# Residents' Post Occupancy Housing Satisfaction Among Various Dwellings

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*Abstract*

*Housing is a basic human need, and architects frequently construct houses with the goal of providing people with pleasant and satisfying living places. However, there is a significant gap between design intended and post-occupancy satisfaction, owing to a failure to consider inhabitants' opinions during the design and building phases. This study looks into the elements that influence inhabitants' post-occupancy housing satisfaction in Enugu, as well as a variety of socio-cultural, architectural, and environmental factors that influence people' preferences. This study identifies various factors that significantly influence post-occupancy satisfaction through a comprehensive investigation of socioeconomic indicators and dwelling attributes. Building design, spatial arrangement, environmental circumstances, safety, and neighborhood features are all included in this list. The study identifies varied patterns of satisfaction among housing types, underlining the differing importance of specific characteristics. Notably, tenement dwellings prioritize access to utilities, building aesthetics, and housing conveniences, whereas bungalows prioritize security and solitude. Architectural and structural factors are important to block of flat residents, whereas duplex homeowners value house design, security, privacy, and comfort. Furthermore, this study emphasizes the impact of inhabitants' socioeconomic variables on postoccupancy satisfaction, such as age, income, and work status. These findings can help legislators, urban planners; architects, surveyors, and housing developers address urban housing difficulties. Tailoring housing solutions for different housing types based on recognized satisfaction variables might improve people' overall well-being and quality of life in cities like Enugu.*

## INTRODUCTION

Housing is a vital aspect of human life, as it provides shelter, comfort, and well-being. However, housing needs and preferences vary depending on various factors, such as culture, lifestyle, income, and location. Therefore, architects and designers should consider the end-users' perspectives when designing housing solutions (Ziama & Li, 2018). Moreover, housing performance should be evaluated regularly to ensure that it meets the residents' expectations and satisfaction levels (Gopikrishnan & Topkar, 2017).

Housing satisfaction is a subjective measure of how content residents are with their living conditions. It is influenced by both objective and subjective factors, such as the physical attributes of the house, the surrounding environment, the social and economic status of the residents, and their personal preferences and aspirations (Bodur & Keskin, 2021). Housing satisfaction can have a significant impact on the well-being and quality of life of the residents, as well as their mental health. Housing satisfaction is also influenced by various factors, such as the demographic and socioeconomic characteristics of the residents (Onemano, 2016).Post-occupancy evaluation (POE) is a method of assessing housing performance based on the feedback of the occupants. POE can help identify the strengths and weaknesses of housing design, as well as the areas for improvement and innovation (Jiwane, 2021).

Several studies have examined the factors affecting post-occupancy housing satisfaction in different contexts and settings. Some of the common factors include housing type, size, quality, affordability, accessibility, safety, security, infrastructure, amenities, and neighborhood characteristics (Abidin et al., 2019; Jiwane, 2021; Preetha & Sheeba, 2020). Income is another factor that can have a complex relationship with housing satisfaction. Higher-income households may have higher expectations and standards for their housing conditions, while lower-income households may face more constraints and challenges in accessing adequate and affordable housing (Anh et al., 2017). Socioeconomic status also affects housing choice and availability, as different income groups may have different options and opportunities in the housing market (Onemano, 2016).

Despite the importance of housing satisfaction, there is a lack of research on this topic in Nigeria. Most of the existing studies have not addressed housing satisfaction holistically, or have focused on specific aspects or segments of the housing sector. Moreover, there is a dearth of studies on post-occupancy housing satisfaction among different housing types in Nigeria.

Enugu Urban is a fast-growing city in Nigeria that faces increasing housing demand and challenges. The city offers a variety of housing types to cater to different segments of the population. These include duplexes, blocks of flats, single-family bungalows, tenement bungalows, tenement story buildings, and temporary structures like batchers. However, there seems to be little or no empirical evidence on how satisfied or dissatisfied the residents are with their housing conditions across different housing categories in Enugu Urban. The study aimed at identifying the post occupancy satisfaction attributes for each house type in Enugu urban, examine-the post occupancy satisfaction differences among the various house type in Enugu urban, and analyze the influence of resident's socio-economic characteristics on the post occupancy living satisfaction across the study area

This study further addressed this gap by investigating post-occupancy housing satisfaction among various housing types in Enugu Urban. The study used a mixed-methods approach to collect and analyze data from a representative sample of residents living in different types of houses in Enugu Urban. The study examined the factors that affect post-occupancy housing satisfaction and provided suggestions for enhancing housing design and policy in Enugu Urban.

## LITERATURE REVIEW

Housing is a complex and multifaceted concept that has different meanings and implications for different people, contexts, and purposes. Housing can be understood as a physical structure, a process, an activity, an object, or an environment that provides shelter, comfort, well-being, and satisfaction to humans.

One of the simplest and most common ways of defining housing is based on its physical characteristics and functions. Umar et al. (2019) define housing as a structure that serves as a home, ranging from a simple dwelling to a complex fixed structure of wood, brick, concrete, and other related materials containing bedrooms, bathrooms, kitchen, living room, dining room, water and plumbing system, power and electrical system, and cross ventilation. Henilane (2016) defines housing as a building or part of a building in which a household can dwell year-round and that meets certain regulatory standards, including a residential address. Housing can also be defined as real estate or a component of a building, including non-residential structures utilized for year-round habitation (Henilane, 2016).

Housing satisfaction is a complex and subjective phenomenon that reflects how content residents are with their living conditions. Housing satisfaction can be influenced by various factors, such as the physical and social features of the house and its surroundings, the expectations and aspirations of the residents, and the performance and quality of the housing services and facilities. Housing satisfaction can also have various implications for the well-being and quality of life of the residents, as well as for the housing market and policy.

One of the common ways of defining housing satisfaction is based on the degree of fit or match between the residents' needs or desires and the actual housing conditions. Abidin et al. (2019) define housing satisfaction as the sensation of contentment that inhabitants experience when their wants or desires are met in a home. Huang & Du (2015) define housing satisfaction as the level of satisfaction that households have with their housing situation, how well it meets their requirements, and if it is necessary as a whole to support their ambitions.

Another way of defining housing satisfaction is based on the evaluation or assessment of various aspects or dimensions of the housing environment. Jiwane (2021) defines housing satisfaction as a complex phenomenon that includes the physical and social features of a house and its surroundings. He argues that measuring housing satisfaction is difficult since it is very subjective to the specific location, period, aim of evaluation, and engagement of a diverse variety of people. Silvija et al. (2018) define housing satisfaction as a subjective assessment based on what a person perceives to be, at any given time, a vital component of the living environment. They suggest that housing satisfaction can be measured by using various indicators, such as housing type, size,

quality, affordability, accessibility, safety, security, infrastructure, amenities, and neighborhood characteristics.

Another way of defining housing satisfaction is based on the outcomes or consequences of housing satisfaction for the residents and society. Tutkun (2018) describes housing satisfaction as more than just a physical structure that satisfies a demand for housing. It serves as the major setting for the growth and preservation of people' health as well as the area where the requirements of the populace are addressed, resulting in a sense of contentment. He argues that housing satisfaction can have a significant impact on the well-being and quality of life of the residents, as well as their mental health. Sheibani & Havard (2015) define housing satisfaction as an outcome or a product of various economic and political forces that shape the housing market and the distribution of housing resources. They argue that housing satisfaction can affect the residential mobility and stability of the residents, as well as their housing demand and preferences.

The concept of residential satisfaction is central to understanding the dynamics of housing and community conditions. It involves measuring the gap between what people desire in their housing and what they actually experience in terms of their living conditions and neighborhood circumstances (Jiwane, 2021). This study will explore various theories of housing satisfaction, including the Marxist Housing Theory and the Liberal Theory.

The Marxist Housing Theory, initially developed by Karl Marx and Friedrich Engels in the mid-19th century, was rooted in the aim of empowering the proletariat to gain control over their lives (Silvija et al., 2018). This theory, which primarily focuses on economic aspects of human existence, has also been applied to the study of housing satisfaction, examining factors such as land use, rental housing, and housing conditions. At its core, Marxism asserts that everyone should have access to decent housing, irrespective of their financial status, and strives to minimize income disparities between the rich and the poor to achieve this goal (Silvija et al., 2018). Marx and Engels argued for the reduction of economic disparities between different social classes, which would consequently lead to a decrease in differences in housing satisfaction. This perspective is based on the notion that Marxism seeks to challenge and transform capitalist views on housing satisfaction (Silvija et al., 2018). Scholars such as S. E. Barton, A. Skarburskis, and M. Moos supported this capitalist housing theory, asserting that the proletariat, under a capitalist system, would recognize their disadvantaged position and become agents of change within society. According to this view, progress can only be achieved when the initial conditions are less developed (Silvija et al., 2018). Among the scholars who extensively explored the Marxist housing theory, A. M. Soliman stands out for providing multiple definitions of housing that have been cited in numerous publications, particularly in the field of geography. According to Silvija et al. (2018), the Marxist approach defines housing based on three key elements: (1) Housing is an essential commodity, necessary for the reproduction of the labor force, and its price impacts the production of all goods in a capitalist society. This makes housing a matter of interest to classes beyond those who directly consume it (Silvija et al., 2018). (2) Housing is a fixed asset, as it requires physical space for its existence. Land, as a finite resource, plays a crucial role in housing, and legal regulations govern

its use (Silvija et al., 2018). (3) Housing can be treated as a commodity, accessible only to those with a housing need and the means to purchase it. In a capitalist society, housing holds both functional and exchange value (Silvija et al., 2018).

The Liberal Theory, in contrast, views housing as a dynamic process that aligns with individuals' needs and their engagement with their communities. It acknowledges the economic, social, and cultural factors that influence housing and recognizes housing as a reflection of occupants' lives, traditions, and social histories (Silvija et al., 2018). The liberal theory places particular emphasis on the socioeconomic inequalities within families, which impact housing demands and perceptions of housing satisfaction.

The functionalist housing theory, as discussed by Silvija et al. (2018), emerged within American sociology during the 1940s and 1950s, with a primary focus on promoting social harmony and the efficient functionality of systems. This approach highlights the importance of integrating various components within a system seamlessly, emphasizing principles such as economy, adaptability to the urban landscape, simplicity, and functionality. The concept "form follows function" had a significant influence on architectural design, suggesting that the design of dwellings should prioritize their intended purpose. When the form and function of dwellings align, it is believed that housing satisfaction is more likely to increase. However, the functionalist approach was not without criticism, particularly in the context of "mass housing." The aim of mass housing was to enhance housing satisfaction by constructing more residential units. Critics argued that this concept reduced dwellings to mere entities fulfilling basic needs like nutrition, protection, and sleep, essentially neglecting other essential functions. This oversimplified approach has been termed the "protective dwelling" concept. Silvija et al. acknowledge that functionalist housing reforms did yield positive outcomes, such as improved public health and urban hygiene. However, they also point out that both the functionalist and protective dwelling concepts oversimplify the complexity of human needs and preferences. One significant drawback of the functionalist theory is its potential to diminish social interactions within residential neighborhoods. On the other hand, advancements in building technologies that offer flexible interior spaces are seen as an advantage. A key debate revolves around whether housing satisfaction is more influenced by the characteristics of individual housing units or those of the residential neighborhoods. The functionalist theory tends to favor the former perspective, while other scholars, including Šiljeg (2016), argue for the latter, considering the complex socio-economic and environmental factors at play. As a result, new theories on housing satisfaction are emerging to complement existing paradigms.

Moving on to the Theory of Housing Satisfaction, G. C. Galster and G. W. Hesser contributed significantly by providing one of the early definitions of living satisfaction. Their definition revolves around assessing an individual's or household's judgment of how well their current living situation aligns with their ideal living situation and future expectations (Silvija et al., 2018). Whether individuals are pleased or dissatisfied with their housing is determined by their existing circumstances and the need for lasting improvements. Housing satisfaction studies primarily focus

on examining the housing unit and its immediate surroundings. However, defining the notion of a neighborhood can be challenging, as it often depends on an individual's perception of their sense of belonging and identification with a place (Silvija et al., 2018). Three key elements influence housing satisfaction: the objective qualities of the household, the objective aspects of the housing environment, and the subjective well-being defined by an individual's views, values, and goals. The objective qualities of the dwelling unit can encompass factors like size, number of rooms, and spatial arrangement, among others. Meanwhile, the objective features of the housing environment may include considerations like access to the dwelling unit, availability of parking spaces, proximity to green spaces, and access to social services (Silvija et al., 2018). It's important to note that subjective housing satisfaction can vary between different families or during different family life cycles. This theory acknowledges that an individual's or family's housing needs are not static and evolve throughout their life cycle. Therefore, adjustments to housing qualities or opportunities may be necessary if housing dissatisfaction arises during a specific life stage (Silvija et al., 2018). This perspective aligns with Morris's theory of housing adjustment, which also addresses housing discontent but is based on cultural standards of living, as opposed to the Theory of Housing Satisfaction, which focuses on housing attributes that contribute to an individual's or family's satisfaction within the housing context.

Post-occupancy satisfaction, often referred to as Post-occupancy evaluation (POE), is a widely utilized conceptual framework for assessing existing buildings and their surrounding environments. Its primary goal is to determine the extent to which architectural and planning decisions align with the needs of end-users (Preiser and Vischer, 2005). Watson (2003) further elaborated on the concept of Post-occupancy satisfaction, describing it as a systematic evaluation of user perspectives on operational buildings, encompassing both interior and exterior spaces. By placing occupants at the center of the evaluation process, POE serves as a valuable tool for scrutinizing structures after their construction and occupancy over an extended period. The rigorous examination intrinsic to Post-occupancy satisfaction follows a formally sanctioned methodology rooted in disciplines such as social sciences, architectural science, urban planning, and related fields (Ilesanmi, 2010). This methodology can encompass quantitative, qualitative, or hybrid approaches. Importantly, POE goes beyond assessing structural and outdoor aspects; it also evaluates various facets of the construction process, including planning, conceptualization, design, cost optimization, construction, facility management, and adaptive reuse. Post-occupancy satisfaction evaluates structures during their operational phase, allowing evaluators to gauge their functional effectiveness. Furthermore, this practice complements pre-occupancy evaluations and similar methodologies. It's worth noting that the criteria for evaluating performance are not always explicit; they can be implicit and interwoven within the evaluation methodology, representing goals or subjective benchmarks (Nwankwo and Okonkwo, 2012). The validation of Post-occupancy satisfaction as an evaluative instrument lies in its potential to advance knowledge through insights drawn from existing projects and retrospective feedback, enabling the improvement of past endeavors in housing and its surrounding environments (Nawawi and Khalil, 2008).

Shifting our focus to the Housing Price Theory, as discussed by Silvija et al. (2018), this theory originated in the 1980s and posits a direct relationship between housing satisfaction and housing costs. Higher costs are associated with greater satisfaction, while lower costs correspond to lower satisfaction. While this theory offers both positive and negative perspectives, it's essential to consider its broader implications. On the positive side, if higher costs lead to sustained housing satisfaction, the theory holds merit. However, it's crucial to recognize the impact on other aspects of quality of life. For instance, a better home might entail a longer commute, potentially resulting in stress, reduced leisure time, and increased expenses. Conversely, a better location might lead to shorter commutes and cost savings. Social relationships are crucial indicators of quality of life, and frequent moving can have a negative impact on them. The housing price theory challenges the classical economic idea of equilibrium between moving to a better dwelling and associated costs. It suggests that housing satisfaction is linked to costs in other life domains, indicating that moving may not necessarily improve overall quality of life. Factors such as age, education, and income influence the ability to move to better housing conditions, but the assumption that more educated or older individuals are automatically more satisfied with housing doesn't always hold true. Therefore, while the housing price theory provides valuable insights, it has limitations and may not universally apply.

Now, turning to the Housing Needs Theory proposed by Rossi in 1955, this theory conceptualizes residential satisfaction and dissatisfaction based on the "lack of fit" between residents' current and desired housing demands (Mohammad & Adel, 2014). According to this theory, changing housing demands and aspirations as families progress through different life cycle stages often lead to a mismatch between their housing and community settings, resulting in stress or dissatisfaction with their current home. This "lack of fit" prompts households to move, adjusting their dwelling to better align with their housing needs. The housing needs theory suggests that life cycle transitions can lead to varying space requirements, which are a crucial aspect of housing demands. When dwellings and neighborhoods fail to meet these evolving demands, households are likely to experience dissatisfaction and consider moving (Mohammad & Adel, 2014). However, it's important to note that this theory does not always account for objective parameters or standards that most residents require for housing satisfaction. In some cases, residents can adapt and become satisfied with their housing without the need for major changes. Therefore, housing needs are not always subject to constant changes.

The assessment of housing satisfaction is a complex endeavor, influenced by a myriad of theories and concepts, as highlighted by Jiwane (2021). It involves understanding the intricate interplay between residents and their environment, considering both objective and subjective factors that shape their dynamic reactions. Personal attributes such as household size, income, and cultural background play a significant role in determining housing satisfaction, as emphasized by Anh et al. (2017). Housing satisfaction serves as a valuable measure, as it evaluates perceived home quality through attitudinal assessments and is relevant across various residential settings. Housing satisfaction, as elucidated by Jiwane (2021), relies on a combination of objectively perceived and subjectively felt conditions. It encompasses not only engineering aspects but also physical, social,

cultural, and behavioral factors, all of which contribute to this assessment. The link between housing satisfaction and neighborhood satisfaction becomes a crucial indicator of overall quality of life. Satisfaction hinges on the match between current housing conditions and desired ones, and Umar et al. (2019) categorize variables influencing post-occupancy housing satisfaction into six components: Physical, Environmental, Economical, Social/Behavioral, Functionality, and Timing.

Abidin et al. (2019) emphasize the multidimensional nature of housing satisfaction, and empirical studies have identified variables focused on perceived environmental quality, satisfaction with living arrangements, socio-demographic characteristics, neighborhood attributes, and behavioral aspects. These variables are critical elements in cross-cultural investigations of housing satisfaction. Let's delve into each of these components:

Social Demographic Characteristics: Research has shown a positive relationship between housing satisfaction and factors such as age, income, education, job status, length of residence, and home ownership (Abidin et al., 2019). Education's impact on housing satisfaction can vary across studies, but it's generally recognized as a significant factor. Age often has a beneficial effect on housing satisfaction, with older individuals tending to be more content with their homes. Income plays a pivotal role, as higher-income households can afford suitable homes in desirable neighborhoods, leading to increased satisfaction. Socio-demographic characteristics, including age, marital status, gender, income, education, race, job status, length of residence, household size, and tenure type, have been linked to residential satisfaction, although findings are not always consistent (Abidin et al., 2019).

Housing Characteristics: Abidin et al. (2019) highlight that housing satisfaction is primarily influenced by housing characteristics, often outweighing demographic factors. This underscores the importance of structural elements like the number of bedrooms, kitchen size and location, overall unit quality, and living space dimensions in determining residents' contentment with their dwelling. The physical attributes of a home, such as laundry and kitchen areas, room sizes, outlets, and the number of bedrooms and bathrooms, are essential in assessing its characteristics. Additionally, factors like housing quality, privacy, safety, and ventilation, provided by builders, also significantly influence residents' perception of a house's physical features.

Neighborhood Characteristics: The neighborhood emerges as a strong predictor of home satisfaction, according to Abidin et al. (2019). Residents tend to be less satisfied with their neighborhoods when they face longer commutes for work, school, shopping, and medical facilities. Housing satisfaction is intrinsically linked to neighborhood features like crime rates and accident risks. Neighborhood satisfaction has been shown to be a key predictor of housing satisfaction, with physical environment characteristics, community and shopping amenities, and public transportation accessibility all contributing factors (Abidin et al., 2019). Environmental physical factors, such as home and neighborhood features, play a significant role in overall satisfaction (Anh et al., 2017).

Behavioral Characteristics of Residents: Housing adjustment and adaptation refer to residents' efforts to address disparities between their current homes and their ideal housing situations. It includes activities like making changes to a particular area of the dwelling, adapting to existing conditions, or even relocating due to dissatisfaction (Abidin et al., 2019). The residents' behavior reflects their level of satisfaction with their housing. Their reactions can vary, ranging from making changes within their current dwelling to adapting to the conditions or even considering a move, depending on their level of dissatisfaction or their means to relocate (Abidin et al., 2019). Behavioral traits such as mobility, modification, adjustment, adaptation, and maintenance culture all contribute to residents' responses to their housing conditions.

Previous research has examined housing satisfaction in various regions, shedding light on the multifaceted nature of residents' contentment with their living spaces (Ubani and Nwauzoma, 2018). In Enugu metropolis, Nigeria, there are four primary categories of housing options: single tenement buildings, blocks of flats, bungalows, and duplexes. The distribution of these housing types is closely linked to the overall environmental quality of the city. The scarcity of certain housing types, particularly blocks of flats and single tenement units, has contributed to the deterioration of existing housing structures and the surrounding natural environment (Emodi & Udechukwu, 2021). Studies in Enugu have delved into factors influencing residents' satisfaction with rental housing, mainly occupied through renting. These studies aimed to identify the determinants of satisfactory housing, utilizing surveys and questionnaires. The determinants included house unit attributes, proximity/accessibility to infrastructure, neighborhood facilities attributes, infrastructure services, utility attributes, social attributes, and waste disposal factors. These factors collectively accounted for a significant portion of the variation in housing satisfaction (Ubani and Nwauzoma, 2018). Another study explored the relationship between housing satisfaction and socioeconomic factors in Akure, Nigeria, revealing a positive correlation between residents' housing satisfaction and their socioeconomic characteristics. This study emphasized the importance of considering these factors in housing development and planning (Fakere et al., 2018). Additionally, research from other regions has highlighted the influence of various factors on housing satisfaction. These factors include income, education level, household size, employment status, and design adequacy. They impact residents' contentment with their homes and neighborhoods (Bordur & Keskin, 2021; Jiwane, 2021; Preetha & Chander, 2020; Ziama & Li, 2018). While these studies provide valuable insights into housing satisfaction, there is still a gap in understanding how different house types within Enugu urban influence post-occupancy satisfaction. Enugu urban encompasses a variety of house types, including bungalows, tenements, duplexes, and blocks of flats, and it's essential to explore how these variations affect residents' satisfaction (Ogunbayo et al., 2018; Onemano, 2016; Umar et al., 2019).

The existing literature underscores the complexity of housing satisfaction and the multitude of factors that contribute to residents' contentment with their housing environments. However, there is a need for further research to delve into the specific dynamics of post-occupancy satisfaction in different house types in Enugu urban, filling a critical gap in our understanding of housing satisfaction in this emerging city of sub-Saharan Africa.
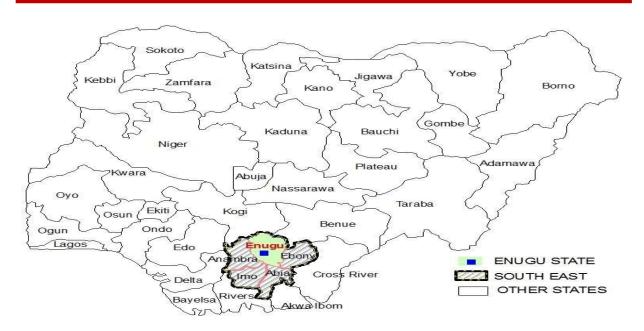
## STUDY AREA AND METHOD

The study area is Enugu Urban, the capital city of Enugu State, located in the southeast geopolitical region of Nigeria. Enugu Urban covers an area of 72.8 square kilometers and comprises three local government areas: Enugu North, Enugu South, and Enugu East. The city has 18 prominent residential neighborhoods, some of which are shown in figure 3.3. The city is bordered by Nkanu East, Udi, Enugu East, and Nkanu West local government areas to the east, west, north, and south, respectively. The maps in figure 3.1 and figure 3.2 show the locations of Enugu State and Enugu Urban in Nigeria.

Enugu Urban has a tropical savannah climate with a humid weather that is wettest between March and November. The average monthly relative humidity ranges from 59.97 to 94.23 percent, and the average daily temperature is 26.7°C. There are two distinct seasons in Enugu Urban: the rainy season from April to October and the dry season from November to March. The rainy season is caused by the moisture-laden southwest winds that blow from the Atlantic, while the dry season is caused by the dry north-east trade winds that carry dust from the Sahara Desert. The harmattan, a heavily dusted wind that blows between December and January, is a characteristic feature of the dry season.

Enugu Urban has a growing population that has increased over the years due to rural-to-urban migration. The city was granted a township status in 1917 as a result of its coal mining operations and the completion of the railway line from Port Harcourt that enabled the export of coal. The population census results from 1952 to 2006 show the expansion of the city from 62,764 to 722,664 people. Using the Thomas Malthus Exponential Model, the current population of Enugu Urban in 2020 is estimated to be 1,032,000 people.

Enugu Urban is situated in a tropical rain forest zone that has been modified by human activities into a derived Guinea savannah vegetation. The soil supports undulating grassland and sporadic pockets of woodland. The trees have developed deep taproots and strong bark to withstand fire and human interference. The most common grass is elephant grass, which reaches a height of 3 to 3.6 meters. The most prevalent trees are isoberline, locust, Shea butter, almond, and oil bean trees, which shed their leaves during the dry season, as well as elephant trees, which are evergreen.

*Map of Nigerian Showing Enugu State.*
**Source***: Google Earth Imaging, 2020.*

This study employed a survey research design, utilizing questionnaires and direct field observations. The survey approach was chosen as it allows for impartial sampling of participants and variables, enhancing the ability to draw conclusions about the phenomena under investigation. The study utilized both primary and secondary data sources. Secondary data were collected from published and unpublished materials, including books, government gazettes, journals, magazines, newspaper registrations, reports, conference papers, seminar papers, workshops, monographs, dissertations, and other statistical records. Unpublished materials such as maps showing Enugu state, Enugu city neighborhoods, and local government units were obtained through online sources. Additionally, housing stock data for various house types in Enugu for 2020 were sourced from the Department of Urban and Regional Planning at the University of Nigeria, Enugu Campus. Primary data included first-hand information collected through direct observation and questionnaire administration. Personal observations focused on the physical and environmental conditions of selected housing areas and available infrastructure. Questionnaires were administered to residents of different housing types in Enugu Urban to gather data on housing characteristics, residents' socioeconomic attributes, and post-occupancy housing satisfaction. The sample population consisted of various house types in Enugu Urban and household heads within these house types. The total number of different housing units in Enugu Urban served as the sample frame, totaling 58,395. A combination of non-probability (purposive sampling) and probability (cluster and simple random sampling) techniques was employed. Enugu Urban was clustered into three administrative areas, and house types were grouped into four categories: tenements, bungalows, blocks of flats, and duplexes. Three neighborhoods were randomly selected from each administrative area, with an emphasis on high population and building density. Purposive sampling was used to select house types within these neighborhoods. The sample size was determined using

a formula based on the population of households to be sampled to a 10% extent, resulting in a sample size of 487 households, representing 0.83% of the total population. Data were analyzed using descriptive and inferential statistical methods. Descriptive statistics included frequencies and percentages. Inferential statistics involved Principal Component Analysis (PCA), Multiple Linear Regression, and Analysis of Variance (ANOVA), as PCA was used to analyze the post-occupancy housing satisfaction attributes. Aggregate factor scores from PCA were used as dependent variables for subsequent analyses, and ANOVA was employed to assess differences in post-occupancy housing satisfaction among different housing types, Multiple Linear Regression (MLR) was also used to explore the relationship between residents' socioeconomic characteristics (age, employment, and income) and post-occupancy housing satisfaction.

## RESULTS AND DISCUSSION

The result of the socioeconomic characteristics of the respondents (table 1) shows that most respondents are males (58.3%), and (41.7%) are females respondents. This shows that this study and the distribution of the questionnaire was not gender biased and thus increases the internal validity of the study. Furthermore, the responses from the respondents indicate that 38% of the respondents were between the ages of 21-30 years, 41% of the respondents were 31- 40years while 15% of the respondents were 41-50 years, 19% of the respondents were between 51-60 years, and 5% were above 60 years. This shows that most of the residents are by implication are youths as could be seen from the age bracket as clearly shown from the table above.It was also seen that only 89% of the respondents were employed, while the remaining 11% were unemployed. This shows that the majority of had a source of livelihood. Again, an examination of income of the respondents reveals that 78% of the respondents had an annual income of N5,000,000 and below, and those who earn above N5,000,000 accounts for only 22% of the respondents.

Table 1 also provides information about the distribution of respondents based on the number of years of occupation of the house. The majority of respondents 64% reported having lived in the house from 4- 6 years,7-10 years accounting for 25% of the total respondents. Those who lived above 10 years were 11% of the total respondents.

| Characteristics | Statistics |
|---|---|
| 1. Sex | Male (58.35%), Female (41.7%) |
| 2. Age | 21-30 years(38%), 31- 40years (41%), 41-50 years, (15%) 51-60 years (19% ), Above 60 (5%) |
| 3. Occupation | Employed(89%) , Non-employed (11%) |
| 4. Annual Income | 100,000-500,000(28%); 500,001-1,000,000 (33%) 1,000,001-5,000,000(17%);    5,000,001-10,000,000(12%); 10,000,001-50,000,000(7%); 50,000,001-150,000,000 (3%) |
| 5. Length of time in house | 4-6 years (64%),    7-10 years  (25%), Above 10 years(11%), |

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Source: Field Survey, 2021.

## POST OCCUPANCY HOUSING SATISFACTION ATTRIBUTES FOR EACH HOUSE TYPE

The result of the PCA analysis identified (table 2) the post occupancy housing satisfactions attributes of residents' in Enugu Urban into 10 components that explained 86.5 percent of observed variation in post occupancy housing satisfactions factors. The identified predominant factors that post occupancy housing satisfactions attributes that accounted for the explained percentage variations were as follows

**Table 2 PCA Parameter Used for the Analysis of tenement building**

| Factors | Classified Factors | EigenValue | % VarianceExplained |
|---------|---------------------|------------|----------------------|
| Factor 1 | Housing Facilities | 20.320 | 45.156 |
| Factor 2 | Community Facility | 3.535 | 7.855 |
| Factor 3 | Thermal Comfort/Recreation | 2.896 | 6.435 |
| Factor 4 | Room Sizes | 2.742 | 6.093 |
| Factor 5 | Security/Privacy | 2.085 | 4.633 |
| Factor 6 | Structural Stability | 1.853 | 4.118 |
| Factor 7 | Neighborhood Infrastructure | 1.683 | 3.739 |
| Factor 8 | Parking space | 1.508 | 3.352 |
| Factor 9 | Architectural | 1.269 | 2.831 |
| Factor10 | Safety/Protection against Hazard | 1.046 | 2.325 |
| | **Total** | | 86.527 |

The result of PCA analysis identified (table 3) the post occupancy housing satisfactions attributes of residents' in Enugu Urban into 11 components that explained 97.04 percent of observed variation in post occupancy housing satisfactions attributes. The identified predominant factors that post occupancy housing satisfactions attributes that accounted for the explained percentage variations were as follows:

**Table 3 PCA Parameter Used for the Analysis of Bungalow**

| Factors | Classified Factors | EigenValue | % VarianceExplained |
|---------|---------------------|------------|----------------------|
| Factor 1 | Security & Privacy | 11.409 | 25.354 |
| Factor 2 | Health/Ventilation | 7.052 | 15.672 |
| Factor 3 | Architectural/Neighborhood facility | 6.174 | 13.721 |
| Factor 4 | leisure/Health | 4.680 | 10.401 |
| Factor 5 | Conduciveness | 3.809 | 8.465 |
| Factor 6 | Greenery/Outdoor space | 2.687 | 5.970 |

| | | | |
|---|---|---|---|
| Factor 7 | Interior finish / safety | 2.187 | 4.859 |
| Factor 8 | Comfort | 1.836 | 4.079 |
| Factor 9 | Age of building/External look | 1.620 | 3.601 |
| Factor10 | Location of Building | 1.174 | 2.608 |
| Factor11 | Interior Finish | 1.040 | 2.311 |
| | **Total** | | 97.04 |

The result PCA analysis identified (table 4) the post occupancy housing satisfactions attributes of residents' in Enugu Urban into 7 components that explained 97.04 percent of observed variation in post occupancy housing satisfactions attributes. The identified predominant factors that post occupancy housing satisfactions attributes that accounted for the explained percentage variations were as follows:

**Table 4 PCA Parameter Used for the Analysis of Block of flat**

| **Factors** | **Classified Factors** | Eigen Value | % Variance Explained |
|---|---|---|---|
| Factor 1 | Architectural/Structural | 17.508 | 25.354 |
| Factor 2 | Outdoor attribute/age | 6.161 | 15.028 |
| Factor 3 | Thermal Comfort/Structure | 4.470 | 10.903 |
| Factor 4 | Housing design | 4.203 | 10.252 |
| Factor 5 | Age of building | 3.070 | 7.488 |
| Factor 6 | Ventilation | 2.514 | 6.132 |
| Factor 7 | Security | 2.169 | 5.290 |
| | **Total** | | 97.796 |

Source: PCA results

The result PCA analysis identified (table 5) the post occupancy housing satisfactions attributes of residents' in Enugu Urban into 6 components that explained 97.04 percent of observed variation in post occupancy housing satisfactions attributes. The identified predominant factors that post occupancy housing satisfactions attributes that accounted for the explained percentage variations were as follows:

**Table 5 PCA Parameter Used for the Analysis of Duplex**

| **Factors** | **Classified Factors** | EigenValue | % VarianceExplained |
|---|---|---|---|
| Factor 1 | House Design/Security | 17.508 | 33.237 |
| Factor 2 | Privacy/Comfort | 6.161 | 26.246 |
| Factor 3 | Neighborhood Facility | 4.470 | 15.093 |

| Factor 4 | Ventilation/Thermal Satisfaction | 4.203 | 12.197 |
|---|---|---|---|
| Factor 5 | Architectural | 3.651 | 8.113 |
| Factor 6 | Structures/Greenery | 2.301 | 5.114 |
| | **Total** | | 100 |

In addition, to explain the post occupancy housing satisfaction levels differences of the different house types in Enugu, each house type post occupancy housing satisfaction attributes were determined using Principal Component Analysis (PCA), an aggregated cross tabulation (table 6) gives a summary of the highest factors that influenced post occupancy satisfaction in the various house types in the study areas are presented.

**Table 6 Aggregated cross tabulation summary of factors that influenced post occupancy satisfaction in the various house types in the study areas**

| Factors | TENEMENT | BUNGALOW | BLOCK OF FLATS | DUPLEX |
|---|---|---|---|---|
| Factor 1 | Housing Facilities | Security/Privacy | Architectural/Structural | House Design/Security |
| Factor 2 | Community Facility | Health/Ventilation | Outdoor attribute/age | Privacy/Comfort |
| Factor 3 | Thermal Comfort/Recreation | Architectural/Neighborhood facility | Thermal Comfort/Structure | Neighborhood Facility |
| Factor 4 | Room Sizes | leisure/Health | Housing design | Ventilation/ Thermal Satisfaction |
| Factor 5 | Security/Privacy | Conduciveness | Age of building | Architectural |
| Factor 6 | Structural Stability | Greenery/Outdoor space | Ventilation | Structures / Greenery |
| Factor 7 | Neighborhood Infrastructure | Interior finish / safety | Security | |
| Factor 8 | Parking space | Comfort | | |
| Factor 9 | Architectural | Age of building/External look | | |
| Factor 10 | Safety/Protection against Hazard | Location of Building | | |
| Factor11 | | Interior Finish | | |

Source: PCA results, 2021

The study's analysis (table 7) revealed a significant variance between housing types concerning post-occupancy housing satisfaction, as indicated by the high F-statistic of 93.414. Furthermore, the p-value of 0.000, significantly lower than the standard significance level of 0.05, implies that the observed differences in housing satisfaction among housing types did not occur by chance. This unequivocally demonstrates that dwelling type doesn't significantly impacts residents' post-occupancy housing satisfaction in Enugu urban.

**Table 7 ANOVA results for assess differences in post-occupancy housing satisfaction among different housing types**

**ANOVA**

Aggsatif

|  | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2456.354 | 3 | 818.785 | 93.414 | .000 |
| Within Groups | 9624.086 | 465 | 8.765 |  |  |
| Total | 12080.440 | 468 |  |  |  |

Source: ANOVA results, 2021

The Multiple Linear Regression analysis (table 8) unveiled a statistically significant relationship between residents' socioeconomic characteristics (age, income, and employment) and post-occupancy housing satisfaction attributes. The high coefficient of determination ($R^2$) of 0.909 suggests that approximately 90.9 percent of the variance in housing satisfaction can be explained by these socioeconomic factors. The adjusted $R^2$ value of 0.869 reinforces the robustness of this relationship. The F-value of 25.014 indicates that the overall model is statistically significant, further emphasizing that age, income, and employment collectively influence post-occupancy housing satisfaction attributes in a non-random manner. Importantly, the p-value of 0.000, significantly lower than the conventional threshold of 0.05, underscores the statistical significance of this relationship. In summary, residents' age, income, and employment status play a substantial role in shaping their post-occupancy housing satisfaction attributes in Enugu urban.

**Table 8 Parameters for the Analysis of MLR**

| R | 0.953 |
|---|---|
| $R^2$ | 0.909 |
| Adjusted $R^2$ | 0.869 |
| Standard error | 3.38673 |
| F value | 25.014 |
| P value | 0.000 |
| Significant value | 0.00 |

Source: Regression results, 2021

The study has yielded valuable insights into post-occupancy satisfaction attributes for different housing types in Enugu urban. It identified specific criteria that significantly influence residents' housing satisfaction within each housing category, including tenement dwellings, bungalows, blocks of flats, and duplexes. Moreover, the research demonstrated that post-occupancy satisfaction differs significantly among various housing types in Enugu urban. The ANOVA results supported this assertion, with a p-value below the 0.05 significance level, indicating that these differences are not random. Lastly, the study underscored the influence of residents' socioeconomic characteristics on their post-occupancy housing satisfaction across the study area. Age, income, and employment emerged as key variables that significantly affect residents' evaluations of their living conditions.

## CONCLUSION AND RECOMMENDATION

This study offers significant insights into the determinants of post-occupancy housing satisfaction among different housing types in Enugu urban. It encompasses a wide range of factors, from architectural features to socio-economic characteristics, shedding light on the intricate dynamics at play. The research identifies distinct factors influencing residents' choices among the diverse housing types, including duplexes, blocks of flats, bungalows, and tenement buildings. These factors encompass socio-cultural backgrounds, bedroom sizes, bathroom locations, architectural layouts, building aesthetics, security, privacy, and many other critical attributes that collectively shape residents' contentment. Furthermore, the study highlights substantial differences in post-occupancy housing satisfaction among these housing types, with discernible classifications indicating the various elements that influence residents' preferences. This underscores the importance of tailoring housing solutions to meet the specific needs and expectations of inhabitants within each housing category. Moreover, residents' socio-economic characteristics, including age, income, and employment status, emerge as influential factors in determining their post-occupancy housing satisfaction. These variables exert a significant impact, emphasizing the importance of addressing socio-economic disparities in housing provision and urban planning.

Based on the substantial findings of this study, several policy implementation suggestions are proposed to enhance the overall well-being and quality of life in Enugu urban: (1) Enugu State Government should adopt comprehensive housing design and quality standards that cater to the unique characteristics of different housing types. Collaboration among architects, urban planners, and housing developers is essential to ensure that each housing type meets the specific requirements and expectations of residents. Additionally, encouraging the construction of diverse housing styles to accommodate different socioeconomic demographic groups is crucial. (2)Urban planning should acknowledge the inherent differences in post-occupancy satisfaction among various housing types. When developing neighborhoods and allocating resources, planners should consider these disparities. For instance, community facilities should be prioritized in tenement areas, while privacy and architectural integrity should take precedence in duplex areas. Infrastructure development should address these variations in housing types. (3)Recognizing the significant influence of socioeconomic variables on housing satisfaction, Enugu State Government should establish affordable housing projects catering to residents of all income levels. This may include subsidies for low-income families, microfinance options, and housing programs tailored

to their needs. Housing support programs offering financial aid, counseling, and employment opportunities can bridge the gap between socioeconomic status and housing happiness.

## REFERENCES

Abidin, N. Z., Jaafar, A. H., & Razak, A. A. (2019). Post-Occupancy Evaluation of Housing Satisfaction in Malaysia: A Review. International Journal of Built Environment and Sustainability, 6(1), 1-10.

Anh, T. T., Ogunlana, S., Dey, P. K., & Jha, K. N. (2017). Factors affecting the satisfaction of low-income households living in affordable apartment housing in Vietnam: a post-occupancy evaluation. International Journal of Construction Management, 17(4), 263-278.

Bodur, M., & Keskin, S. (2021). The effect of housing satisfaction on life satisfaction: A study on the residents of mass housing projects in Turkey. Journal of Housing and the Built Environment, 36(1), 1-21.

Emodi, N. V., & Udechukwu, C. E. (2021). Environmental quality assessment of Enugu urban, Nigeria. Environmental Monitoring and Assessment, 193(2), 1-18.

Fakere, A. A., Fakere, R. A., & Oluwunmi, A. O. (2018). Socio-economic factors influencing residential satisfaction in Akure, Nigeria. Journal of Building Performance, 9(1), 1-12.

Gopikrishnan, S., & Topkar, V. (2017). Post occupancy evaluation of residential satisfaction in Pune city: a case study of Warje and Kothrud area. International Journal of Civil Engineering and Technology, 8(5), 1000-1010.

Henilane, I. (2016). Housing as a component of national wealth: the situation in Latvia and other countries. Journal of Business Management, 12, 7-18.

Ilesanmi, A. O. (2010). Post-occupancy evaluation and residents' satisfaction with public housing in Lagos, Nigeria. Journal of Building Appraisal, 6(2), 153-169.

Jiwane, R. (2021). Post Occupancy Evaluation of Housing Performance: A Review Paper. International Journal of Engineering Research and Technology, 14(2), 1-6.

Mohammad, A. A., & Adel, A. (2014). Housing needs theory: A critical review. International Journal of Architecture and Urban Development, 4(4), 5-12.

Muwaffaq, S. (2020). The Concept of Housing: A Review of Literature. International Journal of Architecture and Urban Development, 10(4), 5-12.

Nawawi, A. H., & Khalil, N. (2008). Post occupancy evaluation correlated with building occupants' satisfaction: An approach to performance evaluation of government and public buildings. Journal of Building Performance, 1(1), 1-16.

Nwankwo, F. N., & Okonkwo, C. A. (2012). Post occupancy evaluation of residential satisfaction in Lagos, Nigeria: Feedback for residential improvement. International Journal of Humanities and Social Science, 2(14), 204-218.

Ogunbayo, B., Ogunbayo, I., & Oyedele, L. (2018). Post occupancy evaluation of residential satisfaction in Lagos megacity: The case of Lekki Peninsula Scheme I. Journal of Building Engineering, 18, 395-406.

Onemano, A. (2016). The influence of income on housing satisfaction: a case study of low-income earners in Lagos metropolis, Nigeria. International Journal of Housing Markets and Analysis, 9(3), 416-431.

Preetha, P., & Sheeba, M. (2020). Post Occupancy Evaluation of Residential Satisfaction in High Rise Apartments–A Case Study in Chennai City. International Journal for Research in Applied Science & Engineering Technology (IJRASET), 8(2), 1310-1317.

Preiser, W. F., & Vischer, J. C. (2005). Assessing building performance. Routledge.

Rossi, P. H. (1955). Why families move: a study in the social psychology of urban residential mobility (Vol. 3). Free Press.

Šiljeg, A. (2016). Housing satisfaction in medium-sized towns: the case of Varaždin County in Croatia. Geodetski list, 70(93), 1-16.

Silvija, B., Kauko, V., & Jurgita, S. (2018). The concept of housing satisfaction and its measurement indicators: a systematic literature review. International Journal of Strategic Property Management, 22(3), 173-188.

Tutkun, N. (2018). The relationship between housing satisfaction and life satisfaction: A research on the residents of Tokat city center. European Journal of Multidisciplinary Studies, 3(2), 7-14.

Ubani, E., & Nwauzoma, A. (2018). Determinants of satisfactory housing: a case study of Enugu metropolis in Nigeria. International Journal of Housing Markets and Analysis.

Umar, A., Hassanain, M., & Al-Hammad, A. (2019). Post occupancy evaluation of housing facilities in Saudi Arabia: a case study of Riyadh city. International Journal of Building Pathology and Adaptation, 37(4), 419-435.

UN-Habitat (2013). State of the World's Cities Report 2012/2013: Prosperity of Cities. Routledge.

Watson, C. (2003). Review of building quality using post occupancy evaluation. In Proceedings of the Pacific Rim Real Estate Society Conference (Vol. 9, No. 1, pp. 19-22). Pacific Rim Real Estate Society (PRRES).

Ziama, D., & Li, X. (2018). Post occupancy evaluation of housing performance and user satisfaction: a case study of the University of Nottingham Jubilee Campus postgraduate students' residences in the UK. International Journal of Building Pathology and Adaptation, 36(4), 368-385.