

AFROCENTRIC ARCHITECTURE FOR LOW-COST HOUSING DESIGN IN KANO, NIGERIA: EXPLORING OPPORTUNITIES

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ABSTRACT

Afrocentric architecture for low-cost housing is a sustainable, economic, and cultural solution that can be used to address the housing needs of low-income communities in Kano, Nigeria. Low-cost housing is a critical need in many developing countries, including Nigeria, where rapid urbanization and population growth have led to a shortage of affordable and sustainable housing options. This paper explores the concept of Afrocentric architecture for low-cost housing design in Kano Nigeria, with a focus on the sustainable, economic, and cultural benefits of this approach. The paper begins by providing background information on low-cost housing design in Kano Nigeria and discussing the importance of Afrocentric architecture in this context. The study employs a qualitative approach, case studies, interviews, and Observation, to identify key principles of Afrocentric architecture that can be incorporated into low-cost housing design in Kano, Nigeria. The limited integration of Afrocentric architecture principles in low-cost housing design in Nigeria has led to a disconnect between cultural heritage and contemporary design practices and hindered the potential economic, social, and environmental benefits of sustainable housing design. In addition, it discusses the economic benefits of Afrocentric architecture for low-cost housing design, including how it can create jobs, stimulate local economies, and reduce construction costs. The paper explores the cultural benefits of



Afrocentric architecture for low-cost housing design, including how it can preserve local culture and heritage, promote social cohesion and community building, and contribute to cultural development in Kano Nigeria. The study's findings provide important insights into the potential benefits of Afrocentric architecture for low-cost housing design in Nigeria and inform future design and policy decisions related to sustainable development, cultural preservation, and economic growth.

Keywords: *Afrocentric architecture, Cultural identity, Benefits, Kano Nigeria, Low-cost housing, Sustainability.*

INTRODUCTION

Housing is a basic need for every individual, and its provision has been a major challenge for many countries, including Nigeria (Jiboye et al., 2020). Nigeria has a population of over 200 million people, and there is a significant housing deficit, particularly in low-income communities (Adegoke et al., 2020). One of the approaches to addressing this challenge is the development of low-cost housing (Bredenoord, 2016). However, low-cost housing projects often fail to take into consideration the cultural and social needs of the communities they serve (Abdullahi, 2021). According to Olotuah et al. (2018), Low-cost housing is a critical need in many developing countries, including Nigeria, where rapid urbanization and population growth have led to a shortage of affordable and sustainable housing options. Housing shortages in Nigeria have resulted in poor living conditions, environmental degradation, and social and economic inequality (Bello et al., 2017). To address these challenges, there is a growing recognition of the importance of incorporating sustainable design principles and cultural heritage considerations into low-cost housing projects (Dukku, 2017). However, there has been limited exploration of how Afrocentric architecture principles can be integrated into low-cost housing design in Nigeria to support sustainable development, preserve cultural identity, and promote economic growth (Okwumabua, 2020). This study aims to fill this gap in knowledge by exploring the potential benefits of Afrocentric architecture for low-cost housing design in Kano, Nigeria, and identifying the challenges and opportunities associated with its implementation. Recent studies have highlighted the potential of Afrocentric Architecture as a

valuable design approach for promoting sustainable development, cultural heritage preservation, and economic growth in developing countries such as Nigeria. For instance, a recent study by (Okwumabua, 2020; Oye, 2021a), explored the potential of incorporating traditional African building materials and techniques into contemporary design practices, highlighting the importance of sustainability and cultural heritage preservation in low-cost housing design. Another recent study by Oye (2021b), emphasized the need for sustainable and culturally sensitive design and planning practices in addressing the housing needs of low-income communities in Nigeria.

These studies suggest that Afrocentric Architecture could provide a valuable design approach for low-cost housing design in Nigeria, promoting sustainable development and cultural preservation. However, the implementation of Afrocentric Architecture principles in low-cost housing design faces several challenges, including limited resources, lack of technical expertise, and competing interests and priorities. Addressing these challenges will require interdisciplinary collaboration between architects, urban planners, policymakers, and local communities to develop innovative and sustainable design solutions that reflect the unique cultural, social, and economic context of Kano, and other rapidly urbanizing areas in Africa. This study contributes to the literature on sustainable low-cost housing design, cultural heritage preservation, and urbanization in developing countries, and provides insights and recommendations for policymakers, urban planners, and architects in Nigeria and other rapidly urbanizing areas in Africa.

The study aims to contribute to the advancement of knowledge in the field of low-cost housing design and highlight the importance of cultural diversity in creating sustainable and livable housing solutions. The study also provides practical recommendations for policymakers, architects, and builders on how to integrate traditional building techniques and their sustainable, economic, and cultural benefits into contemporary low-cost housing design, while preserving the cultural heritage and identity of the community.

Objectives of the study are as follows:

- i. To explore the integration of Afrocentric architecture principles in low-cost housing design in Kano, Nigeria, and evaluate its potential economic, cultural, and environmental benefits.

- ii. To identify the opportunities associated with implementing Afrocentric architecture principles in low-cost housing design in Kano, Nigeria, including social, cultural, economic, and environmental factors.
- iii. To develop recommendations for incorporating Afrocentric architecture principles in low-cost housing design in Kano, Nigeria that support sustainable development, cultural preservation, and economic growth.

LITERATURE REVIEW

Low-cost housing has become an increasingly important issue in many developing countries, including Nigeria, where rapid urbanization and population growth have increased the demand for affordable housing (Ebekoziem et al., 2021; Ezeanah, 2021). Despite the efforts made by the Nigerian government and private sector to provide affordable housing, the current housing solutions have not been able to meet the demand, and many people continue to live in inadequate housing conditions, including slums and informal settlements (Ajayi et al., 2021; Atamewan et al., 2020). To address this challenge, there is a growing interest in integrating traditional building techniques into contemporary low-cost housing design, drawing on the cultural heritage and identity of the community (Labadi et al., 2021; Maina et al., 2018). Traditional building techniques are based on local knowledge and materials, and they have been developed over generations to meet the specific climatic, cultural, and economic conditions of the region (Maina et al., 2018). These techniques have been used in many regions of the world, including Africa, Asia, and Latin America, to create sustainable and cost-effective housing solutions (Ebekoziem et al., 2020). According to (Wang et al., 2020; Zhang et al., 2018), traditional building techniques were the primary means of providing affordable housing solutions for low-income families in Nigeria.

Contemporary low-cost housing design is a type of housing design that focuses on creating affordable and sustainable housing solutions for low-income families, it involves the use of modern building materials and construction techniques, as well as innovative design strategies to reduce the cost of construction and maintenance without sacrificing quality or comfort (Al-Haroun, 2015; Narendra et al., 2022). This involves the use of factory-built components that can be assembled on-site, reducing the time

and labor required for construction (Lodson et al., 2018). This technique can reduce waste and improve quality control, resulting in a more cost-effective and efficient construction process (Ebekozi et al., 2021). According to Amasuomo (2021), Another important feature of contemporary low-cost housing design is the use of energy-efficient and sustainable design strategies, this can include the use of passive solar design techniques, such as orienting the building to maximize natural light and heat, as well as the use of energy-efficient appliances, lighting, and heating systems (Fardous, 2019). According to (Adediran et al., 2020; Adegoke et al., 2020), using low-cost housing technologies can save up to 26.11% and 22.68% of the construction cost in comparison with traditional construction methods for walling and roofing respectively.

Afrocentric Architecture

Afrocentric architecture can be defined as a design approach that seeks to incorporate traditional African design elements and motifs into contemporary architectural styles (Asante, 2020). This approach emphasizes the use of local materials, building techniques, and cultural motifs to create buildings that reflect the region's identity, heritage, and values (Okwumabua, 2020). In Nigeria, Afrocentric architecture draws inspiration from the country's diverse cultural and historical heritage (Oye, 2021b). It incorporates elements of traditional architecture from different ethnic groups such as the Hausa, Yoruba, and Igbo, as well as contemporary design elements to create a unique and visually appealing building style (Adenaike et al., 2020).

According to (Asante, 2017), Afrocentric architecture in Nigeria also emphasizes sustainability, using local materials that are eco-friendly and energy-efficient. The buildings often feature natural ventilation, shading devices, and passive cooling systems that reduce the need for artificial lighting and air conditioning (Noma et al., 2022). Afrocentric architecture in Nigeria is not limited to rural or traditional buildings but has also been applied to urban contemporary buildings. Examples of such contemporary structures include Nike Art Gallery in Lagos, Arewa House in Kaduna, and Olumo Rock Tourist Complex in Abeokuta (Okwumabua, 2020). These buildings demonstrate how traditional African design elements and building techniques can be combined with modern materials and technology to

create functional, sustainable, and culturally relevant structures (Ezenagu, 2020). In conclusion, Afrocentric architecture in the Nigerian context is an important way to preserve cultural identity and heritage, while also creating functional and aesthetically pleasing buildings (Adamu, 2020). It serves as a reflection of the culture, values, and aspirations of the people of Nigeria (Muhammad et al., 2020).



Figure 1. Afrocentric Approach to Low-cost Housing

Source: Author

Sustainable low-cost housing design is an approach to designing and constructing housing solutions that are both environmentally sustainable and affordable for low-income communities (Bredenoord, 2016; Karim, 2021). This approach emphasizes the use of sustainable building materials, renewable energy sources, and energy-efficient design principles to create housing solutions that are both socially and ecologically responsible (Dukku, 2017). Sustainable low-cost housing design aims to reduce the carbon footprint associated with housing construction and operations while also addressing the needs and challenges of low-income communities (Aminudin et al., 2023; Olotuah et al., 2018). It involves a range of design strategies and techniques, including the use of locally sourced, renewable materials, passive cooling, and heating systems, rainwater harvesting, and waste reduction (Ismail et al., 2022).

By incorporating energy-efficient design principles and renewable energy sources, sustainable low-cost housing reduces the negative effects of housing construction and operations on the environment, such as energy consumption, water usage, and waste generation, as well as the long-term cost of ownership, lowering utility bills for residents (Lukuman et al., 2017). In order to improve indoor air quality and residents' health, Dorcas Mobolade et al. (2020) also place a strong emphasis on using non-toxic building materials and adequate ventilation. They also involve the neighbourhood in the design and construction process by encouraging neighbourhood ownership, pride, and participation. This meets the housing needs of low-income communities while promoting social equity and responsibility (Ji et al., 2021).

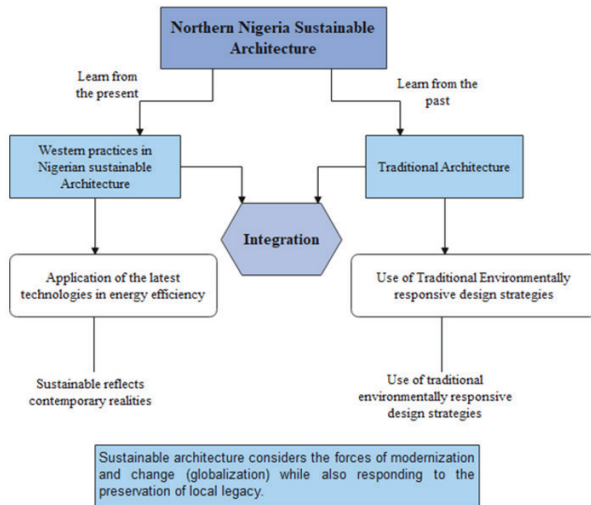


Figure 2. Northern Nigeria Sustainable Architecture

Source: Author

Cultural heritage and urbanization

Cultural heritage and urbanization are two interrelated concepts that reflect the relationship between the built environment and cultural identity (Harun et al., 2018). Cultural heritage refers to the tangible and intangible cultural assets of society, including buildings, monuments, artifacts, customs, and traditions, that are passed down from generation to generation (Harun et al., 2018). Urbanization, on the other hand, refers to the process

of population growth and the concentration of people in urban areas, resulting in the development of cities and towns (Oni-Jimoh et al., 2018). According to Dukku (2017), urbanization can have a significant impact on cultural heritage, as it often leads to the destruction or alteration of historic buildings, monuments, and neighbourhoods, as well as the displacement of communities and the loss of traditional practices.

The relationship between cultural heritage and urbanization is complex and multifaceted. On one hand, urbanization can help to preserve cultural heritage by providing resources for restoration and conservation efforts, as well as promoting cultural tourism and awareness (Rashid et al., 2021). Urbanization can also lead to the revitalization of historic neighbourhoods and the promotion of cultural identity (Oni-Jimoh et al., 2018). On the other hand, urbanization can also pose significant threats to cultural heritage, particularly in developing countries where rapid urbanization and population growth can lead to the destruction of historic buildings and neighbourhoods (Bikam et al., 2020). Urbanization can also lead to the displacement of communities and the loss of traditional practices, resulting in the erosion of cultural identity (Lodson et al., 2018). Therefore, urban planners, policymakers, and communities need to consider the cultural heritage of an area in the planning and development of urban areas. This can involve preserving historic buildings and neighbourhood's, promoting cultural tourism and awareness, and involving local communities in the development process to ensure the preservation of cultural identity (Isah, 2016).

Benefits of integrating traditional building techniques into Contemporary

The benefits of integrating traditional building techniques into contemporary low-cost housing design, such as sustainability, affordability, and cultural preservation. Sustainability in traditional building techniques are often based on locally sourced materials and knowledge that are well-suited to the local environment and resources (Lukiman et al., 2017). These techniques often incorporate features such as passive cooling and natural ventilation, which can reduce energy consumption and improve indoor comfort (Maina et al., 2018). According to (Maina et al., 2018; Palang et al., 2019), by integrating traditional building techniques into

contemporary low-cost housing design, the resulting housing solutions can be more sustainable and environmentally friendly. Low-cost housing is often associated with cost-cutting measures that can compromise the quality and durability of the housing (Aule et al., 2019). However, integrating traditional building techniques into low-cost housing design can reduce costs without compromising quality (Nnametu et al., 2020). Traditional building techniques often use locally sourced materials that are inexpensive and readily available, and they can be constructed with minimal equipment and labour (Gambo et al., 2021).

Cultural motifs are important aspects of cultural heritage and identity (Ikudayisi et al., 2019). By integrating these techniques and motifs into low-cost housing design, the resulting housing solutions can reflect the cultural identity and history of the community (Muhammad et al., 2020). This can promote a sense of place and cultural identity and preserve the community's cultural heritage for future generations. Health Benefits often incorporate features that improve indoor air quality and reduce the risk of respiratory diseases (Maina et al., 2018). For example, mud brick construction can help regulate indoor humidity levels, which can reduce the growth of mold and other indoor pollutants (Dorcas Mobolade et al., 2020). The resulting housing solutions can provide a healthier living environment for the community. Traditional building techniques often rely on local labor and materials, which can stimulate the local economy and create employment opportunities (Hasan et al., 2021). By promoting local resources and knowledge, traditional building techniques can also reduce dependence on external resources and promote self-sufficiency.

METHODOLOGY

This study employs a case-study approach as a research strategy within the framework of qualitative methodologies. The data collection process involves conducting interviews and observations to gather information from architects, builders, and community leaders involved in the state housing co-operation's Architecture Department. Additionally, community leaders residing in the surveyed areas provide valuable insights the survey data is being analysed by NVIVO (Coding). The selected housing estates for examination are the Danladi Nasidi Housing in Kumbotso local government

and Kundila Housing in Tarauni local government, both situated within the Kano metropolis. The interview protocol is designed to encompass five key aspects, namely architectural design, construction materials, spatial utilization, cultural advantages, and sustainability. By exploring these characteristics, the aim is to gain a comprehensive understanding of the advantages offered by the Afrocentric approach in the development of low-cost housing. Additionally, on-site observation is another method that is acceptable for this case-study research to collect data, and the data was then analysed using the layering method. The factors to consider are the façade treatment and spatial configuration (Interior and exterior).

To facilitate comprehensive discussions, all findings are organized and presented in a tabulated format. The collected data is then utilized to propose optimal design guidelines for Afrocentric approach to low-cost housing, aligning with the study's objectives. The selection of the interview sample size was justified by considering a range of architects involved in housing development, ensuring a diverse representation of perspectives. Additionally, both random and dependent categories were taken into account during the sampling process. The determination of the sampling size is a purposive sampling because is one of the oldest and famous low-cost prototypes, which emphasizes the appropriateness of a finite population size. Furthermore, the interviewees were selected based on their years of experience in housing development, ensuring a knowledgeable and experienced pool of participants. The interview questions primarily focused on Afrocentric architecture, with indicators developed from cultural values that encompass external and internal building features, contextual considerations, building envelope, site planning, as well as building layout and design. This approach was crucial in assessing whether the housing designs met the criteria of a conducive living environment that aligns with Afrocentric Architecture, as elucidated by scholarly sources from the literature review. However, it's important to note that the interview questions solely analysed the responses of architects and builders regarding the home environment and cultural values, excluding other aspects.

FINDINGS

This section discusses the findings gathered from interviews and observation on the

two selected case studies- Danladi Nasidi Housing Estate (CS1), Kundila Housing Estate (CS2). The interview was conducted referring to five main indicators of low-cost Housing, the benefits of Afrocentric architecture and compliance as well as the value of sustainable living and cultural benefits for low-income earners. These five key aspects, namely architectural design, construction materials, spatial utilization, cultural advantages, and sustainability in the two selected case study of low-cost housing architectural design comprising of four elements – respond to context, building envelope, site planning as well as building unit layout and design or not. The overall findings are outlined below, and the findings had carefully considered the architects and builders that are involve in Housing development. Since the discussion much focuses on whether the low-cost housing portray the Afrocentric approach to housing, and what is the best design proposal for low-cost housing that considers the role of cultural values -section 5 will elucidate this matter in detail.

Case-study 1 and 2

General Information of Participants

Case-Study 1&2 are among the most initiating projects by the Government to cater for civil servant that are in low-income bracket, The 2 cases were established more than 20 years ago in the year 1996. Interview was held with the director architecture unit at the Housing Cooperation and two other architects, two Builders that are engage in housing project within the state. Table 1. shows the particulars of respondents.

Table 1. Participant Table

ID	Designation	Qualification	Experience	Profession	Participation
A1	Director	Msc(NIA,ARCON)	23	Architect	Interview
A2	Chief Architect	Msc(ARCON)	17	Architect	Interview
A3	Chief Builder	Msc. (NIOB)	20	Builder	Interview
A4	Builder	Bsc	10	Builder	Interview

Source: Author

The interview was conducted with A1, the Director at the housing cooperation Table 1 shows that A1 have worked with case-study 1 &2: even though as of the time he was not the cooperation director but an architect that was involved in the housing development. He possesses a master’s degree and a fellow Nigerian institute of architects (NIA) and a member architects registration council (ARCON) and a cumulative working

Case 1&2: Architectural Design

The words ‘Cultural ‘Housing’ Hausa’ which shows the respondent A1 address the issue of Hausa culture in his interview Although this is a low-cost housing concept, it has already been developed and delivered to the people as owner occupier housing, with some units being rented out by the owners because they are unsuitable for habitation. As the study's goal is to expand knowledge in the area of low-cost housing design and emphasise the value of cultural diversity in developing sustainable and liveable housing solutions.

“As a director in the state housing cooperation that is involve in housing development the decision made was to have 1000 units of block of flat for low-income earners that represent the Hausa culture and will represent the regions cultural heritage by using some Hausa traditional elements in construction.”

(Respondent A1)

Construction Materials

In choosing construction materials for the design of low-cost housing it must be cost-effective, durable, and readily available.

“For this kind of construction that is built in mass an alternate building material is a game changer because it will make the interior more conducive for living. And painting should at least represent the light brown Hausa traditional mud colour”.

(Respondent A1)

Spatial utilization

It is important to provide communal spaces such as playgrounds, and social spaces where residents can interact and socialize. These spaces can help to foster a sense of community and provide a respite from the cramped living conditions.

“Space organization is an ultimate part of a building that should be reviewed, in Hausa culture women segregation is part of Islamic practice but unfortunately government fails to secure both housing living it so open without a fence”.

(Respondent A1)

Cultural advantages

Low-cost housing in Kano, must take cultural factors into account. A sense of community can be fostered, Kano's cultural legacy can be preserved, the quality of life for locals can be improved, it can be profitable, and it can show respect for local values. Housing units that reflect the local culture can do all of these things. Housing units that are economical, sustainable, and culturally acceptable for the people can be made by architects and designers by incorporating cultural factors into low-cost housing design.

“Looking into Case 1&2 Low-cost housing development may have upper hand in achieving the Afrocentric architectural approach to housing by in cooperating cultural elements, it will promote cultural diversity and social cohesion”. (Respondent A1)

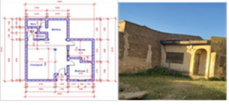

Sustainability

The environmental effect of affordable housing can be reduced while simultaneously enhancing the quality of life for the occupants if sustainability is considered during the design process.

“Materials selection such as Adobe, bamboo, wood and recycled material will have been solutions that are both environmentally sustainable and affordable for low-income communities It involves a range of design strategies and techniques, including the use of locally sourced, renewable materials, passive cooling, and heating systems, rainwater harvesting, and waste reduction”. (Respondent A1)

According to the responses, the low-cost housing round form generally symbolises their cultural heritage, which, coupled with the circular compounds, enables the people to move freely in their natural determination and desire to survive and live independent lives with some level of privacy in each household unit.

Table 2. Analysis of Observation Data

Architectural Elements	Technique of Analysis	Details & criteria of Analysis	Outcomes
<p>Spatial Organization</p>	<p>- An analysis of Danladi Nasidi Housing spatial organization is conducted by reviewing the plans taken from the blue prints and working drawings obtained from the architects and builders at the state housing cooperation. - Observation on-site is conducted to study the flow and movement within spatial layout.</p>	<p>To investigate the interior design of Danladi Nasidi Housing Estate. The research translated the internal areas into a cellular structure. Both of them referred to the structures as genotypes, which are described as collections of sequential spatial segments. The planned layout of both case studies 1 and 2 of the state low-cost housing (Danladi Nasidi and Kudila Housing Estate) is interpreted and mapped into cell structure or segmental diagrams beginning at the entrance to the main building in accordance with Hiler and Hansons technique. - To accomplish this, all roads, limits, and points that might intersect a space are drawn into syntactic structures together with the interior space of the low-cost home. - This will make it easier to analyse and decide if the spaces allow for the free movement of many different branding systems, known as (looped), or only one branching system, known as linear.</p>	<p>CS1</p>  <p>CS2</p> 

<p>Façade Treatment</p>	<p>- An analysis of Danladi Nasidi Housing exterior and interior façade is conducted by reviewing the plans taken from the blue prints and working drawings obtained from the architects and builders at the state housing cooperation. -Observation on-site is conducted to study the exterior and interior façade by examining the elements such as materials and finishes used for the facade.</p>	<p>To examine the state low-cost housing exterior façade, the method of the façade analysis developed by Shalth (2004) is an important as a key reference. Using her method to read and analyse the façade will help to prove or disprove whether or not the low-cost housing portrays Afrocentric architecture. Though Shalths (2004) study focused on reading the façade of villas in Amman, her method nevertheless seems to suits the present study on reading the façade of low-income housing, as her works also concerns investigating the meanings and composition of architectural forms. According to Shalths(2004) in other to analyse the meaning of the architectural façade one should look at the layers, since the façade is representing in layers of abstraction and cumulative complexity. The steps in layering are as follows Layer 1: The architectural composition of the façade is outlined in this first layer to clarify the basic structure Layer 2: this level enhances the articulation on the basic masses of the Facade so that the major alteration within or on the basic masses resulting in addition and subtraction. Layer 3: This stage reinforces the perception of variety across building. It began by adding basic piercing to the façade.</p>	<p>CS1</p>  <p>CS2</p> 
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Source: Author

CONCLUSION

This study delved into the benefits of incorporating Afrocentric architecture into affordable housing initiatives in Kano, Nigeria. The results underscored the importance of integrating cultural elements, utilizing locally sourced materials, maximizing space efficiency, and adopting sustainable construction techniques in the planning and development of low-cost housing ventures. The outcomes of this research hold significant implications for the Kano community in Nigeria. The inclusion of cultural features in the design of low-cost housing projects serves to preserve and promote cultural heritage and identity. Additionally, employing locally available materials in the construction process brings economic advantages to the local community. Optimal space utilization contributes to fostering healthy living conditions for the residents of low-cost housing projects. Furthermore, the adoption of sustainable practices contributes to environmental preservation while also reducing long-term maintenance costs. The significance of this research paper lies in its contribution to the fields of architecture and urban planning in Nigeria. The findings offer valuable guidance to policymakers, architects, and urban planners involved in designing and constructing culturally sensitive, sustainable, and economically viable low-cost housing projects.

The need for affordable housing in low-income cities like Kano, Nigeria, and elsewhere is addressed through Afrocentric design, which offers a possible solution. The results of this study are intended to stimulate additional investigation and the use of Afrocentric architectural concepts in low-cost housing efforts throughout Nigeria and other African countries.

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AUTHOR CONTRIBUTIONS

The design of the research, conducting interviews, and writing up the manuscript were collaborative efforts involving all authors. The

corresponding author specifically handled data cleaning, and tabulation processes. All authors have thoroughly reviewed and given their approval for the final manuscript, indicating their collective agreement on its content and findings.

CONFLICT OF INTEREST

The authors affirm that there are no conflicts of interest to disclose regarding the publication of this paper.

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Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
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Sekian, terima kasih.

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