

# Determining Critical Project Success Criteria for Public Housing Building Projects (PHBPS) in Ghana

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## Abstract

Successive Public Housing Building Project (PHBP) attempts have been unsuccessful due to a number of reasons. Among these is the lack of clearly defined success criteria which guides and measures PHBP success from inception to closure. The adoption and application of project management practice and project success criteria is to deliver projects successfully, attain enhanced output, develop framework to help track key project results and to enable the appropriate allocation of resources. This paper aimed to establish critical success criteria for PHBPs in Ghana. A questionnaire survey was employed to elicit the views of experienced professionals on 13 project success criteria identified from literature. Mean score analysis and factor analysis were conducted on the data collected. The results showed that PHBP practitioners perceive 'cost of individual houses' and 'extensive use of local materials' as the most critical success criteria with 'risk containment' emerging as the least critical criteria. It also revealed the following as the major underlying factors for critical project success criteria for public housing projects in Ghana; 'Time, Cost and Quality Management', 'Satisfaction, Health and Environmental Safety', 'User Affordability and Design Consideration' and 'Cost of Individual Units and Technology'. These two findings are essential for developing a framework which will enable project managers involved in PHBPs in Ghana to channel appropriate efforts and behaviours towards ensuring the attainment of success on their projects.

**Keywords:** public housing, critical success criteria, project management practice, Ghana

## 1. Introduction

Critical Success Criteria (CSC) is seen as an area which organisations must focus on in order to manage projects successfully (Westerveld, 2002). It is the standard by which a project will be judged by its stakeholders to have been successful (Elizabeth, 2007). According to Pinto and Slevin (1988), project success has traditionally been limited to delivering projects on cost, time and quality optimization. However, in recent times many researchers have proven that this is not a satisfactory success criteria and that more is required (Atkinson, 1999). The reality remains that the notion of success is a much more complex issue and often an illusory construct (Westerveld, 2002). This has led to several efforts aimed at evolving some project success criteria for project management in both developed and developing economies (Ahadzie, 2010). However, the degree of originality, the peculiarity of conditions, the uniqueness of projects and the prevailing different objectives makes their wholesale adoption and application of little effect (Wateridge, 1998). It has been therefore suggested that a more 'local' approach to establish these success criteria aimed at improving the benefits from the application of project management be made (Ahadzie et al., 2007).

Project success particularly on public housing projects has been a major problem in Ghana (Konadu-Agyemang, 2001; Ahadzie, 2010). The foremost challenge has always been the ambiguities associated with assessing success on such projects and until this is resolved, it will be very difficult to accurately monitor and anticipate project outcomes effectively. The identification of appropriate success criteria is of interest to project based organisations in the attempt at tracking key project results (Pinto & Slevin, 1988; Baccarini, 1999; Liu & Walker, 1998). It is against this background that the identification of appropriate critical success criteria for PHBPs in

Ghana is deemed important not only for the appropriate allocation of resources but also for developing frameworks to help track key project results.

Studies on the subject have largely focused on developing an understanding of success models (Ahadzie, 2010). Given the varied nature of PHBPs as against one-off projects, measurement of success significantly differs from place to place and from project to project (Ashely, 1988; Mahdi, 2004). Cost, time and quality has been the primal measure of success but this has been reviewed over the years (Atkinson, 1999). In primary context, success has now been expanded to include satisfaction of stakeholders and health and safety implication of the project as this has been the basis of many success frameworks developed in recent times (Pinto and Slevin, 1988; de Wit, 1988; Turner, 1993). The measure of success has always been assessed at the completion stage of the project. However, studies have shown that when the measuring indicators are known from the onset, the assessment will be largely uncomplicated (Ahadzie, 2010). Pinto and Slevin (1988) argued that any success criteria developed must perform its intended purpose, must be 'right' or acceptable for the intended clients. They further argued that PMs must be involved in making sure that the 'right' project is delivered to the client and/or user. The determination of success criteria for any project thus requires the involvement of PMs, other project participants, clients and end users. The central theme for any project success criteria is that it must focus on the needs of the project, client or users (Ahadzie, 2010).

Public housing refers to a form of housing tenure in which the property is fully owned by a government authority or assigned organisation and may be central or local (Duncan & Barlow, 1994). The underlining feature is that its provision is not for profit and aims at providing affordable housing units for the medium to low income bracket of the population. The main objective of public housing is to provide affordable housing targeted at the working low income and poor groups of society. The consideration, details, rentals, requirements and other criteria differ from continent to continent, region to region and country to country (Werna, 1998; Smith, 2006). Public housing projects differ significantly from one-off projects thus requiring well structured management styles for enhanced success in its delivery (Ashely, 1988; Mahdi, 2004; Ahadzie, 2010)

The issue of lack of success on public housing projects in Ghana has generated a lot of discussions in recent times (Amoa-Mensah, 2011). The determination of clearly defined success criteria for PHBPs will be of prime importance not only for future schemes but will enable project managers of current schemes channel appropriate efforts and behaviours towards ensuring the attainment of success on their projects.

## **2. Methodology**

Both primary and secondary data collection methods were employed. Extensive literature review, structured interviews and discussions with key project stakeholders with experience in PHBPs in Ghana were done to establish thirteen (13) critical success criteria for PHBPs in Ghana (See Table 1). The thirteen (13) critical success criteria (CSC) were presented in a questionnaire survey to elicit from respondents their perceived level of importance using a 4-point Likert scale. Using the SPSS package, the variables were organised and ranked based on their mean scores. Factor analysis was also used to reduce the variables into an easily understandable cluster. Factor analysis is a data reduction technique used to reduce a large number of variables into a smaller set of underlying factors that summarises the essential information contained in them (Coates & Steed, 2001). As noted by Field (2005 b), Ahadzie et al., (2007), Heir, (1998) and Badu et al., (2009), factor analysis is also extremely useful and appropriate for finding clusters of related variables and thus very ideal for reducing a large number of variables into a more easily understood framework. The respondents were drawn from industry through snow-ball sampling of people with extensive experience with public housing in Ghana. Respondents were drawn from both the public and private sectors. Out of the 107 respondents reached, 73 responded constituting a 68.2% response rate.

Table 1. Definition of potential success criteria

Variable	Name of Variable	Definition
*CSC 1	Overall project cost	Final out-turn cost for overall project and infrastructure such as road networks, street lighting and social facilities.
*CSC 2	Cost of individual house-units	Final out-turn cost for individual house-units.
*CSC 3	Overall project duration	Time taken to complete entire project including provision of infrastructure such as road works and street lighting
*CSC 4	Rate of delivery of individual house-units	Time taken to deliver individual house-units
+CSC 5	Overall project and individual House quality	Quality of entire project including associated infrastructure as seen by client and the road works and street lighting
*CSC 6	Overall Client satisfaction	Satisfaction of Client with overall project Outcomes/individual house unit including infrastructure Provision
+CSC 7	Extensive admission of natural ventilation/lighting on individual house-units	Extent to which natural ventilation and lighting are incorporated into the design
*CSC 8	Overall risk containment	The extent to which all kinds of risk can be contained or minimized managed on the project
*CSC 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
+CSC 10	Health safety measures with individual house-units	Health and safety in terms of health hazard posed by the living environment, poor materials construction practices.
*CSC 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
+CSC 12	Extensive Use of Local Materials	the extent to which there is greater usage of local materials as against imported ones to reduce cost/ make it affordable
+CSC 13	Easy and Cheaper to Maintain	easy and cheaper to carry out maintenance over time

\* Criteria from literature source: Ahadzie et al, (2007), + criteria from field data

### 3. Data Analysis and Results

The data analysis carried out comprised computation of the mean scores and factor analysis of the dependent variables.

#### 3.1 Ranking of Variables

The mean scores of the variables from the responses were used to rank them as seen in Table 2. Except for two variables, all of the standard deviations are less than 1 suggesting consistency in views of respondents. The variables '*Overall Project Duration Should be on Time*' (1.052) and '*Overall Project and Individual Unit Quality*' (1.056) where the standard deviations are more than 1 suggests that there might be differences in the interpretation given by the respondents to them. The 13 variables were ranked based on the perception of respondents on the importance of each to the success of PHBPs in Ghana. Using the computed means and standard deviations, the summary in Table 2 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, it generally suggest that cost is still a major component in public housing delivery and also agrees with the traditional criteria of 'Cost, Time and Quality' for project success. The variable '*Extensive use of Local Materials*' and '*Extensive admission of Natural Ventilation and Lighting*' were also ranked 2<sup>nd</sup> and 3<sup>rd</sup> respectively. This agrees with the general argument that massive increase in local content is that way forward for any affordable housing scheme in Ghana (Amoa-Mensah, 2011). '*Overall Client/User Satisfaction*' and '*Health and Safety Measures*' emerged 5th and 6th respectively. '*Overall Project Cost*' and '*Technology*'

*Transfer/Innovations* were also ranked 7<sup>th</sup> and 8<sup>th</sup> respectively suggesting they are seen as important in attaining project success. *Cost of individual Units* and *Overall cost* were ranked higher than *Quality* and *Time*. This suggests that stakeholders of PHBPs account for cost as more critical for project success and attach more importance to it than to time and quality. The criteria, *Overall Project Duration* and *Overall Risk containment* were ranked 12<sup>th</sup> and 13<sup>th</sup> respectively. This suggests that though time and risk management are very essential to project managers in attaining project success the situation on PHBPs in Ghana was so what different. Perhaps this is due to the mode of government funding for PHBPs and that might explain why most PHBPs in Ghana have never been completed on time.

Table 2. Summary sample statistics and ranking of variables

Criteria	N	Mean	Standard Deviation	Ranking
Cost of individual house-units must be affordable.	73	3.58	.551	1
Extensive Use of local/cheap and durable materials on the housing scheme.	73	3.56	.601	2
Extensive admission of natural ventilation/lighting on individual house-units so as to be energy efficient.	73	3.53	.603	3
Individual housing units must be Easy and cheaper to maintain or carry out maintenance.	73	3.26	.727	4
Overall Client/User satisfaction must be high and user friendly.	73	3.25	.662	5
Health & safety measures within individual house-units must be high and enhance usage and occupants activities.	73	3.14	.732	6
Overall project cost must be on budget/cheaper.	73	3.10	.730	7
Technology transfer/Innovation must be easily adoptable by local trades men and less expensive to implement.	73	2.95	.643	8
Overall environmental effects/impact of the scheme and individual house-units must be minimal and rather enhance the environment.	73	2.79	.686	9
Rate of delivery of individual units must be on time and appreciable.	73	2.71	.889	10
Overall project quality and quality of individual house units must conform to specification and must be of highest standards.	73	2.48	1.056	11*
Overall project duration should be on time.	73	2.41	1.052	12*
Overall risk containment must be manageable, bearable and containable with little adverse effects.	73	1.99	.808	13

Note: \* Standard Deviation more than 1.

### 3.2 Factor Analysis of Dependent Variables

The first pertinent issue regarding factor analysis is the appropriateness of the sample size. The Cronbach's reliability test conducted on the data gave a test result of 0.782 (Cronbach's alpha). Normally ( $\alpha \geq .9$ =Excellent,  $.9 > \alpha \geq .8$ = Good,  $.8 > \alpha \geq .7$ =Acceptable,  $.7 > \alpha \geq .6$  = Questionable,  $.6 > \alpha \geq .5$ = Poor and  $.5 > \alpha$ = Unacceptable). The Cronbach's alpha of 0.782 (0.8 approx.) suggests that the overall sample reliability (internal consistency) was acceptable for factor analysis. The KMO value of 0.75 and the Bartlett's Test of Sphericity showed a substantial value and thus confirm the adequacy of the sample for factor analysis. Normally the KMO value varies from 0 to 1.0.A value of 0 means that there is diffusion in the pattern of the correlation and hence factor analysis is inappropriate. However, a value close to 1.0 indicates that the patterns of correlation are relatively compact and that factor analysis will yield reliable results. It is generally recommended that the KMO value should be greater than 0.5 if the sample size is adequate (Gorsuch, 1983; Field, 2005a).

Having satisfied the tests for the reliability of the survey instrument, sample size adequacy and the population matrix, the data was condensed through factor analysis using the principal component analysis (PCA) with varimax rotation. Also the commonalities involved were extracted. The summary of the commonalities are given in Table 3.

Table 3. Test of commonalities

Communalities	initial	extraction
overall project cost must be on budget/cheaper	1.000	.531
cost of individual house-unit must be affordable	1.000	.811
overall project duration should be on time	1.000	.811
rate of delivery of individual units	1.000	.741
overall project and individual unit quality	1.000	.707
client/user satisfaction	1.000	.641
extensive admission of natural ventilation and lighting	1.000	.663
overall risk containment	1.000	.634
overall and individual unit impact on environment	1.000	.628
health and safety of individual units	1.000	.469
technology transfer and innovation	1.000	.541
extensive use of local materials	1.000	.609
easy and cheaper to carry out maintenance	1.000	.632

extraction method: principal component analysis

The communalities help explain the total amount an original variable shares with other variables included in the analysis and this is essential in deciding which variables are to be extracted finally. From Table 3, the average commonality of the variables after the extraction was 0.65. The conventional rule on communalities is that; extractions values of more than 0.5 at the initial iteration indicates that the variable is significant and should be included in the data for further analysis or otherwise be removed (Field 2005a). The eigenvalue and factor loading were set at conventional high values of 1.00 and 0.50 respectively (Field, 2005a; Child, 1990). Also applying the latent root of criterion on the number of principal components to be extracted suggest that four (4) component should be extracted as their eigenvalues are greater than 1.00 as shown in Table 4.

Table 4. Component transformation matrix

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.940	30.308	30.308	3.940	30.308	30.308	3.250	25.001	25.001
2	2.046	15.738	46.046	2.046	15.738	46.046	1.999	15.375	40.376
3	1.361	10.469	56.515	1.361	10.469	56.515	1.940	14.923	55.300
4	1.070	8.234	64.749	1.070	8.234	64.749	1.228	9.449	64.749
5	.832	6.397	71.145						
6	.766	5.895	77.040						
7	.687	5.288	82.329						
8	.581	4.466	86.794						
9	.455	3.500	90.294						
10	.408	3.142	93.436						
11	.383	2.945	96.381						
12	.300	2.308	98.689						
13	.170	1.311	100.000						

Extraction Method: Principal Component Analysis.

From Table 4 four main components were extracted with eigenvalues greater than 1.0 using a factor loading of 0.5 as the cut-off point. The first principal component (component1) accounted for 30.31% of the total variance whilst the second principal component (component 2) accounted for 15.74% of the total variance. The third

principal component (component 3) and the fourth component (component 4) accounted for 10.47% and 8.23% of the total variance respectively. These components extracted accounted for approximately 64.75% of the total cumulative variance. The cumulative proportion of the variance criterion says that the extracted components together should explain at least 50% of the variation. The 64.75% gained is indeed greater than the assumed minimum of 50% of the cumulative section. As noted by Norusis (1988), the interpretation of results of Principal Component Analysis (PCA) can be improved through rotation, thus the rotated component matrix was selected and is displayed in Table 5.0. A thorough assessment was undertaken to critically examine the presence of any complex structure and also components that had only one (1) variable loading on them.

Table 5. Rotated component matrix

	component			
	1	2	3	4
overall project duration should be on time	.891			
rate of delivery of individual units	.827			
overall project and individual unit quality	.752			
overall risk containment	.689			
overall project cost must be on budget/cheaper	.563			
client/user satisfaction		.769		
overall and individual unit impact on environment		.736		
health and safety of individual units		.593		
easy and cheaper to carry out maintenance			.767	
extensive use of local materials			.721	
extensive admission of natural ventilation and lighting			.532	
cost of individual house-unit must be affordable				.864
technology transfer and innovation				.525
extraction method: principal component analysis.				
rotation method: varimax with kaiser normalization.				
a. rotation converged in 7 iterations.				

#### 4. Discussion of Results

From Table 5, the entire four components had more than one variable loading on them. A critical examination of the inherent relationships among the variables in each component revealed the following interpretations; Component 1 was labelled as: Time, Cost and Quality Management, Component 2 as: Satisfaction, Health and Environmental Safety, Component 3 as: User Affordability and Design Consideration and Component 4 as: Cost of Individual Units and Technology.

##### 4.1 Component 1: Time, Cost and Quality Management

The first principal component contained five variables. These variables and their factor loadings (in brackets) were Overall Project Duration (89.1%), Rate of Delivery of Individual Unit (82.7%), Overall Project and Individual Unit Quality (75.2%), Overall Risk Containment (68.9%) and Overall Project Cost (56.3%). This component accounted for 30.31% of the total variance. A critical examination of this component confirms the traditional iron triangle of success criteria (Atkinson, 1999) and this suggests that it is still very much relevant to project success. This forms the basis of the evaluation of project manager's competency and performance on project delivery in many parts of the world (Dainty et al., 2003). The works of Turner (1993), Morris and Hough (1993), Wateridge (1998), deWit (1998), Pinto and Slevin (1988), Saarinen (1990), and Ballantine (1996), all agree that cost, time and quality should be used as success criteria, but not exclusively limited to them. Given the huge housing deficit and successive governments resolve to provide housing through PHBPs affordable schemes (Nsiah- Gyabaah, 2009), several innovations and applications are of great necessity. Also stakeholders should make sure that appropriate efforts and resources are employed to ensure the understanding and adoption of effective quality management and risk mitigation practices on PHBPs so as to enhance delivery.

#### *4.2 Component 2: Satisfaction, Health and Environmental Safety*

The second principal component contained three (3) variables. These variables and their factor loadings (in brackets) were 'Client/User Satisfaction (76.9%)', 'Overall and Individual Unit impact on Environment (73.6%)' and 'Health and Safety of Individual Units' (59.3%). This component accounted for 15.75% of the total variance. This component was labelled satisfaction, health and environmental safety. Following the arguments over the need to view project success beyond the 'iron triangle' of cost, time and quality, user/client satisfaction, health and environmental safety has been argued through several literature as an essential criteria to the expansion of attaining project success (Atkinson, 1999).

Satisfaction as a process of evaluation between what was received and what was expected is the most widely adopted description of customer/user satisfaction in current literature (Parker & Mathews, 2001). Customer/user satisfaction in the property industry offers several benefits. Kamara and Anumba (2000) define customer satisfaction as 'the extent to which a product perceived performance matches a buyers expectations'. If the product performance falls short of expectations the buyer is dissatisfied. If the performance matches or exceeds expectations the buyers is satisfied or delighted. Total satisfaction of users/customers in the property housing industry remains very crucial to many housing schemes (Kamara & Anumba, 2000) and it confirms why user/client satisfaction emerged as the most critical factor in this component. It has been seen as a crucial goal or measurement tool in the development of construction quality (Kamara & Anumba, 2000). Though no standardized agreed list of criteria has emerged for the measurement of customer/user satisfaction in housing projects, it is widely argued that meeting the needs and expectations of users of the housing schemes remains a crucial objective for housing provision especially for the affordable group (Zeithaml et al., 1990; Varady & Preiser, 1998; Yang & Zhu, 2006).

From the Square Root Model of project success criteria and measurement, environmental health and safety emerged as a critical criterion which is of prime concern at both the pre and post delivery stage (Atkinson, 1999). In many countries, laws and regulations have been enacted to enforce the compliance of this in all housing schemes examples being the Housing Health and Safety Rating System (England)-Regulations 2005, Housing Health and Safety Rating System Guidance- Australia, Local Housing and Health Action Plans-EU etc. Many adverse health conditions are linked to inadequate housing (Varady & Preiser, 1998). Furthermore, there is a strong relationship between housing quality and perceived health: the better the dwelling, the better the health status. This is because a dwelling will house three or four generations and because people spend a large part of their lives at home, health considerations rightfully belong at the core of all housing policies (Okuwoga, 1998).

The reality of the situation is that many housing schemes are poorly organized with a little consideration for home safety and health as well as environmental consciousness for proper waste disposal and control thereby giving rise to high unsanitary conditions (Okuwoga, 1998). Also the ever increasing demand for houses and coupled with the acute shortage and increasing household size have led to compromise on a lot of health and safety standards (Konadu-Agyemang, 2001). As noted by Morrel et al., (2000), as the demand for housing continues coupled with several interventions to meet demands, the design schemes and widespread increase in the use of high energy materials such as aluminium, concrete, steel, cement and finishes must comply with regulations and standards aimed at protecting the environment and improving the health and safety levels at homes.

#### *4.3 Component 3: User Affordability and Design Consideration*

The third principal component contained three (3) variables. These variables and their factor loadings (in brackets) were 'Easy and cheaper to carry out Maintenance' (76.9%), 'Extensive Use of Local Materials' (72.1%) and 'Extensive Admission of Natural Ventilation and Lighting (53.2%)'. This component accounted for 10.47% of the total variance. This component was called User affordability and design consideration. High cost of building material coupled with the over dependence on imported materials constrain several efforts aimed at providing affordable housing in Ghana (Nsiah-Gyabaah, 2009). According to Amoa-Mensah, (2011), Ghana's housing industry has been saddled with high imported content in conventional designs, foreign materials and specifications coupled with the general non-use of proven local alternative. Also Adjei-Kumi and Osei-Tutu (2009), accounted that the cost of cement which is a major material in the housing building industry, increased from US\$1.12 to US\$1.6 from August to December, 1998. It was again at US\$7.8 in October, 2009. These developments affected many housing projects notably the then government's affordable housing scheme and other private sector interventions.

Lighting and ventilation issues in homes remain a major concern of home occupants and have dominated many discussions on energy efficiency. According to Ahadzie (2010), home owners rate adequate day lighting and

ventilation in homes the first and major critical criteria than any other factor. Again it is estimated that rent and utilities constitute over 50% of the income expenditure of the average Ghanaian (GSS, 2009). In view of this, all efforts and policy framework on public housing delivery must aim at optimising the use of the natural elements of lighting and ventilation so as to ensure low or minimal operation cost in its lifespan. Maintenance remains a poorly adopted culture in Ghana. This has primarily been due to the huge cost outlay in carrying out this task as against budgetary provisions made annually. Most of the materials used for the existing public housing are no more in existence and finding a suitable and workable replacement has been very difficult. Against this background, it is of prime importance that public housing schemes are fashioned consciously to allow for minimal cost in carrying out maintenance both from the design options, choice of materials and methodology employed.

#### *4.4 Component 4: Cost of Individual Units and Technology*

Lastly, the fourth principal component contained two (2) variables. These variables and their factor loadings (in brackets) were 'Cost of Individual Units must be affordable' (86.4%), and 'Technology Transfer and Innovation' (52.5%). This component accounted for 10.70% of the total variance and was termed Cost of Individual Units and Technology. The significance attached to the cost of the unit can be seen from its high score registered (86.4%). The cost of housing unit either for outright purchase or rental purposes is very critical in measuring the affordability of PHBPs. Currently rental charges range from \$40- \$200 for one through to three bedroom apartments. Monthly salary levels of public sector workers range from \$70- \$3,000 (CAGSS, 2011) for ordinary labourers through to top senior managers. Cost of houses for purchase range from \$15,330- \$86,000 (SHC, 2011) for one bedroom to four bedroom apartments. Making public housing affordable especially to the marginal and average income bracket of the population of any economy remains the highest ranked objective. Technology emerging together with cost of individual units suggests that the full benefit of technology and innovation can enhance the attainment of affordable individual units. Introducing more efficient and effective means for housing production has the potential of addressing some of the most critical affordable housing shortages problems. Such accessible technologies as computer-based materials management, innovative methodology and management systems could go a long way in improving affordable housing production (LaMore, 2004).

Against this background, it is essential that policy framework and interventions in public housing delivery schemes aim at ensuring the adoption and application of technology that is cost efficient and harness the benefits of repetitive construction as well as technology transfer. Daniels et al., (1981) argues that an essential component of any comprehensive community revitalization strategy that is its intent to address the inequities of social and economic structures (such as affordable housing construction). Robinson et al., (2002) suggested that the value of social capital (technology) is that 'it can produce economic benefits and if neglected, economic disadvantages (Robinson, 2002). Also LaMore, (2004) contends that the traditional policy choices between 'place-based' redevelopment versus 'people-focused' strategies are neither feasible nor affordable. Innovative comprehensive methods that efficiently produce affordable housing while simultaneously strengthening our civil society must be developed and implemented. This suggests that the enormous benefit inherent from the application of technology can not be underestimated. Seeing the application as a community based effort to reduce poverty and enhance society suggest that the technology should aside being beneficial, its inherent cost benefit must be people focused that is easy to understand, adopt, apply and enhance performance.

## **5. Conclusion**

The subject of project success criteria and its determination has enjoyed considerable discussion in project management practice. Success criteria are unique and cannot be generalized for all projects due to the nature and variability of all projects. The results from this study revealed that respondents still attach great relevance to cost, time and quality in respect of PHBPs in Ghana. 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 Ghana. Though thirteen (13) critical success criteria public housing projects were identified from literature and through interviews, these can be summarized into four main underlying issues namely; 'Time, Cost and Quality Management', 'Satisfaction, Health and Environmental Safety', 'User Affordability and Design Consideration' and 'Cost of Individual Units and Technology'.

The identification of appropriate success criteria is of interest to project organisations in their efforts at developing frameworks to help track key project results. It is evident from this research that the injection of

greater percentage of local and durable materials to replace the expensive imported ones is the way forward for Ghana's public housing schemes. However there are not enough developed locally based materials for the industry. In view of this, as part of government policy and frame work, research institutions and individual researchers should be empowered and resourced to develop in addition to local 'pozzolana' cement, other viable and affordable local building materials to replace the imported ones for the housing construction industry. Also there is an overriding perception of Ghanaians seeing imported building materials as superior to the local counterparts. In realizing this success criterion, there is the need for intensive sensitization and education to embrace the use of locally identified and equally good and quality building materials. Technology transfer and innovation also emerged relatively high among the criteria for public housing project success. New technological interventions in housing must be easily adoptable by the local artisans. The artisans and craftsmen must be trained to be abreast with new innovations in construction methodology.

In all of this, a robust National Housing Policy is required and along with a National Housing Authority charged with the responsibility of initiating, evaluating and regulating the housing industry. This, the authors believe will ensure that a truly free and non partisan approach is adopted for the housing industry. It will ensure continuous and sustained effort in the sector as has been in sister countries such as South Africa, Singapore and the Netherlands.

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