

EVALUATION OF CRITICAL SUCCESS CRITERIA FOR PUBLIC HOUSING PROJECTS IN NIGERIA

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ABSTRACT

Public Housing supply remains one of the much talk about in Nigeria over the past thirty years. Successive Public Housing Policies attempted have been unsuccessful due to a number of reasons. The lack of success on Public Housing Programmes is also due to the lack of clearly defined success criteria which guides the housing projects from inception to completion. The reason for the adoption and application of project management and project success criteria is to deliver projects successfully, achieve enhanced output, develop framework to help follow key project result and for aiding the appropriate allocation of resources. This research seeks to determine and establish what constitute critical project success criteria for Public Housing Programmes in Nigeria. Questionnaire survey was used to bring about what is perceived as critical success criteria from respondents who have considerable experience and have been involved in Public Housing Programmes. Data analysis involving mean scores and t-test were conducted on the responses on the identified criteria to reveal and discuss its characteristics. The 'cost of unit house' and 'extensive use of local materials' were acknowledged as the most critical project success criteria and therefore were ranked First and Second whilst 'risk taking' was the least critical criteria. These findings could form the foundation of a framework and formulating policies which will enable project managers (PM) involved in Public Housing Programmes to channel appropriate efforts and behaviours towards ensuring successful execution.

Keywords: Criteria, Nigeria, Housing Delivery, Project Management

INTRODUCTION

Project success criteria according to Westerveld, (2002) are seen as a result area which organizations must focus on in order to manage projects successfully. Traditionally, project success has been seen by the PMI's iron triangle of cost, time and adherence to specification (quality). In recent times many research have proved that this is not a satisfactory success criteria and more is required beyond this. The reality is that the notion of success is a much more complex issue and often an illusory concept according to Westerveld, (2002). Several efforts have been made through research to evolve and predict some project success criteria for project management in both developed and developing economies, but the degree of originality and peculiarity of conditions, uniqueness of projects and problems and prevailing different objectives in many countries make their comprehensive adoption

Mohammed I.Y

and application of little effects and benefits. It is therefore suggested that a 'local' approach to establish these success criteria aimed at improving the benefits from the application of project management aimed at informing policy makers and stakeholders in their decision and policy framework is advised by Ahadzie et al, (2007). Ahadzie et al, (2008); Konadu-Agyemang, (2001) among other literatures identify key problems facing housing delivery in developing countries, notably project management inefficiencies, lack of clear success criteria for PHPs implementation and management, performance criteria of project managers and key participants, economic mismanagement, lack of effective national housing policy, over dependent on foreign standards and materials/input which have contributed in making the set objectives for these projects unattainable. Wideman, (1996) submitted that the purpose of modern project management is to conduct successful projects. If the meaning of success was generally agreed, and this could be related to a satisfactory project execution, then this relationship would significantly help those responsible for formulating the projects. The identification of appropriate critical project success criteria as recommended by Pinto and Slevin, (1988), Baccarini, (1999) for public housing projects is important and hence in the Nigerian public housing programmes is imperative for enabling the appropriate allocation of resources and also helps develop framework to help follow key project results.

Nature and Characteristics of Public Housing

Public Housing refers to a form of housing tenancy in which the property is fully owned by a government authority, which may be central or local (Duncan and Barlow, 1994). Often Social Housing has been used in place of this. Social Housing is an umbrella term referring to rental housing owned and controlled by the state, by non-profit organizations or by combination of both. The underscoring factor is that its provision is not for profit and aims at providing affordable housing units for the medium and low income of the population. In many available literatures, Social Housing has also been seen as a form of Affordable Housing. In other words Affordable housing refers to dwelling units whose total housing costs are considered within the reach of the medium and low income earners. According to Werna, (1998) and Smith, (2006) the main objective of Public Housing is to provide affordable housing directed at the working class, low income and the poor.

METHODOLOGY

Both primary and secondary data collection methods were employed. Widespread literature review, structured interviews and interviews with key stakeholders such as, project managers, project participants and policy formulators on the subject was done and the result was used for a pilot surveys which established thirteen (13) critical success criteria for public housing projects in Nigeria. The identified critical success criteria were used for the questionnaire survey that produced the respondents perceived level of importance of each variable from a 4-point Likert scale. The variables were ranked based on their mean scores and standard deviations. Grouped sample independent t-test was also used to assess the level of agreement among the groups from the population. The respondents were drawn from the Built environment professionals by 'snow-balling' sampling of people with extensive and considerable experience on Public Housing in Nigeria. Out of the 210 respondents used for the study 173 were received constituting 82.4% response rate.

DATA ANALYSIS

The data analysis carried out comprised computation of the mean scores, standard deviation and group independent sample t-test analysis of the dependent variables.

Relevant Success Criteria

The one-sample t-test is used when data from a single sample of participants or respondents is tested to know whether the mean of the population from which the sample is drawn is the same as or significantly deviant from the hypothesized mean (Coakes et al, 2001). As suggested by Ahadzie et al (2007), Hair et al,(1998) and Field (2005), in a typical one sample t-test analysis, the mean of the test group, the degree of freedom for the test (which approximate the sample size), the t-value (which is an indication of the strength of the test) and the p-value (which is the probability value that the test is significant) are noted. Typically, on a sample size of ≥ 30 , the central limit theorem shows that a normal distribution can be assumed. The work of Field (2005a) also supports that with a sample size of ≥ 50 , the sampling distribution will almost always approach normal distribution. Consequently with a population of 173 (out of a population of 210) the assumptions of the central limit theorem support the assertion that the sample size is relatively adequate to draw statistical deductions and inference from the data.

Mohammed I.Y

Table 1.0: Definition of Potential Success Criteria Variables

	Name of Variable	Definition
PSC 1	Overall project cost	Final cost for overall project and infrastructure such as road networks, street lighting and social facilities.
PSC 2	Cost of individual house-units	Final cost for individual house-units.
PSC 3	Overall project duration	Time taken to complete the project including provision of infrastructure such as road works and street lighting
PSC 4	Rate of delivery of individual house-units	Time taken to deliver individual house-units
PSC 5	Overall project and individual House quality	Quality of project including associated infrastructure as seen by client and the road works and street lighting
PSC 6	Overall Client satisfaction	Satisfaction of Client with overall project Outcomes of individual house unit including infrastructure Provision
PSC 7	Extent of Admission of natural ventilation/lighting on individual house-units	Extent to which natural ventilation and lighting are incorporated into the design
PSC 8	Overall risk containment	The extent to which all categories of risk can be contained, minimized or managed on the project
PSC 9	Overall /individual house unit environmental impact	Impact of construction waste, environmental degradation and pollution and waste from individual house unit (rubbish, sewage, drainage) on the general public
PSC 10	Health and safety measures with individual house-units	Health and safety in terms of health hazard posed by the living environment, poor materials construction practices.
PSC 11	Technology transfer/Innovation	The extent to which new technology significantly improves the design and construction of a living space by decreasing installed cost, increasing installed performance and improving the construction process is applied and easy integration of local artisans
PSC 12	Higher use of Local Materials	The extent to which local materials are used as against imported ones to reduce cost/ make it affordable
PSC 13	Easy and Cheaper to Maintain	The ease and cheapness to carry out maintenance over time

Table 2.0: Summary Sample Statistics and Ranking of Variables

CRITERIA	N	MEAN	STANDARD DEVIATION	STD ERROR MEAN	RANKING
Cost of individual house-units must be affordable	173	3.60	0.555	0.0647	1
Higher Use of local/cheap and durable materials on the housing scheme	173	3.58	0.604	0.073	2
Extent of admission of natural ventilation/lighting on individual house-units so as to be energy efficient.	173	3.55	0.606	0.074	3
Individual housing units must be Easy and cheaper to maintain or carry out maintenance.	173	3.28	0.730	0.088	4
Overall Client/User satisfaction must be high and user friendly	173	3.27	0.665	0.074	5
Health & safety measures within individual house-units must be high and enhance usage and occupants activities.	173	3.16	0.735	0.085	6
Overall project cost must be on budget/cheaper	173	3.12	0.733	0.088	7
Technology transfer/Innovation must be easily adoptable by local trades men and less expensive to implement.	173	2.97	0.646	0.078	8
Overall environmental effects/impact of the scheme and individual house-units must be minimal and rather enhance the environment.	173	2.81	0.689	0.083	9
Rate of delivery of individual units must be on time and appreciable	173	2.73	0.8892	0.107	10
Overall project quality and quality of individual house units must conform to specification and must be of highest standards.	173	2.50	1.061	0.127	11*
Overall project duration should be on time	173	2.43	1.058	0.126	12*
Overall risk containment must be manageable, bearable and containable with little adverse effects	173	2.01	0.811	0.098	13

Note: * Standard Deviation more than 1.0

Table 2.0 gives the summary of sample statistics and ranking of variables. Standard error is a statistical term that measures the accuracy with which a sample represents a population. In statistics, samples mean deviates from the actual mean of a population; this deviation is the standard error. It measures the accuracy with which a sample represents a population. (Investopedia, 2009). Standard errors are important because they reveal how much sampling fluctuation a statistical data will show. The inferential statistics involved in the construction of confidence intervals and significance testing are based on standard errors. The standard error of a statistic depends on the sample size. In general, the larger the samples size the smaller the standard error (Hyperstat, 2010). A small standard error is a reflection of the fact that most sample means are similar to the population mean and there exist low variability and high accuracy of the population. A large standard error on the other hand reflect a high degree of variability between means of different samples and more likely to have a low level of accuracy (Field, 2005). From Table 2.0, the standard errors were 0.08 (min. value) and 0.16 (max. value). These values are all less than 0.5

Mohammed I.Y

and are very close to 0.0 hence indicating that the sample chosen is an adequate reflection of the population. Again from Table 2.0, except for two variables, most of the standard deviations are less than 1. Standard deviation values less than 1 indicate consistency in agreement among respondents. Also for the variables 'Overall Project Duration Should be on Time' (1.055) and 'Overall Project and Individual Unit Quality' (1.058) where the standard deviations were more than 1 suggests that there might be differences and variability in the interpretation given by the respondents to the said variables. The variables were ranked in terms of perception of respondent seen to be critical success criteria for Public Housing Projects in Nigeria based on the computed means and standard deviations. The summary in Table 2.0 reveal that 'Cost of individual house-units must be affordable' emerged as the most critical success criteria with a highest mean score of 3.58. Though this is not the overall cost of the project but it generally suggest that cost is still a major component of consideration for housing delivery and also agrees with the traditional criteria of 'Cost, Time and Quality' for project success. Newly suggested criteria for success such as 'Higher use of Local Materials' and 'Extent of admission of Natural Ventilation and Lighting gain prominence and were ranked 2nd and 3rd respectively. This stands to agree with the general assumption that for achieving affordability in public housing projects in Nigeria, massive increase in local content is very important. 'Overall Client/User Satisfaction' and 'Health and Safety Measures' were ranked 5th and 6th respectively. This largely agrees to the thought that the satisfaction of the client and users are essential in achieving project success and also health and safety issues are very important in Housing communities and Homes as seen as essential parameters for ensuring safe communities and improving human dignity, reducing social exclusion as argued by the UN-Habitat and the World Health Organization (Ankrah, 2009).

The criteria, 'Overall Project Duration' and 'Overall Risk containment' were ranked 12th and 13th respectively. This stands to suggest that though time and risk management are essential to Project Managers in achieving project success, participants in public housing projects in Nigeria do not attach same importance and significance and as such not very keen on delivery projects on time and preventing any threats. Perhaps this is due to the mode of government funding and cash flow of public housing projects and that might explain why most public housing projects in Nigeria have never been completed on time and even some remain uncompleted till date. 'Overall Project Cost' and 'Technology Transfer/Innovations' were also ranked 7th and 8th respectively. This suggest that though traditionally these remain key in achieving project success, participant still attached some level of importance and thus do not grossly overlook them hence their positions as they perceive them to be more important than 'Time' and 'Risk'. Again, 'Cost of individual Units' and 'Overall cost' were ranked higher than 'Quality' and 'Time'. This suggests that stakeholders and participants of public housing projects in Nigeria consider cost to be more critical for project success and therefore attach more importance to it than time and quality.

Critical Success Criteria

The second component of analysis was carried out on the dependent variables in the questionnaire. Under this, the main test conducted was grouped sample independent t-test. The grouped independent sample t-test is also useful for

assessing agreement or otherwise of responses of the different groups from the same population on the dependent variables.

Independent Groups T-Test

The respondents were categorized into two main distinct groups. Those who are involved in public housing projects in Nigeria but are on the side of government and those in private practice; non-governmental organizations; agencies and international organizations. From these two areas of groups, the independent group sample t-test of the dependent variables were run to ascertain whether there exist any level of agreement between them in respect of their perception of critical success criteria among the variables. According to Coakes, (2001), an independent group's t-test is most appropriate when different participant from the same population have performed in each of the different conditions; and also, when we wishes to determine whether the difference between means of two sets of scores is significant. In other words the independent t-test compares the means between two unrelated groups on the same continuous, dependent variable. It is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups. This t-test procedure allows the testing of equality of variances (Levene's test) and the t -value for both equal- and unequal-variance (Statistical Guides, 2008).

Assumptions

Subjects are randomly assigned to one of two groups. The distributions of the means being compared are normal with equal variances as inferred from the work of Field [2005a].

Test: The hypotheses for the comparison of two independent groups are:

Ho: $H_1 = H_2$ (means of the two groups are equal)

The null hypothesis for the independent t-test is that the population means from the two unrelated groups are equal and,

Ha: $H_1 \neq H_2$ (means of the two group are not equal)

The alternative hypothesis for the independent t-test is that the population means from the two unrelated groups are unequal. Again, as seen in the works of Coates (2001) and Field (2005a), when the p-value is less than 0.05 ($p < 0.05$) then the difference between the two means is statistically significant and that there is evidence to reject the null hypothesis in favour of the alternative. On the other hand when the p-value is greater than 0.05 ($p > 0.05$) then the difference between the two means is not statistically significant then the null hypothesis is accepted. From Tables, 3.0, the standard deviations on most of the various variables by the two distinct groups are less than 1 and are very close to zero (0). This suggests that there is high consistency and low variability in the interpretations and responses offered by the two groups to each dependent variable. It must also be noted that for variables 'Overall Project Duration' and 'Overall Project and Individual Quality' the standard deviation from response from Non-Government were more than one (1) as against those from the Government side which was less than one (1). This suggests that there is a variation in the interpretation given by the two groups on these variables. Again the standard mean errors from Table 3.0 were all less than 1 and are close to

Mohammed I.Y

zero (0). This is an indication of generally very high accuracy between the population mean and the sample means and thus there is low sampling fluctuation. As seen in Table 3.0 under the Levene's Test for Equality of Variances, almost all the 'Sig' values were greater than 0.05 ($p > 0.05$). A value greater than 0.05 means that the variability in the two groups or conditions is about the same at the given significance level of the p-value and that there is greater agreement among the two groups in their response and interpretation of the variable. This presents a greater reliability in drawing conclusions on the results from the data. That is the scores in one condition do not vary much more than the scores in the second condition. Put scientifically, it means that the variability in the two conditions is not significantly different. It is very important to draw attention to variable 'Overall Project and Individual Unit Quality', when the p-value is less than 0.05 ($p < 0.05$), then you reject the null hypothesis and accept the alternative hypothesis that the variance estimates are unequal. From the table 3.0, the p-value for this variable was 0.02. This value is less than 0.05 and this means that the variability in the two groups is not the same. That is the scores in one condition vary much more than the scores in the second condition. Also it is interpreted as, there is different interpretations given by the two groups on the same variables and this is likely to affect the reliability and accuracy of the predictions and conclusions from the result. Put scientifically, it means that the variability in the two conditions is significantly different. In this instance the equal variance not assumed estimate is consulted to offset this lapse and that is seen in the second row in table 3.0. Under the test for equality of means section on column 'Sig. (2-tailed)', the result indicate that the p-value in this column for equal variance were all greater than 0.05 ($p > 0.05$), meaning that there is greater reliability and consistency in the interpretations given by each group on the variables and that inferences from the data are very reliable. We can conclude that there is no statistically significant difference between the responses of the conditions/groups on the dependent variable and hence there is a strong and general agreement between those on Government side and the Non-Government side on what they considered to be the critical project success criteria for public housing projects in Nigeria among the variables.

Table 3.0 Independent Group T-Test for Dependent Variables

		Levene'e Test for Equality of variation		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Diff.	Std Error Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
OVERALL PROJECT COST MUST BE ON CHEAPER BUDGET	Equal variances assumed	0.124	0.722	0.665	71	0.508	0.115	0.173	-0.228	0.460
	Equal variances not assumed			0.664	66.180	0.510	0.115	0.173	-0.230	0.461
COST OF INDIVIDUAL HOUSE UNIT MUST BE AFFORDABLE	Equal variances assumed	0.089	0.763	0.174	71	0.863	0.023	0.131	-0.237	0.284
	Equal variances not assumed			0.173	65.710	0.863	0.023	0.131	-0.238	0.285
OVERALL PROJECT DURATION MUST BE ON TIME	Equal variances assumed	2.110	0.150	-0.861	71	0.393	-0.214	0.249	-0.709	0.281
	Equal variances not assumed			-0.846	61.666	0.401	-0.214	0.253	-0.719	0.292
RATE OF DELIVERY OF INDIVIDUAL UNIT	Equal variances assumed	1.864	0.175	-1.388	71	0.170	-0.290	0.208	-0.704	0.126
	Equal variances not assumed			-1.356	59.674	0.181	-0.290	0.213	-0.716	0.137
OVERALL PROJECT AND INDIVIDUAL UNIT QUALITY	Equal variances assumed	5.530	*0.01	-0.814	71	0.413	-0.214	0.250	-0.700	0.294
	Equal variances not assumed			-0.792*	58.217	0.431	-0.214	0.257	-0.716	0.310
CLIENT/USER SATISFACTION	Equal variances assumed	0.369	0.543	-0.314	71	0.755	-0.050	0.157	-0.263	0.363
	Equal variances not assumed			-0.310	62.915	0.758	-0.050	0.159	-0.268	0.368
ADMISSION OF NATURAL VENTILATION AND LIGHTING	Equal variances assumed	2.694	0.104	-0.817	71	0.417	0.117	0.143	-0.167	0.401
	Equal variances not assumed			-0.797	59.118	0.429	0.117	0.146	-0.175	0.409
OVERALL RISKS CONTAINMENT	Equal variances assumed	0.144	0.702	-0.417	71	0.679	-0.080	0.192	-0.461	0.302
	Equal variances not assumed			-0.415	66.053	0.679	-0.080	0.192	-0.463	0.304
OVERALL AND INDIVIDUAL HOUSE UNIT IMPACT ON ENVIRONMENT	Equal variances assumed	2.128	0.148	0.144	71	0.886	0.024	0.163	-0.300	0.349
	Equal variances not assumed			0.148	70.868	0.883	0.024	0.159	-0.292	0.340
HEALTH AND SAFETY OF INDIVIDUAL UNITS	Equal variances assumed	0.674	0.413	-1.167	71	0.248	-0.201	0.172	-0.544	0.142
	Equal variances not assumed			-1.204	70.998	0.233	-0.201	0.167	-0.533	0.132
TECHNOLOGY TRANSFER AND INNOVATION	Equal variances assumed	0.494	0.483	-274	71	0.785	-0.042	0.153	-0.345	0.263
	Equal variances not assumed			-269	61.960	0.789	-0.042	0.155	-0.351	0.268
EXTENT OF USE OF LOCAL MATERIALS	Equal variances assumed	4.076	0.046	-1.598	71	0.115	-0.224	0.140	-0.503	0.055
	Equal variances not assumed			-1.632	70.570	0.108	-0.224	0.137	-0.497	0.049
EASY AND CHEAPER TO CARRY OUT MAINTENANCE	Equal variances assumed	5.623	0.060	-0.539	71	0.592	-0.093	0.172	-0.436	0.251
	Equal variances not assumed			-0.539	70.605	0.577	-0.093	0.166	-0.42	0.237

* Sig Value ≤ 0.05 so the value for equal Variance not assumed was used

SUMMARY

It is critical for a project manager to understand what the customer/client considers as a successful project and the set criteria used to measure them. In order to avoid any surprises at the end of the project, there is an urgent need to identify the different perspectives of what success means before the project goes live. It is also vital to remember that success criteria are the standards by which a project will be judged. Success criteria have changed considerably through time and moved from the classic iron triangle's view of time, cost and quality to a broader framework which includes benefits for the organization and user satisfaction. The discussions from the data analyzed revealed that 'Cost of individual housing units must be affordable' and 'Increase in the use of local content/materials' emerged as first and second critical success criteria for implementing and managing public housing projects in Nigeria, whereas risk containment was judged the least critical success criteria. Again, though several assertion have been given against the 'iron triangle' as the primal success criteria, the results indicated that cost time and quality remains very relevant success criteria considered by stakeholders and practitioners for public housing delivery in Nigeria. There was also high level of agreement between the public housing stakeholders and practitioners from the side of government and non-government sector on what is perceived as 'critical success criteria'. this is an indication that the

Mohammed I.Y

seems to be one voice and stance on what is generally considered as the way forward for achieving success in public housing delivery in Nigeria.

CONCLUSION

The conclusions inferred from the research can be summarized as:

The subject of project success criteria and its determination has had considerable and extensive discussion and research in project management practice. In so much as widely asserted that success criteria is unique and cannot be generalized for all projects due to the nature and variability of all projects, the questionnaire survey revealed thirteen (13) success criteria. The respondent with high level experience and exposure on their level of importance and in their response, "Cost of individual house-units must be affordable" emerged as the most critical success criteria and was ranked first. They also seem to agree with the general assertion that the way forward for generating success and improve delivery in Public Housing project is the injection of greater amount in local resources content. This saw 'Higher Use of local/cheap and durable materials on the housing scheme' criteria emerging second. Again, though several arguments and review of literature, a case have been made against success being perceived based on the 'iron triangle' of cost, time and quality as not complete and not very relevant on many projects today (see Atkinson, 1999). The results revealed that Public Housing practitioners, project managers, top management, stakeholders and project team members and participants still attaché greater relevance to cost, time and quality in respect of public housing projects in Nigeria. This reflected in the fact that the success criteria pining on this three measurements that is, 'Overall project cost must be on budget/cheaper', 'Rate of delivery of individual units must be on time and appreciable' and 'Overall project quality and quality of individual house-units must conform to specification and must be of highest standards' emerged as seventh, tenth and eleventh respectively.

From the discussions and the analysis, it can also be concluded that, new and emerging success criteria such as 'Health and safety measures within individual house-units must be high and enhance usage and occupants activities', 'Overall Client/User satisfaction must be high and user friendly' and 'Overall environmental effects/impact of the scheme and individual house-units must be minimal and rather enhance the environment' are seen to be a key criteria in the measurement of success on Public Housing schemes in Nigeria hence their relatively high ranking of fifth, sixth and ninth respectively. In recent times diverging views have been made on attaining affordability and increasing delivery in Public Housing in Nigeria. Some of the views have been scrutinized by this research as to whether is in line with government's generally accepted position or an individual preposition that has not been subjected to intense scrutiny and proven through research. In the context and findings of this research as documented in Tables 2.0 and 3.0, there is an indication of high level of agreement between private practitioners and government's side on what is perceived as critical success criteria on Public Housing delivery in Nigeria.

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Mohammed I.Y

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