Performance Criteria for Public Housing Evaluation in Developing Countries
(Case Study of Gombe Metropolis, Nigeria)

Rozilah Kasim¹, *Bala Ishiyaku², Adamu Isa Harir³
¹,²,³Department of Construction and Real Estate Management
Faculty of Technology Management, Business and Entrepreneurship
University Tun Hussein Onn Malaysia (UTHM)
Parit Rajah, Batu Pahat, Johor Darul Ta’zim, Malaysia
E-mail: balaishiyaku@yahoo.com
Phone-No. +60108837084

ABSTRACT:
The study highlights the performance criteria for public housing developments in developing countries, with particular reference to Gombe metropolis, Nigeria. As an on-going PhD research, the aim is to postulate a framework for public housing evaluation with reference to occupants’ experience. Literature revealed how little attention is given to safety and health of housing occupants, oversight on the influence of human attributes on housing performance evaluation, the inadequacy in evaluation research on public housing performance and the need for appropriate evaluation tools and methods. Unlike in all previous studies, occupants’ experiences with performance of building and environmental features are compared with socioeconomic attributes of the occupants. As a multi-disciplinary activity, theoretical and conceptual frameworks were adopted. The study approach is considered a mixed method, because of the need for both quantitative and qualitative data to explain the findings and implication of the results. As the study moves toward pragmatists’ school of thought about what constitute knowledge, exploratory survey and case study were adopted. The study focused on five (5) housing estates, with total housing units of 1048. 286 households will be selected by systematic random sampling to answer the questionnaires. The study will reveal the most significant building and environmental features that influence public housing performance in Gombe metropolis from occupants’ experience, the most relevant socioeconomic attributes of the occupants that influence the occupants’ experience with the performance of public housing in Gombe metropolis and Performance criteria for public housing evaluation in developing countries. The findings will portray the relevance of occupants experience to the sustainable public housing evaluation in developing countries.
(Contents should agree with abstract)

Keywords - Occupants’ Experience, Performance Evaluation, Performance Criteria, Post Occupancy Evaluation, Public Housing, Developing Countries

BACKGROUND OF THE STUDY
Houses are prediction of a shelter that meets human basic needs of habitation. Therefore, the prediction can be right in some areas and wrong in others. There is mostly wide gap between the design intent and the final performance of the building after occupation (Loftness et al., 2009). This is because the occupants view is never taken into consideration as a source of knowledge that a professional architect or planner can utilise for future designs (Southworth & Cranz, 2012). It is constant performance evaluation of the houses in use that can identify, correct and
provide guide to avoid the occurrence of the same mistakes in future housing policies, design and developments. It is also a key instrument that can show the importance of collective participation and improve the performance of housing developments and government housing policies (Mohit & Azim, 2012). More specific was the study by Sengupta & Tipple (2007) which suggested the use of public housing evaluation to generate parameters for evaluating the performance of public sector in general toward housing delivery.

STATEMENT OF THE PROBLEM
Poor housing represents and environmental health risk (Sheppard, 2011). A study by Curtis, Corman, Noonan, & Reichman (2010) to investigate the relationship between health shock at birth and housing condition of the patient revealed that a health shock at birth increases the likelihood that the family experiences overcrowding and homelessness, with inadequate utilities or lives in a poor quality sub-optimal maintenance housing unit. Gibson, Thomson, Kearns, & Petficrew (2011) reviewed 130 relevant publications on relationship between health and housing which shows that change from neighbourhood with better facilities condition increases the proportion of participants reporting good or excellent health condition. Other studies like Rauh, Landrigan, & Claudio (2008) have demonstrated the relation between health and housing infrastructure. A study by Afolabi, Clement, Ekundayo, & Dolapo (2012) attributed the study findings on major causes of death among under-five year’s children in Nigeria on hidden causative factors such as poor housing. Ibem (2011) also revealed how little attention is given to safety of housing occupants, especially in public housing developments. Moreover, literature indicated that human attitudes and behaviour are in most cases overlooked in the housing performance evaluation (Stevenson & Leaman, 2010). Sinou & Kyvelou, (2006) further noted that not all the building evaluation tools take into consideration the aesthetics, social parameters as well as the economic condition of the occupants. However, there are also the issues of inadequacy of housing performance evaluation, tools and methods. Djebarni & Al-Abed (2000) pointed that research in the areas of public housing is limited, and little attention is given to the variation in the houses and how they affect satisfaction. Ibem and Amole (2010) pointed that there is inadequacy in evaluation research on public housing. These problems were more prominent in developing countries because of the illiteracy level, poor funding of research, poor resource utilisation and corruption. Therefore, any of the above issues can form the base for public housing evaluation in developing countries and Nigeria in particular. As the same problems were observed in Gombe metropolis, Nigeria, they became the basis for this review.

PURPOSE OF THE STUDY
The review is to highlights the performance criteria for public housing developments in developing countries, with particular reference to Gombe metropolis, Nigeria, with a view to postulate a framework for public housing evaluation with reference to occupants’ experience. To successfully achieve the aim for public housing evaluation based on occupants experience in developing countries, the objectives of the study can cover one or more of the following areas, with reference to Gombe metropolis;

i. To determine the occupants’ experience with the performance of building features of public houses in Gombe metropolis.

ii. To identify the occupants’ experience with the performance of environmental features of public houses in Gombe metropolis.
iii. To examine the socio-economic attributes of the occupants that influence occupants’ experience with the performance of public residential housing in Gombe metropolis

iv. To propose a framework for effective performance of public housing development in the study area.

SCOPE OF THE STUDY
The study can measure occupants experience with building (structural) features such as number and size of rooms and ventilation. It can examine the environmental (neighbourhood) features such as greenery, sport facilities, and security of the area. As the occupants’ socio-economic attributes such as family size and education status are relevant to the study as they may influence experience of the occupants, they have to be taken in to consideration. The expected respondents to the instruments are the occupants of the public houses in the study area. Such research are significant not only to government as developer and provider of public estates, but also to private real estate developers as well as the occupants of such estate based on the fact that it will provide enormous potential for improving the housing design, facilities and hence performance.

RESEARCH STRUCTURE
Research structure is an overview of how the study is planned; the procedures, data collection techniques, statistical tools for analysis and reporting of data. The reporting covers the contents discussed in various chapters of the research report. Research structure in other words, is an outline or a scheme that serves as a useful guide to researcher in effort to generate data for study. For the purpose of public housing performance evaluation research, data regarding the occupants' level of experience with performance of various elements of the houses and environment were required. In the same vein, the socio-economic attributes of the occupants were also important as they can influence the occupant’s level of experience with the performance of physical and environmental features of the house. The data is to be collected using questionnaire, structured interview and walkthrough observation. The collected data is to be analysed using regression, ANOVA and Correlation then presented in tabular form and descriptively explained. Summary of findings recommendations and conclusion will then be forwarded to serve as a yardstick for future developments and further researches.

LITERATURE REVIEW
Public housing is “a form of housing tenure in which the property is owned by a government authority, which may be central or local". The Nigerian government efforts on public housing were dated back from the colonial’s era to date (Rees, 2009). The public housing policy structure tends to favour the architects preferences, with overall target of low costing, while there is need for the buildings to serve the needs of the people who use them (Watson, 1996). Systematic judgement through empirical study was referred to evaluation research (Patton, 1990). Post Occupancy Evaluation (POE) was sighted by Shen, Shen, & Sun (2012) as a process of evaluating building performance in an organised and thorough way after it has been in occupation for some time. The term POE was said to have originated from occupancy permission given to certify that a property is fit for occupation (Riley, Kokkarinen, & Pitt, 2010).
Post occupancy evaluation as a relevant technique, involves a careful & systematic approach to measuring the performance of a building by involving each user group & each important element of the building under examination (Khan & Kotharkar, 2012). POE in this context is use to evaluate occupants experience with public housing developments. Experience was also defined by Hurlburt and Schwitzgebel (2007) as “anything that emerges, coalesces, become a phenomenon or is experience out of the inner and outer stimuli that simultaneously impinge on people”. Hence, experience is seems to have specific content and significant form, for in each experience there is seem to be a specific reference to reality. Occupants experience refers to all parts of the interaction between occupants and the houses (Kuniavsky, 2007). However, emphasis is given to the usability of the housing units in describing occupants’ experience. Good experience relies on the extent of use by the occupants concern (Hassenzahl and Tractinsky, 2006). Who interacts with what, when and how shape the nature of the occupants’ experience. Quantification of occupants experience is inevitably difficult, as it measure who interacts with the house, how, when and where.

In simple terms building performance has been defined in BS 5240 as behaviour of a product in use (Douglas, 1996). Collections of the occupants view of buildings was introduced by the Royal Institution Of British Architects (RIBA) and was incorporated in the RIBA First handbook in 1965 (Gray, Isaacs, Kernohan, & McIndoe, 1996). The Building Performance Research Unit (BPRU) at University of Strathclyde was sponsored by RIBA, The Architects’ Journal and the Ministry of Public Buildings and Works to carry out POE researches as feedback programme in UK. Relatively better recognition and application of POE was reported in USA Federal Facilities Council (2001) in Wheeler et al. (2011). The POE was accepted as a tool for sustainable development which led to the development of building database in USA. Khan & Kotharkar (2012) pointed that POE is an accepted technique for assessment of building performance worldwide but in India such evaluations are in a nascent stage, going by the lack of publications on this issue. Scholars like Jaafar & Hasan (2008) and Shafie, Zahari, Yusoff & Pawi (2012) examined the building performance in Malaysia, while Ibem & Amole (2011) and Ibem, Opoko, Adeboye & Amole (2013) carried out building performance evaluation in Nigeria. The results indicated the importance of such evaluation in public houses.

Various methods were developed to provide a guide for effective assessment of building performance in relation to physical, environmental and socio-economic characteristics of the property. Some of the methods were targeted at solving a particular problem like thermal and acoustic, which makes them applicable only to a particular problem, stage of development process or even a country. The most popular methods were presented in table 1 below;
Table 1: Building Performance Evaluation Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Authors/Year</th>
<th>Focus</th>
</tr>
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<tbody>
<tr>
<td>The BREEAM</td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Buildings and environment</td>
</tr>
<tr>
<td>The GBTool method</td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Building, Environment and sustainability</td>
</tr>
<tr>
<td>The LEED method</td>
<td>Fernández-Solís et al. 2011</td>
<td>National standard for developing sustainable buildings (LEED-H for homes)</td>
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<td></td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Framework for Selecting Performance Assessment Tools for Achieving LEED 3.0 Credits</td>
</tr>
<tr>
<td>The CASBEE method</td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Environmental labelling method for buildings, based on environmental performance</td>
</tr>
<tr>
<td>The HQE method</td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Integrates parameters with management of the building life operations</td>
</tr>
<tr>
<td>The VERDE method</td>
<td>Sinou &amp; Kyvelou, 2006</td>
<td>Environmental performance of buildings</td>
</tr>
<tr>
<td>COPRAS</td>
<td>Viteikiene &amp; Zavadskas, 2007</td>
<td>Evaluating The Sustainability Residential Areas</td>
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The literature review on performance criteria used in housing evaluations showed that Likert scales are mostly used to measure variables in evaluation studies. For instance adequacy is measured by very adequate, fairly adequate and inadequate; satisfactions are also measured by unsatisfied, satisfied, very satisfied and performance are measured by very good, good, fair, bad and very bad. Authors usually start by identification of building parameters, weight is then assigned to each variable respond, significance tests are then carried out, correlation analysis is then used to identify variables that determine building performance and their levels of performance (Ibem, 2011; & Ibem and Amole, 2010).

Literature is full of studies on housing evaluation using occupants’ satisfaction indicators in housing performance evaluation. The conventional method of asking whether occupants are satisfied or not satisfied is too broad and does not specifically measure the effective performance of the house in developing countries. This is because a satisfaction rating like ‘very satisfied' or ‘very dissatisfied' is a cluster carrying within it the attributes of the respondent such as perception, social taste, economic background and a lot of other attributes which may change over time. In addition, the pressure on public housing allocation which resulted from inadequate financing, low production rate and general poor housing condition in cities have force the development institutions to allocate the houses to unbefitting beneficiaries (Ishiyaku & Ighalo, 2012). Even though, the target beneficiaries of public housing in developing countries like Nigeria are low income earners, the allocation criterion does not favour them. As a result of that, the targeted beneficiaries whom the houses were designed to serve are not the occupants. Hence, evaluation of the occupants’ satisfaction may not be appropriate in determining the performance of public housing in developing countries, like Nigeria. Therefore, public housing performance can be more effectively evaluated using occupants’ experience with the
functionality of the building components and environmental features of the public houses. This is because occupants experience is closer to reality and hence truth than satisfaction. Occupants experience is also complete and indivisible, there are no such things as ‘very experienced’ or ‘very inexperienced’ in the evaluation as used in satisfaction. Hence, this can be used to evaluate the performance of public housing developments in Gombe metropolis of Gombe state, Nigeria.

RESEARCH METHODOLOGY
As housing evaluation is multi-disciplinary activity, it has multiple theoretical underpinnings. Literature review indicated that there is no definite theoretical or conceptual framework for evaluating public housing developments; instead, scholars use approaches that best suit the needs of the evaluation (Ibem and Amole, 2010). Therefore, it is based on this that both theoretical and conceptual frameworks can be adopted by incorporating different components of public housing features with a number of relevant theories and philosophical assumptions generated from literature. The place of theory in Deductive Reasoning intent is theory testing and in Inductive Reasoning is theory building, both needed each other to conceptualise scientific research holistically. Inductive and Deductive reasoning do not occur in isolation, instead they are fused together (Martella et al., 1999), therefore the appropriate research reasoning approach for the evaluation of public housing performance is the combination of both Deductive and Inductive reasoning. This is because there are many theories relevant to housing performance evaluation. In addition, Housing evaluation has some elements of subjectivity as it is based on the occupants’ experience on the physical attributes of the building and environment which is influenced by the gender, ethnicity and social role of the respondents (Fifil, 1999). Evaluation research, involving human instruments required the use of naturalistic inquiry procedures to ensure its reliability (Guba, Lincoln and Yvonna, 1981). Therefore public housing evaluation as exemplified in Gombe metropolis, Nigeria employed four (4) inquiry levels presented in the research plan of the study Figure 1 below. It comprises of area of investigation, methodology adopted for data collection, methods of data analysis, purpose or aim of studying each area of study and
expected results from each area.

Figure 1: Plan to Evaluate Public Housing Performance in Gombe Metropolis, Nigeria

The areas of investigation were divided into four stages based on the aim and objectives of the study. Each stage has a particular method adopted for its data collection and analysis. As a result, the study is considered mixed method, because of the need for both quantitative and qualitative data to explain the findings and implication of the study. However, there are three (3) schools of thought about what constitute knowledge which are more relevant to public housing evaluation. These are epistemology, ontology and axiology. Each of them goes with its two (2) extremes of objective and subjective levels. This is illustrated graphically in Figure 3 below;

Figure: 3 positivism research paradigm (Sexton, 2003)
Public housing performance evaluations are in most cases exploratory survey studies based on a particular case study area. Therefore, epistemologically they are gear toward positivism, trying to answer ‘what’ questions. Ontologically, public housing performance evaluations are investigations toward identifying realism, based on research questions such as ‘what’. Moreover, axiological, public housing performance evaluations are closer to value free, with objective approach. Even though they are not totally free like experimental researches, because of research questions such as ‘how’ and ‘why’ but they are much far away from being value laden. Therefore, the position of the public housing performance evaluation on paradigm relation graph was presented in Figure 3 above.

**MIXED METHOD IN PUBLIC HOUSING PERFORMANCE EVALUATION**

The strategy of inquiry in public housing performance evaluation follow the sequence of ‘what’ ‘how’ and ‘why’ to evaluate the performance of public housing development from occupation experience. As a result, both quantitative and qualitative data are relevant. The need for mixed method in such research arises as a result of the ‘how’ and ‘why’ research questions use in the research. These questions need explanatory discussion with necessary occupants’ experience from observation and interview data to be collected. However, in the course of the study, greater priority is given to the quantitative approach with data from questionnaire administration. The qualitative aspects are only supportive to the quantitative aspects. The data is extracted from the questions in numerical form, which is then posted to statistical software such as SPSS for analysis. Descriptive and Regression results are obtained to answer the research questions of the study. The rationale behind this is because the major objectives of the study were quantitative and the expected data is from the questionnaire. The qualitative data is expected to come from structured interview and walkthrough observation, and to be analysed using Nvivo.

**POPULATION, SAMPLE AND SAMPLING TECHNIQUES**

Population refers to totality of all elements, subjects, or members that possess a specified set of one or more common characteristics. It refers to the entire set of individuals, items or scores from which the sample is drawn (Byrne, 2002). The population of public housing performance evaluation study comprises of the public housing units developed by government relevant agencies like the State Housing Corporations, Ministries of Housing, Housing Authority in the case study area, like Gombe metropolis, Nigeria within a defined period of time. The major goal in the sampling design is to obtain a sample that is effective representation of the population so that precise generalization can be made. Therefore Probability sampling methods were employed in public housing performance evaluation studies to provide fair inference and enable the researcher to make statistical statements about the size of the sampling errors. The housing units to administer the questionnaire can be selected by stratified or random systematic sample method to fall in to the exact sample representing the population. Tomal (2010) defined stratified systematic sampling as method of selecting equally sized subgroups of subjects from a known population. As the population is divided into cluster of housing units called housing estates, which is the sample frame (Howley, 2010) and each housing estate can be sampled using a systematic approach.
EXPECTED OUTCOMES
The expected outcomes from public housing performance evaluation depend on the objectives intended to achieve by the study. Therefore, using Gombe metropolis as example of a case study area, the expected outcomes of the study based on the above objectives are that the study should indicate:

i) The most significant building features that influences public housing performance in Gombe metropolis from occupants' experience.

ii) The most significant Environmental features that influence public housing performance in Gombe metropolis from occupants' experience.

iii) The most relevant socio-economic attributes of the occupants that influence occupants' experience with the performance of public residential housing in Gombe metropolis, and

iv) Performance criteria for public housing evaluation in Gombe metropolis.

CONCLUSION
The findings of the study will portray the importance and relevance of POE to sustainable public housing development especially in developing countries like Nigeria. Therefore, the use of POE on public housing development has become necessary to identify areas of weakness and guide future developments.

REFERENCE


