al., 2017). In Nigeria for example, the construction industry produces several building types, coupled with being the largest employer of labour worldwide.

Some of the activities undertaken by participants in the industry include the construction of dams, roads, and most important buildings, which is the focus of the study. Oke reiterated the importance of buildings as an entity that other industries depend upon to carry out their operations

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(Oke, 2011). To further buttress this view, Babalola averred that various activities taking place worldwide require enclosures (buildings) for them to perform optimally (Babalola, 2015). Examples of such buildings include educational, institutional, religious, commercial, and residential buildings among others. However, the unceasing menace of building collapse, coupled with its psychological and cost implications has become worrisome. Based on Windapo existing buildings accounted for a higher percentage of building collapse occurrences in Nigeria, which were either total or partial collapse (Windapo, 2006). A group researchers further confirmed records of both total and partial incidences of building collapse on buildings such as residential and commercial buildings (Oni, 2010; Adetunji et al., 2018). Others are educational, religious (churches and mosques), mercantile (shopping mall), and institutional buildings. This was not without several degrees of injuries inflicted on victims with loss of lives and properties of huge amounts of money as the aftermath. According to some study, between 1978 and 2010 in Lagos State alone, 47 building collapse cases were recorded (Oni, 2010; Windapo and Rotimi, 2012). Similarly, 52 cases were recorded between 1985 and 2013 (Nwankwo et al., 2015). The study further noted that existing buildings accounted for the largest percentage of collapse records in Lagos State.

The spate of building collapse has also been attributed to the inadequacies in the level of responsiveness of construction participants to their respective duties and responsibilities at mitigating the menace. According to the duties and responsibilities of construction industry participants are diverse (Olatunji et al., 2014). The requisite knowledge that professionals have acquired by way of education and practical experience makes them well-grounded in their respective disciplines (Arilesere, 2002; Oke, 2011). Alabi further submitted on the need for construction professionals to carefully exercise their expertise as they would be answerable for any act of omission or commission during the construction process (Alabi, 2016). The big issue has therefore been that some participants engage in their duties and responsibilities to execute building projects. It has also been the usual practice in the Nigerian construction industry to regard anybody supervising a construction project as an engineer. Furthermore, construction participants engage in a blame game of all sorts, with the belief that a party did not play its role effectively on a project (Ayedun et al., 2011; Babalola, 2015). Hence, the failure of a participant to carry out their expected duties and responsibilities adequately as expected is a major problem plaguing the Nigerian Construction Industry (Oke, 2011; Babalola, 2015).

2. Perceived Factors Influencing Responsiveness of Construction Participants

In this study, responsiveness is defined as the proactive competency of participants to decipher and respond duly to their duties and responsibilities. But, investigating the perceived factors influencing the responsiveness of construction participants to building collapse is a herculean task, based on the paucity of studies of responsiveness in the construction industry. Hence, related studies on construction projects performance in relation to value management, project management, policy enforcement, moral concerns and innovation of construction projects are regarded useful for investigating the factors influencing the responsiveness of construction participants.

A group researchers conducted a survey on some critical factors responsible for the success of building projects (Sanvido et al., 1992). Among these are: well-organized management team and their experience in planning, designing and executing the project successfully. A study further identified other variants of management teams' experience which include suitability of designs and specifications, level of involvement and commitment of project managers, constructability of the project, contractual motivation and incentives as well as clarity of purpose, roles and responsibilities of the participants.

Furthermore, an empirical study on the real success factors of construction projects identified the factors that are germane to project management success (Cooke-Davies, 2002; Skitmore and Lyons, 2004). These were highlighted to include the level of education on the concept of risk management, procurement method, understanding of scope changes, and ability to maintain the integrity of the project performance baseline (Eriksson and Westerberg, 2015). Other factors identified by include the level of competence of the participants, committed team of participants', the commitment of the participants to the project at hand, availability of funding throughout the building process as well as the provision of the required resources for an undisturbed process (Nguyen et al., 2004).

In another related study by Homthong and Moungnoi, critical success factors influencing construction project performance for different objectives was looked at from both the operation and maintenance phase of a building project (Homthong and Moungnoi, 2016). The study highlighted nine different categories under which certain factors were identified. These were categorised into time, cost, quality, risk management, health and safety, environment, client satisfaction, productivity and human resource. The time-related factors highlighted and ranked in their order of importance include quality of communication process among the participants involved, clear understanding of project objectives, competence and experience of construction participants', level of commitment of construction participants involved, timely decision making, contractual motivation and incentives among others.

The success of any construction project is also a measure of the level of satisfaction that can be derived from the products delivered. This could be determined by the quality of the services employed, duration of completion and cost of the project among others. A group researchers construe that there are four dimensions used in measuring the service quality of construction project (Sunindijo et al., 2014). These were identified as reliability, responsiveness, assurance and tangibility. One of the factors identified with responsiveness was the delivery of on-time services from the angle of construction participants. Other components of responsiveness include the proactive nature of construction participants', giving attention to clients, the willingness of the participants to go the extra mile for the client, sincerity and ability to be a problem solver, reporting how work is progressing on site and ability to execute the job as required.

Furthermore, Mwangi opined that there is a need for proper management of funds during any building project (Mwangi, 2016). The importance of proper planning, sourcing, and controlling the fund is very crucial to the project success to avoid incidences of building collapse. It was further noted that participants' responsiveness is dependent on the provision and proper management of funds to facilitate building projects to successful completion without encountering cases of delay, abandonment, or collapse. Adequacy of funds and the composition must be consistent all through the period of the project. Although, Nwude also noted the need for participants to possess a high level of moral attitude with responsibility and determination to properly manage the project to completion (Nwude, 2010). Their failure in measuring up to this responsibility could lower project performance which is often evident on the increased records of building collapses in the construction industry.

Ogbebor and Akintunde confirmed that building projects often exceed their budgeted costs as well as the duration of work (Ogbebor, 2002; Akintunde, 2003). This they conclude was as a result of unavailability or inadequacy of project fund. In other words, a majority of building projects were not completed within the contractual period and contract sums. For a building project to be successful and free from facing any form of collapse, adequate funding is required. This was why Ameh and Osegbo and Rahman maintained that availability and adequacy of funds guarantee a proper construction process and encourage quality delivery (Ameh and Osegbo, 2011; Rahman, 2013).

There were concerns over the quality of equipment and raw materials and shortage or inadequacy of skilled manpower required for the proper execution of a building project. According to skilled manpower are individuals with versatile building skills obtained from training and practical experiences in the construction industry (Medugu et al., 2011). They were identified as those in direct contact with the building during the construction stage and therefore have a lot of impact on the successful delivery of the project (Rafee, 2012). Whether a building project succeeds without experiencing any form of failure or collapse is also a function of the type of manpower engaged.

A group researchers alluded to the importance of adhering to basic codes of practice as a measure of increased performance of building projects (Omenihu et al., 2016). The Nigerian Building and Road Research Institute has observed that construction participants are fond of changing the purpose for which a building was meant, thereby causing havoc to the environment (Nigerian Building and Road Research Institute, 2012). For example, a building designed for residential purpose being converted to a religious building, a multipurpose office complex into a shopping mall and at other times, the illegal increase of the number of storeys without any recourse to the original foundation design.

According to the International Conference of Building Officials (ICBO), there is a minimum standard that the code of practice is expected to achieve (International Conference of Building Officials (ICBO), 1997). It was noted that the *"minimum standards shall provide necessary safeguard to life or limb, health, property and public welfare by regulating and controlling the design, construction, quality of materials used and occupancy, location and maintenance of all buildings and structure within*

its jurisdiction and certain equipment specially regulated herein."

In Nigeria, the National Building Code (NBC) exists. However, based on research and observations, conclusions can be reached that the NBC is yet to have a grip on all building and construction activities, hence, the recurrent incidences of building collapse. Construction participants in the building construction industry have continued to engage in building processes without considering the importance of the building code. In addition, majority of the built environment professionals have always engaged in the execution of building projects without adequate emphasis on the codes.

Uji noted that construction participants go as far as increasing the floor levels of their buildings which negates the originally approved plan (Uji, 2015). Oni and Oke also pointed out the conversion of bungalows to one or two-storey buildings without seeking approval from the necessary authority (Oni, 2010; Oke, 2011). These actions would have an impact on the strength required for attaining stability of the building (Adebowale et al., 2016). According to Oyedele, most of the clients have oftentimes approached unqualified professionals having nursed the notion that the service of a qualified professional was too expensive (Oyedele, 2018). Therefore, they opt for quacks that probably have been on the job for many years but lack the required expertise, technicality, and manpower to execute certain types of projects (Ayininuola and Olalusi, 2004).

Uji opined that the greed of wanting to make more profit far beyond the necessary has led construction participants to cut corners and not honestly abiding by the terms of engagement as written in the conditions of a contract (Uji, 2015). According to Windapo and Rotimi, construction participants are fond of planning a short-cut method of minimising the costs incurred on building projects to increase their profit (Windapo and Rotimi, 2012). Some researchers confirmed the alarming increase of greed, fraud, bribery and corruption in the construction industry which has impacted the performance of construction works (Adeyemi and Kashiwagi, 2014; Asante and Sasu, 2018). Moral misconduct and conflict of interest among participants could also lead to poor project performance based on construction errors, poor supervision and total reliance on contractor's judgement (Oloyede et al., 2010). Also, a group researchers averred that loss of moral values among participants have greatly contributed to the increased cases of building collapse in Nigeria (Oyewobi et al., 2011).

According to NBRRI, there has not been adequate enforcement of the codes and that, in the event of a building collapse, those found culpable of several offences have never been prosecuted (NBRRI, 2012). This has therefore resulted in a lack of trust by the general populace in the activities of the construction industry professionals. It could therefore be interpreted that violations of the codes of practice and building misuse in the country have assumed an embarrassing and alarming proportion and it is believed that the professionals are not receiving the appropriate support to attend to this ugly situation. Oyedele also indicates a lack of commitment on the part of participants in academics to engage in research that would come up with a concrete workpiece that can be adopted to proffer a solution to the lingering issue of building collapse (Oyedele, 2018). Wasiu, Oyebode and Adebayo have also identified poor work ethics, non-enforcement of building regulations and deficiency of professional proficiency among construction professionals (Wasiu et al., 2014). Similarly, improper and poor monitoring mechanism of projects at the construction stage by the necessary regulatory authorities have resulted in several occurrences of building collapse (Hamma-Adama and Kouider, 2017). Furthermore, site accessibility, lack of qualified professionals/staff, incompetent professionals/staff, inadequate logistics required for effectiveness, as well as political influence among others, have also hindered the regulatory body from properly executing their duty (Asante and Sasu, 2018).

These factors and many others have continued to lead to more buildings collapsing, lives being lost, properties damaged and some if not the majority of victims incurring fatal injuries that render them partially or permanently impotent. Mason states that efforts must be focused on rebuilding the moral standards of integrity, honesty, respect of persons, trust, fairness, confidentiality, accountability, transparency, diligence, and reliability that have been lost among participants (Mason, 2011). It is also important to imbibe and inculcate moral standards into the psyche of young professionals right from the academic environment. These characteristic factors have been viewed as important enough to consider an investigation of their influence on the responsiveness of participants in the construction industry to incidences of building collapse. There is a need to stimulate the relevant authorities and, indeed, all Nigerians to be responsive in a proactive manner to combat the issue squarely.

3. Research Methodology

In this research, extant literatures of current and relevant studies on the subject of building collapse were reviewed. This was with the view to identify factors influencing the responsiveness of construction participants to building collapse. Quantitative research method was adopted, using a structured questionnaire to obtain relevant and useable information from the respondents. Primary and secondary data were collected for this study. Construction participants responded to request for relevant information such as academic/professional qualifications, and years of working experience among others. Other information responded to include factors influencing responsiveness of construction participants. The essence of this information was to enhance the duties and responsibilities of construction participants aimed at mitigating incessant cases of building collapse.

3.1 Study Location

Figure 1 is the map of Nigeria showing Lagos State as the study location. The state is located in the South-Western part of Nigeria on the Narrow Coastal Plain of the Bight of Benin. Lagos State is about 6.5^0 North of the equator and 3.5^0 East of the Greenwich Meridian. It is bounded in the North and East by Ogun State in Nigeria, in the West by the Republic of Benin, and stretches over 180 kilometres along the Guinea coast of the Bight of Benin on the Atlantic Ocean. The state comprises the city of Lagos and four other administrative divisions which are Badagry, Epe, Ikeja and Ikorodu (Oni, 2010). Lagos State was first founded as a trading port in the 17th century by the Portuguese and became the colonial administrative headquarters of the newly formed Nigeria in 1914. It remained the capital city of Nigeria until 1991 when it was replaced by Abuja (Oyeleye, 2013). It is the smallest of the administrative states in the country in terms of land area occupying only 3,577sq km of mostly coastal plains. The state is surrounded by lagoons which make up about 22% of the state's landmass. The land use pattern in Lagos State is mixed, comprising all forms of land uses such as residential, commercial, industrial, recreational, circulation, agricultural and others (Kolawole, 2018).

3.2 Study Population

Construction participants involved in the development and monitoring of projects in the building industry are classified as the study population namely: the clients, construction professionals, contractors, government agencies and non-governmental organisations. Table 1 detailed the study population by showing the categories of all the participants involved.

3.3 Survey Administration

Questionnaires were administered to all the relevant construction participants. The sampling frame for the construction professionals was based on the available list of registered and financially responsive members of each of the professional associations (Nigeria Institute of Architects; Nigeria Institute of Building; Nigeria Institution of Structural Engineers; Nigeria Institute of Quantity Surveyors and; Nigeria Institute of Town Planners). A total of 328 Architects, 608 Builders, 1748 Structural Engineers, 949 Quantity Surveyors and 378 Town Planners were financially up to date in their respective associations. These formed the sampling frame for the study. Samples are subsets of a population used to represent the entire group. 10-30% of the population were sampled. From the list of registered and financially up-to-date members obtained from the respective professional associations, 5% of the structural Engineers and 10% of other construction professionals were selected randomly for questionnaire administration. Hence, 33 Architects, 61 Builders, 87 Structural Engineers, 95 Quantity Surveyors and 38 Town Planners summing up to a total of 314 construction professionals were selected. This method of sampling has been adopted by several authors in similar studies (Ameh and Odusami, 2010; Hassim, 2012; Orji, Enebe and Onoh, 2016; Kolawole, 2018).

Two private clients (individual and corporate) were nominated by the 57 contractors, and this amounted to one hundred and fourteen (114), which were all used for the questionnaire. Also, the public clients were identified from all the five MDAs, these were one hundred and eight (108) in number. These were equally used for questionnaire administration. In all, a total of 222 clients were enumerated for questionnaire administration. In the same vein, all the 41 district offices from the two government agencies (LASPPPA and LASBCA) in Lagos State were administered questionnaire based on total enumeration. Also enumerated were 57 contractors registered with the Federation of Construction Industry (FOCI) in Lagos State and two (2) non-governmental organisations. The participants selected for this study (Table 2) were; 222 clients, 314 construction professionals, 57 building contractors, 41 government agencies and two NGOs. All these summed up totalled six hundred and thirty-six (636).

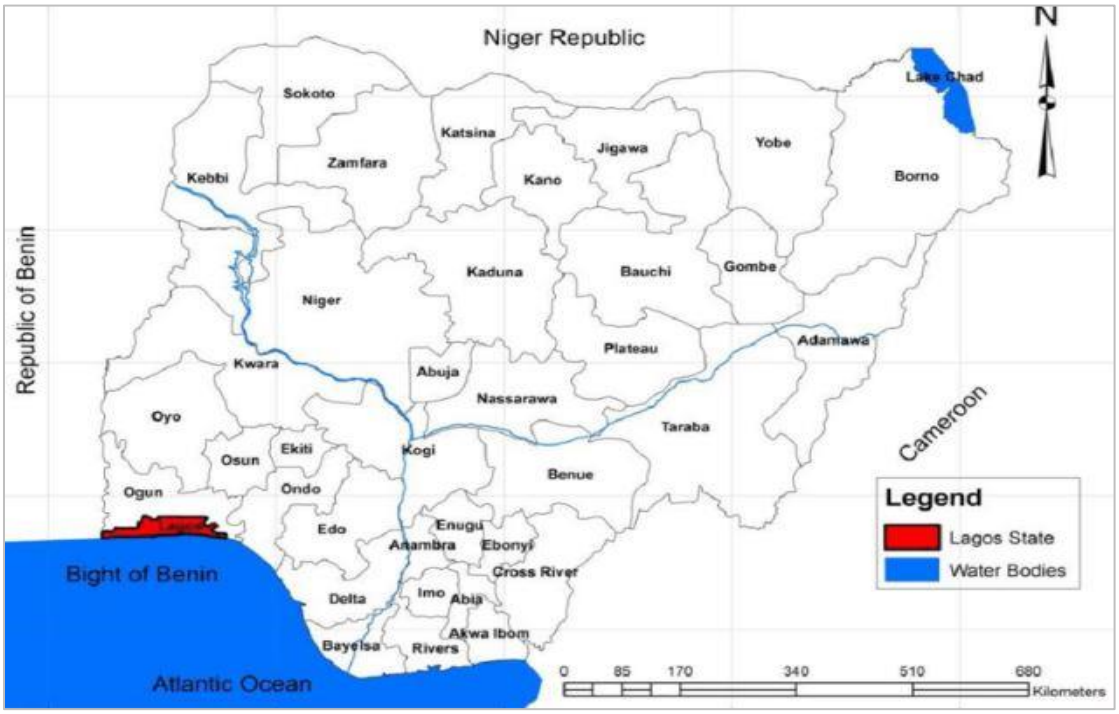

Figure 1: Map of Nigeria showing Lagos State (Source: Adeniran, Otokiti and Durojaye, 2020)

Table 1: Study Population

S/N	Participants	Categories
1	Clients	Private (Individuals and Corporate organisations); Public (Lagos State Government Ministries)
2	Construction Professionals	Architects, Builders, Civil Engineers, Quantity Surveyors and Town Planners
3	Contractors	Federation of Construction Industry (FOCI)
4	Government Agencies	Al district offices under LASPPPA and LASBCA located across Lagos State
5	Non-Governmental Organisations (NGOs)	Building Collapse Prevention Guild (BCPG); Engineering Regulations Monitoring (ERM) Unit

Table 2: Total Number of Construction Participants

S/N	Construction Participants	Number
1	Clients (Private and Public)	222
2	Construction Professionals	314
3	Contractors (FOCI)	57
4	Government Agencies	41
5	Non-Governmental Organisations (BCPG & ERM)	2
	Total	**636**

4. Results and Discussions

The factors influencing the responsiveness of construction participants to building collapse incidences in the study area were investigated. Forty-nine (49) variables extracted from the literature were presented in the questionnaire. The construction participants, in their opinions, responded to the questionnaire based on a 6-point Likert scale measure provided. The results are presented in Table 3 with their mean scores and rankings. The mean scores range from 3.82 to 4.45. Therefore, following the set boundary of mean score value of 3.50 on the scale of 5 as established in the studies, all the factors identified in this study are very important and adjudged to influence the responsiveness of construction participants to building collapse (Okorie and Olanrewaju, 2019; Olanrewaju et al., 2020). Overall, construction participants ranked "quality of materials" 1st with a mean score of 4.45 and "availability of experienced professionals" 2nd with a mean score of 4.43.

Also, "adequate enforcement of building code" with a mean score of 4.37 and "design and specifications changes" with a mean score of 4.37 were both ranked 3rd among the factors while "financial capability of clients" with a mean score of 4.35 and "budget allocation for building projects" with a mean score of 4.34 both ranked 4th and 5th respectively among all the factors influencing the responsiveness of construction participants to building collapse. The least ranked factors include "client reputation" with a mean score of 3.94, "type of procurement method" with a mean score of 3.94, "current workload" with a mean score of 3.92, "need for work" with a mean score of 3.89, "relationship with clients" with a mean score of 3.87, "tendering duration" with a mean score of 3.83 and "size of the client" with a mean score of 3.82.

In addition to the mean score value rankings, the result of K-W one-way ANOVA test conducted in order to test the hypothesis of no significant difference in the perception of differing construction participants was also presented. The statistical significance for the analysis was set at a 95% confidence level. Prior to K-W test, the Kolmogorov-Smirnov (K-S) test was conducted to confirm the normality of the data distribution as used in the studies of (Shokri-Ghasabeh and Chileshe, 2016; Olanrewaju et al., 2020). From Table 3, thirty-five out of the forty-nine factors influencing responsiveness were significantly different ($\rho < 0.05$). This indicates a variation in the response of construction participants in terms of agreement with the ranking of those factors. While 35 of the factors representing 71.4% were significant, there was no statistically significant difference ($\rho > 0.05$) in the perception of construction participants on the remaining 14 factors, representing 28.6% of the total. Therefore,

irrespective of the individuality of response from each group of construction participants, they still demonstrated a reasonable level of agreement in the ranking of some of the factors.

Factors that were statistically significantly different are "payment habit of the client" (ρ = 0.04), "client reputation" (ρ = 0.05), "type of client" (ρ = 0.00), "relationship with client" (ρ = 0.00), "budget allocation for building project" (ρ = 0.01), "level of commitment" (ρ = 0.04), "availability of experienced professionals" (ρ = 0.01), and "project fund management" (ρ = 0.03). Factors not statistically significantly different include "client requirement" (ρ = 0.47), "financial capability of client" (ρ = 0.55), "size of client" (ρ = 0.18), "building project team selection process" (ρ = 0.35), "leadership strategy" (ρ = 0.18), "integrity of project performance" (ρ = 0.41) and "collusion among participants" (ρ = 0.11).

Table 3: Factors Influencing the Responsiveness of Construction Participants

Factors	Overall		Cls	CPs	Cs	GAs	NGOs	K-W
	Mean Score	Rk	Mean Score	Mean Score	Mean Score	Mean Score	Mean Score	
Quality of Materials	4.45	1	4.24	4.40	4.33	4.69	5.00	0.02*
Availability of Experienced Professional	4.43	2	4.41	4.30	4.45	4.61	4.50	0.01*
Adequate Enforcement of Building Code	4.37	3	4.27	4.31	4.38	4.56	4.50	0.10
Design and Specifications Changes	4.37	3	4.33	4.29	4.38	4.42	4.50	0.23
Financial Capability of Clients	4.35	4	4.26	4.32	4.35	4.44	4.50	0.55
Budget Allocation for Building Project	4.34	5	4.45	4.19	4.30	4.47	4.50	0.01*
Adequacy and Availability of Skilled Manpower	4.34	5	4.26	4.24	4.33	4.47	5.00	0.09
Integrity of Project Performance	4.30	6	4.16	4.26	4.33	4.50	4.50	0.41
Building Project Team Selection Process	4.29	7	4.35	4.21	4.20	4.44	4.00	0.35
Available and Quality of Construction Equipment	4.27	8	4.27	4.21	4.00	4.36	5.00	0.10
Availability of Materials to Avoid Delays	4.26	9	4.24	4.15	4.13	4.47	4.50	0.02*
Possess Understanding of Building Construction Methods	4.25	10	4.22	4.16	4.18	4.44	5.00	0.02*
Leadership Strategy	4.25	10	4.29	4.18	4.10	4.44	4.50	0.18
Authenticity of Approvals of Building Plans	4.24	11	4.14	4.21	4.03	4.50	4.00	0.02*
Level of Commitment	4.23	12	4.20	4.18	4.18	4.36	4.50	0.04*
Completeness of Drawings and Specs	4.23	12	4.15	4.17	4.23	4.19	5.00	0.13
Accountability and Integrity with Approvals Given	4.21	13	4.24	4.14	4.18	4.33	3.50	0.05*

Table 3: Factors Influencing the Responsiveness of Construction Participants (Cont'd)

Factors	Overall		Cls	CPs	Cs	GAs	NGOs	K-W
	Mean Score	Rk	Mean Score	Mean Score	Mean Score	Mean Score	Mean Score	
Understand Minimum Standard Code of Practice	4.19	14	4.38	4.00	4.10	4.28	4.50	0.00*
Clearly Defined Roles and Responsibilities	4.19	14	4.00	4.16	4.13	4.39	4.50	0.07
Collusion among Participants	4.18	15	4.17	4.10	4.13	4.33	4.50	0.11
Quality of Communication among Participants	4.17	16	4.19	4.01	4.15	4.31	4.00	0.00*
Adequacy of Participants Moral Responsibility	4.17	16	4.37	4.00	3.95	4.36	4.50	0.00*
Clarity of Project Objectives	4.17	16	4.16	4.03	4.25	4.19	5.00	0.00*
Certainty of Constructability	4.17	16	4.21	4.00	4.05	4.28	4.00	0.00*
Authenticity of Approvals for Building Location	4.17	16	4.02	4.11	4.05	4.36	4.00	0.03*
Full Inspection of the Building Project	4.16	17	4.38	4.00	4.00	4.19	4.00	0.01*
Construction Participants Level of Education	4.16	17	4.08	4.16	3.98	4.25	5.00	0.14
Government Requirement/Policy	4.16	17	4.16	3.95	4.10	4.36	4.00	0.00*
Payment Habit	4.15	18	4.29	3.96	4.18	4.25	4.50	0.04*
Project Fund Management	4.12	19	4.21	4.00	4.05	4.08	4.00	0.03*
Fluctuation in Prices of Materials and Labour	4.09	20	4.37	3.90	3.95	4.00	4.00	0.00*
Type of Client	4.08	21	4.30	3.89	4.15	3.89	4.00	0.00*
Clarity on Duration of Completion	4.08	21	3.99	3.98	4.20	4.08	4.00	0.01*
Client Requirement	4.07	22	4.13	4.01	3.98	4.11	4.00	0.47
Overall Economy	4.07	22	4.23	3.88	4.03	4.19	3.50	0.00*
Past Experience in Managing Building Projects	4.07	22	4.26	3.82	4.13	4.08	4.50	0.02*
Contractual Motivation and Incentives	4.06	23	4.03	3.95	3.90	4.44	4.50	0.01*
Market Condition	4.05	24	4.26	3.89	3.95	4.06	3.50	0.01*
Familiarity with Site Condition	4.05	24	4.05	3.94	4.00	4.11	4.50	0.01*
Assurance on Health and Safety Issues	3.97	25	4.19	3.76	3.90	4.00	4.50	0.00*
Construction Price Fluctuation	3.96	26	4.06	3.86	3.68	4.17	4.50	0.01*
Prequalification Requirements	3.96	26	4.00	3.82	3.93	4.03	3.50	0.01*
Client Reputation	3.94	27	3.95	3.82	3.85	4.11	4.00	0.05*
Type of Procurement Method	3.94	27	4.13	3.76	3.80	4.03	4.00	0.01*
Current Workload	3.92	28	3.99	3.81	3.80	4.00	4.00	0.03*
Need for Work	3.89	29	4.03	3.75	3.83	3.92	3.50	0.02*
Relationship with Client	3.87	30	4.03	3.64	3.95	3.78	4.50	0.00*
Tendering Duration	3.83	31	4.01	3.67	3.78	3.81	3.50	0.02*
Size of Client	3.82	32	3.88	3.70	3.93	3.72	4.00	0.18

Note: Cls - Clients; CPs - Construction Professionals; Cs - Contractors; GAs - Government Agencies; NGOs - Non-Governmental Organisations; Rk - Ranks; K-W - Kruskal-Wallis

4.1 Categorisation of Factors Influencing Responsiveness of Participants

The variables were further subjected to factor analysis to reduce them to sizeable factors that generally represent and explain the views of the construction professionals. Table 4 shows the summary of Rotated Factor Matrix (RFM) for the 49 factors influencing the responsiveness of participants extracted. It was observed that components 1 and 5 had twelve (12) number of variables loaded on each, components 2 and 3 had eleven (11) and six (6) variables respectively while components 4 and 6 both had four (4) variables loaded on each. Consequently, the variance explained by factors in components 1 to 6 after rotation were 20.92%, 17.88%, 16.58%, 13.39%, 11.39% and 3.77% respectively.

4.1.1 Client Related Factors

The variables with significant loadings in the first category from Table 4 include; "size of client" (0.825), "type of client" (0.806), "client requirement" (0.800), "relationship with client" (0.799), "client reputation" (0.736), "level of commitment" (0.655), "payment habit of client" (0.644), "assurance on health and safety issues" (0.641), "leadership strategy" (0.633), "financial capability of client" (0.600), "budget allocation for building project" (0.558) and "understanding minimum standard code of practice" (0.512). This gave credence to the 65.57% variance explained before optimisation and 20.92% after rotation. The variables are seen to be revolving round the clients who happened to be a major participant in building construction projects. Hence, ***'client related'*** was assigned to the 12 variables in this category. With high loading values, these variables exhibited ***'very high'*** tendencies of influencing the responsiveness of participants to building collapse. Hence, prior knowledge of the size, type, reputation and payment habit of clients would inform construction professionals and contractors on how to manage them. It also informs on the need to execute the job without recording cases of delays, abandonment or eventual collapse of building projects (Chendo and Obi, 2015). Clients' commitment to being responsive to their responsibility of paying for quality materials, professional services and work done as and when due would minimize and prevent incidences of building collapse (Ogunde et al., 2017; Adebayo, 2006). Clients also plays a major role in ensuring that success is achieved in any type of project embarked upon. According to Pekuri, Pekuri and Haapasalo, they are an integral part of the construction team that influences how construction projects are being executed (Pekuri et al., 2014). The study also confirmed the impact of the financial capability of client on the successful delivery of building construction projects (Ogunde et al., 2017).

Table 4: Matrix for Factors Influencing Responsiveness of Participants

Factors	Components					
	1	2	3	4	5	6
Size of client	0.825					
Type of client	0.806					
Client requirement	0.800					
Relationship with client	0.799					
Client reputation	0.736					
Level of commitment	0.655					
Payment habit	0.644					
Assurance on health and safety issues	0.641					
Leadership strategy	0.633					
Financial capability of client	0.600					
Budget allocation for building project	0.558					
Understand minimum standard code of practice	0.512					
Type of procurement method		0.799				
Tendering duration		0.791				
Clarity on duration of completion		0.760				
Completeness of drawings and specifications		0.760				
Prequalification requirements		0.756				
Contractual motivation and incentives		0.723				
Clearly defined roles and responsibilities		0.645				
Project fund management		0.620				
Clarity of project objectives		0.594				
Building project team selection process		0.530				
Integrity of project performance		0.513				
Overall economy			0.779			
Market condition			0.738			
Current workload			0.721			
Fluctuation in prices of materials and labour			0.716			
Need for work			0.711			
Construction price fluctuation			0.691			
Adequacy of participants moral responsibility				0.673		
Accountability and integrity with approvals given				0.659		
Quality of communication among participants				0.645		
Collusion among participants				0.620		
Possess understanding of building construction methods					0.662	
Certainty of constructability					0.632	
Familiarity with site condition					0.605	
Full inspection of the building project					0.594	
Available and quality of construction equipment					0.591	
Construction participants level of education					0.588	
Past experience in managing building projects					0.581	
Availability of materials to avoid delays					0.562	
Quality of materials					0.551	
Adequacy and availability of skilled manpower					0.550	
Design and specification changes					0.549	
Availability of experienced professional					0.546	
Adequate enforcement of building code						0.663
Government requirement/policy						0.617
Authenticity of approvals for building location						0.581
Authenticity of approvals of building plans						0.579

Extraction Method: Principal Component Analysis
a. Rotation converged in 9 iterations.

4.1.2 Project Procurement Related

The variables loaded into category two with significant loadings is comprised of the following; "type of procurement method" (0.799), "tendering duration" (0.791), "clarity on duration of completion" (0.760), "completeness of drawings and specifications" (0.760), "prequalification requirements" (0.756), "contractual motivation and incentives" (0.723), "clearly defined roles and responsibilities" (0.645), "project fund management" (0.620), "clarity of project objectives" (0.594), "building project team selection process" (0.530) and "integrity of project performance" (0.513). From the foregoing, the 11 rotated variables loaded into the second category of components revolved round project management processes; hence, named ***'project procurement related',*** which also accounted for 17.88% variance explained after optimisation. These variables also exhibited ***'very high'*** tendencies of influencing the responsiveness of participants to building collapse. A group researchers opined that at the initiation of the tendering process, all the participants must be aware of the project procurement method adopted (Pekuri et al., 2014). According to clients adopts different type of procurement methods for the execution of construction projects (Wardani et al., 2006; Love et al., 1998; Cox and Thompson, 1997). However, while procurement methods are believed to enhance project objectives, Laedre, Austeng, Haugen and Klakegg identified clients' behaviour as a great impediment for its actualisation (Laedre et al., 2006). Eriksson and Westerberg in their study as well submitted that procurement method could impact on the integrity of project performance (Eriksson and Westerberg, 2015).

4.1.3 Economic Management Related

Six variables with significant loadings were loaded into the third category as follows; "overall economy" (0.779), "market condition" (0.738), "current workload" (0.721), "fluctuation in prices of materials and labour" (0.716), "need for work" (0.711) and "construction price fluctuation" (0.691). The foregoing was regarded as issues surrounding the state of the economy of any system and was therefore denoted as ***'economic management related'***. These accounted for 16.58% of the variance explained after optimisation. Although loaded in the third category, these factors also exhibited ***'very high'*** tendencies of influencing the responsiveness of participants to building collapse. The economy of any nation impacts greatly on their activities and building construction and infrastructure development are inclusive. Fluctuation in the prices of building materials and labour rates has affected the market causing an increased construction cost and leading participants to be cutting corners in order to meet various need. Therefore, proper management of the economy plays a major role in influencing the responsiveness of participants to building collapse in Nigeria. Economic factors were also confirmed to be responsible for the majority of delays experienced on several construction projects (Sweis et al., 2008; Frimpong and Oluwoye, 2003). Also, according to Sanni and Hashim, unstable market conditions is one of the examples of economic factors plaguing the Nigeria construction industry (Sanni and Hashim, 2013).

4.1.4 Ethical Values Related

The fourth category has four variables loaded with significant loadings into it which is comprised of the followings: "adequacy of participants' moral responsibility" (0.673), "accountability and integrity with approvals given" (0.659), "quality of communication among participants" (0.645) and "collusion among participants" (0.620). These accounted for 13.39% variance explained after rotation. They are essential variables surrounding the issues of moral and value system among participants in the construction industry and are therefore named ***'ethical values related'***. These variable loadings, although not as very high in comparison with their counterparts in the first three categories, they exhibited ***'high'*** and germane influence on the responsiveness of participants to building collapse. The findings from the foregoing represents the non-technical aspect of the responsiveness of participants to building collapse. Several cases of building collapse in Nigeria have been attributed to the carelessness and loss of ethical and moral values of the participants in the discharge of duties and responsibilities (Windapo, 2006; Chinwokwu, 2000; Uji, 2015; Adeniran, 2013). Collision and blame game is commonplace among participants in the construction industry and there is yet to be any record of punishment for defaulting in their duties and responsibilities (Babalola, 2015; Ayedun et al., 2011; Mathenge, 2012). Therefore, "adequacy of participants' moral responsibility", "accountability and integrity with approvals given" and "quality of communication among participants" would erase the issue of collision and invariably aid in mitigating/preventing building collapse.

4.1.5 Construction Management Related

The fifth category has the following variable loaded significantly; "possessing understanding of building construction methods" (0.662), "certainty of constructability" (0.632), "familiarity with site condition" (0.605), "inspection of building project" (0.594), "availability and quality of construction equipment" (0.591), "construction participants level of education" (0.588), "past experience in managing building projects" (0.581), "availability of construction materials to avoid delay" (0.562), "quality of materials" (0.551), "adequacy and availability of skilled manpower" (0.550), "design and specification changes" (0.549) and "availability of experienced construction professionals" (0.546). Although, there were twelve variables each loaded into categories 1 and 5, however, the value loading in the later are lower compared to that of the former. Therefore, it accounted for 11.39% variance explained after optimisation. Since the variables are related with construction stage activities of a building project, it was assigned the name ***'construction management related'***. Although, the variable loadings are not as high as in the case of the first four components. However, they are regarded to have as well exhibited ***'high'*** strength of influence on the responsiveness of participants to building collapse. These variables are basically the technical aspects of construction processes which are also germane to the success of building project. 'Good understanding of construction methods' is as important as 'certainty of constructability' of any building design. In addition, 'familiarity with the site condition' and 'inspecting the building' while construction activities are ongoing is crucial to mitigating/preventing collapses (Enshassi et al., 2009; Adebajo, 2000; Nguyen et al., 2004).

4.1.6 Policy Management Related

The significant variables loaded in the sixth category include "adequate enforcement of building code" (0.663), "government requirement/policy" (0.617), "authenticity of approvals for building location" (0.581) and "authenticity of approvals for building plans" (0.579). These variables accounted for 3.77% variance explained after rotation. These factors were however named ***'policy management related'*** since they are more of issues surrounding policy formulation and enforcement. While loaded in the sixth category however, they still accounted for ***'high'*** strength of influence on the responsiveness of participants to building collapse. Specifically, the issue of "adequate enforcement of building code" is key to policy management. Lack of enforcement and passage of the National Building Code (NBC) into law have continued to cripple the impact of the activities of the building construction industry. This non-passage into law has been the status-quo since the year 2006, therefore limiting the effectiveness and efficiency of several statutory regulatory organisations (QSRBN, ARCON, COREN etc.) saddled with the responsibility of checkmating the activities of professionals in the industry. Also, government policies authenticating the approvals for building plans and locations is yet to be adequately monitored and enforced in the view of mitigating/preventing collapses in Nigeria.

5. Conclusions

The study, based on the questionnaire survey presented factors influencing the responsiveness of construction participants to building collapse in Lagos State. Factors with the highest rankings include quality of materials, availability of experienced professional, adequate enforcement of building code, design and specifications changes, the financial capability of clients, and budget allocation for the project. Others are adequacy and availability of skilled manpower, the integrity of project performance, and the building project team selection. Current workload, need for work, relationship with the client, tendering duration, and size of the client were some of the least ranked factors influencing the responsiveness of participants to building collapse. The findings implied that all the factors vary in terms of their level of significance to the subject matter. Although, based on their mean score values they all influence the responsiveness of participants in the construction industry since their mean scores is greater than 3.5 threshold. Furthermore, the result of factor analysis categorised the factors into six basic groups as follows: client-related factors, project procurement-related factors, economic management-related factors, ethical values-related factors, construction management-related factors, and policy management-related factors. This categorisation forms the significant factors influencing participants negatively in their responsiveness to incidences of building collapse in the Nigerian construction industry. Based on these findings from factors analysis, the issue of building collapse can be adequately addressed by construction participants and develop effective response strategies for mitigating further occurrences.

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