Cost Control Procedure in Mass Housing Development in Ilorin Metropolis, Kwara State, Nigeria

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ABSTRACT

This study investigates cost control Procedure in Mass Housing Development in Ilorin Metropolis, Kwara State, Nigeria. The major aim is on the need for effective control of the direct cost of acquiring a dwelling by a household. The conceptual anchor used in this study is the systems approach. Cross sectional research design using case study approach is adopted. Structured interview is used to elicit information from selected respondents using purposive sampling technique and data analyzed using Statistical Packages for Social Sciences (SPSS 20). Findings revealed that the use of local building materials barely affects the cost of mass housing delivery when compared with other methods of construction. Planning, Programme, disbursement, cash-flow and Elemental Cost Breakdown Structure were found to be adopted for budget preparation of mass housing by the firm. It is recommended among others that regular meeting among project participants can enhance performance; owners should facilitate payment to developers in order to overcome delays, disputes and claims.
Keywords: Cost Control, Organized Private Sector, Mass Housing, Development, Developer

INTRODUCTION

Every household deserves decent and affordable housing accommodation as a basic necessity of life. Housing plays a significant role in the economy of a country as it could account for a sizeable portion of the production activities such as land market, building materials, equipment labour market and its linkage with financial market of a nation (Babalola, 2014). However, only 25% of Nigerian population owns their own homes as against 70% of the population in the developed economies of the world (Akumazi, 2014). One of the major causes of this is that not many household have the capability to own a decent housing accommodation in Nigeria because of affordability issues (Onyike, 2007). Housing affordability is a function of both housing cost and household income (Disney, 2006). However, the focus of this study is on the need for effective control of the direct cost of acquiring a dwelling by a household. Currently, efforts are geared towards achievement of mass housing through the provision of affordable housing by organized private sector. However, considerations are not given to proper cost monitoring of mass housing delivery by the organized private sector and the issue of cost and affordability are somehow neglected (Akumazi, 2014). The Nigerian housing problem has been that of inadequacy of affordable stock, rather than that of acceptability of provision (Ogbu and

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Adindu, 2012). Studies have shown that Nigeria, in spite of her urban population rate of 36.2%, ranks among the least urbanized nations of the world, especially when compared with Libya, 86%; Angola, 42%; South Africa, 57%; United Kingdom, 90%; and USA, 75% (Adindu and Oyoh, 2011).

The research questions to be answered are:

(i)   Does the effort of the organized private sector in providing affordable mass housing control the cost of housing development?

(ii)   Does organized private sector initiative effectively contribute to the improvement of planning of cost control in mass housing delivery?

Need for affordable Housing: The United Nations estimates that Nigeria's population in 2005 stands at 141 million, and predicted that it would reach 289 million by 2050 (Encarta, 2007). The United States Census Bureau projects that population of Nigeria will reach 264 million by 2050. Rapid growth in population creates demand pressure towards shelter and efficient supply and distribution of basic utilities and services for the city dwellers. In most of our urban centres the problem of housing is not only restricted to quantity but to the poor quality of available housing units, the effect of which is manifested in overcrowding in houses. Nigeria is perhaps the fastest urbanizing country in the African continent. One of the most important challenges facing the country is the provision of affordable housing. As more and more Nigerians make towns and cities their homes, the resulting social, economic, environmental and political challenges need to be urgently addressed (Raji, 2008).

Housing Demand and Supply: There is a gap between need for housing and the capacity to acquire the desired housing type, resulting in an effective demand crisis for affordable housing in the country. While it is clear there is a housing deficit, it is crucial to recognize that people can only acquire what they can afford. Affordability analysis shows that low-income earners can afford housing units at N2 million ($13,333.33). This is based on assumption that the borrower is on an average monthly income of - N34,000 ($226) and should spend a maximum of 33% of his gross income on housing. For a 30 year NHTF mortgage at 6% per annum and a down payment of 10% (N200,000 = $1,333) of the cost of the house, the monthly payments will be N10,792 ($71.94). Analysis of the stock of dwelling units helps to understand affordability. Demand is influenced by several economic factors, such as increased economic activity that has led to increased demand for labour and rural-urban migration. The result is that there are 14 million units of housing deficit in the country. There has been an intractable gap between government's supply efforts and actual achievement over the years, worsened by a population growth from about 42 million in 1960 to more than 151 million in 2010 (World Bank, 2010).

Mass Housing Provision in Kwara State: Mass housing provision is aimed at providing large quantity of houses for the populace who do not own a house and majority of the mass housing schemes are located within the state capitals in Nigeria. Mass housing is often viewed as the only way through which low income earning population of an urban centre can own a house by instalment payments. It is however sad that the houses oftentimes

do not get to the proposed house owner because the housing process did not start by identifying them. The mass housing process in practice in Kwara State can be said to be of little or no difference with the method adopted in many other States of Nigeria. According to Kabir and Bustani (2009), the 3rd National Development plan of 1975-1980 showed how government tried to provide houses in large quantities throughout the country regardless of location, climate and culture. This same mistake according to Aribigbola (2008) was continued in the National Housing policy of 2002. The mistake of providing same house type around the country has been suggested as a major reason for the failure of the policies. It can be assumed that the realisation of the failure of the policies led the government to call for the private sector to play active role in mass housing provision.

In Kwara State prior to 2001 there were only two major housing estates built in the State namely; Kulende estate and Adewole estate. The collaboration of the state government and private sector through what is referred to as the Public Private Partnership (PPP), has now led to at least six more housing estates all constructed after 2001. The process adopted and put into use by these private developers is based on the cost and product production principle which was common to manufacturing industries and factories but introduced into housing in order to meet the demand.

Cost Control in the Construction Industry: In the construction industry, the aim of project control is to ensure that the projects are completed on time, within budget and achieving other project objectives. It is a complex task undertaken by project managers in practice, which involves constantly measuring progress; evaluating plans; and taking corrective actions when required (Kerzner, 2003). During the last few decades, numerous project control methods, such as Gantt Bar Chart, Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM), have been developed (Nicholas 2001, Lester 2000). A variety of software packages have become available to support the application of these project control methods, for example Microsoft Project, Asta Power Project, Primavera, etc. Despite the wide use of these methods and software packages in practice, many construction projects still suffer cost overruns.

In recent years, there have been numerous studies on the identification of influencing factors of project cost overruns worldwide. Mansfield, Ugwu and Doran (1994) carried out a questionnaire survey amongst 50 contractor, consultant and client organizations in Nigeria and found out that the most important variables causing construction delays and cost overruns are poor contract management, financing and payment of completed works, changes in site conditions, shortage of materials, imported materials and plant items, design changes, subcontractors and nominated suppliers. While the top variables causing only cost overruns were revealed as price fluctuation, inaccurate estimates, delays, additional work. Kaming, Olomolaiye, Holt and Harris (1997) identify factors influencing construction time and cost overruns on high-rise building projects in Indonesia through a questionnaire survey administered on 31 project managers. A total of 11 variables (design changes, poor labour productivity, inadequate planning, material shortages, inaccuracy of material estimate, skilled labour shortage etc) were identified for time overrun and 7 (materials cost increased by inflation, inaccurate quantity take-off, lack of experience of project location, lack of

experience of project type etc) for cost overrun. Kumaraswamy and Chan (1998) conducted a more extensive study in Hong Kong using 400 questionnaire after which follow up interviews were held. The study revealed the top ten causes of construction delays from the contractors' point of view as delays in design information, long waiting time for approval of drawings, poor site management and supervision, mistakes and discrepancies in design documents, etc.

Similar survey studies were reported by Frimpong, Oluwoye and Crawford (2003) in Ghana and by Assaf and Al-Hejji (2006) in Sandi Arabia. In addition to questionnaire surveys, other researchers adopted a case study approach. Al-Momani (2000) examined 130 public projects in Jordan and concluded that the main causes of delays include changes initiated by designers, client requirement, weather, site conditions, late deliveries, economic conditions, etc. Hsieh Lu and Wu (2004) conducted a statistical analysis in 90 metropolitan public work projects in Taiwan and identified problems in planning and design as main causes of change orders. Yogeswaran, Kumaraswamy and Miller (1998) scrutinised 67 civil engineering projects in Hong Kong and suggested that at least a 15-20% time overrun was due to inclement weather. Based on analysis of 46 completed building projects in the UK, Akinsola, Potts, Ndekugri and Harris (1997) identified and quantitatively examined factors influencing the magnitude and frequency of variations in building projects.

These factors include client characteristics, especially lack of prior experience and knowledge of construction project organization and the production processes; project characteristics, such as type, size, complexity and duration of the project; and project organisation factors, such as; design duration, percentage of design completed before tender, procurement and contract type, adequacy of information provided, and number of sub-contractors. While all the above studies, to various extents, helped with the better understanding of the problems associated with cost and time overruns in construction projects, there are some limitations. Most existing studies stopped at the identification of the influencing factors, but did not progress onto finding ways of mitigating the identified problems. These observations underlie the rationale for this study. Its aim is to evaluate the impact of cost control on mass housing development especially with reference to the organized private sector using Harmony Estate in Ilorin as a case study.

METHOD

This study was carried out in Kwara State. The Harmony Estate in Ilorin was used as the case study. A descriptive Cross-sectional survey design was used whereby structured questionnaire was used in eliciting information from nine respondents of the private developer in charge of the estate. Both descriptive and inferential statistical tools were used in analyzing the data collected. Data for the study were processed and analyzed using a one-sample t-test to determine whether access to mass houses produced by the organized private sector was social class biased. The responses were also assessed by Shapiro-Wilk's test with the aid of the Statistical Packages for Social Sciences (SPSS 20.0) to determine the distribution of the responses.

RESULTS AND DISCUSSION

The survey of the sex of respondents considered for this work as reflected on table 1 shows that 9 of the respondents, which represented 100% of the respondents that participated in the survey were male, while there was no female. The position/rank of the respondents on table 2 shows that there is one managing director making 11.11% of the respondents, two each for site manager and contracts manager with 22.22% while other cadres constituted 44.44% of the respondents. The respondents' profession is also reflected on table 3 as there were respondents from Civil/Structural Engineering field and Mechanical Engineering field, constituting 11.11% each, while there were 44.44% of the respondents each for Architecture and Quantity Surveyors while respondents having other professional qualifications constituted 33.33%. The professional affiliations of the respondents is also exhibited on table 4 as there were two respondents each belonging to the Nigerian Institute of Quantity Surveyors (22.22%) and the Nigerian Institution of Architects (22.22%), the Nigerian Institute of Estate Surveyors and Valuers and Nigerian Society of Engineers had three (33.33%) and one (11.11%) respectively. Table 5 shows that 33.33% of the respondents had Higher National Diploma, while 44.44% and 22.22% are for B.Sc and M.Sc holders respectively. There were none with neither OND nor Ph.D. Table 6 shows the length of time by which the respondents have been into mass housing development. 33.33% of the respondents are between eleven to fifteen years while respondents that fall between 1-5 years, 16-20 years and above 21-years had 0%, 11.11% and 0% respectively. Table 8 shows the ranking by respondents of how often the firm delivers budgeted units. It can be seen that 22.22% of the respondents opine that they deliver very often, 11.11% opine that the units were often delivered as planned; while 66.67% were not sure of the rate of delivery.

The respondents revealed that Government Policy, Site location, Distance in relation to resources (Transportation Cost), Ground condition, inadequate time for tendering/ contractual arrangement, Fluctuations are the factors that affect building material prices. Variations, and incomplete contract documents (designs) were identified as factors that affect building amounts. The respondents also identify place of manufacture, poor standard of materials and workmanship used, poor project management, fixed contract method as the factors that affect building quality. The cost and time overrun, project abandonment, increase in the price of sales, reduced quality of building were said to be the effects of the identified factors on mass housing production. Table 9 shows that progress curves analysis (s-curve) had 88.88% response while time variance analysis had 11.11%.

The following methods are said to be adopted for budget preparation of mass housing by the respondents: (1) planning, programme, disbursement and cash flow and (2) elemental cost breakdown structure. From table 10, 77.77% of the respondents opined that the use of local building materials barely affect the cost of mass housing delivery when compared with other methods of construction. A few of the respondents also opines that the impact of local building materials on mass housing delivery is of low extent. It can then be generally observed that local building materials do not have dramatic impact on the cost

of mass housing delivery in Harmony Estate. Mass Housing Delivery by Organized Private Sector has controlled the Cost of Housing Development in the State. The organized private sector creates competition in cost and quality of delivery. Very effective but with poor quality of work. From the table 12, a one-sample t-test was run to determine whether access to mass houses produced by the organized private sector was social class biased, defined as a response of 0.0. The responses were normally distributed, as assessed by Shapiro-Wilk's test ($p > 0.05$) and there were no outliners in the data, as assessed by a boxplot. Mean response (3.33 ± 0.5) was greater than the normal response of 0.0, with a statistically significant difference of 0.5 (95% CI, 2.95 to 3.72), $t(8) = 20$, $p = 0.005$. From table 15, a one-sample t-test was run to determine whether there is mismatch between the need for mass houses produced by the organized private sector and the provision of such houses, defined as a response of 0.0. The responses were normally distributed, as assessed by Shapiro-Wilk's test ($p > 0.05$) and there were no outliners in the data, as assessed by a boxplot. Mean response (3.67 ± 0.5) was greater than the normal response of 0.0, a statistically significant difference of 0.5 (95% CI, 3.28 to 4.05), $t(8) = 22$, $p = 0.005$. There was a statistically significant difference between means ($p < 0.05$) and, therefore, reject the null hypothesis and accept the alternative hypothesis.

Findings reveal that the specific objectives of the firm were three fold. Firstly, to maximize profit for its shareholders; Secondly, to act as an intermediary between mortgage bank and house owners; thirdly to develop affordable housing with commensurate value derivable by end users. The firm was found to be involved with the provision of infrastructure, funding of projects, the construction of new houses and the allocation of houses to buyers. Findings also reveal that the need of the state government and the presence of potential off takers were the major factors that influenced the choice of housing estate locations. The level of occupation of the produced houses was also found to be significantly high. The importance of cost control was also recognized by construction professionals in the firm. The two principal methods used in preparing budget for mass housing by the firm were planning, programme, disbursement and cash-flow method on one hand and elemental cost break-down structure on the other. It was also discovered that the cash-flow analysis was the major method used in measuring, controlling and analyzing construction progress followed by earned value analysis. The methods used by the firm in estimating project duration were work packages. The study has shown that the organized private sector contributes immensely when it comes to housing provision in the country especially in Kwara State. The effect of local building material cost on the overall project delivery has been observed to have very little impact which makes the upper and the middle class the only set of people that have access to these facilities.

Table 1: Sex of Respondents

Sex	No of Respondents	Percentage
Male	9	100
Female	0	0
Total	9	100

Source: Fieldwork 2014

Table 2: Position/Rank of Respondents

Position/Rank	No of Respondents	Percentage
Managing Director	1	11.11
Site Manager	2	22.22
Contract Manager	2	22.22
Others	4	44.44
Total	9	100

Source: Fieldwork, 2014

Table 3: Profession of Respondents

Profession	Number of Respondents	Percentage
Architecture	2	22.22
Building	0	0
Civil/Structural Engineer	1	11.11
Mechanical Engineer	1	11.11
Quantity Surveyor	2	22.22
Others	3	33.33
Total	9	100

Source: Fieldwork, 2014

Table 4: Professional Body of Respondents

Professional Body	Number of respondents	Percentage
NIA	2	22.22
NIOB	0	0
NIESV	3	33.33
NIQS	2	22.22
NSE	1	11.11
Others	1	11.11
Total	9	100

Source: Fieldwork, 2014

Table 5: Highest Level of Education of Respondents

Level of education	Number of Respondents	Percentage
OND	0	0
HND	3	33.33
B.Sc.	4	44.44
M.Sc.	2	22.22
Ph.D.	0	0
Others	0	0
Total	9	100

Table 6: Years of Experience of Respondents

Years of Experience	Number of Respondents	Percentage
1-5 years	0	0
6-10 years	5	55.55
11- 15 years	3	33.33
16-20 years	1	11.11
21 years and above	0	0
Total	9	

Source: Field work 2014

Table 7: Nature of Firm

Nature	Frequency	Percentage
Building Construction	9	100
Civil Engineering	0	0
Heavy Engineering	0	0
Others	0	0

Source: Field work 2014

Table 8: How often budgeted units are delivered

Ranking	Frequency	Percentage
Very Often	2	22.22
Often	1	11.11
Not often	0	0
Rarely	0	0
Don't keep time records/ don't know	6	66.67

Source: Field work 2014

Table 9: Method of Measuring, Controlling and Analyzing Schedule Progress

Technique	Frequency	Percentage
Incremental Milestone	0	0
Progress Curves Analysis (S-curve)	8	88.88
Time Variance Analysis	1	11.11
Cash Flow Analysis	0	0
Schedule of Values for Progress Payment Processing	0	0
Trend Analysis	0	0
Forecast Analysis	0	0
Others	0	0

Source: Field work 2014

Table 10: How local building materials have reduced the cost of mass housing delivery

Response	Frequency	Percentage
Very High Extent	0	0
High Extent	0	0
Barely High Extent	7	77.77
Barely Low Extent	0	0
Low Extent	2	22.23
Very Low Extent	0	0

Source: Field work 2014

Table 11: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
type of occupier	9	3.00	4.00	3.3333	.50000
payment method	9	2.00	2.00	2.0000	.00000
Valid N (listwise)	9				

Table 12: One-Sample Test

Test Value = 0	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Type of occupier	20.000	8	.000	3.33333	2.9490	3.7177

Table 13: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
contribution of local building material	9	3.00	4.00	3.6667	.50000
local material non cost reduction	9	3.00	4.00	3.6667	.50000
extent of cost reduction by local material	9	3.00	4.00	3.6667	.50000
Valid N (listwise)	9				

Table 14: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Contribution of local building material	9	3.6667	.50000	.16667
Local material non cost reduction	9	3.6667	.50000	.16667
Extent of cost reduction by local material	9	3.6667	.50000	.16667

Table 15: One-Sample Test
Test Value = 0

	t	df			95% Confidence Interval of the Difference	
					Lower	Upper
Contribution of local building material	22.000	8	.000	3.66667	3.2823	4.0510
Local material non cost reduction	22.000	8	.000	3.66667	3.2823	4.0510
Extent of cost reduction by local material	22.000	8	.000	3.66667	3.2823	4.0510

CONCLUSION AND RECOMMENDATIONS

Abandonment of projects are caused by inadequate planning, inadequate finance, inflation, delayed payment and political factor, incompetent project manager, wrong estimate, faculty, design and inadequate cost control; The top five factors inhibiting cost control in mass housing delivery was revealed as design changes, risks and uncertainties; inaccurate evaluation of project time/duration; complexity of works and; non-performance of subcontractors; Design change is the single most important factor considered by practitioners as hindering the ability to control not only time of construction projects but also cost. In fact, it is found that there is a high level correlation between the inhibiting factors for cost control and time control. Private sector initiative has contributed to effectively controlling the cost of mass housing development; low income by the citizens has not hampered their ability to own houses but the non availability of these units.

The following issues are recommendations related to obtained results. To drastically reduce the effects of cost overrun and consequent project abandonment clients should undertake adequate planning for the project at inception and make enough fund available based on reliable estimate made by the Quantity Surveyor at the inception. The client should engage services of competent construction professionals; the Architect should at once and at inception produce economic design as dictated by cost plan prepared by the Quantity Surveyor who also controls cost from inception and throughout the duration of the contract. The client should not unnecessarily vary project scope.

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