GSJ: Volume 8, Issue 7, July 2020, Online: ISSN 2320-9186
www.globalscientificjournal.com

COST CONTROL OF ENGINEERING SERVICES IN BUILDING AND HOUSING PROJECTS IN NIGERIA

[1]Dr. Okereke Reuben A,[2]EjekwuTobechi B. and [3]Ohamma Victor O.
[1,2&3]Department of Quantity Surveying, Imo State University, Owerri
tobejekwu@gmail.com
raphicaben2013@gmail.com
likemindz4good@yahoo.com

Abstract

Project cost controls in the Nigerian construction sector have always been under studied. For every project to be successfully executed, its cost must have been analyzed and the cost from start to finish noted so as to prevent unnecessary contingency spendings which may hamper the complete execution of the project. Thus this prompted this study on the very aim of ascertaining cost control mechanisms and its impact on engineering services in building and housing project delivery in Nigeria. To achieve the above, the study employed four specific objectives and four research questions. The study is of a quantitative data conducted using descriptive statistical techniques. Additionally, detailed accounts of participant responses during the qualitative interviews were reported and tabulated under appropriate sections. The results of statistical analysis were interpreted: inferences were drawn from the results and discussed thoroughly to bring the research conclusions into focus. Quantitative data collection for this study was conducted through the use of a questionnaire survey. A total of two hundred and twenty-five (225) questionnaires were administered to construction stakeholders (architects, site engineers, project managers, quantity surveyors, contractors, building materials suppliers, site managers and government workers) in the Owerri Imo State of Nigeria. The study however concluded that increase in the building costs has been narrowed down to economic instability of this country. There exist array of factors that obstruct successful procurement of building construction projects. Several of these obstructions have been well researched upon and solutions proffered to improve projects procurement. One aspect of the recommendations that has received less than deserved attention is the proactive way of managing cost, believed will offer the deserved scientific cost management of building construction projects. Finally the study recommends that

Construction managers should be cautious in inventory keeping and consumption, and should be weary of materials more sensitive to market pressure as identified in this work. Items that indicated higher sensitivity to market pressure should be given priority in inventory keeping and consumption.

Keywords: Cost Control, Construction, Project, Building, Housing, Engineering

1.0 Background of the Study

The construction industry delivers construction products like houses, hotels, hospitals, roads, dams and schools among others and plays very dominant role in the economy of nations (Oswald, 2001; Khan, 2008; Olusegun& Michael, 2011). The construction sector is viewed as the regulator/stimulator of national economic development; the engine that drives the overall economy; a barometer to gauge the economic performance of a country, and the societies' wealth engine (Oswald, 2001). Khan (2008) capped it all by stating that the industry plays an essential role in the socio economic development of any country. However, uncertainty, variability, interdependence and complexity according to Harrison & Lock (2005), still bedevils the sector, thus making the management of construction projects difficult. According to Fleming(2009), every project conceived has a set of objectives it seeks to attain which do also vary from project to project. Furthermore, Management at any time,as opined by Fleming (2007), seeks to achieve successful attainment of the identified objectives in projects. Bayraktar et al. (2011) included budget and schedule in the list of four goals identified as frequently forming part of project objectives. Cost, time and quality are found to form fundamental priorities of most project objectives (Muriro& Wood, 2010). However, the pair of cost and time frequently proves more difficult to manage when it relates to construction projects, and has become a long lingering problem in construction projects management practice.

To achieve the predetermined project objectives of cost, time, quality and function, great effort has been expended in the discipline of proper management (Williams, 2002), time, planning, material development (Bariga et al., 2005), procurement (Oyegoke, 2006; Rashid et al., 2006; Federal Facilities Council [FFC], 2007), life cycle costing, modeling and forecasting.

Despite these concerted management efforts, experts' assessment of the sector's performance still leaves much to be desired (Anigbogwu et al., 2007). Literature is awash with stakeholders' lamentations on the poor performance of most construction projects including Nigeria (Anderson et al., 2007; Abanda et al., 2011). Unlike other sectors of the economy (e.g. manufacturing), success in achieving predetermined cost plans are often difficult to meet in construction (Shane et al., 2009). These projects are often completed

well beyond acceptable budget limits, a phenomenon best referred to as cost growth by Merrow et al. (1981). This undesirable surge in project cost has variedly been described in diverse terminologies like cost overruns, cost increase and cost escalation (Creedy, 2006). These terms, as used in this work, mean the same, and define the positive change between the previous and later cost of an item, component or facility over a certain change in time and circumstance. Such growth in cost poses enormous challenges that often result to poor and unsatisfactory performance in the construction procurement process. Better and more effective mechanism is thus, needed to manage these cost growths to enhance the overall project success. Harrison and Lock (2005) and Bal et al., (2013) buttressed this when they emphasised that management of construction projects be proactive in nature if more successful procurement must result.

Project cost controls in the Nigerian construction sector have always been under studied. On the course of prosecuting a project,controlling the cost of these projects would help in maintaining such projects from being too capital intensive which may lead to theproject being abandoned. For every project to be successfully executed, its cost must have been analyzed and the cost from start tofinish noted so as to prevent unnecessary contingency spendings which may hamper the complete execution of the project. Costcontrol includes monitoring cost, task completion, and time. If total cost of a project at a given time is over the cost baseline, costcontrol measures may be necessary. Such project management actions may range from ensuring that only tasks within the scope ofthe work are being performed to alerting stakeholders of potential cost overruns. As a project manager, it is important, professional,and ethical to identify and report on these issues as soon as they are identified.

Organizations whether private or government owned must complete projects on budget to achieve financial objectives and save cost.Project managers applying cost control techniques effectively can ensure that projects stay within projected budgets or are allowed toexceed budgets in a controlled way for specific reasons. When an organization implements appropriate project cost controls, it reducesrisk and receives the full benefits anticipated from project completion.

Controlling costs means meeting a budget that is based on cost estimates. The two components of such estimates are the scope of thework and the cost of each completed task. The project plan details the requirements for the project, which you have to translate intoactivities. A typical activity requires labor, materials and equipment. Once you have defined the project scope in terms of activities anddivided the activity into its cost components, you can calculate cost estimates using costs from historical sources, bids, industry normsand other projects as a base.

Statement of Research Problem

Cost management of construction projects is still largely traditional in Nigeria. This is so despite incessant calls for a switch to a more effective proactive model (Harrison & Lock, 2005; Arrow, 2008; Johnson,

2010;Bal et al., 2013). The traditional model, as Creedy (2006) rightly observed, responds to flaws only when they occur. To Kern and Formoso (2010), such a model is lacking in transparency and always belated in response to management challenges, thus, preventing the right identification and correction of production flow inefficiencies. Beeston (1987) added that the model responds inadequately to construction challenges especially at the early developmental stage (cited in Ogunsami&Fasoranbaku, 2000). Such traditional management practice is characterised by late delivery of projects, overran budgets, reduced functionality and unsatisfactory quality (Creedy, 2006). The increase in the number of abandoned, uncompleted and under completed projects by individuals, companies and evengovernment has been a cause for serious concern. This high rate of abandonment has inflicted our infrastructural development negatively and may have dissuadedprospective investors from investing in our economy.Lack of a better, effective and efficient proactive model to aid the ineffective and poor performing traditional cost management model forms the central challenge of this study

Objectives of the Study

The objectives of this research are as follows:

1. To examine the level of implementation of project cost control in the Nigerian construction industry
2. To examine factors responsible for increase in cost of building construction that ultimately hinder sustainable housing delivery;
3. To evaluate the effects of increase in the cost of building resources on the delivery of affordable housing;
4. To establish solutions to factors causing increase in the cost of building materials towards efficient housing project delivery in Nigeria.

Research questions

The research questions to be addressed are as follows:

1. What is the level of implementation of project cost control in the Nigerian building industry?
2. What are the factors responsible for increase in cost of building construction that ultimately hinder sustainable housing delivery?
3. What are the effects of increase in the cost of building resources on the delivery of affordable housing project in Nigeria?
4. What are the solutions to factors causing increase in the cost of building materials towards efficient housing projectdelivery in Nigeria?

Justification for the Study

It is agreed that procurement of construction facilities is generally capital intensive, and consumes a big chunk of the national capital budgets (Bustani et-al., 2000; Oswald, 2001). Managing cost in the sector therefore becomes very important as it creates savings for reinvestment and rapid development of the economy.Creedy (2006), Arrow (2008), Johnson (2010) and Gambo and Ashen (2012) have argued that since the traditional cost management model has outlived its time, models that are more proactive in nature should be developed. When construction cost objective fails, it often results in great economic loss. Both government and other owners of construction projects, contractors and construction workers are affected in one way or another. Unnecessary and incessant acrimony do also persist, resulting in avoidable dispute and dissatisfaction. Eventually, the project integrity is severely compromised. Managing in a proactive way involves a lot of tenets some of which include proper general assessment, documentation and reporting of events during procurement (Arrow, 2008). The identification of those factors causing cost to grow; and the understanding of the pattern of the changes will add value to proactive management. Furthermore, there must be effective flow of information or communication among team members involved in the system. Therefore, apart from bringing project participants into close collaboration, the proactive model developed herein reduces risks and uncertainties that trail management activities by preempting the kind of challenges affecting management for proper andadequate response to them. The model is not intended to substitute the traditional way of project management, rather it is to complement the observed aspects of deficiencies inherent in it by injecting a proactive component in cost management. The model relates cost to time for the purpose of predicting changes vital in planning, monitoring and controlling of building construction projects. Vast information made available also enables stakeholders‘ the proper understanding of how diverse building materials respond to market dynamics. When management effort is based on in-depth understanding of analysed trends, success in project procurement can better be guaranteed.

2.0 Literature Review

Nature of Cost Growth in Building Projects

Factors that pressure cost estimates of construction projects to change after the estimates have been prepared and agreed are many and complex (Kapano and Karshenas, 2003 cited in Gambo and Ashen, 2012). Changes can occur in the upward or downward directions (Anderson *et al*., 2007). However, the upward change causes greater concern. An estimate documented during placement of a contract (initial contract figure) remains the basis of implementation of the entire contract. The expectation of stakeholders

is that the estimate should complete the project as specified. More succinctly, ―estimates prepared by consultants are expected to forecast the anticipated actual cost of projects, give clients reliable idea of the financial outlay and also guide the implementation of projects‖ (Anigbogu*et al*., 2007). However, change in the actual cost of labor, materials and components often occur over time. Many changes that occur in the market conditions including other factors identified by Anderson *et al*. (2007) are either from internal or external sources and often cause estimated cost to change and become unreliable. Their impact has forced initial contract figures, according to Brook (1998) and Abanda*et al*. (2011), to overrun. These overruns can only be mitigated with extra cost.

Extent of cost growth

Historical evidence suggests that the problems associated with project cost and time spans over a long period and is devastating; affecting all kinds of construction projects, and spreading across nations. For example:

i. Year 1869, Suez Canal was completed 3 times its estimate. (Flyvbjerg*et al*., 2003)

ii. Year 1914, the panama canal was completed 200% above budget (Flyvbjerg*et al*., 2003)

iii. Year 1974-1988, 1778 projects funded by the World Bank were found to overshoot their cost by 63%. About 1627 projects were also studied and 83% completed late (Thompson & Perry, 1992 in Willoughby, 2005)

iv. Year 1983-1988, 37 building projects that extended their time were studied in Nigeria, initial estimate was N2.55billion but completed at N5.55billion, that is about 117.65% cost growth (Giwa, 1988b).

v. Year 1988-2000 in Nigeria, the price of cement, a major building material has escalated by about 2000% (Bala, 2000)

vi. Nigeria has spent $5bn on the Ajaokuta Steel Complex project which was supposed to cost $650m (Omotoso, 2012).

Eight main ways for the client to avoid cost overruns as listed by the Office of Government Commerce (OGC, 2003) are to have:

a. objectives that are realistic and not changed during the course of the project

b. estimates for project approval that are realistic – that is, not unduly optimistic

c. a project brief that is complete, clear and consistent

d. a design that meets planning and statutory requirements

e. a design that is coordinated and takes account of buildability, maintainability, health and safety and sustainability

f. risk allocation that is unambiguous and clear to all parties involved

g. clear leadership and appropriate management controls

h. simple payment mechanisms that incentivise all parties to achieve a common and agreed goal.

However, other project team members have roles to play to mitigate cost growth and were considered in the later parts of this attestation.

Cost Growth Factors

The factors that cause cost to change have also been identified by scholars and categorised into those that stakeholders have greater influence and control, and those stakeholders have little or no influence at all (Nicholas and Steyn, 2008). Damnjanovic*et al.* (2009) described it as internal and external factors. In the first category, improper planning, delay, change and poor estimating do result from poor handling of the sub-processes by those involved. Project implementers handling sub-processes have greater control over and can influence their frequency of occurrence and impact on projects. Azhar (2008) described it as management related factors and can be controlled. The scholar believes that this category of factors can be foreseen, and also recommended some strategies to control some of the factors. Damnjanovic*et al.* (2009) gave further examples of factors affecting cost and categorised their nature as either internally or externally controlled (Table1).

Table 1: Factors Affecting Cost	
Control	Factors Affecting Cost
Internal	Design
Specifications	
Physical layout	
Project duration	
Project scope	
Size of the project	
Contract provisions	
Timing of the letting	
Communication	

Unique or complex design	
Accuracy of design and estimates	
External	Competition
Macroeconomic factors	
Local project conditions	

(Source: Damnjanovic*et al*., 2009)

In the second category, stakeholders have little or no control over the occurrences of the factors, and the factors relate more to external conditions. Macroeconomic factors like forces of demand and supply affect them and cause inflation or price fluctuations (Stewart, 1995). Stewart (1995) concurred and defined inflation as ―a time-oriented increase in costs brought by rising prices and rising costs of materials, sub-contracts, parts, supplies, goods and services and is entwined with the political, geographical and social government policies trends‖. The author stated further that inflation is a major source of cost growth in the construction sector and can hardly be controlled.

Even in the developed economies like the United States (US) economy, inflation remains an important factor in cost growth and posing great difficulty to cost estimators to understand and deal with. However, two ways of dealing with inflation was suggested by Stewart (1995). The first is through the use of cost indices or some form of cost adjustment indices to predict and account for inflation in construction projects. The second is that trends can be observed, recorded, and used in estimating the cost of new works. This thesis was carried out in line with the later suggestion.

3.0 Methodology

The study isof a quantitative data conducted using descriptive statistical techniques. Additionally, detailed accounts of participant responses during the qualitative interviews were reported and tabulated under appropriate sections. The results of statistical analysis were interpreted: inferences were drawn from the results and discussed thoroughly to bring the research conclusions into focus.

Quantitative data collection for this study was conducted through the use of a questionnaire survey. A total of two hundred and twenty-five (225) questionnaires were administered to construction stakeholders (architects, site engineers, project managers, quantity surveyors, contractors, building materials suppliers, site managers and government workers) in the Owerri Imo State of Nigeria. One hundred and thirty-seven (137) questionnaires were administered in person to selected respondents, of which fifty-one (51) questionnaires were adequately completed and retrieved. Subsequently, eighty-eight (88) were administered online via electronic mails: eighteen (18) questionnaires were completed and sent back electronically. Ultimately, then, sixty-nine (69) questionnaires were retrieved and used for analysis.

4.0 Results

Socio-Demographic Characteristics of Respondents

Respondents Firms

The results in Figure 1 below present the characteristics of the respondents from different work divisions, professions and companies. The information obtained was from both the private and public sector of the construction industry, with 13% of the respondents from project management firms; *29*% of respondents from contracting firms; 10.1% from material suppliers; 21.7% from construction management firms; 11.6% from government establishments; 7.2% from quantity surveying firms; and 7.2% from architectural firms. From this result, it is evident that the majority of respondents undertook housing construction, an indication that the data provided by the respondents in their survey response could be relied upon for making decisions pertaining to sustainable housing construction.

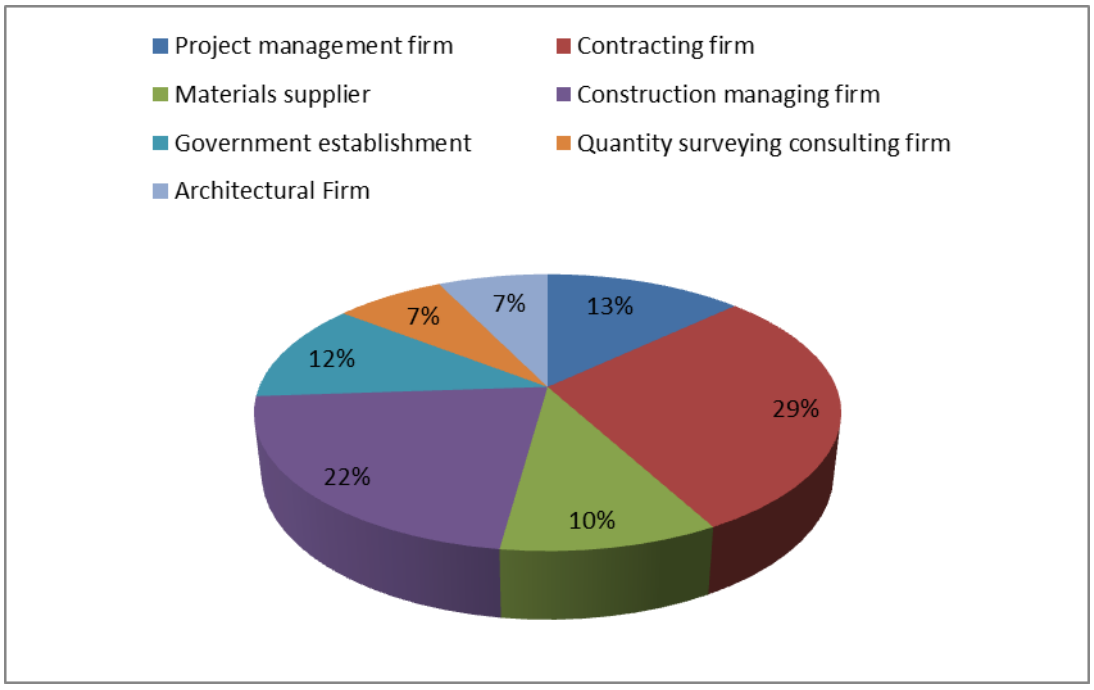

Figure.1: Respondents' Firms

Gender of Respondents

Table 1 shows that the majority (84%) of survey participants are male, while female participants represent the only 16%. This gender distribution indicates that maleparticipants

are significantly higher in number than their female counterparts. Nevertheless, this inference doesn't suggest that the female participation is not significantly reliable for this research study. In fact, these results proved that the respondents were qualified; inference suggests that equality of the gender is significantly consistent for this researchstudy.

Table 1: Respondents' gender

Category	Frequency	Percentage
Male	58	84.1
Female	11	15.9
Total	**69**	**100**

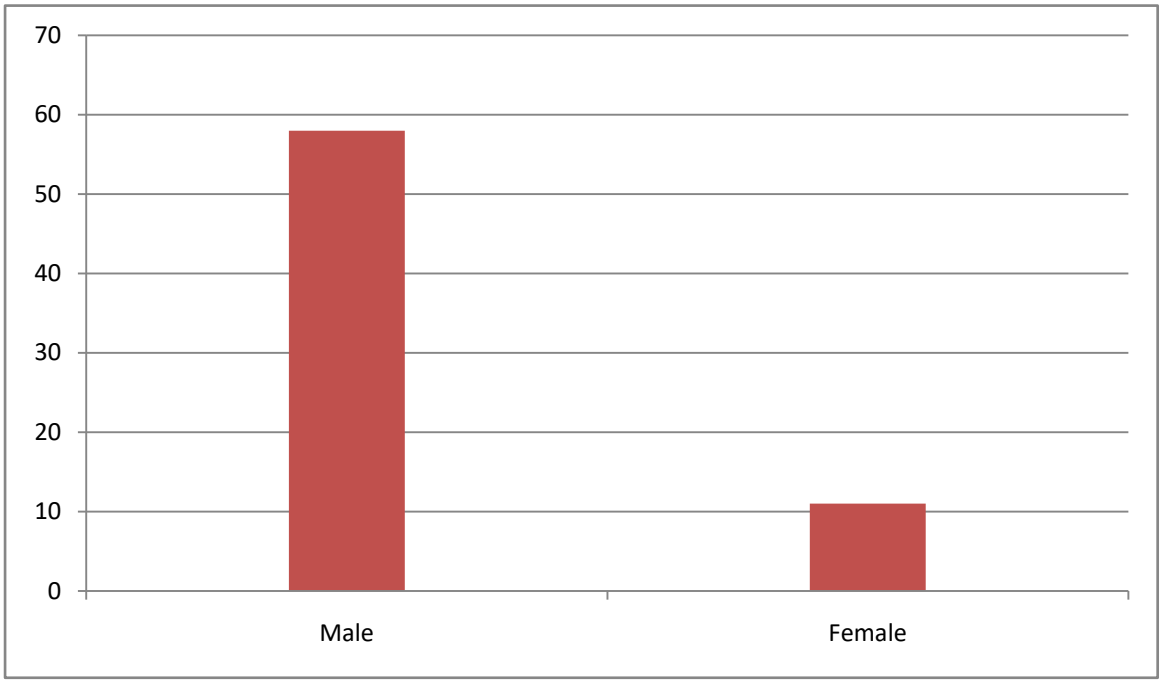

Figure 2:Showing Gender of Respondents

Experience ofrespondents

Table 2, presents the work experience of respondents in the construction sector, reveals respondents with one to five years' work experience in the construction industry represented 7.2% of the total respondents. Respondents having six to ten years construction work experience represented 10.1% of the total. A substantial 36.2% of study participants had been involved in construction work for eleven to fifteen years, while 21.7% had sixteen to twenty years' experience, and 24.6% had construction experience of greater than twenty years. Also from Table 4.2, the working experience of the minority of respondents (17%) in the construction industry spanned between one to ten years, while 58% of respondents had been working in the construction sector for more than ten years. The years of experience of respondents are significantly worthy to achieve the purpose of the study, as a significant 83% of study respondents have more than ten years work experience in the construction industry. Nonetheless, this is not to suggest that the input and work experiences of the respondents working only between 1-5 years is not significantly reliable for thisresearch.

Table 2: Experience of respondents in the construction industry

Category	Frequency	Percentage
1 - 5 years	5	7.2
6 - 10 years	7	10.1
11- 15 years	25	36.2
16-20 years	15	21.7
20 years above	17	24.6
Total	**69**	**100**

Presentation offindings

The study is designed to identify effects of significant factors affecting building cost on housing delivery in Nigeria. From the findings, the significant factors affecting the cost of building, its effects in the delivery of sustainable housing and cost control measures are:

Economic related factors responsible for increase in cost of building

Table 3 Economic related factors

Economic related factors	No.	Strongly agree	Agree(%)	Disagree (%)	Strongly disagree	Mean value (mv)	Std.D	Rank (r)
Inflation	69	60.9	33.3	5.9	0.0	3.55	0.61	1
Exchange rate of Naira	69	56.5	40.6	1.4	1.4	3.52	0.60	2
Interest rate	69	44.9	47.9	7.2	0.0	3.38	0.62	3
Cost of building materials	69	44.9	43.5	11.6	0.0	3.33	0.68	4
Market condition	69	44.9	36.2	18.8	0.0	3.26	0.76	5
Fluctuation in the cost of raw materials	69	36.2	50.7	13.0	0.0	3.23	0.67	6
Local taxes	69	34.8	46.4	14.5	4.3	3.12	0.81	7
Supply and demand of building materials	69	31.9	44.9	21.7	1.4	3.07	0.77	8
Inadequate production of building materials	69	27.5	39.1	31.9	1.4	2.93	0.81	9
Scarcity of building materials	69	21.7	52.2	21.7	4.3	2.91	0.78	10

Building production related factors responsible for the increase in cost of building

Table 4: Building production related factors responsible for increase in cost of building materials

Building production related factors	No.	Strongly agree	Agree (%)	Disagree (%)	Strongly	Mean	Std.D	Rank (r)
Site related factors								
Wastages of building materials by labourers	69	40.6	50.7	8.7	0.0	3.31	0.63	1
Poor site planning prevent easy movement of materials	69	52.2	20.3	18.8	8.7	3.15	1.02	2
Inadequate infrastructural facilities	69	18.8	65.2	15.9	0.0	3.03	0.59	3
Unsuitable location for building materials storage	69	27.5	47.8	21.8	2.9	3.00	0.79	4
Cost of fuel	69	29.0	46.4	18.8	5.8	2.94	0.85	5
Pilferage of materials on site	69	18.8	56.5	24.6	0.0	2.94	0.66	6
Shortage of building materials on site	69	20.3	49.3	24.6	5.8	2.84	0.82	7
Human related factors								
Cost of transportation and distribution of labour	69	40.6	46.4	13.0	0.0	3.28	0.68	1

Cost of power supply	69	43.5	39.1	15.9	1.4	3.24	0.77	2
Cost of labour	69	44.9	33.3	15.9	5.8	3.17	0.91	3
Cost of plant	69	31.9	52.2	13.2	2.9	3.13	0.74	4
Communication problem between labourer and supervisors	69	34.4	39.1	24.6	1.4	3.07	0.81	5
Cost of fuel	69	31.9	39.1	21.7	7.2	2.96	0.91	6
Lack of discipline among labourers	69	24.6	40.6	26.1	8.7	2.81	0.91	7
Delay in the payment of construction labourers	69	15.9	42.0	29.0	13.0	2.81	0.91	8
Design related factors								
Design changes	69	37.7	49.9	11.6	1.4	3.36	0.75	1
Additional work due to change in design	69	37.7	55.1	5.8	1.4	3.29	0.64	2
Wrong method of estimation by quantity surveyor	69	42.0	43.5	11.6	2.6	3.24	0.77	3
Construction design Complexity	69	43.3	42.0	10.1	4.3	3.24	0.71	4
Additional work due to errors	69	37.7	49.3	11.6	1.4	3.23	0.79	5
Design team experience	69	39.1	39.1	20.3	1.4	3.16	0.79	6
Inadequate coordination among design team	69	26.1	59.4	14.5	0.0	3.12	0.63	7

Stakeholder related factors responsible for increase in cost of buildingmaterials

Table 5: Stakeholder related factors responsible for increase in the cost of building materials

Stakeholder related factors	No.	Strongly agree	Agree (%)	Disagree (%)	Strongly	Mean value	Std.D	Rank (r)
Client contribution to design change	69	37.7	52.2	10.1	0.0	3.28	0.63	1
Incorrect construction method	69	29.0	63.8	4.3	2.9	3.19	0.64	2
Improper planning	69	39.1	42.0	15.9	2.9	3.17	0.80	3
Client demand on high quality project delivery	69	39.1	42.0	15.9	2.9	3.16	0.72	4
Supplier default	69	34.8	49.3	11.6	4.3	3.14	0.79	5
Delay in the supply of materials on site	69	21.7	52.2	11.6	8.7	3.09	0.87	6
Fraudulent activities	69	21.7	52.2	23.2	2.9	2.92	0.75	7
Contractor issue (change initiated by contractor to improve quality)	69	23.3	43.5	26.1	7.2	2.82	0.87	8

External factors responsible for increase in the cost of building

Table 6: External factors responsible for increase in the cost of building materials

External factors	No.	Strongly agree	Agree (%)	Disagree (%)	Strongly	Mean value	Std.D	Rank (r)
Change in government policies and regulation	*69*	*21.7*	*60.9*	*15.9*	*1.4*	*3.02*	*0.66*	*1*
Government legislations	69	18.8	66.7	11.6	2.9	3.01	0.65	2
Lack of substitute for product	69	23.2	55.1	17.4	4.3	3.00	0.76	3
Level of advanced technology	69	23.2	53.6	18.8	4.3	2.95	0.77	4
Increase in cost of hiring construction machineries	69	21.7	52.2	24.6	1.4	2.94	0.73	5
Poor nature of construction site	69	21.7	56.5	14.5	7.2	2.92	0.81	6
Weather condition	69	26.1	44.9	23.2	5.8	2.91	0.85	7
Effect of rainfall on building materials	69	20.3	50.7	23.2	5.8	2.85	0.81	8
Political interference	69	17.4	53.6	20.3	8.7	2.80	0.83	9
Force majeure (natural occurrences)	69	17.4	47.8	30.4	4.3	2.78	0.78	10

Effects of increase in the building cost on housingdelivery

Table 7: Effects of increase in the cost of building materials on housing delivery

Effects	No.	To a very large extent	To a large	To a little	Not at all (%)	Mean	Std.D	Rank (r)
Fluctuation in cost of construction	69	37.7	52.2	8.7	1.4	3.26	0.68	1
High maintenance cost due to poor workmanship	69	36.2	50.7	13.0	0.0	3.23	0.67	2
Increase in the cost of repair due to inferior materials used	69	31.9	56.5	10.1	1.4	3.19	0.67	3
Poor workmanship	69	31.9	52.2	14.5	1.4	3.14	0.71	4
Affect client expectation's on quality project delivery	69	33.3	46.4	18.8	1.4	3.11	0.75	5
Building collapses due to the use of less quality materials	69	34.8	43.5	18.8	2.9	3.10	0.80	6
Conflict between client and contractors due to upward review of contract sum	69	34.8	44.9	15.9	4.3	3.10	0.82	7
Delay on the progress of project works	69	26.1	60.9	10.1	2.9	3.10	0.69	8
Poor quality of construction product	69	21.7	65.2	13.0	0.0	3.09	0.58	9
Increase in final cost of building products, that is final cost of production higher than budgeted	69	31.9	47.8	15.9	4.3	3.07	0.81	10
High rate of contractors' fraudulent practices	69	27.5	53.6	17.4	1.4	3.07	0.71	11
Low income earners are priced out for home ownership due to high cost of	69	31.9	49.3	11.6	7.2	3.06	0.86	12

Building								
Affect the aesthetics value of building product	69	20.3	65.2	13.0	1.4	3.04	0.63	13
Shortage in the delivery of housing to the populace	69	29.0	50.7	15.9	4.3	3.04	0.79	14
Affect gross domestic product (GDP) contribution to the economy	69	21.7	62.3	13.0	2.9	3.03	0.68	15
Investment return on construction project are delayed	69	27.5	52.2	15.9	4.3	3.02	0.79	16
Threatening health and safety of workers on site	69	27.5	49.3	20.3	2.9	3.01	0.77	17
Completion at the expense of other Projects	69	23.2	50.7	24.6	1.4	2.96	0.74	18
Low volume of construction product	69	17.9	60.9	20.3	1.4	2.94	0.66	19
Transportation cost – e.g. returning substandard materials to the supplier	69	26.1	50.7	14.5	8.7	2.94	0.87	20
Increase in project abandonment	69	21.7	47.8	27.5	2.9	2.88	0.78	21
Hindered adequate implementation of innovation in construction	69	17.4	60.9	20.3	1.4	2.87	0.62	22
Unemployment of construction Workers	69	23.2	33.3	37.7	5.8	2.74	0.89	23

Discussion offindings

Table 8: Summary of findings of quantitative data

S/N	CONCEPTS	ISSUED ADDRESSED	FINDINGS
To identify factors responsible for increase in the building costs that hinders sustainable housing delivery		Economic related factors	1. Inflation 2. Exchange rate ofrand 3. Interestrate 4. Cost of buildingmaterials 5. Marketcondition
		Site related factors	1. Wastages of buildingmaterials byworkers 2. Poor site planning preventseasy movement ofmaterials 3. Inadequate infrastructural facilities 4. Unsuitable location for building materials storage
		Human related factors	1. Cost of transportation and distribution oflabour 2. Cost of powersupply 3. Cost oflabour 4. Cost ofplant 5. Communication problembetween labourer andsupervisors.
		Design related factors	1. Design changes 2. Additional work due to change in design 3. Wrong method of estimation

		by quantitysurveyor 4. Construction designcomplexity 5. Additional work due toerrors
	Stakeholder related factors	1. Client contribution to design change 2. Incorrect constructionmethod 3. Improperplanning 4. Client demand on high quality projectdelivery 5. Supplierdefault
	External factors	1. Change in governmentpolicies
		and regulation 2. Government legislations 3. Lack of substitute for product 4. Level of advanced technology 5. Increase in the cost of hiring construction machineries
	Effects of increase in the building costs on housing delivery	1. Fluctuation in cost of construction 2. High maintenance cost due to poor workmanship 3. Increase in the cost of repair due to inferior materials used 4. Poor workmanship 5. Affect client expectation on quality project delivery

5.0 Conclusion andRecommendations

Conclusion

This research was set to look at the cost control measures, causes and effects of building and housing projects in Nigeria and also proffer solution that will meet the desire of building construction projects procurement in Nigeria. Emanating from the incessant cost and time overruns in construction projects procurement, calls were made to reconsider the conventional management model which often fail in responding optimally to management flaws. Precisely, the traditional management concept common in construction procurement responds poorly to the kinds of challenges plaguing it. Responses to flaws are often late sand suboptimal which leads to cost and time overruns, also known as cost growth. Proactive management approach was identified as panacea to the persistent cost and time overruns in the procurement of building projects. Despite incessant calls for the development of proactive management models to either replace or complement the traditional model, the subject has not however, received adequate attention required from researchers. This gave rise to the main issue in this research which is the lack of proactive tendency in the widely favoured traditional way of managing building construction projects.

The examined findings that are responsible for increase in building costs, if effectively considered by stakeholders during the implementation process, will improve delivery of a project at construction budgeted costs satisfactory to the client. Increase in the building costs has been narrowed down to economic instability of this country. There exist array of factors that obstruct successful procurement of building construction projects. Several of these obstructions have been well researched upon and solutions proffered to improve projects procurement. One aspect of the recommendations that has received less than deserved attention is the proactive way of managing cost, believed will offer the deserved scientific cost management of building construction projects.

This study showed fluctuation in construction as a top effect of increase in the cost of building on housing delivery. In order to diminish excessive fluctuation in the cost of construction, Desai and Desale (2013) suggested that stakeholders should have a well- developed plan for materials,

in advance, to avoid the effect of increase in building materials prices in the market. Thus proper planning and scheduling at the initial stages of construction is essential; this includes early purchase of building materials within the budgeted cost and suitable storage of building materials to avoid cost overrun, disputes and inflation. This will enhance timely delivery of housing at the budgeted cost while meeting clientexpectations.

The delivery of sustainable housing entails the ability to meet the present housing needs of humans without obliging on the capacity of the future generation to meet their own needs. Hence, the enhancement requires major resources (materials, machinery and manpower), and criteria carefully considered by construction stakeholders for a successful project delivery. Proficient consideration of several criteria in material selection will ensure sustainable development in building design and construction. Maintenance cost, energy consumption and maintainability are significant criteria to be considered in the selection of sustainable building materials to enhance delivery of affordable housing. Thus, effective consideration of building materials *before* selection in construction towards enhancing sustainable housing delivery based on socio-economic, environmental and technical criteria is a framework to ensure that sustainability supply chain requirements are met from the very beginning of the project.

Recommendations

In order to provide lasting solutions,

1. Construction managers should be cautious in inventory keeping and consumption, and should be weary of materials more sensitive to market pressure as identified in this work. Items that indicated higher sensitivity to market pressure should be given priority in inventory keeping and consumption. Cement, aluminium, bitumen and emulsion paints were found to deserve less priority for being more stable in price changes compared to other materials.
2. During the assembly process of a building project, elements with higher cost growth factors should be targeted for early completion since delay can result to greater impact of market forces on the cost of that element which will later translate into cost overrun of the entire project.
3. Quarterly material research will help curb the continuous increases in building

material price. Government should support and encourage the conducting of innovative research in the development of new local building materials for production; this will reduce the reliance on expensive imported materials.

4. Wastages of building materials by workers is a site related factor responsible for escalating costs of building materials. This could be a result of the lack of communication between the involved stakeholders and site workers and lack of material management. Construction stakeholders are required to incorporate practical knowledge acquired in the industry and intelligent management skills to effectively communicate about the project with site workers.
5. Additionally, effective material procurement management is required to avoid wastage of building materials during building production process. Moreover, timely delivery of building materials to site enables the effective usage of materials during construction and reduces material wastages during production processes.
6. Government should also take drastic measures to counter the problem of transportation costs, cost of power supply, and increase in the fuel prices, to improve ease of movement and distribution of raw materials to the factory as well as distribution of the finished products from the factory to the end-users.

6.0 References

Abanda, F. H., Tah, J. H. M., Pettang, C. &Manjia, M. B. (2011).An ontology- driven building construction labor cost estimation in Cameroon.*Journal of Information Technology in Construction (ITCON),* 16, 617-634.Retrieved from http://www.itcon.org/2011/35, on 22 April, 2013.

Anigbogu, A.I., Achuenu, E., Anigbogu, N. A. &Kuroshi, P. A. (2007). Assessment of consultant‘s pre-tender cost and duration estimates of building projects in Nigeria. *Construction Focus*.*Journal of Construction Management and Engineering*,1 (1) 23-36.

Bal, M., Bryde D., Fearon, D. &Ochieng, E. (2013). Stakeholder engagement: Achieving sustainability in the construction sector. *Sustainability.*doi:10.3390/su5020695.

Barriga, E. M., Jeong, J. G., Hastak, M. &Syal, M. (2005).Material control system for the manufactured housing industry.*Journal of Management and Engineering.12(1)*

Bayraktar, M., Hastak, M., Gokhale, S., & Safi, B. (2011).Decision tool for selecting the optimal techniques for cost and schedule reduction in capital projects.*Journal of Construction Engineering and Management*, 137(9), 645–655. doi: 10.1061/(ASCE).

Federal Facilities Council [FFC] (2007). Reducing construction costs: Uses of best dispute resolution practices by project owners.*Technical Report No. 149, National Research Council*.The National Academy Press, Washington DC, United States of America.Available at http://www.nap.edu/catalog/11846.html.on 12 December, 2009.Field, B. &Ofori, G. (1988).Construction and economic development-a case study.*Third World Planning Review*.

Fleming, G. (2007). *Construction project management handbook*.Prepared for Federal Transit Administration (FTA), Office of Research, Demonstration and Innovation U.S. Department of Transportation Washington, DC 20590.

Fleming, G. (2009). *Construction project management handbook*.Prepared for Federal Transit Administration (FTA) Office of Research, Demonstration and Innovation U.S. Department of Transportation Washington, DC 20590, Report Number FTA-CA-26-7077-2009.1.

Gambo, M. J & Ashen, M. J. (2012). Application of economic indicators in predicting construction cost escalation for residential buildings in Nigeria. *International Journal of Economic Development Research and Investment*, 3 (1).

Harrison, F. & Lock, D. (2005).*Advanced project management: A structural approach*.4th edition, Gower Publishers Ltd. England.

Johnson, S. (2010). Proactive verses reactive project management. Retrieved from http://blogs.attask.com/blog/a-better-way-to-get-work-done/proactive-vs reactive-project-management, on14 January 2010.

Khan, R. A. (2008). Role of construction sector in economic growth: Empirical evidence from Pakistan economy. A paper presented at the First *International Conference on*

Construction in Developing Countries(ICCIDC–I) Titled, ―Advancing and Integrating Construction Education, Research & Practice‖4-5 August, Karachi,, Pakistan.

*Management Sciences (JETEMS).*Scholarlink Research Institute Journals, available at jetems.scholarlinkresearch.org.

Muriro, A. & Wood, G. (2010).A comparative analysis of procurement methods used on competitively tendered office projects in the UK. A publication of The Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors, UK (September).

Olusegun, A. E. & Michael, A. O. (2011).Abandonment of construction projects in Nigeria: Causes and effects. *Journal of Emerging Trends in Economics and* 265

Oswald, P. F. (2001). *Construction cost analysis and estimating*. Prentice Hall Inc., Upper Saddle River, New Jersey.

Oyegoke, A. S. (2006). Managing client‘s expectations in project delivery: a comparative study of delivery systems. *Quantity surveying in the 21st century agenda for the future.*The 22nd Biennial conference of the Nigerian Institute of Quantity Surveyors, 22-25th November, Calabar, Nigeria.

Rashid, R. A., Taib, I. M., Ahmad, W. B. W., Nasid, Md. A., Ali, W. N. W. &Zainordin, Z. M. (2006). Effect of procurement systems on the performance of construction projects. Department of Quantity Surveying Faculty of Built Environment, UniversitiTeknologiMalaysia.