

# Appraising Elements of Post-Occupancy Evaluation Influencing Improvement of Residential Satisfaction in Public Housing Estates in Nigeria

NKPITE, Bari-ene Samuel<sup>1</sup>, ESAU, James Esau<sup>2</sup>

<sup>1</sup>*Department of Estate Management, Rivers State University, Port Harcourt Nigeria.*

<sup>2</sup>*Department of Architecture, Rivers State University, Port Harcourt Nigeria.*

**ABSTRACT:** Residential satisfaction in public housing estates, its impact can better understand through buildings delivery processes and decision on resident's response to initially and over the life cycle of the building. This study focused on the elements influencing improvement of residential satisfaction in federal housing estates in Abia State, Nigeria. An investigative post occupancy evaluation (POE) was the approach adopted for this study with questionnaire and interview conducted on the residents. A sample of 75 households were selected from 105 housing units within the two public housing estates. The sample represents 78.6% of the total public housing population. Data collected were analyzed using percentage, mean, and relative importance index (RII) on a 5 point likert scale questions with scaling namely: strongly disagree = 1, disagreed = 2, undecided = 3, agree = 4, and strongly agree = 5, in order to weigh the influencing mechanisms. It was found that more than half of the respondents (74.6%) agree that architectural, economic, technical, procurement, and functional processes are the aspects of POE to residential satisfaction with the expectations of improving the aesthetic quality of the built environment, brings return on invested capital, create imaginative thinking to maintenance issues, maintain and manage buildings with allocated resources, and explore the understanding towards building in-use to support human's daily activities. Also, with an average RII values >0.60 the study established that the elements influencing improvement of residential satisfaction are building assessment and procurement, participatory maintenance, innovative tools developed, information dissemination, feedbacks, formulate and implement policies, and plan, programme and manage building life cycles. Therefore, POE should be adopted by public estate developers; as feedback mechanisms for data collected and information on buildings that are better target to appropriate decision making, and the lesson learned are applied in the next building cycle of a similar facility type.

**Keywords:** Appraisal, Elements, Influence, Residential Satisfaction, Public Housing Estates.

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## 1. INTRODUCTION

End-user's satisfaction has subject of investigation by scholars, various interest groups and researchers in the built environment. It has been viewed as an evaluation of the extent to which the current building environment of residents met their needs, expectations and aspiration (Mohit, Ibrahim and Rashid, 2010). Recently, there has been an increasing recognition of the importance of the occupants' voice in determination quality residential estates (Boldy, 2001, Boldy and Grenade, 2001; Ryden, Gross, Savik, Snyder, Oh, Jang, et-al; 2000; Schmitt, 2000). Understanding the residents' views and the factors influencing their satisfaction can

assist facility managers to provide occupant focused services that with enhance occupant's quality of life., it has also been stressed that occupants provide a valuable source of information about the appropriateness and quality of service and that such information would be used for improvement (Chou, Boldy and Lee, 2003).

In the past housing was defined as the physical space in people resided and carried out their everyday lives. However, housing has risen in significance from a simple residential space to a driver of change in the quality of life (Byun and Hal, 2016). In responding to this situation, Federal Government of Nigeria adopted a strategic plan to construct public housing estates in Ogbo-Hill Aba and Umuahia in Abia State. Although the building has been occupied, but several of the housing units constructed and occupied could not deliver to the residents, the needed expectations. Nevertheless, there complaints from residents regarding the quality and physical space provided within the housing estates. The perception of achieving residential satisfaction as a basic condition of the comfort due all the occupants has been fail to be achieve, put forth continuously. However, public housing estates remains in short supply and is far worse in the quality than private housing estates.

The residential environment of these public housing estates need to be improved, and to achieve this, a research into satisfaction with public housing and residential environment having the occupants in mind who currently reside in the public housing estates. Therefore, a need arises to evaluate residential satisfaction with Federal Housing Estates in Abia State in order to gauge their expectations, needs and preferences of the residents, thereby determining which factors are important to their satisfaction.

### **Aim and Objectives of the study**

The main aim of this study is appraise the elements influencing improvement of residential satisfaction in Federal Housing Estates in Abia State, Nigeria.

In order to meet the above aim, the specific objectives are to:

1. Examine the aspects and expectations of post-occupancy evaluation on residential satisfaction in Federal Housing Estates, Abia State.
2. Identify key elements of POE that improve residential satisfaction at Federal Housing Estates, Abia State.

### **Scope of the Study**

The scope of this study is limited to Federal Housing Estate; built in Ogbo-Hill Aba and Umuahia in Abia State, Nigeria. The buildings in the Housing Estates comprises of duplex, single family bungalows, semi-detached bungalow and blocks of flat and are been occupied by residents. It should have been ideal that the study covers all public housing estate in Nigeria but study opted to restrict the scope of the Federal Housing Estates in Abia State, which the findings will be used to better the conditions of the public housing estates in the country.

## **2. LITERATURES REVIEW**

Residential satisfaction can be defined as the "emotional response to a person's dwelling; the positive and negative feelings that the residents have for where they reside (Mohit and Azim, 2012). Residential satisfaction has been used as a measure to determine the success of building development projects. According to Nkpote and Wokekoro (2017), the basis for optimizing the maintenance management of public building developments is where feedbacks were collected from the end-users occupying the building with regard to occupants' views on the physical features of the occupied building and then feeding those views back into the procurement process. The method of choice for evaluating residential satisfaction today applies structured surveys follows by statistical correlation on variables (Nkpote and Frank, 2019; Mohit and Azim, 2012).

Research into residential satisfaction with public housing estates has been extensively conducted for the requirement of building performance and quality. The grade of residential satisfaction has become a vitally important indicator of property purchase/sales determination (Tin, Miao, Geng and Sun, 2018). Therefore, residential which reflects the degree of the satisfaction of the occupants with residential environment, has been a major concern of recent studies (Victoria, 2006; Mohit, et.al., 2010). They mainly focus on factors influencing residential satisfaction including the resident's characteristics, the building physical conditions, and the social space state (Salleh, 2008); Parkes; Keams and Atkinson, 2002; Li and Wang, 2014). Among the factors some scholars believed that the construction quality, relationship have a certain impact on residential

satisfaction degree (Ren and Chen, 2010; Fu, 2000; Wu and Chan, 2013; du, 2002). These studies fail to establish the component of satisfaction and determining mechanisms of that influencing residential satisfaction.

Nkpote and Wokekoro's study on end-user's satisfaction highlighted physical characteristics of buildings, the neighbourhood environment and the public facilities provided determine the level of end-user satisfaction with public school buildings. However, these may vary by the type of building, the locate, the community the cultural backgrounds as well as nationality (Mohit and Azim, 2012). This explains that studies to determine the residential satisfaction of building types is specific to the location of the building, type building provided, community, housing policies and the country itself (Mohit and Nazyddah, 2011). As such in order to evaluate the level of residential satisfaction with public housing estates at Agbo-Hill Aba and Umuahia, the elements influencing the improvement of residential satisfaction which other studies fail to address, would be the criteria to be specific in Abia State. Due to lack of such studies in the Federal Housing Estates at Abia State, this study aims to fill the existing gap and contribute towards the development and growth of the public housing estates sector and contributing to the development of future housing projects in Nigeria.

### 3. RESEARCH METHODOLOGY

Investigative Post Occupancy Evaluation (POE) was the approach adopted for this study. The targeted population comprises mainly residents of buildings in Federal Housing Estates; Ogbo-Hill and Umuahia in Abia States living there for more than 5 years. A sample of 75 households were selected from 105 housing units within the two public housing estates of Abia State. The sample represents 78.6% of the total public housing population. The primary data source of data for this study was collected through a self-administered questionnaires interview carried out on face-to-face basis as well as observations' for Federal Housing Estate, Ogbo-Hill Aba 84% questionnaires were retrieved, while 75.6% were retrieved from Federal Housing Estate Umuahia. In order to weigh resident's satisfaction influencing mechanism in the selected estates, housing variables were identified from previous studies. The questionnaire is a 5 point likert scale questions with scaling namely: strongly disagree = 1, disagreed = 2, undecided = 3, agree = 4, and strongly agree = 5 was used. The overall satisfaction for each component and mechanisms influencing residential satisfaction was analysed based on a mean score of 3.00 as positive indication of satisfaction, and value below 3.00 indicating dissatisfaction.

### 4. RESULTS AND DATA ANALYSIS

This section of the study presents the elements for the improvement of residential satisfaction in public residential estates. It will outline aspects and expectations of residential satisfaction and the factors for its improvements. The analysis utilizes simple percentage and relative importance index (RII) to achieve this particular objective.

#### Aspects and Expectation of Post-Occupancy Evaluation on Residential Satisfaction

Table 1 shows the aspects of residential and the expectation of post-occupancy evaluation towards residential satisfaction in public estates. Table 1 revealed that 72.7% of the residents agree with architectural process as an aspect for residential satisfaction in public housing estates, while 27.3% disagree; with expectation that building designed and constructed will improve the aesthetics quality of the building environment. The table further showed that 80% of the residents agree with economic process as one of the aspect of residential satisfaction, while 20% disagree; with the expectation of buildings bringing return on invested capital like any other products/services. Table 1 indicated that 81.8% of the residents agree with procurement process as an aspect of residential satisfaction, while 18.2% disagree with expectation that the designed, constructed and managed buildings are based on set standards and specifications established including allocation of resources to sustain the built environment. The table also established that 69.1% of the residents agree with the functional process as an aspect of residential satisfaction in public estates, while 30.9% disagree. The end-user's expectation should be for the buildings to provide the understanding for human's attitudes, needs and aspiration toward the building in-use supportive to daily activities of the residents.

This implication is that building are expected to be:

- Designed and constructed with lots of expectations to improve the aesthetic quality of the built environment with the architectural process.
- Products of creative and imaginative thinking providing solutions where maintenance management issues were not into with the technical process.
- Meet the needs and aspiration of the residents supportive to their daily activities towards building in-use with the functional process.
- Planned constructed and managed with set standards and specification to be timely, acceptable and qualitative resulting sustainable built environment as of the procurement process.
- Bring returns on investment like other products or services.

**Table 1: Aspects and Expectation for the Residential Satisfaction (N = 55)**

Aspects	Expectations	True		False		Total	
		N	%	N	%	N	%
Architectural process	Building designed and constructed with improve aesthetics quality to the built environment	40	72.7	15	27.3	55	100.0
Economic process	Building to bring returns on investment like any other product/services	44	80.0	11	20.0	55	100.0
Technical process	Create imaginative thinking to maintenance management issues where it was not provided.	42	76.4	13	23.6	55	100.0
Procurement process	Design, construct and manage buildings based on standards and specifications established allocated resources to result in sustainable built environment.	45	81.8	10	18.2	55	100.0
Functional process	Understanding human's attitudes, needs and aspiration towards building in-use to support any activities.	38	69.1	17	30.9	55	100.0
<b>Average</b>		<b>42</b>	<b>76.4</b>	<b>13</b>	<b>23.6</b>	<b>55</b>	<b>100.0</b>

Source: Author's Field Investigation, 2020

### Determinants for the Improvements of Residential Satisfaction

This section identifies the key elements of improving the residential satisfaction in public residential estates. Table 2 establishes the factors that determines the improvement of residential satisfaction. The table illustrated that the relative importance index (RII) ranked feedbacks with RII of 0.67 (1<sup>st</sup>) as most important determine that improve residential satisfaction, followed by building assessment (evaluation) with RII of 0.66 (2<sup>nd</sup>), and building procurement process with RII of 0.65 (3<sup>rd</sup>). Other determining factors of improving residential satisfaction ranked include; participatory maintenance management process with RII of 0.64 (4<sup>th</sup>), developing innovative POE tools with RII of 0.63 (5<sup>th</sup>), disseminating information on buildings with RII of 0.62 (6<sup>th</sup>), formulate and implement policies with RII of 0.61 (7<sup>th</sup>), and plan, program and manage building life cycle

with RII of 0.60 (8<sup>th</sup>). It implies that exploring and understanding residential satisfaction needs and expectations are essential ingredients determining building performance with public housing estates.

To buttress on it further on POE, the following key informants' information were obtained from residents of public housing estates in the study area. That POE improved residential satisfaction in the following ways:

- Provide feedback on causes and effects of environmental issues on buildings.
- Adopt participatory maintenance management delivery process.
- Disseminate information on buildings among the residents and the management.
- Adopt efficient building procurement process
- Conduct actual performance of buildings by exploring and understanding residents' needs.
- Culminate the production of sustainable built environment.
- Develop new innovative tools for building improvement
- Formulate and implement building laws, legislations, regulations and policies.
- Plan, program and manage building life cycles.

**Table 2: Improvement Determinants of POE on Residential Satisfaction**

Determinants	Weigh: N = 55					$\Sigma f x$	$\frac{\Sigma f x}{\Sigma f}$	RII	Rank
	5	4	3	2	1				
Feedbacks	14	15	10	8	8	184	3.34	0.67	1 <sup>st</sup>
Building assessment	12	14	12	10	7	179	3.25	0.66	2 <sup>nd</sup>
Procurement process	12	11	13	11	9	177	3.21	0.65	3 <sup>rd</sup>
Formulate and implement policies	7	16	14	9	9	168	3.05	0.61	7 <sup>th</sup>
Disseminate information	12	11	12	10	10	173	3.15	0.62	6 <sup>th</sup>
Innovative tools	11	12	11	11	10	170	3.10	0.63	5 <sup>th</sup>
Participatory maintenance	14	10	11	11	9	174	3.16	0.64	4 <sup>th</sup>
Plan, program and manage building life cycle	11	11	11	11	11	165	3.00	0.60	8 <sup>th</sup>

**Legend:** 1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.  
**Decision:** <3.00 = Disagree, > 3.00 = Agree

Source: Author's Investigation, 2020

## 5. DISCUSSION OF FINDINGS

The findings on aspects and expectations, for and elements influencing improvement for residential satisfaction were discussed under this subheading as shown in Tables 1 and 2.

### Aspects and Expectations for Residential Satisfaction in Public Housing Estates

The findings showed that an average of 76.4% of the respondents agree that architectural process, economic process, technical process, procurement process and functional progress are the aspects of residential satisfaction as shown in Table 1. The study revealed that the expectations for residential satisfaction in public estates include; as an architectural process designed and the constructed building will improve aesthetics quality of the built environment; as an economic process brings return on invested capital; as a procurement process, building designed and constructed are managed based on set standards and specification established with allocated resources; as a technical process, create and imaginably manage maintenance issues as it arises; and as a functional process to understand human's attitudes, need and aspirations toward building in-use supporting daily activities of the residents. This finding aligned that "residential satisfactions are important indicators of building quality and condition which affect individuals' quality of life." Therefore, the factors which determine residential satisfaction levels, are essential inputs in monitoring the success of building policies as explained in the study.

The study also confirmed that “building and property managers can only remain competitive in the built environment when they listen and responded to tenants’ needs, concerns, expectations and opinions by comparing best practices with quantity performance information.” This study also aligned that “property managers and other professionals in the building industry cannot seek to improve quality of design, construction and management of buildings and by extension promotes sustainable built environment, where maintenance issues were not look into. It implies that the criteria for judging residential satisfaction are the fulfilment of residents’ needs and expectation assessing it functional fit that create the understanding of where things fall short of expectations in its inherent retrospective.

From an in-depth interview, the study revealed that the aspects and expectations of residential satisfaction includes:

- Improving the aesthetics quality of the built environment
- Providing solutions where maintenance management issued were not looked into.
- Supporting daily activities towards building in-use
- Bringing returns on invested capital like other products or services.
- Planning, constructing and managing buildings with set standards and specifications to be timely, acceptable, qualitative and qualitative in nature.

The implication of the foregoing is that the expectations residential satisfaction is diverse and very among individuals and groups. And in order to capture the feelings and expectations of all categories of residents:

- Different approaches and diverse tools and indicator would be used
- Residents’ expectation with regard to buildings are diverse and would be measured in terms of satisfaction.
- Different approaches, tools and indicators used would contribute to policy, practice and research.

This assertion applied when the buildings are focused on issues related to resident’s satisfaction, sustainable buildings and the physical and socio-economic environment. This view no doubt underscore that the quest for residential expectations and preferences of the residents. The implication of this is that the residents acquire buildings with expectations that will contribute towards the attainment of specific goals in life; and they see building as an asset capable of facilitating overall achievement of life purposes.

#### **Determinants of POF on Improvements of Residential Satisfaction in Public Housing Estates**

The study found out that more than half of the respondents with a mean score of >3.00 agree factors deterring the improvement of residential satisfaction are feedbacks, assessment, procurement, policies information, innovative tools, participatory maintenance, management of building life cycles. The study revealed that the improve quality of design, construction and management of buildings and by extension the promotion of sustainable built environment enhance residential satisfaction. This finding aligned that “ascertaining residential satisfaction contributes to improving the quality of buildings in building delivering process. This study has established that the improve residential satisfaction, feedbacks is needed to provides the causes and effects of environmental issues on buildings to inform planning and management through the buildings’ life cycle. The importance of feedbacks from the residents, hence their satisfaction is measured towards improving rising current issues in the said building. The most important issues of improving residential satisfaction is to address architectural aspects of building issues with faculty design and maintenance.

The study found out that developing innovative tools is another determinant of residential satisfaction which will also involve participatory maintenance management delivery process. This study confirmed that “there are many innovative tools utilized in gathering feedbacks from residents which include questionnaire, focus groups, interviews, photographs, walkthrough observation, survey, workshops etc. All results from the tools provide beneficial information to fulfil the main objective of residential satisfaction assessment. It implies that his information is important in informing building policy and planning intervention throughout the building life cycle.

The findings from key informants buttressed on the following points to be the determinants for improving residential satisfaction. They include by:

- Providing feedbacks on causes and effects of environment issues on buildings.
- Adopting participatory maintenance management delivery process.
- Disseminating information on buildings among the residents and the management.
- Adopting efficient building procurement process
- Conducting actual residential satisfaction assessment of buildings, tax by exploring and understanding resident's needs.
- Culminating the production of sustainable built environment
- Developing new innovative tools for building improvement
- Formulating and implementing building regulations and policies.
- Planning, programming and managing of building life cycle.

Interestingly, "the application of building performance and its satisfaction on end-users are proactive steps that would improve the condition of building and its end-users as a continuous important asset in the tool-kit of facility/property managers to use for total quality management of buildings and its environment." The study found that most residential satisfaction promotes better understanding of the key sources of satisfaction and dissatisfaction among residents, factors that influence their satisfaction levels and how they are most likely to react in the event that they felt dissatisfied with their building conditions. The different rationales and objectives influencing residential satisfaction of the Federal Housing Estates (Umuahia and Ogbo-Hill, Aba) Abia State would had been addressed. Therefore, the researcher up held the study to be true that residential satisfaction is important in the assessment of quality of life, prediction of residential behavior, evaluation of the performance of building projects and informing strategies for improving present building condition of the residents in the different residential settings.

## 6. CONCLUSION AND RECOMMENDATIONS

This study examined residential satisfaction with residents of Federal Housing Estates (Umuahia and Ogbo-Hill, Aba) Abia State using post occupancy evaluation (POE) in the research work. The findings of this study were on the premises which conclusion could be drawn on how to improve residential satisfaction in public housing estates. In this regard the study identifies the factors influencing the improvement of residential satisfaction in public housing estates. With an average RII values  $>0.60$ , as established in the study, the elements influencing the improvement of residential satisfaction are building assessment and procurement, participatory maintenance, innovative tools developed, information dissemination, feedbacks, formulate and implement policies, and plan, programme and manage building life cycles. The study also discovered that architectural, economic, technical, procurement, and functional processes are the aspects of residential satisfaction. It has the expectations of improving the aesthetic quality of the built environment, brings return on invested capital, create imaginative thinking to maintenance issues, maintain and manage buildings with allocated resources, and explore the understanding towards building in-use to support human's daily activities. Therefore, residential satisfaction should take into account not only the physical, socio-economic and environmental components of the buildings, but also the social, behavioral, cultural and personal characteristics of residents and under the arrangements, that essentially require to demonstrate that building programmes are responsibly managed. This is vitally needed to ensure the tasks confronting built environment professional that concerned housing delivery identify relevant factors or parameters to determine residential satisfaction with buildings for the improvement of the quality of public housing estates in Nigeria.

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## **INFO**

**Corresponding Author:** *NKPITE, Bari-ene Samuel, Department of Estate Management, Rivers State University, Port Harcourt Nigeria.*

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