



EVALUATION OF FACTORS AFFECTING THE DELIVERY OF BUILDING CONSTRUCTION PROJECT IN ABUJA, NIGERIA

S. Y. Oloyede and M. O. Anifowose

*Department of Quantity Surveying, School of Environmental Technology,
Federal University of Technology Minna, Nigeria*

ABSTRACT

Successful building construction project delivery is of great importance to any construction industry as it enables the client to achieve value for money. However, the construction industry has been posed with various challenges which make it difficult to deliver a successful building construction project. Building construction projects often considered being successful when delivered within completion time, allocated budget and specified quality. The study adopted a quantitative research approach using questionnaires to source relevant information from respondents. 339 questionnaires were distributed to the professionals while 204 usable responses were received. Similarly, 60 out of 90 questionnaires distributed to end-users were received and used for the analysis. Delay in payment of valuation, use of substandard materials, corruption and inadequate experience are the most important factors affecting building construction project delivery. The effect of these factors on cost of construction was at 0.013 significant level and F-value of 1.626, indicating a significant effect. Also, frequent maintenance work, dampness, leakages and shortage of water supply have a significant impact on the end-users. Therefore, this research on a general note concluded from the perception of the professionals and the end-users that factors affecting the delivery of building construction project existed in multiples and that those factors have significant effect on cost of construction.

Keywords: Building construction cost, End-users, Professionals, Project delivery.

oloyedsaheed21@yahoo.com

anifowosemo@futminna.edu.ng ; anny4yemi2000@yahoo.com

INTRODUCTION

A successful building construction project delivery is of great importance to any construction industry as it enables the client to achieve value for money. But the construction industry has been posed with various challenges which make it difficult to deliver a successful building construction project. Building construction projects often considered being successful when delivered within completion time, allocated budget and specified quality (Majid, 2006; Owolabi *et al.*, 2014). In Australia, it was also found that only one-eighth of building contracts were completed within the scheduled completion times and the average time overrun exceeded 40%, which also affect the delivery of building construction projects in Australia. According to Faridi and El-Sayegh (2006), shortage of skills of manpower, poor supervision and poor site management, unsuitable leadership, shortage and breakdown of equipment among others contribute to unsuccessful delivery of building construction projects in the United Arab Emirates. It is imperative to create awareness of the extent to which such factors can adversely affect building construction project delivery. Majid (2006) opined that Projects are considered delayed when their stipulated completion durations have not been realized. Delays are frequent occurrences in developing countries such as Thailand, Pakistan, Saudi Arabia, Nigeria and Vietnam respectively (Toor, 2008). Pourrostan *et al.* (2011) remarked that project delays are the biggest challenges for the building construction industry in developing countries.

The building construction industry in Nigeria is a fast growing sector of the economy which recorded a growth rate of more than 20% between 2006 and 2007. This growth however is not equaled when compared to the growth of Nigeria's total GDP as the overall contribution of the construction sector to the country's GDP remains very low at 1.83% in 2008. Key factors that have contributed to the growth in the construction and property sector include high demand for buildings across all sectors of the economy; the focus on infrastructure development by state and federal governments; the adoption of privatization and commercialization as instruments of federal government policy and attempts at controlling regulations relating to how the constructions business is carried out in the country (Trade Invest Nigeria, 2012). Oke and Abiola-Falemu (2009) revealed that the quality of materials and workmanship in Nigeria building industry is not satisfactory and that the problem lies in the use of inappropriate materials supplied to site and inefficient use of workmen which is also among the indicator of factors that affect building construction project delivery.

Ayodele and Alabi (2014) revealed that government projects adopt the use of Bill of quantities and other cost control measure which have resulted in high quality job. Although they still possess high cost and elongated time which is as a result of the emergence of variations and fluctuation in government projects, while private developers do not utilize Bill of quantities or any cost control measure, which has resulted in low quality job, elongated time of delivery and ultimately high cost. Abbasnejad (2013) opined that Poor quality breeds several undesirable effects throughout the entire building construction project supply chain. This, by extension is the entire life span of a Building project. It has also been gathered that various studies have identified several factors that are associated with building construction project delivery, but the previous studies have failed to linked how factors affecting the delivery of building construction project has effect on cost of construction, and the impact of those factors on the end users of the

building construction project (not all clients are end-user of buildings) particularly from the point of view of the Abuja construction industry. Hence, the need to evaluate the factors affecting the delivery of building construction project on how it affects the cost of construction and its impacts on the end users of the building construction project.

The Delivery of Building Construction Project

The delivery of building construction project can be defined as the process whereby resources are gathered to secure materials, labour and plant which leads to an agreement between the client and contractor to carry out construction project as specified by the client. Project delivery can also be described as a contractual relationship between the client who employs an architect to represent his/her dream into a design which will be given to a contractor to utilize and execute the project. Building construction projects be it small, large, complex or mega is vital to man's survival, economic activities, enhancement and development of his activities within the natural and built environment. Taiwo and Afolami (2010) affirmed that buildings are structures that serve as shelters for man, his properties and activities. As such, they must be properly planned, designed and constructed to obtain desired satisfaction from the environment and to impacted good on the end users in which health and safety of such end users are guaranteed. This clearly indicates that all the tasks involved in building construction project phases must be carried out perfectly to achieve successfully delivery of such building project. Although building projects nowadays have been considered to have some element of defect or failure during and after construction process that hinder successful and satisfactory of building construction projects. Some factors have been identified by previous researchers as they affect project performance, project delay and project success in which those factors identified contribute greatly to poor and unsatisfactory building construction project delivery.

A recently conducted study on analysis of project failure factors of infrastructure projects in Saudi Arabia by Dubem *et al.* (2014) looked into a multivariate approach to projects and identified thirty (30) factors affecting infrastructure project and based on these factor analysis approach, twenty four (24) out of thirty (30) failure factors were analyzed and further categorized into eight (8) significant factors which are as follows; project management deficiencies, risk challenges, project team commitment, ethical issues, government interference, constraints imposed by stakeholders, financial and schedule challenges, user requirement. Those eight factors were recognized as the significant factors after the analysis of data collected. Also a study conducted by Frank *et al.* (2010) investigated delays in building construction projects in Ghana, and came out with thirty-two (32) identified factors affecting building construction project delay using relative importance index analysis. Thus, after the analysis ten (10) factors were identified as the most important factors causing delay in building construction projects. These include; delay in honoring certificate, underestimation of the cost of project, under estimation of complexity of project, difficulty in accessing bank credit, poor supervision, underestimation of time for completion of project by the contractors, shortage of materials, poor professional management, fluctuation of prices/rising cost of materials and poor site management.

Samuel *et al.* (2016) carried out an assessment on the effect of construction project performance on the economic development in Nigeria and recognized the following as the most significant factors that affect the performance of construction projects which includes; project design cost, cost of reworks, unavailability of resources, average delay in regular payment, quality of equipment and raw materials, and unavailability of competent staffs to handle construction process. It is important to understand the fact that any factors that affect building failure, building performance, building success and any delay that occur during building construction project contributes greatly to any successful building construction project delivery and if the building project is not successfully delivered it affect the comfortability of the client or the end user of such building and also reduces the life span of such building. It is necessary to also focus on building construction project supervision as it contribute to the achievement of a good and sound building construction project if and only if is properly guided by the professionals that are supposed to be involved towards the delivery process.

Project supervision is understood to be all activities undertaken to secure effective and efficient delivery of building construction project outputs and achievement of building construction project outcome. It is important to note that assessment of project supervision does not assess the performance of projects, but also focus on the work done in the supervision and management of project implementation (Spilsbury *et al.* 2010). If building construction project is not properly implemented right from the inception stage, definitely it will affect its delivery process.

Moreover, Adequate project supervision during the construction stage is vital as it may provide the necessary indicators to other factors that may cause collapse of buildings; without which a lot of activities will go unnoticed, unchecked, un-approved and not to specification or standards, (Dalibi, 2016). It is necessary to avoid any factors that affect building construction project as it does not only affect how the building was deliver but also affect the end-user, a good example is that of building collapse in Gwarinpa area of Abuja in 2015 where by the cause was that the building construction site is only approved to build a bungalow building and the client went ahead and build a high rise building which make it to collapse and Buildings, like all structures, are designed to support certain loads without deforming excessively. The loads are the weights of people and objects, the intensity of rain and the varying wind pressure, other live loads and the dead load of the building itself. With buildings of a few floors, strength generally accompanies sufficient rigidity, and the design is mainly that of a roof that keeps the weather out while spanning large open spaces. With tall buildings of many floors, foundation, which supports the building itself, is of major consideration as tall buildings.

Any type of building that cannot withstand such loads can collapse but multi storey buildings are more prone to catastrophic collapse which has effect on construction cost (Oloyede *et al.*, 2010). Chinwaso (2001) stated that among factors that affect building construction projects are non-quality of firm's project, bad weather conditions, and economic instability. Aftab *et al.* (2010) affirmed that the most significant factors affecting building construction projects are unavailability of competent management staffs, and unstable financial plans. Also, the Project Management Institute (2004) suggested that the success or failure of a project is measured by the difference between what is expected of a project both during and after its completion and the

actual observed performance of the project when it is put to use. In other words, when the expectations of the client and other stakeholders in terms of cost, completion time and quality are not matched by the actual construction by contractors and other project teams, the project is decided to be a failure. Poor feasibility studies can also be recognized as one of the critical factors that affect building construction project because if feasibility studies are not carried out appropriately it can affect its delivery.

The inability of many projects to generally satisfy the desires and aspirations of the end user is also an instance of failure (Nwachukwu and Nzotta 2010). A project, regardless of completion time or cost fitting is certainly a failed one if it does not justify its cost and the value derivable from its use. This in case of a building construction project in Abuja. In a study Baker *et al.* (2010) to gauge the value of customer satisfaction(end-users) as a measure of project success, analysis of responses from project managers caused the researchers to conclude that project success means much more than merely meeting cost schedules and performance specifications. In fact, the level of satisfaction of the client is a very strong index of project failure or success. If building client cannot achieve value for money for its construction, definitely the end-users of such building will not be comfortable with the use of the building. It can be note that failure of a building construction project affects the end-users in many aspects which includes but not limited to extra cost incurred after delivery, presence of sick building syndrome, building collapse which can claim life. Building construction Projects evaluation is a crucial task which illuminate the conformance of any given project with international best practices and with the projects own objectives and goals. A failed building construction project is a drain on government funds and a waste of tax payers' money and goodwill. It seriously limits the ability of the government or the individual building construction project sponsors to undertake other needed building projects and defaces the landscape.

Madu (2005) identified causes of building failure as due to natural occurrences such as earthquakes, tornadoes, flood, etc. Other causes according to him include factors such as omission, carelessness, leading to use of deficient structural drawings, absence of proper supervision of projects, alteration of approved drawings, use of substandard materials, corruption in the Nigerian system, building without approved drawings and translocation of building plans to different sites. This may also be in form of illegal alteration to approved drawings. This practice if not properly controlled could spell danger years after the buildings are in use (Chendo and Obi 2015). Failure in building could also be of two types, namely, cosmetics and structural failure. The former occurs when something has been added to or subtracted from the building, thus affecting the structural outlooks. The later affects both the outlook and structural stability of the building (Ayininuola and Olalusi, 2004). In line with the above assertions, building collapse can simply be defined as a total or partial/progressive failure of one or more components of a building leading to the inability of the building to perform its principal function of comfort, satisfaction, safety and stability (Olagunju *et al.*, 2013). It is therefore necessary to illuminate the factors that trigger building construction project failure as a step towards minimizing building project failure, the accompanying wastefulness in building projects and also to minimize or eradicate its impact on the end-users of the building project.

The delivery of building construction project system can be categorized as a framework “designed to achieve the satisfactory completion of a construction project from conception to occupancy” (CMAA, 2012), and the type of system adopted is dependent on the objective and type of the project in question. Therefore, based on this definition a building construction project delivery system can be described as various processes which requires materializing the goals and objective of a client into a project through integrated project team efforts (Chen *et al.*, 2011). There is various delivery of building construction project that are mostly practiced in Nigeria which are namely; design-bid-build (DBB), design and build (DB), turnkey, and build-own and transfer (BOT). The public and private sector of the building construction industry can choose any of the listed above delivery system, but no matter the system chosen in delivering a building construction project, it has to be ensured that all the rules and regulations guiding the system chosen should be followed to avoid failures during and after delivery of the building construction project. A building projects delivery system acts as a “management function of the owner in project execution” (Chen *et al.*, 2010), thus the building construction project delivery system gives the owner added advantage in controlling and managing the key success determinants which are cost, time and quality of the building projects. It is also important to make a good decision during the selection of building construction project delivery system because it impacted on the end results of the building projects. The decision made in the selection of a project delivery system for a project impacts all phases of execution of the project and greatly impacts the efficiency of project execution” (Oyetunji and Anderson, 2006).

The role of the facility manger in any organization is to provide support services that satisfy the clients’ business needs and support the fundamental objective of the organization. Statistics of projects failing and poor project performance denotes the failure of both facility and project manager to meet their client’s business needs (Brown, Hinks and Sneddon, 2001). The current role of the facility/project manager: “strategic leader” (Shenhar *et al.*, 2002) extends beyond managing operations and processes and providing support services, but involves executing strategic management strategy in executing project delivery systems to ensure success of the building construction project (Shenhar *et al.*, 2002). It is also important to involve a facility manager from the inception of the building construction project in order to achieve a better results or outcome of the building construction project. Maximum control of the building construction project can be achieving through consistent monitoring and evaluation of project processes, which enables “efficient positioning” (Doloi, 2012) within project management and allows efficient allocation of resources, sustainable project performance and optimum project quality, while delivering on direct project objectives (Meredith and Mantel, 2010; Shenhar *et al.*, 2002). Brown, Hinks and Sneddon (2001) argued that, conventional practices and established roles of professionals in the construction industry hinder best practice in project delivery at the management level (Brown, Hinks and Sneddon, 2001).

Hence, “the core problem lies with the systems and approaches that are applied to the management of new building projects rather than any technological or methodological issues that are unique to construction” (Brown, Hinks and Sneddon, 2001). The National audit office’s (NAO) (2011) study on 40 major projects in the United Kingdom stated that quality of project initiation (planning and design) is “highly predictive of project success” (NAO, 2011) over the

long term. This supports the theory of this research that, if the building construction project delivery is not properly handle and planned from the initial stage of the project it can have a long-term effect on efficient and effective operations after completion and also affect the end users of the building construction project.

Although the basic factors are largely perceived to be reasons for building construction project delivery to be affected, causing failures during and after completion of the project. This research intends to contribute in this regard by addressing and looking into how those factors affecting building construction project delivery can be minimized. Hence, the need to evaluate the factors affecting the delivery of building construction project in Abuja, Nigeria.

METHODOLOGY

Data for this research was obtained from both primary and secondary sources. The secondary data for this research was obtained through extensive literature search from various textbooks, journals, reports, internet materials and previous research in order to establish a theoretical framework for the delivery of building construction project. Primary data was collected using a well-structured questionnaire as the most suitable instrument for collecting the required data to achieve the research objectives. This research made use of two different questionnaires; one of which was filled by the professionals and the other by the end-users of the building (because not all clients are end-user). The professionals' questionnaire was divided into three sections. Section A comprises of background information of the respondents and includes gender, professional background, academic qualification, working experience and type of practice. Section B contained identified factors affecting the delivery of building construction project from literature. The section C contained the effect of the delivery of building construction projects. Respondents were required to tick appropriately on a 5 point Likert scale. The end-users' questionnaire was divided into two sections. Section A comprises of background information of the respondents. It also includes name (optional), type of building, location, and years spent in the building. Section B contained impact of factors affecting the delivery of building construction project on the end-users. Respondents were required to tick appropriately on a 5 point Likert scale.

The sample frame of this research consists of the professionals that partake in building construction project and the end-Users that make use of the building (because not all clients are end-users) in Abuja. The sampling techniques that were used for this research were stratified sampling and purposive sampling technique. Stratified sampling is a method of sampling which is predominately used to ensure adequate representation of different groups that constitute a research population, while, purposive sampling is usually referred to as judgemental sampling technique which involved the subjectivity in the researcher's selection of sampling units (Ajila, 2012). This research made use of both sampling techniques.

The total population for professional members is 2842. The population of the members was obtained from their respective institute. The institute includes the followings; Nigerian institute of Architect (NIA), Nigerian institute of Quantity Surveyors (NIQS), Nigerian institute of Builders (NIOB) and Nigerian Society of Engineers (NSE). The institutes provide the population of the members registered with their respective body in Nigeria from which the sample was

derived.

The end-users using the executed building construction project were also considered, but due to the fact that end-users' population cannot be obtained from any institution, the research choose to distribute ninety (90) questionnaire to all Abuja Municipal Area Council (AMAC) which is categorized into six. Abuja was chosen as the study area because a reasonable number of construction activities take place there. This was due to the fact that Abuja experiences rapid population increase and new developmental projects daily as a result of rapid urbanization and rural-urban migration. This leads to constant increase in demand for shelter for both residential and commercial purposes.

The sample size for this study consists majorly of professionals and the end-users of the buildings within the study area i.e. Abuja metropolis, to whom questionnaires were administered. The questionnaires distributed to professionals in the construction industry were based on the sample size obtained from the population. The end-users' questionnaires were distributed to all area councils in Abuja to represent fifteen end-users per area council because Abuja Municipal Area Council (AMAC) is categorized into six area councils. A total of three hundred and thirty-nine (339) questionnaires were distributed to the professionals but two hundred and twenty-eight (228) questionnaires were successfully returned from the professionals but out of two hundred and twenty-eight returned and twenty-four (24) out of two hundred and twenty-eight (228) returned were incompletely filled, whereby the total number of two hundred and four (204) was used for the analysis for the professionals. Also, sixty (60) questionnaires were received from a total of ninety (90) questionnaires distributed to end-users of the building which is to cover for both private and public buildings selected from the six categories of Abuja Municipal Area Council (AMAC) were used for the analysis. Thus, the sample used for this study comprises of professionals from the bodies aforementioned within the built environment in the population study together with the end-users of the building. The finite population formula of (Krejcie & Morgan, 1970) was also used in this study to determine the sample size.

Data collected were analyzed through descriptive and inferential method of analysis. The use of Mean Item Score was used for objective 1 and 3, while the use of ANOVA was employed for objective 2. Data presentation was done using tables. Data analysis was carried out using statistical software package SPSS 16.

ANALYSIS AND RESULTS

Demography of respondents

Table I presents the frequency and percentage of the professionals' gender, profession, educational qualification, types of practice and years of working experience as well as the type of building responded from by the end-users.

Table 1: Demography of respondents

Gender	Frequency	Percentage (%)	Cumulative (%)
Male	154	75	75
Female	50	25	100
Profession			
Architects	47	23	23
Builders	28	14	37
Civil Engineers	43	21	58
Quantity Surveyor	86	42	100
Educational Qualification			
National Diploma (ND)	9	4	4
Higher National Diploma (HND)	55	27	31
Bachelor's Degree	94	46	77
Master's Degree	39	19	96
Doctoral Degree (PhD)	7	3	100
Type of Practice			
Consortium Private Practice	54	26	26
Government Practice	34	17	43
Independent private practice	116	57	100
Years of Working Experience			
Less than 5 years	62	31	31
5-10years	38	19	50
11-15years	21	10	60
16-20years	31	15	75
21 years and above	52	25	100
Type of Building			
Private Building	46	23	23
Public Building	14	7	30

Author's field work, 2017

Factors Affecting The Delivery Of Building Construction Project In Abuja

The use of Mean Item Score (MIS) was employed to rank the identified factors affecting the delivery of building construction project in order of importance. Table II gave a summary of the results of the ranking of the factors affecting the delivery of building construction project in Abuja.

Table 2: Factors Affecting the delivery of Building Construction Project in Abuja

S/N	Factors Affecting the delivery of Building Construction Project	MIS	St.Dev	Rank	Decision
1	Delay in Payment of Valuation	4.2059	0.6979	1 st	Most Important
2	Use of Substandard Materials	4.1814	0.7485	2 nd	Most Important
3	Corruption	4.0882	0.6946	3 rd	Most Important
4	Inadequate Experience	4.0294	0.7202	4 th	Most Important
5	Poor Planning	3.9755	0.7306	5 th	Very Important
6	Inaccurate Valuation for Completed Works	3.9706	0.6854	6 th	Very Important
7	Under Estimation of Complexity of project	3.8431	0.7827	7 th	Very Important
8	Poor Supervision	3.8333	0.7013	8 th	Very Important
9	Fluctuation of Prices	3.7941	0.6618	9 th	Very Important
10	Alteration of Approved Drawings	3.7892	0.7473	10 th	Very Important
11	Under Estimation of Cost of Project	3.6961	0.7248	11 th	Very Important
12	Use of Deficient structural Drawing	3.6471	0.6664	12 th	Very Important
13	Carelessness	3.5931	0.7645	13 th	Very Important
14	Omission	3.5784	0.7975	14 th	Very Important
15	Translocation of Building Plans to Different Sites	3.5686	0.8166	15 th	Very Important
16	Under Estimation of Time for Completion of Project by Contractors	3.5147	0.6750	16 th	Very Important
17	Poor Enforcement of Building Codes	3.4706	0.8484	17 th	Very Important
18	Building Without Approved Drawing	3.3775	1.0383	18 th	Very Important
19	Economic Instability	3.3529	0.9817	19 th	Very Important
20	Difficulty in Assessing Bank Credits	3.2696	0.9502	20 th	Very Important
21	Political Interference	3.1078	0.9942	21 st	Very Important
22	Non-quality of Firm's project	3.0147	0.7951	22 nd	Very Important
23	Shortage of Materials	2.9069	0.8610	23 rd	Less Important

24	Unavailability of Competent Management Staffs	2.8137	1.1046	24 th	Less Important
25	Unavailability of Resources	2.7206	1.2701	25 th	Less Important
26	Natural Occurrences	2.7157	0.9889	26 th	Less Important
27	Poor Professional Management	2.6863	1.0845	27 th	Less Important
28	Poor Site Management	2.5833	1.1367	28 th	Less Important
29	Unavailability of Competent staffs to Handle construction process	2.5245	1.0866	29 th	Least Important
30	Project design cost	2.4902	1.1902	30 th	Least Important

Author's field work, 2017

A total number of 30 identified factors were ranked according to the preference of the respondents. Table II revealed the thirty (30) factors affecting the delivery of building construction project that was identified from literature review. Four of these factors which are delay in payment of valuation, use of substandard materials, corruption, and inadequate experience were ranked highest and the most important with MIS of 4.2059, 4.1814, 4.0882, and 4.0294 respectively.

Also poor planning, inaccurate valuation for completed works, under estimation of complexity of project, poor supervision, fluctuation of prices, alteration of approved drawing, under estimation of cost of project, use of deficient structural drawings, carelessness, omission, translocation of building plan to different sites under estimation of time for completion of the project by contractor, were ranked next as very important factors with MIS of 3.9755, 3.9706, 3.8431, 3.8333, 3.7941, 3.7892, 3.6961, 3.6471, 3.5931, 3.5784, 3.5686, and 3.5147 respectively. Poor enforcement of building codes, building without approved drawing, economic instability, difficulty in assessing bank credits, political interference, and non-quality of firm's project were also ranked as importance factors with MIS of 3.4706, 3.3775, 3.3529, 3.2696, 3.1078, and 3.0147 respectively.

Shortage of materials, unavailability of competent management staffs, unavailability of resources, natural occurrences, poor professional management, and poor site management were ranked as the less importance factors with MIS of 2.9069, 2.8137, 2.7206, 2.7157, 2.6863, and 2.5833 respectively. The least ranked factors are unavailability of competent staffs to handle construction process and project design cost with MIS of 2.5245, and 2.4902 respectively.

Effect of Factors Affecting The Delivery of Building Construction Project on Cost of Construction

The One-Way Analysis of Variance (ANOVA) was employed to examine the effect of factors affecting the delivery of building construction project in Abuja. Table III gives a summary of the results of the analysis on the effect of those factors on the delivery of building construction project.

Table 3: Effect of Factors Affecting the Delivery of Building Construction Project on Cost of Construction

Variables	F	Sig.	Eta Squared	Remark
Effect of factors affecting the delivery of building construction projects on cost of construction.	1.626	.013	0.34	Large Effect

Author's field work, 2017

Table III presents the effects of factors affecting the delivery of building construction projects on cost of construction based on significant value and eta squared value. The effect of factors affecting the delivery of building construction project on cost of construction was at 0.013 significant level with F- value of 1.626. Since the level of significant is less than 0.05. Therefore, Factors affecting the delivery of building construction project have a significant effect on cost of construction. The effect size as calculated using eta squared was 0.34 which depicts that the effect size of the factors affecting the delivery of building construction project on cost of construction was a large effect according to decision rule by Cohen's (1988).

Impact of Factors Affecting the Delivery of Building Construction Project on End-Users of Buildings in Abuja

The use of MIS was employed to rank the impact of factors affecting the delivery of building construction project on end-users of the building in Abuja. Table IV gives a summary of the results of the ranking of the impact of those factors on end-users of the building.

Table 4: Impact of Factors Affecting the delivery of Building Construction Project on End-users of buildings in Abuja

S/No	Impact on End-users of the Building	MIS	St.Dev	Rank	Decision
1	Frequent Maintenance work	4.1000	0.7461	1 st	Extremely Significant
2	Dampness on Wall of the building	3.8000	1.1804	2 nd	Extremely Significant
3	Leakages from Roof Work	3.6333	1.3034	3 rd	Extremely Significant
4	Threats to Human Health	3.5833	1.0048	4 th	very significant
5	Discomfort of the Occupants	3.4500	0.9023	5 th	very significant
6	Shortage of water supply due to poor plumbing Works	3.0000	1.1547	6 th	very significant
7	Frequent Depreciation of Aesthetic value	2.8667	0.8654	7 th	Moderately significant
8	Pest infestation due to Cracks on the wall	2.4500	1.0712	8 th	Moderately significant
9	Frequent electrical accidents	2.1333	1.0077	9 th	Slightly Significant
10	Extra cost of Reworks	1.8333	1.1279	10 th	Slightly Significant
11	Building Collapse which claim loss of life	1.7333	1.0143	11 th	Slightly Significant

Author's field work, 2017

Table IV revealed that factors affecting the delivery of building construction project in Abuja from table II have a significant impact on end-users of the building with eleven (11) impacts

which was ranked by the end-users according to their preference. Table IV presents the impacts factors affecting delivery as frequent maintenance work, dampness on wall of the building, and leakages from roof work. These factors were ranked as extremely significant impact on the end-users with MIS of 4.1000, 3.8000, and 3.6333 respectively.

Also threats to human health, discomfort of the occupants, and shortage of water supply due to poor plumbing works was ranked as very significant with MIS of 3.5833, 3.4500, and 3.0000 respectively. Frequent depreciation of aesthetic value, and pest infestation due to cracks on the wall was ranked as moderately significant with MIS of 2.8667 and 2.4500. Frequent electrical accidents, extra cost of reworks, and building collapse which claim loss of life were ranked as slightly significant with MIS of 2.1333, 1.8333, and 1.7333 respectively.

DISCUSSION

The ten (10) most highly ranked identified factors affecting the delivery of building construction project in Abuja (based on respondents' perceptions), were shown in Table II. Delay in payment of valuation was ranked as the 1st on the list of identified factors with MIS of 4.2059. The delay in payment of valuation has been recognized as 1st most important factors which affect building construction project delivery. This finding is similar to the finding of Mohammed, (2014) which reported that delay in payment by the client/owner to the contractor affect the delivery of building project.

The use of substandard materials was ranked 2nd among the top ten identified factors with MIS of 4.1814. The use of substandard materials will make the building to rendered low quality work which is in line with Madu (2005) who reported causes of building failure and mentioned use of substandard materials as a significant factor that causes most of buildings failed. Corruption was ranked 3rd among the top ten of identified factors which affect building construction project delivery with MIS of 4.0882. Corruption is one of the biggest challenges in the construction industry which make contractor not to perform as expected which is similar to a study carried out by Falobi (2009) in which he reported that most of public project are compromised due to corruption. Inadequate experience was ranked as 4th among the top ten identified factors with MIS of 4.0294. some of the professionals involved in construction project lack adequate experience about the construction process which will definitely affect its delivery as was also ranked by the respondents which is in line with Olagunju *et al.* (2013) when he reported causes of building collapse occurs due to inadequate experience among professionals.

Poor planning was ranked as the 5th factors among the top ten factors with MIS of 3.9755. Poor planning was also ranked by Falobi (2009) which he listed among the casual factors that cause structural failure in building construction projects. Inaccurate Valuation for Completed Works was also ranked by the respondents as the 6th factors among the top ten factors that affect building construction project delivery with MIS of 3.9706, which was also similar to factor reported by Abdul-Rahman *et al.* (2009) as among the factor that causes delay in delivering building construction project. Under estimation of complexity of the project was ranked as the 7th factor among the top ten identified factors with MIS of 3.8431. this is one of the vital factor that cause a construction project to suffer long time of delivery which also cost the client more money for completion.

Poor supervision was ranked as the 8th factor among the top ten identified factors which affect building construction project delivery with MIS of 3.8333. This factor is similar to resultant effect of poor supervision on building construction project by Dalibi (2016) which he stated that poor supervision contribute significantly to the delivery of building projects. Fluctuation of prices was ranked as the 9th factor among the top ten factors with MIS of 3.7941. Fluctuation of prices occur when there are frequent changes in price of materials most especially the key materials such as cement, reinforcement, plank for formwork among others which make client to spend more money than it has initially budgeted cost. This factor is similar to a factor mentioned by Frank *et al.* (2010) when he conducted a study on factors that causes delay in building project in Ghana.

Alteration of Approved Drawings was ranked as the 10th factor among the top ten factors identified that affect building construction project delivery with MIS of 3.7892. Alteration of approved drawing is mostly practiced by professionals engaged in building project which can result in building collapse or any other form of damages to the building because what has been early designed for has been altered. This is also similar to a study conducted by Chendo and Obi (2015) that any form of illegal alteration to approved drawings if not properly controlled could spell danger years after the buildings are in use.

The effect of factors affecting the delivery of building construction project on cost of construction was at 0.013 significant level with F- value of 1.626. Since the level of significant is less than 0.05, therefore, Factors affecting the delivery of building construction project have a significant effect on cost of construction. The effect size as calculated using eta squared was 0.34 which depicts that the effect size of the factors affecting the delivery building construction project on cost of construction was a large effect according to decision rule of calculating effect size by Cohen's (1988). This is against the study conducted by (Oloyede *et al.*, 2010) in which multi storey buildings singled out as prone to catastrophic building collapse were regarded as having effect on cost of construction. Joint factors weren't considered or linked as it also has effect on cost of construction.

The impact of factors affecting the delivery of building construction project on end-users of the building which represents the objective 3 in which eleven impacts were identified and ranked by the end-users, but only six having very significant impacts were discussed because they are with highest MIS. Frequent Maintenance work was ranked as the 1st impact by the end-users with MIS of 4.1000. This can occur when use of substandard materials were used for the building which turn fade quickly or got spoil at early stage. Dampness on Wall of the building was ranked as the 2nd impacts on the end-users with MIS of 3.8000. This occurs as a result of poor supervision of building project or as a result of inadequate experience to carry out building construction work efficiently. Leakages from roof work were ranked as 3rd impact by the end-users among the top six impacts with MIS of 3.6333. This can also occur as a result of poor supervision and the use of substandard materials which make the end-users feel embarrass in front of visitors or feel uncomfortable when raining.

Threats to human health were ranked as the 4th impact by the end-users among the top six identified impacts with MIS of 3.5833. This occurs when end-users of the building feel some element of sick building syndrome which can make he/she fell a sick or feel unsatisfied with the building. Discomfort of the occupant was ranked as 5th impact by the end-user among the top six impacts with MIS of 3.4500. Also Shortage of water supply due to poor plumbing Works was

ranked as the 6th impact among the top six impacts with MIS of 3.0000. All the impacts of factors affecting the delivery of building construction project on end-users mentioned above is similar to Nwachukwu & Nzotta (2010) description about end-user that inability of building projects to generally satisfy the desires and aspirations of the end user is also an instance of failures.

CONCLUSION

For every organization in the built environment, it is necessary to note where its strength and weaknesses lies. Identified factors that affect the delivery of building construction project from literature and data collected from construction industry professionals and the end-users have critically shown where the weakness lies in the delivery process with emphasis on its significant effect on cost of construction and threats consequently caused to the end-users. Based on the findings of the research, the following conclusions were therefore deduced; The factors affecting the delivery of building construction project in Abuja, Nigeria occurred by lots of factors which includes; delay in payment of valuation, use of substandard materials, corruption, inadequate experience, poor planning, inaccurate valuations for completed works, among others. Delay in payment of valuation, use of substandard materials, corruption and inadequate experience were the most important factors that affect building construction project delivery seriously and critically based on the perception of the professionals. The result of the analysis shows that factors affecting the delivery of building construction project have significant effect on cost of construction and that the effect is large based on Cohen's (1988) decision rule of calculating effect size. There is also an impact of factors affecting the delivery of building construction project delivery on the end-users of the building with the following major impacts; frequent maintenance work, dampness on wall of the building, leakages from roof work, threats to human health, discomfort of the occupants and shortage of water supply due to poor plumbing work among others. Therefore, this research on a general note concluded from the perception of the professionals and the end-users that factors affecting the delivery of building construction project existed in multiples and that those factors have significant effect on cost of construction. Also end-users of the building testify to the impact of those factors on building as they faced the challenges that arise after delivery.

REFERENCES

- Abbasnejad Behzad (2013): Poor Quality Cost in Construction: Literature Review Master's Thesis in the Master's program Design and Construction Project Management. Department of Civil and Environmental Engineering Division of Construction Management Chalmers University of Technology Gothenburg, Sweden 2013. Vol.3, No.3. pp1-20.
- Aftab, H. I. (2010). Factors affecting construction cost in Maralarge construction project; Perspective of project management consultant . *International Journal of Sustainable Construction Engineering and Technology*. Vol.9, No.11, pp25-33.
- Ayininuola, G. M. and Olalusi, O. O. (2004). Assessment of Building Failures in Nigeria: Lagos and Ibadan Case Study. *African Journal of Science and Technology (AJST), Science and Engineering Series*. Vol. 5, No.1. pp73-78
- Ayodele, E. O., and Alabi, M. O. (2014). Effect of cost control on building projects delivery in Nigeria. *School of Built Environment, University of Salford, Manchester, United Kingdom*. Vol.7, No.3, pp1-12.
- Baker, B. N. (2010). Factors affecting project success. *International Journal of Project Management*, 17(4), 243–248.
- Brown, A., Hinks, J. and Sneddon, J. (2001) "The facilities management role in new building procurement", *Facilities*. [online] 19 (3/4) p.119 – 130.
- Chen, C., Chiu, P., Orr, R. and Goldstein A. (2011). An Empirical Analysis of Chinese Construction Firms' Entry into Africa. International Symposium on Advancement of Construction Management and Real Estate. 8-13 August 2011, Sydney, Australia
- Chendo I. G. and Obi N. I. (2015): Building Collapse in Nigeria: The Causes, Effects, Consequences. *International Journal of Civil Engineering, Construction and Estate Management*. Vol.3, No.4, pp.41- 49, October 2015
- Chimwaso, K. D. (2001) "An Evaluation of Cost Performance of Public Projects; Case of Botswana" 2nd International Conference on Construction in Developing Countries, Rotterdam (Netherlands).
- Construction Management Association of America. (2012). Advancing professional construction and program management world wide. *Owner's guide to project delivery methods*.
- Dalibi, S. G. (2016). Resultant Effect Of Poor Supervision In Building Construction Projects In Nigeria. *BCERT-6 Quantity Surveyors Registration Board Of Nigeria (QSRBN)* (p. 23). Shehu Musa Yar'adua center Abuja FCT: QSRBN.
- Doloi, H. S. (2012). Analysis of factors affecting delay in Indian Construction Projects. *International Journal of Project Management*.
- Dubem. I. I., Stephen O. O. and Abdulaziz A. (2014). Analysis of project failure factors for infrastructure projects in Saudi Arabia: A multivariate Approach. *Journal of Construction in Developing Countries* 19(1), 35-52.
- Falobi F. (2009): Nigeria "Tackling disaster at grass root in Lagos. Daily Independent newspaper, retrieved (10/11/16) from www.dailysunnewspapers.ng.
- Faridi, A. and El-Sayegh, S. (2006). Significant factors causing delay in the UAE construction industry. *Construction Management and Economics*, 1167-1176.
- Frank D. K, Fugar, Adwoa B., and Agyakwah B. (2010). Department of building technology, Kwame Nkrumah university of science and technology Kumasi, Ghana.
- Madu, L.C (2005): *Journal of Nigeria Institute of Architects (N.I.A) Architecture: Research and Practice* Vol. 1. No. 3 November 2005. ISSN 1597-2947. PP.

- Majid I. A. (2006). Causes and Effects of Delays in Aceh Construction Industry. Master thesis, Univ. Teknol. Malaysia.
- NAO- Nation Audit Office, (2011). Initiating successful projects. [online] Available at; <http://www.nao.org.uk/wp>.
- Nwachukwu, A. N. (2010). Quality factors indexes; a measure of project success constraints in developing economy. *Interdisciplinary Journal of contemporary Research in business*, 505.
- Oke, A. A.-F. (2009). Relationship between building collapse and poor quality of materials and workmanship in Nigeria. *Proceedings of the Royal Institution of Chartered Surveyors*.
- Olagunju, R. E., Aremu, S. C. and Ogundele, J. (2013): Incessant Collapse of Buildings in Nigeria: An Architects view. *Journal of Civil and Environmental Research*. ISSN 2224-5790 and ISSN 2225-0514 (Online) Vol. 3 No 4, 2013.
- Oloyede, S. A., Omogun, C. B. and Akinjare, O. A. (2010): Tracking Causes of Building Collapse in Nigeria. *Journal of Sustainable Development* Vol. 3. No. 3 PP. 127-132
- Owolabi A.O Chan, A. A and Ogunlana A.A. (2014). Root causes of construction project delays in Singapore. *Journal of Construction Management*. Vol.4 No.1 p.19-31.
- Oyetunji, A. A. and Anderson, S. D. (2006). Relative effectiveness of project delivery and contract strategies. *Journal of Construction Engineering and Management*, [online]132(1).
- Pourrostam. T., Ismail A. and Mansounejad.M. (2011). Identification of success factors in minimizing delays on construction in IAU-Shoushtar-Iran Applied mechanics and materials. *International Journal of Energy and Environmental Research*. Vol.4 No.7 Pp33-50.
- Project Management Institute. (2004). *Guide to the Project Management Body of Knowledge: PMBOK Guide 2004 Edition*. Pennsylvania Newtown Square: Project Management Institute, Inc.
- Samuel O. and Olatunji, A. E. (2016). Effect of construction project performance on economic development of Nigeria. *Journal of Economics and Sustainable Development*. vol.7, No.12.
- Shenhar, A. J., & Maltz, A. C (2001). project success; A multidimensional strategic concepts. Long range planning. 699-725.
- Spilsbury M. J., Brann J. and Norgbey S. (2010): Quality of Project Supervision Review 2009 Summary Report for UNEP January, 2010
- Taiwo A.A and J.A. Afolami (2010): Incessant building collapse: A case of a hotel in Akure, Nigeria. *Journal of Building Appraisal* (2010) 6, 241 – 248. doi: 10.1057/jba.2011.1
- Toor, S. A. (2008). Problems causing delays in major construction projects in Thailand. *Journal of project management* 28(3) p.228-236.
- Trade Invest Nigeria (2012). The Four Factors Driving Growth in Construction and Property. *Journal of product innovation management*. [online] 13(6), p.478-496.