ARCHITECTURAL DESIGN INTERVENTION AS A SOLUTION TO THE PROBLEM OF LACK OF SUSTAINABLE AND EQUITABLE HOUSING IN NIGERIA

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Abstract. Housing offers shelter and a feeling of security for the future and helps form communities. In Nigeria, several challenges are associated with houses and architecture, particularly in the context of sustainability and traditional building practices. One of the primary concerns is the lack of awareness and comprehension among the general population, developers, and policymakers regarding the concept and advantages of flexible architecture. Nigeria's lack of sustainable and equitable housing poses many challenges impacting residents and the community. It is unknown how the use of design models/interventions in actual building situations and virtual simulations can aid the nation of Nigeria in becoming more resilient and dynamic by emphasizing inclusive and sustainable housing options that meet varied requirements and promote social fairness. This study examined the various interventions and efforts (architectural design and non-design interventions). The research aims to investigate whether or not design improvement through simulation studies on building typology could effectively and economically provide housing equity in slum areas in Nigeria. The study focused on the various architectural intervention variables, such as typology, segregation, centrifugation, and morphology, emphasizing typology most suitable for Nigeria's peculiar housing challenges.
Keywords: *housing equity, building typology, housing inequity, architectural intervention*

Introduction

Housing provides a place to live and a sense of future stability and aids in forming communities (Gil Everaert, 2021). A nation's sustainable growth depends heavily on housing, a basic human necessity (Dumreicher and Kolb, 2008). To improve sustainability, this crucial element hasn't been explored much in markets for inexpensive homes. The unpredictability of housing disparity and the slow increase in demand have led to calls for affordable housing equity to build a more prosperous and bright future for the nation. A multidisciplinary approach and knowledge of physical, historic, and recreational attribute analysis are necessary for this type of research (Shi et al., 2013). Accordingly, the relationship between the natural and built environments has drawn much scholarly interest and sparked new scientific investigations (Anderson and Shiers, 2002). In Nigeria, several challenges are associated with houses and architecture, particularly in the context of sustainability and traditional building practices. One of the primary concerns is the lack of awareness and comprehension among the general population, developers, and policymakers regarding the concept and advantages of flexible architecture. Without effective education and awareness campaigns, securing acceptance and support for innovative architectural solutions can be challenging. Identifying suitable locations for implementing flexible architecture projects is challenging due to land tenure systems, land ownership disputes, and informal settlements.

Furthermore, Nigeria has a variety of housing typologies that represent the country's different cultural, social, and economic settings (Saidu and Yeom, 2020). The "Face-Me-I-Face-You" house typology is a popular dwelling design in Nigeria. Built initially as upper-class dwellings, these structures have grown into overcrowded tenements, sometimes in disrepair. The "Face-Me-I-Face-You" layout often comprises many apartments with common areas like kitchens and toilets, with one unit facing another across a central hallway or courtyard (Saidu and Yeom, 2020). Further, Nigeria has diverse housing morphologies catering to different preferences, economic capabilities, and cultural influences. The various housing morphologies reflect the diverse needs and preferences of individuals in Nigeria based on factors such as affordability, space requirements, and cultural traditions. Variables such as the high construction cost, the inflexibility of the traditional housing typology, limited property value appreciation in the country, and inefficient resource management have led to a loop that not only intensifies poverty in the area but also hurts people to attain financial stability. Nigeria's lack of sustainable and equitable housing poses many challenges impacting residents and the community (Obayomi et al., 2023). It is unknown how the use of design models and interventions in actual building situations and virtual simulations can aid the nation of Nigeria to become more resilient and dynamic by emphasizing inclusive and sustainable housing options that meet varied requirements and promote social fairness (Ochedi, 2022). Architectural design intervention variables are a comprehensive list of the factors architects consider when designing new buildings or making changes or modifications to existing structures. These variables can include typology, segregation, centrifugation, and morphology. The study will show that modeling and forecasting for building designs is feasible for communities to implement sustainable and equitable housing and development ideals. Furthermore, the study will examine the various architectural intervention variables, such as typology, segregation, centrifugation, and morphology, to determine the most suitable for Nigeria’s peculiar housing challenges.

Results and Discussion

Traditional architectural design styles in Nigeria

Nigeria showcases a variety of traditional architectural design styles throughout various locations, influenced by climatic circumstances, socio-economic factors, and cultural backgrounds. Rikko and Gwatau (2011) define tradition as an artistic legacy passed down from generation to generation and embraced and followed by the community. Thus, traditional architectural designs reflect the people's cultural lifestyle and symbolize the population's legacy (Ikudayisi and Odeyale, 2021). Therefore, addressing society's material, spiritual, and social structure cannot be overstated (Olotuah and Bobadoye, 2009). As a result, establishing close contact with the whole system restored the values and practices accepted by the social groupings of the population (Ikudayisi and Odeyale, 2021). Furthermore, the design and purposes of housing differ according to individuals' traditions and culture, reflecting their priorities in terms of housing. Baumanova (2022) asserted that environmental and social factors influenced architectural design solutions in pre-colonial traditional settings. These factors, such as climate and the availability of building materials, played a crucial role in determining the characteristics of the developed structures.

Adoption of modern architectural design in Nigeria

A prevailing trend among urban dwellers in Nigeria is the adoption of foreign architectural design, materials, and services in building construction. This trend has raised concerns about the survival of structures constructed using native building materials (Owamoyo and Tabibi, 2023). Typically, buildings made from locally sourced materials are demolished and replaced with structures made from imported resources. Consequently, several modern metropolitan areas lack historical structures and landmarks constructed using local resources that may be regarded as attractive tourist sites. Udoudoh and Bassey (2021) have critiqued this tendency to prioritize foreign technology and commercial preferences above preserving historical and cultural characteristics specific to the community where the building is located.

Housing challenges in Nigeria

A critical factor affecting housing availability and urban policy is housing financing. Experts assert that any town may improve its housing by establishing a suitable financial framework (Chileshe et al., 2022). Numerous governments have revised their financial institutions to encourage private-sector finance entities to engage in funding for housing provision (Liu et al., 2023). Odoyi and Riekkinen (2022) assert that Nigeria's lack of an adequate housing financing framework adversely affects housing delivery and hinders housing development.

Housing inequality and the proliferation of informal urban settlements

Housing inequality is one aspect of spatial exclusion that results from the significant differences between people living in formal and informal urban communities (UN-Habitat, 2010). Unequal access to housing, infrastructure, and land is the root of these inequities. According to the Centre for Affordable Housing Finance in Africa, there is a significant disparity in the environmental quality and housing conditions between formal and informal settlements, particularly in metropolitan Africa (Alagba et al., 2023). This disparity has led to widespread inadequate living conditions and deterioration in the physical environment in major cities across the continent (Anierobi et al., 2023). According to a 2017 study published by the Centre for Affordable Housing Finance in Africa, there is a significant disparity in the environmental quality and housing conditions between formal and informal settlements, particularly in metropolitan Africa (Alagba et al., 2023). This disparity has led to widespread inadequate living conditions and a deterioration in the physical environment in major cities across the continent (Anierobi et al., 2023). Numerous causes, such as migration and the incapacity of people or households in informal settlements to own or rent adequate property due to their financial status, have been blamed for this condition. Another contributing issue has been the poor quality of the housing delivery system, which is often biased toward the few high-income earners rather than the low-income individuals who make up the bulk of urban inhabitants, especially in Nigeria (Anierobi et al., 2023).

One of the elements that has led to and still contributes to the rising urban housing disparity in sub-Saharan African cities is an insufficient supply of housing units. According to Anierobi et al. (2023), Nigeria is now experiencing a housing supply gap of 12-15 million units. This is because there is a greater demand for homes than supply. There’s a groups calculated that $650 billion would be needed annually to close the worldwide gap in affordable housing supply. This was in spite of the fact that both the

public and private sectors had funded housing. The current situation gives the impression that this gap is still widening without any signs of slowing down, particularly in many developing countries, including Nigeria. Aduwo et al. (2016) identify the restricted availability of land for house construction as a contributing cause to the housing issues afflicting metropolitan Nigeria.

Non-design intervention approach: National housing policy-A failed approach

Many ideas, efforts, and policies have been created and proposed to solve the housing issues that Nigeria's built environment is now dealing with (Odoyi and Riekkinen, 2022). Nigeria initiated its inaugural national housing policy in 1991, aiming to provide homes for every individual by 2000. The strategy proved challenging to execute, and by 2000, it had failed to achieve its intended impact on society to ensure universal access to adequate housing (Odoyi and Riekkinen, 2022). The housing delivery initiatives of the Nigerian government, which were entirely ineffective from pre-independence until 2000, serve as evidence of the deficiencies of the Primary Mortgage Institution (PMI), the challenges in acquiring land, and the expenses associated with mortgage loans. A realistic assessment of the 1991 National Housing Policy was crucial owing to its significance to the national economy and the inadequacy of previous initiatives to address the housing issue. Nigeria’s land administration system was flawed by the 1978 Land Use Act, which made buying land unaffordable, among other reasons, making the 2006 housing policy fall short of expectations. This meant that this approach could not resolve the cost of constructing new homes. In September 2011, a proposal was presented to amend the National Housing Policy 2002, citing significant data that impacted the housing market. The previous strategy was revised to revitalize the housing industry and offer a feasible alternative for adequate socio-economic progress. A new national housing policy was implemented in 2012 with the following goals: promote active involvement of all three levels of government in housing provision; address housing delivery challenges through increased public-private partnerships; reduce housing production costs by encouraging the use of locally produced building materials; and increase the number and quality of rural housing. The NHP has initiated a variety of development initiatives to ensure that housing is accessible to individuals of all income levels, from the most impoverished to the most affluent. Notwithstanding, these policy objectives have not been effectively realized, as evidenced by previous studies (Ndeche et al., 2020). This can be attributed to a variety of factors, including a labor deficit, corruption, changing political administrations, political influence, and production expenses (Ndeche et al., 2020).

Architectural design interventions for alleviation housing inequality

Architectural design interventions significantly address housing inequity by concentrating on typology, segregation, centrifugation, and morphology. The study of different housing types and how they are arranged in space within a community is referred to as typology (Khalatbari, 2024). By understanding the various requirements of various demographics, architects can design housing solutions suitable for a wide range of family sizes and income levels. Mixed-use developments, for instance, which combine residential units with commercial spaces, have the potential to foster social integration and economic diversity within neighborhoods (Khalatbari, 2024). Throughout history, segregation in housing design has been responsible for perpetuating

inequalities by isolating marginalized communities from opportunities and resources that are essential to their survival. Architects can combat this trend by implementing inclusive design strategies encouraging social cohesion and accessibility. For instance, incorporating universal design principles into affordable housing projects ensures that people of all abilities can access and navigate their living spaces comfortably (Imrie and Street, 2011).

In architectural design, "centrifugation" refers to the decentralization of urban development to reduce the pressure placed on city centers and distribute resources more equitably (Marchini, 2020). A reduction in the concentration of poverty and an increase in social mobility for disadvantaged populations can be achieved by architects through the promotion of mixed-income housing developments in suburban areas (Marchini, 2020). This approach also promotes sustainable urban growth by reducing the negative impact on the environment and encouraging the efficient utilization of land. Morphological interventions aim to improve the livability of housing structures and promote the well-being of communities by focusing on the physical form and layout of housing structures (Sarkar and Bardhan, 2020). Architects can incorporate green spaces, pathways friendly to pedestrians, and communal facilities into residential designs to create vibrant neighborhoods that encourage social interaction and collective identity (Sarkar and Bardhan, 2020). Additionally, according to Madanipour (2018), the adaptive reuse of existing buildings has the potential to revitalize areas that have been abandoned, provide affordable housing options, and preserve cultural heritage. Architectural design interventions are vital to reducing housing inequality (Zallio and Clarkson, 2021). Architects can contribute to creating more equitable built environments that improve the quality of life for all residents by prioritizing community engagement, sustainability, and inclusivity in their projects (Zallio and Clarkson, 2021).

Building typology as an effective architectural intervention

The earliest studies to be organized into typologies at the building level date back to around 1800. "Recuiel et Parallèle des Edifices de Tout Genre, Anciens et Modernes" by Durand classifies architectural types in its large format pages with lovely illustrations (Zallio and Clarkson, 2021). Over 40 different kinds of buildings are depicted in 1,176 drawings, all organized by function. Quatremére de Quincey's 1789 "Encyclopédie" also summarizes structures categorized by their purposes (Luccarelli, 2016). Buildings serving specific purposes were meant to be designed according to these standard works (Madrazo, 1995). Nikolaus Pevsner also uses a function-based classification to teach an overview in his 1970 lectures. Research has emerged on categorizing structures based on building and floor plan shapes (Schneider, 1994). Classifying and arranging buildings based on their essential characteristics is known as building typology (Arora et al., 2021). When categorizing buildings, the building's function, form, or style is typically considered. The name is derived from the Greek words typos and logia, which collectively denote "a blow, dent, impression, mark, effect of a blow." The term "architectural" refers to a particular combination of a building's attributes that enables classifying and identifying structures into distinct form groups (Arora et al., 2021). A rectangular, box-like structure with a domed roof may characterize the residence's architectural design. The archetypal home style is a term that is frequently used to describe this design. Typology is undoubtedly unnecessary in architectural design, as not all residences are constructed this way (Pevsner, 2023). However, the types were developed for specific purposes and are now widely used. The post and lintel

construction, proposed as the foundation for constructing dwellings to ensure structural integrity, has been in use since antiquity. The apex of the roof sustains the remainder of the building against external weight influences such as precipitation and snow, uniformly dispersing the load onto the columns that uphold the entire edifice (Pevsner, 2023). Apartment buildings are generally designed as a series of residential units encircling a central core, as this configuration optimally utilizes space: infrequently used corridors and vertical circulation are situated internally. In contrast, all units benefit from external views and natural light (Pevsner, 2023).

Consequently, a typology establishes the function of the space and the optimal structural configuration for it. These types may vary in several aspects (Martínez-Rocamora et al., 2021). A home or group of residences can be constructed in several manners, contingent upon the suitability of the kind for the urban environment, the residents' lifestyle, or the specific climate conditions of the site. Townhouses, low-rise apartments, and detached residences are but a few examples; several others may exist. However, not every variety is considered a standard form. Typology is essential to architectural design because it gives architects a methodical way to think through and design buildings (Zikirov et al., 2021). Designers can better make decisions regarding spatial organization, material selection, circulation patterns, and aesthetic considerations when they thoroughly understand various building types within functional, stylistic, and formal frameworks (Zikirov et al., 2021). Typological studies support architects in responding creatively to modern challenges while inspiring historical precedents (Zikirov et al., 2021).

Conclusion

While there have been studies on housing and urban development in Nigeria, there has been little study on how architectural interventions can tackle the housing equity problem. Furthermore, there is limited research concerning how various building typological interventions affect equity in the Nigerian setting. Anierobi et al. (2023) propose that future research should prioritize investigating the characteristics of connections that would promote equal access to adequate housing and essential social services in informal settlements, emphasizing inclusivity and equity. Moreover, there is a substantial research gap in the body of knowledge regarding understanding the link between architectural typology and equality. One of the most significant research gaps is a dearth of thorough studies that examine how various construction typologies contribute to or impede fair access to housing, utilities, and resources in Nigeria. This circumstance makes it necessary to reexamine Nigeria's housing market in light of issues on home equity and the different types of construction designs. Against this background, this study assessed the performance of the typology as an architectural design intervention towards enhancing housing equity in slums and informal settlements in Nigeria.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

REFERENCES

[1] Aduwo, E.B., Edewor, P.A., Ibem, E.O. (2016): Urbanization and housing for low-income earners in Nigeria: A review of features, challenges, and prospects. – Mediterranean Journal of Social Sciences 7(3S1): 347-357.
[2] Alagba, O.S., Ugherughe, E.J., Egiugbo, R. (2023): Factors Militating Against Federal Government of Nigeria's Affordable Housing Delivery Programme. – Asian Social Science and Humanities Research Journal (ASHREJ) 5(2): 14-20.
[3] Anderson, J., Shiers, D. (2002): Green guide to specification. – BRE and Environmental Profiles 238p.
[4] Anierobi, C.M., Nwalusi, D.M., Efobi, K.O., Nwosu, K.I., Nwokolo, N.C., Ibem, E.O. (2023): Urban Housing Inequality and the Nature of Relationship Between Formal and Informal Settlements in Enugu Metropolis, Nigeria. – SAGE Open 13(3): 16p.
[5] Arora, M., Raspall, F., Fearnley, L., Silva, A. (2021): Urban mining in buildings for a circular economy: Planning, process and feasibility prospects. – Resources, Conservation and Recycling 174: 10p.
[6] Baumanova, M. (2022): Comparative Perspectives on (Pre) Colonial Urban Transformations. – In Urban Public Space in Colonial Transformations, Cham: Springer International Publishing 14p.
[7] Chileshe, N., Njau, C.W., Kibichii, B.K., Macharia, L.N., Kavishe, N. (2022): Critical success factors for Public-Private Partnership (PPP) infrastructure and housing projects in Kenya. – International Journal of Construction Management 22(9): 1606-1617.
[8] Dumreicher, H., Kolb, B. (2008): Place as a social space: Fields of encounter relating to the local sustainability process. – Journal of Environmental Management 87(2): 317-328.
[9] Gil Everaert, I. (2021): Inhabiting the meanwhile: Rebuilding home and restoring predictability in a space of waiting. – Journal of Ethnic and Migration Studies 47(19): 4327-4343.
[10] Ikudayisi, A.E., Odeyale, T.O. (2021): Designing for cultural revival: African housing in perspective. – Space and Culture 24(4): 617-634.
[11] Imrie, R., Street, E. (2011): Architectural design and regulation. – John Wiley & Sons 376p.
[12] Khalatbari, A. (2024): Correlation between the Built Environment and Sociology: A critical review of Residential Segregation and Social Housing Policy in Iran. – Preprint Organization 14p.
[13] Liu, Z., Yu, C., Qian, Q.K., Huang, R., You, K., Visscher, H., Zhang, G. (2023): Incentive initiatives on energy-efficient renovation of existing buildings towards carbon-neutral blueprints in China: Advancements, challenges and perspectives. – Energy and Buildings 296: 23p.
[14] Luccarelli, M. (2016): Interdisciplinarity in product design education: balancing disciplines to foster creativity. – In Fourth International Conference on Design Creativity, Atlanta, GA, Design Society 8p.
[15] Madanipour, A. (2018): Temporary use of space: Urban processes between flexibility, opportunity and precarity. – Urban Studies 55(5): 1093-1110.
[16] Madrazo, L. (1995): The concept of type in architecture: An inquiry into the nature of architectural form. – ETH Zurich 385p.
[17] Marchini, A. (2020): Urban water management and recycling: assessment of current practices and development of future economic projections. – Politecnico di Torino 231p.

[18] Martínez-Rocamora, A., Rivera-Gómez, C., Galán-Marín, C., Marrero, M. (2021): Environmental benchmarking of building typologies through BIM-based combinatorial case studies. – Automation in Construction 132: 17p.
[19] Ndeche, C.B., Ezeudu, C., Okafor, J.I. (2020): Assessment of Problems and Prospects of Residential Housing Development in Awka, Anambra State of Nigeria. – Tropical Built Environment Journal 7(1): 15p.
[20] Obayomi, A., Popoola, A., Medayese, S., Wahab, B. (2023): Examining liveability in the informal community of Kabawa, Nigeria. – Town and Regional Planning 82(1): 18-33.
[21] Ochedi, E.T. (2022): Simulation Study of Thermal Comfort in Residential Building Types: The Case of Lokoja, Nigeria. – International Journal of Energy and Environmental Research 10(3): 1-13.
[22] Odoyi, E.J., Riekkinen, K. (2022): Housing policy: An analysis of public housing policy strategies for low-income earners in Nigeria. – Sustainability 14(4): 27p.
[23] Olotuah, A.O., Bobadoye, S.A. (2009): Sustainable housing provision for the urban poor: a review of public sector intervention in Nigeria. – The Built and Human Environment Review 2(1): 51-63.
[24] Owamoyo, L., Tabibi, B. (2023): The Impact of Globalisation on Traditional Architecture in Nigeria: A Case Study of Lagos Island. – Advances in Applied Sociology 13(9): 636-650.
[25] Pevsner, N. (2023): A history of building types. – Princeton University Press 352p.
[26] Rikko, L.S., Gwatau, D. (2011): The Nigerian architecture: The trend in housing development. –
[27] Journal of Geography and Regional Planning 4(5): 273-278.
[28] Sarkar, A., Bardhan, R. (2020): Socio-physical liveability through socio-spatiality in low-income resettlement archetypes-A case of slum rehabilitation housing in Mumbai, India. – Cities 105: 18p.
[29] Saidu, A.I., Yeom, C. (2020): Success criteria evaluation for a sustainable and affordable housing model: A case for improving household welfare in Nigeria Cities. – Sustainability 12(2): 16p.
[30] Schneider, F. (1994): Measuring the size and development of the shadow economy. Can the causes be found and the obstacles be overcome? – Springer Berlin Heidelberg 19p.
[31] Shi, Q., Zuo, J., Huang, R., Huang, J., Pullen, S. (2013): Identifying the critical factors for green construction–an empirical study in China. – Habitat International 40: 1-8.
[32] Udoudoh, F.P., Bassey, L.E. (2021): Traditional building materials in housing construction: usage and maintenance strategy. – PM World Journal 10(4): 1-20.
[33] UN-Habitat (2010): The State of African cities 2010-governance, inequality, urban land markets. – UN-Habitat Web Portal 3p.
[34] Zallio, M., Clarkson, P.J. (2021): Inclusion, diversity, equity and accessibility in the built environment: A study of architectural design practice. – Building and Environment 206: 11p.
[35] Zikirov, M.C., Qosimova, S.F., Qosimov, L.M. (2021): Direction of modern design activities. – Asian Journal of Multidimensional Research (AJMR) 10(2): 11-18.