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Exploring inhibiting factors to affordable housing provision in Lagos metropolitan city, Nigeria

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Different inhibiting factors have affected the need for affordable housing provisions to keep pace with the increase in urbanisation and population growth, leading to the non-availability of desirable, affordable housing goals for low-income earners. Unfortunately, these inhibiting factors continue to create challenges that affect affordable housing development for low-income earners. Hence, this study examines the inhibiting factors affecting affordable housing provisions using Lagos metropolitan city, Nigeria, as a case study exemplar. A quantitative research design was employed, using the survey to collect data from the target populations of low-income earners in Lagos, Nigeria, through a purposive sampling technique with a high response rate of 75.3%. Descriptive and exploratory factor analysis was conducted on the retrieved data and Cronbach's alpha test to determine data reliability and interrelatedness. Thirty-seven identified inhibiting factors of affordable housing provisions were clustered into seven components: problems with affordable land and security of tenure; socioeconomic constraints; problems with conventional materials and technologies; unpredictable internal factors; absence of innovative framework and supply chain; absent of community collaboration and external economic factors; and urbanisation factors. The implications of the study findings provide a better understanding of land tenureship, improved social inclusion, community-based stakeholder collaboration, standardisation of indigenous construction materials and technologies utilisation, and housing policy reforms to alleviate the shortage of affordable housing delivery in metropolitan cities. The study recommends successful implementations of affordable housing provisions hinged on an innovative housing framework and affordable supply chain through design, standardisation of non-conventional materials and technologies utilisation and social inclusion. The study's conclusion gives housing stakeholders, realtors, policymakers, and government agencies the ability to understand and implement strategies to overcome socioeconomic constraints, land security of tenure, and urbanisation factors to predict and improve affordable housing demand and supply in metropolitan cities.

KEYWORDS

affordable housing, housing shortage, inhibiting factors, low-income earners, metropolitan city, Lagos, Nigeria

1 Introduction

Population growth and housing needs are significant concerns in most developing countries like Nigeria (Adeshina and Idaeho, 2019). This is because the housing shortage is hitting hard on the populace (Owolabi et al., 2022a). Musewe (2012) and Defo (2014) concurred that Africa as a continent has the prospect of the highest population growth rates globally. The continent accounted for 20% of the world's slum dwellers, estimated at 200 million (The University of Dublin, Trinity College, 2015). This also represents that most African cities are densely populated, and about 75%–90% live in slums (United States Department of Housing and Urban Development, 2006). This condition further stirred housing shortage problems beyond Nigeria's border (Ezeigwe, 2015). It has become a common problem experienced in developing countries (Ibimilua and Ibitoye, 2015) and a global concern in which countries seek government interventions to solve this menace (Zanganah et al., 2013). Nevertheless, Ogunbayo et al. (2018) and Olufemi (2018) admitted that housing quality impacts national and community infrastructural development, reflecting individual users' identity, cultural values, desires, and future expectations.

Researchers have expressed different views concerning the problems of affordable housing provision in metropolitan cities in developed and developing countries, which helps put this study in context (Boamah, 2010; Ibimilua and Ibitoye, 2015; Adeshina and Idaeho, 2019; Ajayi, 2019; Ogunbayo B. et al., 2022; Owolabi et al., 2022a). In Nigeria, Omiunu (2014), Makinde (2014), Fitzgerald (2017), Adeshina and Idaeho (2019), and Ogunbayo B. et al. (2022) attributed the problems of affordable housing provision to high urban migration, population growth, and high cost of building materials. Olanrewaju, Anavhe, and Hai (2016) attributed issues with affordable housing shortage to inaccessible financial support, low capital and budgetary distribution, the problem of land security of tenure, ineffective policies and regulations, legal issues, and conflicting government legal requirements. However, Ajayi (2019) noted that the standard of living in metropolitan cities is becoming a problem with the constant spatial variation in population growth rate, making affordable housing provisions for middle and lower-income earners unsolved (Ajayi, 2019; Ogunbayo B. F. et al., 2022). This is because of the continuous influx of people to metropolitan cities to improve their standard of living and seek employment opportunities (Owolabi et al., 2022b).

However, the objective of the Nigerian housing policy focuses on making housing stock available and accessible for all citizens (Azevedo et al., 2010; Ajayi, 2019). The government's commitment to solving housing problems in developing countries, particularly Nigeria, has only resulted in insufficient and unaffordable housing unit provisions across the country (Ugochukwu and Chioma, 2015). In South Africa, Marutlulle (2021) linked the shortage of affordable housing provision to administrative tussle, unavailable land, population growth, urbanisation, and economic variables. This has led to poor access to basic amenities such as water supply, solid waste management, recurrent shack fires, security risks, and safety and health hazards (Marutlulle, 2021). In Ghana, Boamah (2010) shared the same view that the Ghanaian government cannot provide affordable housing due to unsuccessful housing interventions adopted over the years.

Likewise, issues such as population growth, urbanisation, a low supply of housing stocks to meet growing demand, high unemployment rates, and inflation rates also contributed to the housing crisis (Boamah, 2010). Hence, Ansah and Ametepey (2014) admitted that government and private housing interventions implemented in most developing countries are yet to improve the accessibility to affordable housing (Boamah, 2010; Ansah and Ametepey, 2014).

The imbalance between housing supply and demand is causing the affordability housing crisis in metropolitan cities. Metropolitan cities, as described by Solís Trapero et al. (2015), citing Scott (2011), are the progressive wheels of the global economy. Sud and Yilmaz (2013) described metropolitan areas as an economic base, and innovative solid capacity cities contribute a significant share of gross domestic product, job opportunities, high-level skills, and economic growth rate and income. Napoli (2017) posited that a high-density city centre characterises metropolitan cities, solid economic activities interconnected with mobility and communication infrastructures, and a continuous influx of people, commodities, information, capital, and investment. As a metropolitan city, Lagos is located in Southwestern Nigeria and is adjudged one of the most popular cities and major economic centres (Aliyu and Amadu, 2017). Lagos metropolitan city is a commercial hub for industrialisation and urbanisation, leading to the rise in rural-urban migration and housing shortage (Ogunde et al., 2017; Ogundipe et al., 2018). Idris and Fagbenro (2019) noted that Lagos metropolitan city has made various progress in the last decades, stimulating rapid economic growth, infrastructure and services and significantly reducing crime rates. The study by Ibimilua and Ibitoye (2015), Ugochukwu and Chioma (2015) and Idris and Fagbenro (2019) showed that Lagos, like any other metropolitan city in developing countries, is faced with different factors affecting affordable housing provision.

Nonetheless, the affordable housing concept has evolved over the decades, and researchers have expressed different views. For instance, Perera and Lee (2021) and Bangura and Lee (2021), citing Stone (2006), describe the concept of housing affordability as the capacity of households to rent or purchase housing within their income levels to achieve life aspirations. Bieri (2013:1) expressed different perspectives of housing affordability as follows: 1) house-price-to-income ratio or rent-to-income ratio, 2) the difference between non-housing expenditures to what is left after paying for housing, 3) income affordability distinguishing between "purchase affordability" (the ability to borrow funds to purchase a house), or "repayment affordability" (the ability to afford housing finance repayments). The concept has also been used to describe housing for the "poor" or low-income earners without being stigmatised (Ogunnaiké et al., 2013). Ogunbayo et al. (2018) noted that the concept also describes government intervention in providing essential facilities such as roads, electricity, schools, markets, and healthcare services to deliver affordable housing. It also represents a suitable dwelling unit where an individual spends less than 30% of monthly household income on rent (Man, 2011). Different factors also influence affordable housing provisions, and they include the income level, the cost of land, the cost of building materials, and the cost of labour for the construction (Katz et al., 2003; Okeleheim, 2011; Ogunnaiké et al., 2013; Odi and Nwaogazie, 2017; Bangura and Lee, 2021; Perera and Lee, 2021). Perera and Lee (2021) noted

that housing affordability (housing cost and household income) was developed based on the post-war Keynesian welfare state model, which might be insufficient to meet the 21st-century housing market.

Moreover, the need to understand and holistically identify the inhibiting factors affecting affordable housing provisions in metropolitan cities created a knowledge gap, leading to the non-availability of desirable, affordable housing goals for low-income earners in Lagos, Nigeria. [Adedeji's \(2023\)](#) study established the significance of affordable housing in addressing sustainable urban development to improve quality of life, social cohesion, and economic opportunities and reduce homelessness. [Reid \(2023\)](#) maintained that closing the gap in the provision of affordable housing requires identifying barriers hindering its design, construction, and delivery. Thus, this study assesses the inhibiting factors affecting affordable housing provisions using Lagos metropolitan city, Nigeria, as a case study exemplar. The study's objective was achieved through a literature review to establish the inhibiting factors of affordable housing provisions, followed by an exploratory factor analysis to explore the correlation and interrelatedness of each of the seven components of inhibiting factors of affordable housing provisions using the perspective of low-income earners in Lagos, Nigeria. Thus, the study findings are expected to assist stakeholders in housing provisions, professional institutions, financial institutions, realtors, and government policymakers in understanding strategies to overcome inhibiting factors of affordable housing provisions in metropolitan cities. Understanding these inhibiting factors would also stimulate the efficiency of the value chain supply of affordable housing provision and drive housing stakeholders, policymakers, and government agencies in housing policy formulation and initiatives towards attaining pillar one of Africa Agenda 2063 and sustainable development goals (SDGs) goal eleven in providing a high standard of living, quality of life, and wellbeing.

2 Literature review

The literature review aspect of this study provides a theoretical understanding supporting affordable housing provisions, which provides contextual knowledge on individual behaviour toward housing needs. The section also conceptualised the Nigerian National Housing Policy and Land Use Act, detailing the importance of policy formulation in housing provision for low-income earners in developing countries. Further, the review identified the inhibiting factors affecting affordable housing provisions from existing literature on the subject matter. This was discussed in three sub-sections to give further credence to the study.

2.1 Theoretical background supporting affordable housing provisions

The sociological label theory provides a theoretical understanding for this study ([Becker, 1963](#); [Lemert, 1967](#)). The label theory offers contextual knowledge based on self-identity or behaviour; it uses social status or characteristics as determinants for

labelling. The theory has been previously used in race or crime literature in addressing social classification, making some individuals more vulnerable to the label and susceptible to the aftermath of stigmatisation ([Becker, 1963](#); [Lemert, 1967](#)). In housing provision, affordability has also been labelled in expressing housing needs for the "poor" or low-income earners without being stigmatised ([Ogunnaike et al., 2013](#)). The sociological label theory in the context of this study is used to represent affordable housing provisions for low-income earners. Housing provisions in developing countries have taken on a new dimension over the years, with different innovative frameworks that help to label the classes of people and the housing types that represent their status in society ([Adegoke and Agbola, 2020](#)). For example, affordable housing is often labelled in the context of the housing market concerning the buying cost, rental value of the housing stock, or material applications ([Katz et al., 2003](#)). In the United Kingdom, local authorities linked affordable housing to local income levels; house or rental prices are grouped according to household types with provisions for specific eligible households whose housing needs cannot be met by the housing market ([Okeleheim, 2011](#)).

The demand for affordable housing depends majorly on population growth and urbanisation. [Gopalan and Venkataraman \(2015\)](#) contend that the progressive rate of urbanisation and population growth have a consequence on metropolitan cities. This has led to land and housing shortages, congested transit, and inadequate infrastructural facilities: water, power, and recreation centres ([Gopalan and Venkataraman, 2015](#)). Affordable housing has good linkages that balance human social-economic attributes. [Gopalan and Venkataraman \(2015\)](#), citing [Rohe and Stegman \(1994\)](#), argued that affordable housing provisions create access to adequate education, healthcare, perceived control, and satisfaction. [Mueller and Tighe \(2007\)](#) indicated that affordable housing is also linked to education, reduced homelessness, and health benefits to the larger community. In their study, [Gopalan and Venkataraman \(2015\)](#) attributed the benefit of affordable housing provisions in metropolitan cities to its economic growth drivers to attract and maintain workers that could drive economic success ([Gopalan and Venkataraman, 2015](#)). However, [Wetzstein \(2017\)](#) noted that housing costs rise faster than the user's earnings. Thus, [Adegoke and Agbola \(2020\)](#) maintained that affordable housing indicates a balance or creates an imbalance in economic growth.

2.2 Overview of Nigerian national housing policies

Housing policy is enacted by government laws for administrative regulations and practices, which directly and indirectly affect housing availability and delivery to end users ([Ibimilua and Ibitoye, 2015](#); [Olufemi, 2018](#):114). The Nigerian National Housing Policy 1991 aimed to solve housing problems by making decent shelters available and affordable to all Nigerians. The policy considers freedom, justice, equity, authority, and public interest in housing delivery. The fundamental issues raised in the Nigerian National Housing Policy include land ownership, housing finance, construction, and delivery. Above all, a housing policy

requires a strategy to enforce the purpose of the intended action programmes (Ibimilua and Ibitoye, 2015). Ibimilua and Ibitoye (2015), citing Lawal (1997:139), posited that a comprehensive sustainable national housing policy requires government roles to look beyond planning and control, land, investment, construction and occupancy aspects of housing production. The focus must include specific problems involving land use, plans and controls, credit and financial aids, subsidies to low-income groups, rent control, slum clearance and relocation. The Nigerian National Housing Policy 1991 contained an introduction, goals and objectives, institutional framework for housing delivery, land and settlement development policy, housing finance, building materials and construction costs, low-income housing, mobilising private sector participation, and monitoring and evaluation.

As part of the strategies to realise the goals of the Nigerian national housing policy, various institutions were empowered under the policy, including the Federal Mortgage Bank of Nigeria, providing loans for housing research, construction, and delivery. The Standard Organisation of Nigeria (SON) standardised building materials to ensure the quality of housing delivered. The Nigerian Building and Research Institute was empowered to conduct adequate research into various alternative materials for housing construction and delivery in Nigeria. Other instituted organisations were the Real Estate Development Association of Nigeria (REDAN) and the Building Materials Producers Association of Nigeria (BUMPAN). The Nigerian national housing policy promotes collaboration and participation among non-governmental, governmental agencies, and community-based organisations in housing provision and delivery, emphasising using indigenous building materials. However, Ibimilua and Ibitoye (2015) attributed the failure of Nigeria's national housing policy to poor administration, inadequate funding systems, inadequate housing budget/finance, government miss-priorities and insufficient infrastructural amenities. Olufemi (2018) postulates that global urbanisation in metropolitan cities in developing countries is due to increased economic hubs and the need for liveable and affordable housing. However, Ajayi (2019) maintained that the Nigerian housing policy could not address the issue of housing affordability because the policy was built upon the tenet that the government would provide houses for all citizens. In addition, Odoi and Riekkinen (2022) noted that the housing policies under various ministries between 1991–2020 emphasised seven key policy strategies to strengthen affordable housing delivery. These include funds, schemes, governments, implementation, development, land, and rurality. Odoi and Riekkinen (2022) concluded that the existing housing policy strategic theme does not equate to affordable housing provision and affordability for low-income earners. However, activating and implementing strategic themes could promote affordable housing development.

2.3 Perceived inhibiting factors of affordable housing

Globally, there are several factors inhibiting affordable housing provision. The government policy on the Land Use Act makes land and other housing inputs inaccessible (UN-HABITAT, National Trends in Housing Production Practices, 2006). Ibem and

Azuh (2011) traced these factors to the weak socio-political climate and failed institutional frameworks of Nigeria's housing policy. Olanrewaju, Anavhe, and Hai (2016) attributed the problem of affordable housing provisions to economic instability, housing policies, lack of legislation, legal crises, market conditions, and the construction industry. Ajayi (2019) concurred that the housing policy in Nigeria had not addressed the housing needs of the populace because the housing policy placed absolute responsibility on the government to provide housing for all citizens. Archer (2022) admitted that the organisations in which housing ownership and control are vested are affected by organisational form, internal rules and regulatory activity, and unique roles of residents/users, which influence the housing rent or prices. Thus, it is unclear whether housing affordability is a product of form and functions or other factors (Archer, 2022).

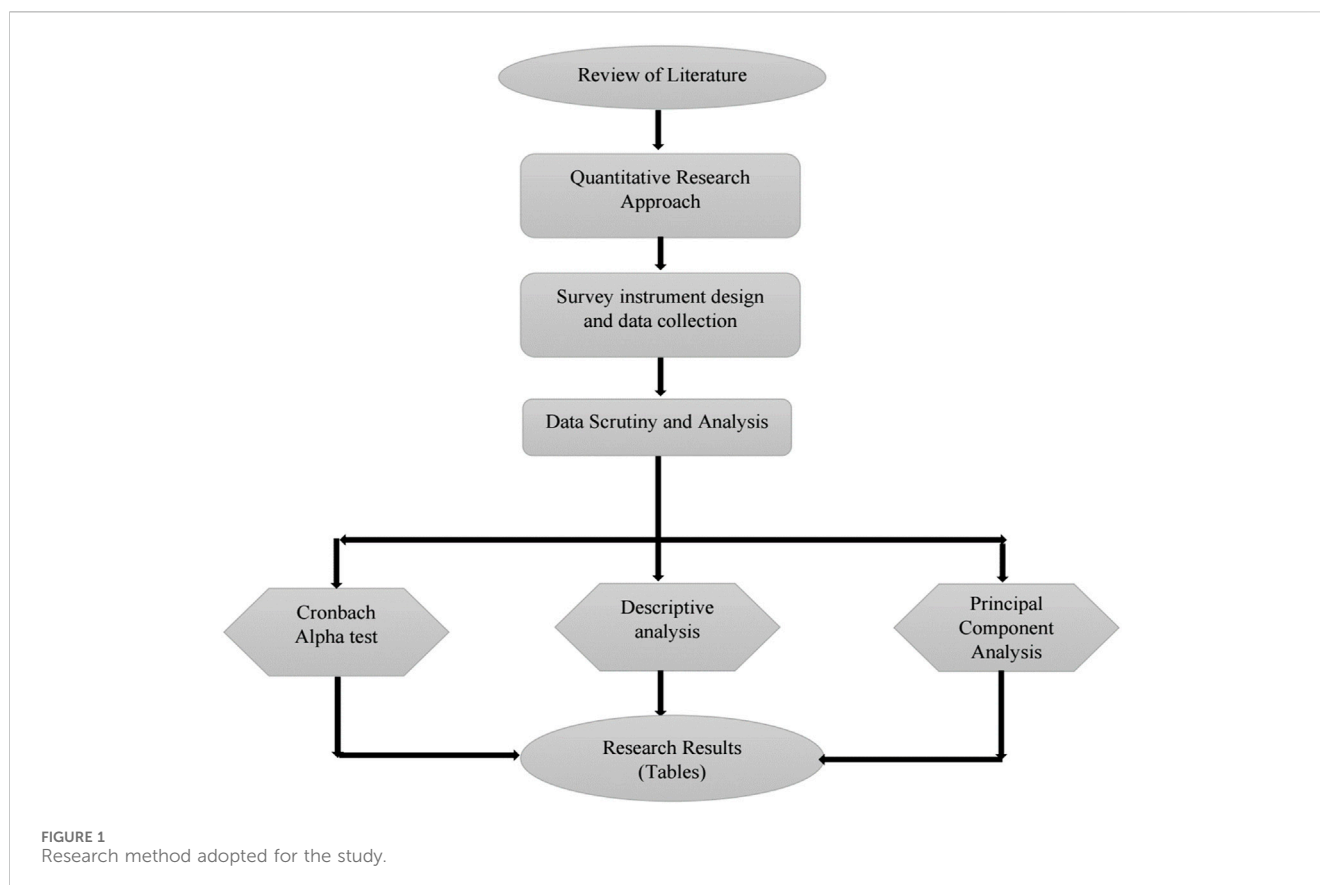
According to National Housing Policy (1991) and Gulghane and Khandve (2015), building materials account for more than half of the total housing production costs. Iwuagwu and Eme-anele (2012) conceived the high cost of using conventional building materials for housing production. Construction stakeholders play a significant role in specifying materials selection and standardisation for the housing project (Ogundipe et al., 2020a). The price of the housing stock is influenced by the choice of building materials and technologies, poor promotion of security of tenure, insufficient affordable land, and poor infrastructure and service (Ugochukwu and Chioma, 2015). Ugochukwu and Chioma (2015) noted that most housing developers and intending owners insist on using conventional building materials and technologies in Nigeria. Ogundipe et al. (2020b) noted that non-conventional building materials could be developed from agricultural and marine waste to reduce the cost of housing production. To this end, Ugochukwu and Chioma (2015) argued that the unacceptance of local materials and technologies affects affordable housing provision; most end users have inadequate knowledge about the performance of alternative building materials (Ogundipe et al., 2021). Shen et al. (2019) opined that lack of financial will, poor economic incentives, and ineffective legislation enforcement hindered housing affordability. Affordable housing provisions require end users' input to meet their housing goals and quality delivery (Ogunbayo et al., 2021).

Oyewole (2010) noted that high interest rates and delays in allocating cooperative multipurpose society loans also limit the cooperative member's access to the required housing fund. Baqutaya, Ariffin, and Raji (2016) noted that housing policy regarding housing loan interest rates and the high cost of housing are the major factors militating against affordable housing provision. Ghaedrahmati and Shahsavari (2019) highlighted some affordable housing problems, including lack of affordable housing, transportation, Tehran's air pollution, lack of health services, and increasing land prices and rent. Patel and Padhya (2021) opined that faulty housing regulations, inadequate low-cost green technologies, short supply chains, inadequate information, flawed construction processes, and high cost of sustainable practices affect affordable housing provision. Gopalan and Venkataraman (2015) studied affordable housing provision from the perspective of land, finance, and urban utilities/amenities by interviewing stakeholders. The study identified the problems of affordable housing provision: rising cost, regulatory

TABLE 1 Inhibiting factors of affordable housing provisions.

Inhibiting factors of affordable housing	Authors
High cost of conventional building materials	Iwuagwu and Eme-anele (2012), Gulghane and Khandve (2015)
Low government housing budgetary distributions	Ibimilua and Ibitoye (2015), Olanrewaju et al. (2016), Ansah and Ametepey (2014)
Unsuccessful government housing intervention	Ansah and Ametepey (2014), Alhajri (2022), Adedeji (2023), Reid (2023)
Inadequate government support of infrastructural allocation	Ibem and Azuh (2011), Olanrewaju et al. (2016)
Non-acceptance of local construction materials	Ugochukwu and Chioma (2015), Ezennia (2022)
Inadequate innovative designs and technologies	Gopalan and Venkataraman (2015), Saidu and Yeom (2020)
Reliance on imported construction materials	Ugochukwu and Chioma (2015)
Low acceptance of housing innovation	Gopalan and Venkataraman (2015), Ugochukwu and Chioma (2015), Gulghane and Khandve (2015)
Ineffective maintenance management	Ihuah et al. (2014)
Land location outskirts of the town	Gopalan and Venkataraman (2015)
Increase in foreign workforce	Alhajri (2022)
Poor funding for local construction materials research	Ugochukwu and Chioma (2015), Ezennia (2022)
Insufficient financial income of low-income households	Olanrewaju et al. (2016), Adedeji (2023), Reid (2023)
Inadequate mortgage schemes	Olanrewaju et al. (2016)
Rural-urban migration	Ogundipe et al. (2018), Ogundipe et al. (2021), Adedeji (2023), Reid (2023)
High cost of securing land in a choice area	Ugochukwu and Chioma (2015)
Social exclusion of essential facilities	Ogunbayo et al. (2021)
Poor national minimum wage structure	Okeleheim (2011), Ogunnaike et al. (2013), Oda and Nwaogazie (2017)
Profligacy, bribery and overpricing of contract sums	Ihuah et al. (2014)
Stigmatization of affordable housing dwellers	Adegoke and Agbola (2020), Ogunnaike et al. (2013)
Developers strong profit-driven mentality	Olanrewaju, et al. (2016)
Lack of security of tenure	Ugochukwu and Chioma (2015)
High inflation and foreign exchange	Boamah, 2010; Ansah and Ametepey (2014)
Communities' poor participation in housing development	Olanrewaju et al. (2016), Adedeji (2023), Reid (2023)
High population growth	Fitzgerald (2017), Adeshina and Idaeho (2019), Marutlulle (2021)
Insufficient supply of affordable infrastructure	Patel and Padhya (2021), Ezennia (2022)
The problem of land rights and ownership	Ghaedrahmati and Shahsavari (2019)
Inadequate innovative housing framework and supply chain	Gopalan and Venkataraman (2015), Saidu and Yeom (2020)
Inadequate housing standards and legislation	Ibem and Azuh (2011), Olanrewaju et al. (2016), Archer (2022)
Inadequate execution strategies	Olanrewaju et al. (2016), Adedeji (2023), Reid (2023)
Poor housing policy implementation	Ibem and Azuh (2011) Olanrewaju et al. (2016), Archer (2022)
Low housing priority from successive governments	Boamah (2010), Ansah and Ametepey (2014), Marutlulle (2021)
Lack of rent and mortgage price control	Ibimilua and Ibitoye (2015), Archer (2022)
The problem of land speculators	Babalola and Hull (2019)
High mortgage interest rate	Oyewole (2010), Boamah (2010), Ansah and Ametepey (2014)
Low investment in public housing	Boamah (2010), Ansah and Ametepey (2014), Marutlulle (2021)
Inadequate qualified construction managers and artisans	Olanrewaju et al. (2016)

Source: Author's compilation (2023) as reviewed from the literature.



constraints, tiling issues, scarcity of marketable land and shortage of land, lack of rural housing, lack of housing innovation, lack of affordable construction technology, higher floor index, and customer preference.

Additionally, [Alhajri \(2022\)](#) highlighted the challenges facing affordable housing delivery in the Kingdom of Saudi Arabia as follows: the high price of residential land, high construction cost, high urbanisation rate, reduction of government housing budget, increase in the foreign labour force, new household formation, and difficulties in optioning housing mortgage and loans. [Babalola and Hull \(2019\)](#) observed that the inherent problem and poor implementation of the Land Use Act of 1978 had affected the Land Act to fulfil its goals, and the rural and low-income earners are mostly affected. The study attributed the problem with securing land in Nigeria to the complex process of securing the title of the land, land speculators, high rates/cost of land, and formal land registration not in the interest of the low-income earners. [Oluwatayo, Omowunmi, and Ojo \(2019\)](#) added that bureaucratic bottlenecks, high land registration costs, lengthy registration procedures, and inconsistent policy regimes affect land market development in Nigeria.

[Oyewole \(2010\)](#) noted that flexibility in accessing cooperative housing funds would increase access to affordable housing production more than the National Housing Fund (NHF). [Saidu and Yeom \(2020\)](#) postulated that affordable housing provisions required innovative design techniques, materials quality performance, energy conservation consideration, building orientation, and positioning to improve the housing situation. [Ihuah, Kakulu, and](#)

[Eaton \(2014\)](#) attributed the failure of affordable housing to low quality, ineffective housing management, time and cost overruns, poor estate, project management, and corruption in housing delivery. However, [Ezennia \(2022\)](#) posited that the problem with affordable housing is beyond financial problems but lacks sustainability practices; though researchers often advocated for sustainable housing, its uptake in Nigeria is deficient. Hence, the various views expressed by researchers on inhibiting factors of affordable housing that often affect low-income earners in metropolitan cities are highlighted in [Table 1](#).

3 Research methods

The study assesses the inhibiting factors affecting affordable housing provisions using Lagos metropolitan city, Nigeria, as a case study exemplar. The study used a quantitative approach to see the perspective of low-income earners on the subject matter, as illustrated in [Figure 1](#). According to [Apuke \(2017\)](#), quantitative research methods describe and analyse phenomena unbiasedly using mathematical, statistical, or numerical data. The quantitative research approach uses a deducible way to connect theory and research, using structured questionnaires, voting polls, survey studies, or computational techniques to alter or validate existing statistical data ([Akinradewo et al., 2020](#)). Adopting a quantitative research approach in this study aids the generalisation of research findings based on data collection and analysis in the study area ([Eyisi \(2016\)](#)). It further allows researchers to establish relationships, test

TABLE 2 Demographic information of the respondents.

	Frequency	Percentage
Respondents age		
25–35 Years	38	34
36–45 Years	48	42
46–55 Years	17	17
56 Years Above	7	7
Total	113	100
Respondents occupation		
Government workers	37	33
Entrepreneurs	20	18
Private sector workers	33	32
Others	23	20
Respondents annual income		
0–#250,000.00	40	45
#250,000–#500,000.00	31	35
#500,000–#750,000.00	19	21
#750,000–#1,000,000.00	8	10
Above #1,000,000.00	2	2
Respondents family size		
1–3 people	21	18
3–6 people	45	40
6–9 people	43	38
Above 9 people	4	3
Respondents residence status		
Self-owned	31	28
Rented	44	39
Living with friends and family	38	33

hypotheses, and determine the opinions of a large population compared to the qualitative research approach (Eyisi, 2016). The choice of Lagos, Nigeria, was based on its commercial hub for industrialisation, leading to the rise in rural-urban migration (Ogunde et al., 2017). A purposive sampling method was adopted for the field survey to collect data from the targeted population of low-income earners, Government workers on levels 1–6, entrepreneurs, private sector workers and others (domestic staff, drivers and artisans) within Lagos metropolitan city. Purposive sampling is a non-probability sampling technique that allows a representative sample using a subjective method (Patton, 2001). Zhao, Hwang, Pheng-Low, and Wu (2015) posited that a non-probability sample could be adopted when the research sampling frame is unknown. Wilkins (2011) and Ezennia (2022) maintained that non-probability sampling allows the selection of respondents willing to participate in a survey when a random sampling method

could not be used to choose respondents. Hence, through a purposive sampling strategy, a sample size of 150 participants with annual income levels of $\text{₦}250,000 \leq X \leq \text{₦}1,000,000$ comprises 50 Government workers on levels 1–6; 25 entrepreneurs; 40 private sectors; and 35 others (domestic staff, drivers and artisans) were selected.

Before designing the research instrument for data collection, an extensive review of extant literature was conducted in line with the label theory to identify variables that measure the research objective. Hence, the survey questionnaire was designed based on a five-point Likert scale of 5 = highly significant, 4 = significant, 3 = moderately significant, 2 = less significant, and 1 = insignificant on the 37 identified inhibiting factors of affordable housing provisions. The survey questionnaire was physically administered to the respondents, and 113 completed copies were retrieved from the 150 participants, representing a 75.3% response rate falling within the (Moser and Kalton, 1999) specification. The data obtained from the study were analysed using IBM SPSS Statistic V28. Descriptive statistics (percentages, mean, and standard deviation) and the Kruskal-Wallis were used to compare respondents' annual income with the inhibiting factors of affordable housing provision in Lagos metropolitan city.

According to Pallant (2016), Ade-Ojo and Awodele (2020), Ejidike, Mewomo and Anugwo (2022), Kruskal-Wallis H is a non-parametric test used to compare variance in the mean scores on the continuous variables based on the survey participants responses at 95% significant value. This is followed by exploratory factor analysis (EFA) to analyse the respondents' perceptions of the identified factors in line with the study's objectives. Ledwaba (2012) describes descriptive analysis as using frequency and percentiles for the respondents' demographic information. Ezennia (2022) describes EFA as a statistical analysis tool that eliminates the high tendency of interrelatedness or severe autocorrelation among the variable factors to produce orthogonal findings that are reliable and stable. It helps point out the relationship structure between the respondents and each variable; however, the data set must have multivariate and univariate normality (Pallant, 2016). As Yong and Pearce (2013) noted, using EFA in this study allows determining correlation patterns within the dataset to extract the variables into the different factor components. The data reliability was checked using Cronbach's alpha because it measures the scale interrelatedness of variables in a test by considering the same construct of the variables. Pallant (2016) noted that a value of 0.6 is required for the coefficient of a scale using Cronbach's alpha. The data collected returned Cronbach's alpha value of 0.923, justifying that the data collection instrument is reliable and that the responses obtained are valid.

4 Results and discussion

4.1 Respondents' demographic characteristics

As indicated in Table 2, the respondents' demographic information comprises their age, occupations, annual income, family sizes, and residence status. Most respondents, 42% (48), are 36–45%, 34% (38) fall within the age bracket of 25–35 years, 17% (17) age range from 46–55 years, and only 7%

TABLE 3 Descriptive analysis of inhibiting factors of affordable housing provision.

Inhibiting factors of affordable housing	Mean	Std. D (σ)	Rank	Chi-square	Asymp-Sig
Land location outskirts of the town	4.28	0.69	1	13.484	0.009
High cost of conventional building materials	4.14	0.84	2	10.060	0.039
Stigmatization of affordable housing dwellers	4.11	0.84	3	7.281	0.122
Lack of security of tenure	4.09	0.79	4	8.219	0.084
High inflation and foreign exchange	4.06	0.84	5	5.447	0.244
Low housing priority from successive governments	4.04	0.89	6	13.643	0.009
Low government housing budgetary distributions	4.04	0.83	6	9.930	0.042
Inadequate innovative housing framework and supply chain	4.01	0.87	8	6.500	0.165
Low acceptance of housing innovation	4.01	0.90	8	2.552	0.063
Non-acceptance of local construction materials	3.97	0.89	10	5.005	0.287
Increase in foreign the workforce	3.97	0.78	10	6.087	0.193
The problem of land rights and ownership	3.96	0.84	12	3.236	0.519
Poor funding for local construction materials research	3.96	0.83	12	6.743	0.150
Lack of rent and mortgage price control	3.95	0.91	14	14.777	0.050
Developers strong profit-driven mentality	3.95	0.82	14	5.280	0.260
Reliance on imported construction materials	3.94	0.87	16	8.096	0.088
Inadequate government support of infrastructural allocation	3.93	0.91	17	3.503	0.477
The problem of land speculators	3.91	0.82	18	10.262	0.036
Rural-urban migration	3.91	0.76	18	7.037	0.134
Insufficient supply of affordable infrastructure	3.90	0.77	20	5.391	0.249
Inadequate innovative designs and technologies	3.90	0.81	20	2.509	0.643
Communities' poor participation in housing development	3.89	0.75	22	3.902	0.419
Inadequate housing standards and legislation	3.89	0.91	22	6.366	0.173
Inadequate execution strategies	3.88	0.88	24	8.255	0.020
High mortgage interest rate	3.88	0.85	24	13.838	0.008
Ineffective maintenance management	3.87	0.86	26	4.516	0.341
Unsuccessful government housing intervention	3.87	0.89	26	8.310	0.081
High population growth	3.87	0.85	26	5.165	0.271
Insufficient financial income of low-income households	3.85	0.90	29	4.396	0.355
Poor housing policy implementation	3.84	0.91	30	11.668	0.020
Profligacy, bribery and overpricing of contract sums	3.81	0.90	31	3.874	0.423
High cost of securing land in a choice area	3.80	0.88	32	1.937	0.747
Inadequate mortgage schemes	3.79	0.92	33	6.275	0.180
Inadequate qualified construction managers and artisans	3.73	0.92	34	7.210	0.125
Social exclusion of essential facilities	3.69	0.91	35	7.171	0.127
Low investment in public housing	3.66	0.91	36	5.403	0.248
Poor national minimum wage structure	3.65	1.01	37	3.509	0.477

(7) are above 56 years. Likewise, 33% (37) of the respondents are level 1–6 government workers, followed by 32% (33) that work in private sectors; 18% (20) are entrepreneurs, and the other 20% (23) are individual workers comprising drivers, domestic staff, and artisans. The annual income of 45% (40) of the respondents is below #250,000; while 35% (31) earn an annual income between #250,000–#500,000. 2% (19) earn between #500,000 and #750,000 per annum, 10% (8) earn between #750,000 and #1,000,000 per annum, and only 2% (2) earn above #1,000,000 per annum. The information gathered from Table 32 shows the family size of the respondents. 40% (45) have a family size of 3–6 people, 38% (43) have a family size of 6–9 people, followed by 18% (21) have a family size of 1–3 people, and only 3% (4) have a family size above nine people. 39% (44) of the respondents live in a rented apartment, while 33% (38) squat with friends and family, and only 28% (31) live in their own houses.

4.2 Descriptive analysis of inhibiting factors of affordable housing

The descriptive analysis of the inhibiting factors of affordable housing provision determines low-income earners' opinions based on their knowledge and agreement with the survey questionnaire using the mean score (MS) and standard deviation (σ) ranking presented in Table 3. The land location outskirts of the town ranked first with MS 4.28; (σ) 0.69; the high cost of conventional building materials ranked second with MS 4.14; (σ) 0.84; stigmatisation of affordable housing dwellers ranked third with MS 4.11; (σ) 0.84; lack of security of tenure ranked fourth with MS 4.09; (σ) 0.79; and high inflation and foreign exchange ranked fifth with MS 4.06; (σ) 0.79. Low housing priority from successive governments with MS 4.04; (σ) 0.89; and low government housing budgetary distributions with MS 4.04; (σ) 0.83 ranked sixth; Inadequate innovative housing framework and supply chain with MS 4.01; (σ) 0.87 and low acceptance of housing innovation with MS 4.01; (σ) 0.90 were ranked eighth. Non-acceptance of local construction materials with MS 3.97; (σ) 0.89 and increase in the foreign workforce with MS 3.97; (σ) 0.78 were ranked 10th, respectively. Likewise, the problem of land rights and ownership with MS 3.96; (σ) 0.84, and funding for local construction materials research with MS 3.96; (σ) 0.83, ranked 12th; lack of rent and mortgage price control with MS 3.95; (σ) 0.91, and developers strong profit-driven mentality with MS 3.96; (σ) 0.82, ranked 14th; reliance on imported construction materials with MS 3.95; (σ) 0.87 ranked 16th; inadequate government support of infrastructural allocation with MS 3.93; (σ) 0.91 ranked seventh; the problem of land speculators with MS 3.91; (σ) 0.82 and rural-urban migration with MS 3.91; (σ) 0.76, ranked 18th; insufficient supply of affordable infrastructure with MS 3.90; (σ) 0.77, and inadequate innovative designs and technologies with MS 3.90; (σ) 0.81, ranked 20th.

Consequently, communities' poor participation in housing development with MS 3.89; (σ) 0.75, and inadequate housing standards and legislation with MS 3.89; (σ) 0.91, ranked 20-s; inadequate execution strategies with MS 3.88 (σ) 0.88 and high mortgage interest rate with MS 3.88; (σ) 0.85, ranked twenty-fourth; ineffective maintenance management with MS 3.87 (σ) 0.86, unsuccessful government housing intervention with MS 3.87; (σ)

0.89, and high population growth with MS 3.87; (σ) 0.85, ranked twenty-sixth; insufficient financial income of low-income households ranked twenty-ninth with MS 3.85; (σ) 0.90; and poor housing policy implementation ranked 30th with MS 3.84; (σ) 0.85. However, the seven inhibiting factors least ranked thirty-first to thirty-seventh were profligacy, bribery and overpricing of contract sum with MS 3.80; (σ) 0.90; high cost of securing land in a choice area with MS 3.80; (σ) 0.88; inadequate mortgage schemes MS 3.79; (σ) 0.92; shortage of qualified construction managers and artisans ranked thirty-fourth with MS 3.73; (σ) 0.92; social exclusion of essential facilities with MS 3.69; (σ) 0.91; low investment in public housing with MS 3.66; (σ) 0.91; and poor national minimum wage with MS 3.65; (σ) 1.01. Hence, the findings of the descriptive analysis indicated that all the identified inhibiting factors affecting affordable housing provision based on the perspective of low-income earners have a mean score above 3.65. According to [Opawole and Jagboro \(2016\)](#), an MIS value of 3.50 indicates the significance of the identified inhibiting factors of affordable housing provision in Lagos metropolitan city.

The study tests the significant difference between the annual income of low-income earners and the inhibiting factors affecting affordable housing provision in Lagos metropolitan city, Nigeria. The Kruskal-Wallis H findings of the thirty-seven identified inhibiting factors of affordable housing provision returned values ranging from 2.509–14.777 for the chi-square (χ^2) and 0.020–0.747 for the p -value (Asymp-Sig). Seven out of thirty-seven statistically significant factors include land location on the outskirts of the town with a p -value of 0.009; low housing priority from successive governments with a p -value of 0.009; low government housing budgetary distributions with a p -value of 0.042; lack of rent and mortgage price control with a p -value of 0.050; inadequate execution strategies with a p -value of 0.020; high mortgage interest rate with a p -value of 0.008; and poor housing policy implementation with a p -value of 0.020.

4.3 Exploratory factor analysis result

The results of the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity, presented in Table 4, determine data appropriateness for EFA. The KMO test returned a 0.883 value, more than the recommended value of 0.6. At the same time, Bartlett's test of sphericity has a significant value of 0.000 below 0.50 sets as standard by [Eiselen et al. \(2007\)](#) and [Tabachnick and Fidell \(2007\)](#), indicating the dataset's suitability for factor analysis.

Table 5 shows the inhibiting factors of affordable housing provisions (IFAHP) housing after the extraction; all the extracted values higher than 0.1 are considered suitable for exploratory factor analysis. This shows that the identified IFAHP are well fitted in their respective components without any signs of variance. The factor grouping can be relied upon since no variables have a low extraction value.

Table 6 presents the eigenvalues of the variables in the dataset. Kaiser's criterion for retaining a factor with an eigenvalue above 1.0 was considered ([Eiselen et al., 2007](#)). Therefore, seven factors with an eigenvalue above 1.0 were retained. The eigenvalue of the retained components is as follows: 15.813, 2.910, 1.933, 1.693, 1.532,

TABLE 4 KMO and Bartlett's test.

KMO and Bartlett's test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.883
Bartlett's Test of Sphericity	Approx. Chi-Square	3218.292
	Df	666
	Sig	0.000

1.146, and 1.097, which explains 42.737%, 7.866%, 5.224%, 4.576%; 4.141%; 3.098%, and 2.966% of the variance respectively. The seven components represent 70.608% of the cumulative variance, justifying the importance of the 37 variables measured.

4.4 Exploratory factor component report

The pattern matrix in Table 7 shows how factors in the components were clustered. The table presents the results of the exploratory factor analysis, returning seven components of inhibiting factors of affordable housing provision and the arrangement of variables in each component that align with their significance level. The common name assigned to each of the seven components is as follows: Component 1 is named: *Problems with affordable land and security of tenure*; Component 2 is named *Socioeconomic constraints*; Component 3 is named: *Problems with conventional materials and technologies*; Component 4 is named: *Unpredictable internal factors*; Component 5 is named: *Absence of innovative framework and supply chain*; Component 6 is named: *Absent of community collaboration and external economic factors*; Component 7 is named: *Urbanisation factors*. According to Yong and Pearce's (2013) recommendation, a 0.40 loading factor is adopted as a criterion for retaining loading value EFA components based on pragmatic reasons. The criterion guided this study in retaining a 0.4 and above loadings factor as underlying variables in the seven components.

4.4.1 First component: problems with affordable land and security of tenure

As presented in Table 7, the distribution of variables in the component includes the location of the land on the outskirts of the town 53%; the problem of land speculators 51%, the problem of land rights and ownership 49%; high cost of securing land in a choice area 43%; and lack of security of tenure 41%. The first component emphasises problems associated with affordable land and security of tenure, with the highest loading inhibiting factors of affordable housing provision, explaining 42.74% of the total variance. This shows the significance of the variables in this component. These variables supported the findings of Gopalan and Venkataraman (2015) and Ghaedrahmati and Shahsavari (2019) regarding the increasing price of land and scarcity of marketable land, which is one of the significant factors of housing production (Marutulle, 2021). Also, Olanrewaju et al. (2016) noted that the inefficient and overpriced land market impacts the affordable housing provisions among low-income earners in Nigeria. This is because industrialisation influences urban migration, and the available housing stock could not meet the housing needs of the migrants,

thereby rendering many homeless or living in shanties. The income level of the respondents labelled as low-income earners made them not creditworthy to attract housing loans or access mortgage homes. The findings also align with Baqutaya, Ariffin, and Raji's (2016) study, which advocated a policy regulating loan interest rates and mortgage administration. In addition, the study collaborated with Babalola and Hull (2019) and Oluwatayo et al. (2019) findings, who attributed the inherent problems and poor implementation of the Land Use Act of 1978 affecting access to affordable land due to complex processes in securing the title of the land, and activities of land speculators. Thus, the component provides an understanding for stakeholders, realtors, policymakers, and government agencies in the housing sector to develop innovative strategies for implementing and controlling the Land Use Act. Also, policymakers and government agencies must understand policies to control land speculators' activities and ensure flexibility in accessing housing funds and mortgage loans targeting low-income earners.

4.4.2 Second component: socioeconomic constraints

As presented in Table 7, the second component had nine variables of inhibiting factors of affordable housing provision with a 7.87% of the total variance. The importance of the factors in the component and the distribution of variables in the component are as follows: social exclusion of essential facilities 82%; inadequate mortgage schemes 82%; poor national minimum wage structure 70%; shortage of qualified construction managers and artisans 62%; stigmatization of affordable housing dwellers 60%; insufficient financial income of low-income households 57%; low investment in public housing 53%; rural-urban migration 42%; developers strong profit-driven mentality 40%. The findings from this component focus on the socioeconomic constraints from the respondents' perspective of factors inhibiting affordable housing provisions. The results align with the study of Boamah (2010) and Ansah and Ametepey (2014) findings on low-income levels, less supply of housing stocks to meet growing demand, and high unemployment rates causing socioeconomic constraints among low-income earners to access affordable housing matching their groups. In addition, the results support the findings of Alhajri (2022), who attribute inhibiting factors of affordable housing delivery in the Kingdom of Saudi Arabia to the high price of residential land, growing urbanisation rate, increase in the foreign workforce, and difficulties in optioning housing mortgage and loans. The study findings further explain the stigmatisation attributed to affordable housing provision to low-income earners (Ogunnaik et al., 2013; Adegoke and Agbola, 2020). The findings of this study also align with the work of Misselhorn (2010) and Marutulle (2021), who linked the shortage of affordable housing

TABLE 5 Communalities of inhibiting factors of affordable housing provisions.

Inhibiting factors of affordable housing	Initial	Extraction
High cost of conventional building materials	1.000	0.642
Low government housing budgetary distributions	1.000	0.702
Unsuccessful government housing intervention	1.000	0.649
Inadequate government support of infrastructural allocation	1.000	0.655
Non-acceptance of local construction materials	1.000	0.653
Inadequate innovative designs and technologies	1.000	0.773
Reliance on imported construction materials	1.000	0.773
Low acceptance of housing innovation	1.000	0.736
Ineffective maintenance management	1.000	0.624
Land location outskirts of the town	1.000	0.607
Increase in foreign workforce	1.000	0.613
Poor funding for local construction materials research	1.000	0.643
Insufficient financial income of low-income households	1.000	0.636
Inadequate mortgage schemes	1.000	0.787
Rural-urban migration	1.000	0.727
High cost of securing land in a choice area	1.000	0.728
Social exclusion of essential facilities	1.000	0.776
Poor national minimum wage structure	1.000	0.621
Profligacy, bribery and overpricing of contract sums	1.000	0.654
Stigmatization of affordable housing dwellers	1.000	0.654
Developers strong profit-driven mentality	1.000	0.580
Lack of security of tenure	1.000	0.700
High inflation and foreign exchange	1.000	0.734
Communities' poor participation in housing development	1.000	0.767
High population growth	1.000	0.742
Insufficient supply of affordable infrastructure	1.000	0.684
The problem of land rights and ownership	1.000	0.705
Inadequate innovative housing framework and supply chain	1.000	0.800
Inadequate housing standards and legislation	1.000	0.783
Inadequate execution strategies	1.000	0.809
Poor housing policy implementation	1.000	0.697
Low housing priority from successive governments	1.000	0.766
Lack of rent and mortgage price control	1.000	0.802
The problem of land speculators	1.000	0.674
High mortgage interest rate	1.000	0.751
Low investment in public housing	1.000	0.745
Inadequate qualified construction managers and artisans	1.000	0.733

Extraction Method: Principal Component Analysis.

TABLE 6 Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared Loadings ^a
	Total	% Of Var	Cumul. %	Total	% Of Var	Cumul. %	Total
IFAHP 1	15.813	42.737	42.737	15.813	42.737	42.737	4.779
IFAHP 2	2.910	7.866	50.603	2.910	7.866	50.603	8.048
IFAHP 3	1.933	5.224	55.827	1.933	5.224	55.827	10.291
IFAHP 4	1.693	4.576	60.403	1.693	4.576	60.403	8.036
IFAHP 5	1.532	4.141	64.544	1.532	4.141	64.544	9.841
IFAHP 6	1.146	3.098	67.642	1.146	3.098	67.642	2.770
IFAHP 7	1.097	2.966	70.608	1.097	2.966	70.608	4.681
IFAHP 8	0.916	2.476	73.084				
IFAHP 9	0.870	2.352	75.436				
IFAHP 10	0.772	2.085	77.521				
IFAHP 11	0.724	1.956	79.477				
IFAHP 12	0.685	1.851	81.328				
IFAHP 13	0.646	1.747	83.075				
IFAHP 14	0.546	1.476	84.551				
IFAHP 15	0.516	1.395	85.946				
IFAHP 16	0.480	1.296	87.242				
IFAHP 17	0.459	1.240	88.483				
IFAHP 18	0.437	1.182	89.665				
IFAHP 19	0.406	1.096	90.761				
IFAHP 20	0.331	0.895	91.656				
IFAHP 21	0.315	0.850	92.506				
IFAHP 22	0.297	0.803	93.309				
IFAHP 23	0.285	0.771	94.080				
IFAHP 24	0.262	0.709	94.789				
IFAHP 25	0.251	0.678	95.467				
IFAHP 26	0.240	0.648	96.115				
IFAHP 27	0.214	0.577	96.692				
IFAHP 28	0.195	0.528	97.220				
IFAHP 29	0.170	0.460	97.680				
IFAHP 30	0.158	0.428	98.108				
IFAHP 31	0.140	0.378	98.486				
IFAHP 32	0.120	0.325	98.811				
IFAHP 33	0.116	0.315	99.126				
IFAHP 34	0.108	0.291	99.417				
IFAHP 35	0.088	0.239	99.656				
IFAHP 36	0.075	0.202	99.859				

(Continued on following page)

TABLE 6 (Continued) Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared Loadings ^a
	Total	% Of Var	Cumul. %	Total	% Of Var	Cumul. %	Total
IFAHP 37	0.052	0.141	100.000				

Extraction Method: Principal Component Analysis.

^aWhen components are correlated, sums of squared loadings cannot be added to obtain a total variance.

to administrative tussle, population growth, and economic variables, leading to poor access to basic amenities. Therefore, housing stakeholders, realtors, policymakers, and government agencies must understand and implement strategies to overcome the socioeconomic constraints (inflation rate, unemployment, national minimum wage) to predict and improve affordable housing demand and supply in metropolitan cities.

4.4.3 Third component: problems with conventional materials and technologies

The variables in the component are as follows: inadequate innovative designs and technologies 92%; unsuccessful government housing intervention 84%; reliance on imported construction materials 80%; ineffective maintenance management 76%; low acceptance of housing innovation 76%; low government housing budgetary distributions 73%; non-acceptance of local construction materials 63%; high cost of conventional building materials 58%; and inadequate government support of infrastructural allocation 52%. The third component explained nine inhibiting factors of affordable housing provision, with 5.22% of the total variance, stating the significance of the variables in the component. The study results align with the cost of building materials, which is one of the major determinant factors of affordable housing provision; [Iwuagwu and Eme-anele \(2012\)](#) linked this to the high price of imported building materials. In addition, [Gulghane and Khandve \(2015\)](#) stated that building materials account for more than half of the total housing costs. In agreement with [Iwuagwu and Eme-anele's \(2012\)](#) study, the high price of using conventional building materials and technologies for housing production contributed to the high cost of housing stock. Previous research findings advocated using local technologies and materials for low-cost or affordable housing provisions. [Ugochukwu and Chioma \(2015\)](#) noted that the unacceptance of local materials and technologies affects affordable housing provision. The study findings further support the conclusion of [Ogundipe et al. \(2021\)](#), who noted that the end users lack awareness about the performance of alternative building materials. Likewise, the study findings also conform with [Ihuah et al. \(2014\)](#), who attributed the inhibiting factors of affordable housing provisions to ineffective housing provision and maintenance management of public housing from government intervention. Therefore, the findings regarding inhibiting factors of affordable housing provision provide an understanding of how to ensure the standardisation of indigenous construction materials and technologies to alleviate the shortage of affordable housing delivery in metropolitan cities.

4.4.4 Fourth component: unpredictable internal economic factors

The fourth component had four variables inhibiting affordable housing provision factors: lack of rent and mortgage price control 87%; high mortgage interest rate 71%; low housing priority from successive governments 70%; and poor funding for local construction materials research 58%. The unpredictable internal factors that affect affordable housing provisions explained 4.58% of the total variance. This study finding emphasises the drive of realtors and private investors in the housing business to expect a competitive return on investment, leading to high mortgage interest rates, as noted in the studies of [Oyewole \(2010\)](#), [Boamah \(2010\)](#), [Anisah and Ametepey \(2014\)](#) and [Olanrewaju et al. \(2016\)](#). In addition, [Gopalan and Venkataraman \(2015\)](#) state that these factors result in the rising rental or purchasing prices of housing. The study findings imply that the supply of affordable housing in metropolitan cities must keep up with population and urbanisation growth to meet the demand of rural-urban migrants.

4.4.5 Fifth component: absence of innovative framework and supply chain

The fifth component explained 4.141% of the total variance, highlighting the six variables loaded into this component as follows: inadequate housing standards and legislation 88%; inadequate innovative housing framework and supply chain 87%; inadequate execution strategies 76%; increase in foreign workforce 65%; insufficient supply of affordable infrastructure 6%; and poor housing policy implementation 45%. The variables listed in this component agree with the findings of [Ibem and Azuh \(2011\)](#), [Olanrewaju et al. \(2016\)](#), and [Owolabi et al. \(2022a\)](#), who observed that the Nigeria National Housing Policy is known to have a weak socio-political climate and failed institutional frameworks to deliver affordable housing. This is because the National Housing Policy in Nigeria lacks innovative strategies to implement the absolute responsibility placed on the government to provide affordable housing for all citizens ([Ajayi, 2019](#)). In addition, the study findings support [Olanrewaju et al. \(2016\)](#) conclusion that the problem of affordable housing provisions is due to economic instability, housing policies, lack of legislation, and legal requirements crises. Also, the study findings agree with [Gopalan and Venkataraman's \(2015\)](#) recommendations of factors inhibiting affordable housing provisions due to a lack of housing innovation and affordable construction technologies. Thus, the study's results align with the existing empirical findings and recommendations for improving housing policies and regulations to embrace innovative frameworks, supply chains, and affordable technologies to improve housing supply.

TABLE 7 Pattern matrix^(a).

Inhibiting factors of affordable housing provision	Component						
	1	2	3	4	5	6	7
Land location outskirts of the town	0.53						
The problem of land speculators	0.51						
The problem of land rights and ownership	0.49						
High cost of securing land in a choice area	0.43						
Lack of security of tenure	0.41						
Social exclusion of essential facilities		0.82					
Inadequate mortgage schemes		0.82					
Poor national minimum wage structure		0.70					
Inadequate qualified construction managers and artisans		0.62					
Stigmatization of affordable housing dwellers		0.60					
Insufficient financial income of low-income households		0.57					
Low investment in public housing		0.53					
Rural-urban migration		0.42					
Developers strong profit-driven mentality		0.40					
Inadequate innovative designs and technologies			0.92				
Unsuccessful government housing intervention			0.84				
Reliance on imported construction materials			0.80				
Ineffective maintenance management			0.76				
Low acceptance of housing innovation			0.76				
Low government housing budgetary distributions			0.73				
Non-acceptance of local construction materials			0.63				
High cost of conventional building materials			0.58				
Inadequate government support of infrastructural allocation			0.52				
Lack of rent and mortgage price control				0.87			
High mortgage interest rate				0.71			
Low housing priority from successive governments				0.67			
Poor funding for local construction materials research				0.59			
Inadequate housing standards and legislation					0.88		
Inadequate innovative housing framework and supply chain					0.80		
Inadequate execution strategies					0.76		
Increase in foreign workforce					0.65		
Insufficient supply of affordable infrastructure					0.56		
Poor housing policy implementation					0.45		
Communities' poor participation in housing development						0.63	
High inflation and foreign exchange						0.47	
High population growth							0.77

(Continued on following page)

TABLE 7 (Continued) Pattern matrix^(a).

Inhibiting factors of affordable housing provision	Component						
	1	2	3	4	5	6	7
Profligacy, bribery and overpricing of contract sums							0.53

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

^aRotation converged in 22 iterations.

4.4.6 Sixth component: absent of community collaboration and external economic factors

The two variables loaded into the sixth component: community poor participation in housing development 64% and high inflation and foreign exchange 77%. The component had 3.098% of the total variance. The findings align with [Shen et al. \(2019\)](#), who state that a lack of financial will, poor economic incentives, high inflation, and foreign exchange affect affordable housing provision. The study findings support [Ibimilua and Ibitoye \(2015\)](#) and [Olanrewaju et al. \(2016\)](#), who noted that the absence of community-based participation and collaboration with governmental or non-governmental agencies inhibits affordable housing delivery. Thus, prioritising support for community-based collaboration and partnerships with governmental intervention schemes will improve the supply of affordable housing delivery in metropolitan cities. Furthermore, partnering with non-governmental agencies will increase financial support for community-based intervention schemes to improve the supply of affordable housing in metropolitan cities.

4.4.7 Seventh component: urbanisation factors

The seventh component comprises two variables: high population growth 77% and profligacy, bribery, and overprice of the contract 53%. The component explained 2.966% of the total variance. In line with most of the available literature on affordable housing in developing economies attributed the inhibiting factors of affordable housing to an increase in population growth and urbanisation and overstressing the housing stock in urban centres. In line with [Ajayi's \(2019\)](#) recommendation, the standard of living in urban cities is becoming a significant problem with the population growth rate. [Omiunu \(2014\)](#), [Makinde \(2014\)](#), [Fitzgerald \(2017\)](#), and [Adeshina and Idaeho \(2019\)](#) noted that commercialization in metropolitan cities attracts rural-urban migration, and population growth increases the demand for housing. In line with [Ihuah, Kakulu, and Eaton \(2014\)](#), ineffective housing management and corruption in housing delivery inhibit affordable housing provisions. The study findings imply that the government and stakeholders in the housing sector must understand the growth rate to forecast future demand and supply of affordable housing provision in metropolitan cities.

4.4.8 Component correlation matrix and reliability of the factors

[Table 8](#) shows the relationship between the established seven clusters in the component correlation matrix. The 0.300 value in the component correlation matrix shows positive relationships among the variables, and the variables of the components correlate with one another. It also suggests dependence and connection within the

variables because of Cronbach's Alpha Coefficient test value above 0.7 ([Kothari, 2004](#); [Eiselen et al., 2007](#)).

5 Conclusion and recommendation

The need for affordable housing provisions to keep pace with urbanisation and industrialisation in metropolitan cities has led to different research findings on improving housing stocks and deficits. This study explored relevant literature on affordable housing provisions and identified inhibiting factors that prevent affordable housing provision from reducing its negative impact on low-income earners in metropolitan cities. In this study, the inhibiting factors affecting affordable housing provision were holistically identified and validated through exploratory factor analysis based on the perspective of low-income earners, which explored the relationship and the correlation between the identified factors. The 37 identified inhibiting factors of affordable housing provision were clustered into seven components as follows: problems with affordable land and security of tenure; socioeconomic constraints; problems with conventional materials and technologies; unpredictable internal factors; absence of innovative framework and supply chain; absent of community collaboration and external economic factors; and urbanisation factors. The study concludes that the seven inhibiting factors of affordable housing provisions are imperative to guide the construction industry's stakeholders, professionals, and regulatory agencies to improve affordable housing provisions in metropolitan cities, keep up with population and urbanisation growth and meet the demand of rural-urban migrants. Therefore, the study findings give housing stakeholders, realtors, policymakers, and government agencies the ability to understand and implement strategies to overcome socioeconomic constraints (inflation rate, unemployment, mortgage and rent price control, national minimum wage) to predict and improve affordable housing demand and supply in metropolitan cities. It also provides a roadmap driving housing stakeholders, policymakers, and government agencies in housing policy formulation and initiatives towards attaining pillar one of Africa Agenda 2063 and sustainable development goals (SDGs) goal eleven in providing a high standard of living, quality of life, and wellbeing.

Moreover, the study's primary focus is on the challenges of affordable housing provision in metropolitan cities, and the data analysed was limited to the perspective of selected low-income earners (as described in the research methods) in Lagos Metropolitan City, Nigeria. The study findings inform future research to explore the accelerators, facilitators, and opportunities associated with affordable housing through the perspective of

TABLE 8 Component correlation matrix and reliability of the factors.

Component	Component correlation matrix							Cronbach's alpha
	1	2	3	4	5	6	7	Coefficient
1	1.00	0.136	0.292	0.223	0.273	0.167	0.150	0.803
2	0.136	1.00	0.305	0.388	0.398	0.106	0.303	0.886
3	0.292	0.305	1.000	0.364	0.465	0.144	0.279	0.923
4	0.223	0.388	0.364	1.000	0.420	0.088	0.216	0.862
5	0.273	0.398	0.465	0.420	1.000	0.164	0.266	0.901
6	0.167	0.106	0.144	0.088	0.164	1.000	0.131	0.786
7	0.150	0.303	0.279	0.216	0.266	0.131	1.00	0.628

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

housing stakeholders, professionals and agencies regulating housing to significantly influence affordable housing development in terms of quality, identity, and aspirations, among other factors. In addition, further study could also explore more case studies involving a large sample size of respondents from the private and public sectors in the Nigerian housing sector to mitigate the dearth of research and improve the generalisation and application of the findings. Despite these limitations, this study provides various practical and theoretical understandings that successful implementations of affordable housing provisions hinged on an innovative housing framework and affordable supply chain management. The practical implication of this research finding is that it provides an understanding to stakeholders, financial institutions, realtors, policymakers, and government agencies in the housing sector to adopt innovative strategies for implementing and controlling the Land Use Act to promote affordable housing provision. Also, the findings imply that policymakers and government agencies require an understanding of implementing policies to control land speculators' activities and ensure flexibility in accessing housing funds and mortgage loans targeting low-income earners.

The study recommends understanding users' perceptions, social inclusion, and the standardisation of indigenous construction materials and technologies to alleviate the shortage of affordable housing delivery in metropolitan cities. This could provide practical solutions to affordable housing issues like dependence on imported materials, technology, inflation, and foreign exchange rates toward reducing homelessness and slum dwellers, especially in Lagos metropolitan city, Nigeria and other developing countries owing to similarities in context. The study highlights various actionable recommendations for the government to incorporate the study's findings into its affordable housing provisions, thereby fostering development. These potentially actionable strategies include prioritising support for community-based stakeholders' collaboration with governmental housing intervention schemes to improve the supply of affordable housing delivery in metropolitan cities. Also, partnerships with non-governmental agencies are required to increase financial support for community-based intervention schemes to improve the supply of affordable housing in metropolitan cities. In addition, the study also calls for research collaboration among higher education institutions, professional

bodies, and governmental and non-governmental agencies to standardise indigenous construction materials and technologies.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the studies involving humans because Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements'. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements because Written informed consent from the [patients/ participants OR patients/participants legal guardian/next of kin] was not required to participate in this study in accordance with the national legislation and the institutional requirements'. Ethical approval was not required for the study involving animals in accordance with the local legislation and institutional requirements because Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements.

Author contributions

KO: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing—original draft, Writing—review and editing. JO: Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing—review and editing. BO: Conceptualization, Project administration, Supervision, Validation, Visualization, Writing—review and editing. CA: Conceptualization,

Project administration, Supervision, Validation, Visualization, Writing–review and editing.

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References

- Adedeji, I. (2023). Nigerian urbanization and the significance of affordable housing. *J. Serv. Sci. Manag.* 16 (3), 351–368. doi:10.4236/jssm.2023.163020
- Adegoke, S. A. O., and Agbola, T. (2020). Housing affordability and the organized private sector housing in Nigeria. *Open J. Soc. Sci.* 8 (4), 177–192. doi:10.4236/jss.2020.84013
- Ade-Ojo, C. O., and Awodele, O. A. (2020). “Awareness of green building prerequisites for skill development among built-industry professionals in Nigeria,” in *The Construction Industry in the Fourth Industrial Revolution: Proceedings of 11th Construction Industry Development Board (CIDB) Postgraduate Research Conference* (Springer International Publishing), 188–196.
- Adeshina, T., and Idaeho, R. (2019). *Analysis of Nigeria’s policy on housing*. Lagos, Nigeria: JEE sector thought leadership series.
- Ajayi, I. S. (2019). Addressing housing deficit in Nigeria: issues, challenges, and prospects. *Econ. Financial Rev.* 57 (4), 16.
- Akinradewo, O., Aghimien, D., Aigbavboa, C., and Onyia, M. (2020). Factors influencing the adoption of insurance as a risk treatment tool by contractors in the construction industry. *Int. J. Constr. Manag.* 22 (13), 2484–2492. doi:10.1080/15623599.2020.1797986
- Alhajri, M. F. (2022). Housing challenges and programs to enhance access to affordable housing in the Kingdom of Saudi Arabia. *Ain Shams Eng. J.* 13 (6), 101798. doi:10.1016/j.asej.2022.101798
- Aliyu, A. A., and Amadu, L. (2017). Urbanization, cities, and health: the challenges to Nigeria – a review. *Ann. Afr. Med.* 16 (4), 149–158. doi:10.4103/aam.aam_1_17
- Ansah, S. K., and Ametepey, S. O. (2014). Housing deficit and delivery in Ghana: intervention by various Governments. *Int. J. Dev. Sustain.* 3 (5), 978–988.
- Apuke, O. D. (2017). Quantitative research methods: a synopsis approach. *Kuwait Chapter Arabian J. Bus. Manag. Rev.* 33 (5471), 40–47. doi:10.12816/0040336
- Archer, T. (2022). The mechanics of housing collectivism: how forms and functions affect affordability. *Hous. Stud.* 37 (1), 73–102. doi:10.1080/02673037.2020.1803798
- Azevedo, N. J. D., Silva, J. J. R., and Silva, P. M. W. M. (2010). Definition of indicators for sustainable social housing in search of a model. *Int. J. Hous. Sci. Its Appl.* 34 (2).
- Babalola, K. H., and Hull, S. A. (2019). Examining the land use Act of 1978 and its effects on tenure security in Nigeria: a case study of ekiti state, Nigeria. *Potchefstroom Electron. Law Journal/Potchefstroomse Elektron. Regsbl.* 22 (1), 1–34. doi:10.17159/1727-3781/2019/v22i0a5803
- Bangura, M., and Lee, C. L. (2021). The determinants of homeownership affordability in Greater Sydney: evidence from a submarket analysis. *Hous. Stud.* 38 (2), 206–232. doi:10.1080/02673037.2021.1879995
- Baqutaya, S., Ariffin, A. S., and Raji, F. (2016). Affordable housing policy: issues and challenges among middle-income groups. *Int. J. Soc. Sci. Humanity* 6 (6), 433–436. doi:10.7763/ijssh.2016.v6.686
- Becker, H. S. (1963). *Outsider: studies in the sociology of deviance*. New York: Free Press.
- Boamah, N. A. (2010). Housing affordability in Ghana: a focus on Kumasi and Tamale. *Ethiop. J. Environ. Stud. Manag.* 3 (3). doi:10.4314/ejesm.v3i3.63958
- Defo, B. K. (2014). Demographic, epidemiological, and health transitions: are they relevant to population health patterns in Africa? *Glob. Health Action* 7 (1), 22443. doi:10.3402/gha.v7.22443
- Eiselen, R., Uys, T., and Potgieter, T. (2007). *Analysing survey data using SPSS13*. 3rd. Johannesburg: STATKON, University of Johannesburg.
- Eyisi, D. (2016). The usefulness of qualitative and quantitative approaches and methods in researching problem-solving ability in science education curriculum. *J. Educ. Pract.* 7 (15), 91–100.
- Ezeigwe, P. C. (2015). Evaluation of the causes of housing problems in Nigeria: a case study of Awka, the capital city of Anambra State. *J. Econ. Sustain. Dev.* 6 (20), 87–93.
- Ezennia, I. S. (2022). Insights of housing providers’ on the critical barriers to sustainable affordable housing uptake in Nigeria. *World Dev. Sustain.* 1, 100023. doi:10.1016/j.wds.2022.100023
- Fitzgerald, A. (2017). Querying the resilient local authority: the question of resilience for whom? *Local Gov. Stud.* 44 (6), 788–806. doi:10.1080/03003930.2018.1473767
- Ghaedrahmati, S., and Shahsavari, F. (2019). Affordable housing: elderly in Tehran and their housing problems. *J. Hous. Elder.* 33 (2), 140–152. doi:10.1080/02763893.2018.1534179
- Gopalan, K., and Venkataraman, M. (2015). Affordable housing: policy and practice in India. *HMB Manag. Rev.* 27 (2), 79–140. doi:10.1016/j.iimb.2015.04.007
- Gulghane, A. A., and Khandve, P. V. (2015). Management for construction materials and control of construction waste in construction industry: a review. *Int. J. Eng. Res. Appl.* 5 (4), 59–64.
- Ibem, E. O., and Azuh, D. E. (2011). Framework for evaluating the sustainability of public housing programmes in developing countries. *J. Sustain. Dev. Environ. Prot. (JSDEP)* 1 (3), 24–39.
- Ibimilua, A. F., and Ibitoye, O. A. (2015). Housing policy in Nigeria: an overview. *Am. Int. J. Contemp. Res.* 5 (2), 53–58.
- Idris, J., and Fagbenro, A. (2019). Lagos the Mega-City: a report on how the metropolis handled an outbreak of the Ebola epidemic. *Socio-cultural Dimensions Emerg. Infect. Dis. Afr. Indig. Response Deadly Epidemics*, 281–298. doi:10.1007/978-3-030-17474-3_21
- Ihuah, P. W., Kakulu, I. I., and Eaton, D. (2014). A review of critical project management success factors (CPMSF) for sustainable social housing in Nigeria. *Int. J. Sustain. Built Environ.* 3 (1), 62–71. doi:10.1016/j.ijbsbe.2014.08.001
- Iwuagwu, B. U., and Eme-anele, N. (2012). Earth construction technology and design: a positive solution to mass housing in Africa. *Int. J. Sci. Innovations Sustain. Dev.* 2 (2), 89–92.
- Katz, B., Turner, M. A., Brown, K. D., Cunningham, M., and Sawyer, N. (2003). *Rethinking local affordable housing strategies: lessons from 70 years of policy and practice*. Washington, DC: The Brookings Institute.
- Kothari, C. R. (2004). *Research methodology: methods and techniques*. Delhi, India: New Age International.
- Ledwaba, M. J. (2012). *Informal settlements and organisations in post-apartheid South Africa: the case of Bethlehem, Tshwane*. South Africa: University of Johannesburg.
- Lemert, E. (1967). *Human deviance*. Englewood Cliffs: Prentice Hall.
- Makinde, O. O. (2014). Housing delivery system, need and demand. *Environ. Dev. Sustain.* 16, 49–69. doi:10.1007/s10668-013-9474-9

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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- Man, J. Y. (2011). Affordable housing in China: lincoln Institute of land policy. Available at: <https://center4affordablehousing.org/wp-content/uploads/2021/12/Cina-Affordable-housing-in-China.pdf> (Assessed September 5, 2022).
- Marutulle, N. K. (2021). A critical analysis of housing inadequacy in South Africa and its ramifications. *Africa's Public Serv. Deliv. Perform. Rev.* 9 (1), 16. doi:10.4102/apsdp.v9i1.372
- Misselhorn, M. (2010). A new response to informal settlements. *The Transformer* 15, 16–20.
- Moser, C. A., and Kalton, G. (1999). *Survey methods in social investigation*. 2nd. Aldershot: Gower Publishing Company Ltd, 256–269.
- Mueller, E. J., and Tighe, J. R. (2007). Making the case for affordable housing: connecting housing with health and education outcomes. *J. Plan. Literature* 21 (4), 371–385. doi:10.1177/0885412207299653
- Musewe, T. (2012). Housing our people: developing adequate housing for Africans. *Mobilitate* 15 (5), 37.
- Napoli, G. (2017). Housing affordability in metropolitan areas. The application of a combination of the ratio income and residual income approaches to two case studies in Sicily, Italy. *Buildings* 7 (4), 95. doi:10.3390/buildings7040095
- Odia, M., and Nwaogazie, I. L. (2017). Multivariate statistical approach in modeling surface and groundwater quality near municipal solid waste dumpsites in warri metropolitan City. *Archives Curr. Res. Int.* 8 (4), 1–21. doi:10.9734/acri/2017/35089
- Odoyi, E. J., and Riekkinen, K. (2022). Housing policy: an analysis of public housing policy strategies for low-income earners in Nigeria. *Sustainability* 14 (4), 2258. doi:10.3390/su14042258
- Ogunbayo, B., Aigbavboa, C., Thwala, D., Akinradewo, O., and Oguntona, O. (2022a). “Institutional evaluation of public and private partnerships relevant contributions to housing delivery system,” in Human Factors in Architecture, Sustainable Urban Planning, and Infrastructure. AHFE (2022) International Conference. AHFE Open Access, vol 58. Editor A. Maciejko (USA: AHFE International). doi:10.54941/ahfe1002374
- Ogunbayo, B. F., Aigbavboa, C. O., Amusan, L. M., Ogundipe, K. E., and Akinradewo, O. I. (2021). Appraisal of facility provisions in public-private partnership housing delivery in southwest Nigeria. *Afr. J. Reproductive Health* 25, 46–54. doi:10.29063/ajrh2021/v25i5s.4
- Ogunbayo, B. F., Ajao, A. M., Alagbe, O. T., Ogundipe, K. E., Tunji-Olayeni, P. F., and Ogunde, A. (2018). Residents’ facilities satisfaction in housing project delivered by public-private-partnership (PPP) in Ogun State, Nigeria. *Int. J. Civ. Eng. Technol. (IJCIET)* 9 (1), 562–577.
- Ogunbayo, B. F., Clinton, O., Aigbavboa, C. O., Thwala, W. D., Olusegun, A., and Oguntona, O. A. (2022b). “Residents’ degree of satisfaction in public-private partnerships housing provision in developing economy,” in Proceedings of Structural Engineering and Construction, Vol. 9 (1) (ISEC). ISSN 2644-108X, Jun 2022.
- Ogunde, A. O., Dafe, O. E., Akinola, G. A., Ogundipe, K. E., Oloke, O. C., Ademola, S. A., et al. (2017). Factors militating against prompt delivery of construction projects in Lagos megacity, Nigeria contractors’ perspective. *Mediterr. J. Soc. Sci.* 8 (3), 233–242. doi:10.5901/mjss.2017.v8n3p233
- Ogundipe, K. E., Ajao, A. M., Ogunbayo, B. F., and Adeyi, A. S. (2020b). “Impact of Partial Replacement of granite with periwinkle and palm kernel shells on concrete strength,” in Proceedings of International Structural Engineering and Construction. Theme: Holistic Overview of Structural Design and Construction (Limassol, Cyprus: ISEC Press).
- Ogundipe, K. E., Ogunbayo, B. F., Olofinnade, O. M., Amusan, L. M., and Aigbavboa, C. O. (2021). Affordable housing issue: experimental investigation on properties of eco-friendly lightweight concrete produced from incorporating periwinkle and palm kernel shells. *Results Eng.* 9, 100193. doi:10.1016/j.rineng.2020.100193
- Ogundipe, K. E., Owolabi, J. D., and Ogbebor, C. (2020a). “Factors militating against effective building materials management (EBMM) in construction projects,” in Proceedings of International Structural Engineering and Construction. Theme: Holistic Overview of Structural Design and Construction (Limassol, Cyprus: ISEC Press).
- Ogundipe, K. E., Owolabi, J. D., Olanipekun, E. A., Olaniran, H. F., Akuete, E., and Fagbenle, A. O. (2018). Factors affecting effective use of safety wears among construction site operatives: lessons from indigenous firms in South Western Nigeria. *Int. J. Appl. Eng. Res.* 13 (6), 4314–4325.
- Ogunnaike, A., Squires, G., and Booth, C. A. (2013). A pluralistic conceptual model for affordable housing in Lagos, Nigeria. *WIT Trans. Ecol. Environ.* 179, 523–533.
- Okeleheim, N. A. (2011). *Benchmark for impact assessment of affordable housing*. PhD dissertation. Wolverhampton: University of Wolverhampton. Available at: <http://hdl.handle.net/2436/138925> (Assessed September 5, 2022).
- Olanrewaju, A., Anavhe, P., and Hai, T. K. (2016). A framework for affordable housing governance for the Nigerian property market. *Procedia Eng.* 164, 307–314. doi:10.1016/j.proeng.2016.11.624
- Olufemi, O. A. (2018). *Neighbourhood revitalisation and housing satisfaction: enhancing residents’ quality of life in public low-income housing in Lagos metropolis Nigeria*. Doctoral dissertation. Durban, South Africa: Urban and Regional Planning, University of KwaZulu-Natal.
- Oluwatayo, I. B., Omowunmi, T., and Ojo, A. O. (2019). Land acquisition and use in Nigeria: implications for sustainable food and livelihood security. *Land use Assess. past, envisioning future*, 91–110.
- Omiunu, O. G. (2014). Towards a sustainable higher education for an increasing population and information technology dynamics. *J. Educ. Res. Behav. Sci.* 3 (5), 116–121.
- Opawole, A., and Jagboro, G. O. (2016). Benchmarking parties’ obligations in the execution of concession-based PPP projects in Nigeria. *J. place Manag. Dev.* 9 (1), 27–46. doi:10.1108/jpmd-08-2015-0029
- Owolabi, J. D., Aigbavboa, C., Ogunbayo, B. F., and Ogundipe, K. E. (2022b). “Assessing factors militating against affordable housing delivery in developing countries,” in Proceedings of the Construction Business and Project Management Conference (Cape Town, South Africa: Department of Construction Economics and Management).
- Owolabi, J. D., Aigbavboa, C., Ogundipe, K. E., and Ogunbayo, B. F. (2022a). “Affordable housing issue: users’ perception on the adoption of cargotecture in developing economies,” in Proceedings of the Construction Business and Project Management Conference (Cape Town, South Africa: Department of Construction Economics and Management).
- Oyewole, M. O. (2010). *Housing development finance through cooperative societies: the case of Ogbomoso*. Nigeria: International Journal of Housing Markets and Analysis.
- Pallant, J. (2016). *SPSS survival manual*. UK: McGraw-Hill Education.
- Patel, R. G., and Padhya, H. J. (2021). Challenges and prospects of sustainable and affordable housing. *Int. J. Res. Eng. Sci. (IJRES)* 9 (1), 51–56.
- Patton, M. Q. (2001). *Qualitative research and evaluation components*. Thousand Oaks, CA: Sage, 893.
- Perera, U., and Lee, P. (2021). A relational lens to understand housing affordability in the 21st Century. *J. Urban Manag.* 10 (4), 314–324. doi:10.1016/j.jum.2021.08.004
- Reid, A. (2023). Closing the affordable housing gap: identifying the barriers hindering the sustainable design and construction of affordable homes. *Sustainability* 15 (11), 8754. doi:10.3390/su15118754
- Rohe, W. M., and Stegman, M. A. (1994). The effects of homeownership: on the self-esteem, perceived control and life satisfaction of low-income people. *J. Am. Plan. Assoc.* 60 (2), 173–184. doi:10.1080/01944369408975571
- Saidu, A. I., and 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), 656. doi:10.3390/su12020656
- Scott, A. J. (2011). Emerging cities of the third wave, city: analysis of urban Trends, culture, theory. *Policy, Action* 15 (2–3), 289–231.
- Shen, L., Yang, J., Zhang, R., Shao, C., and Song, X. (2019). The benefits and barriers for promoting bamboo as a green building material in China—an integrative analysis. *Sustainability* 11, 2493. doi:10.3390/su11092493
- Solis Trapero, E., Sanz, I. M., and Francés, J. M. D. U. (2015). Global metropolitan-regional scale in evolution: metropolitan intermediary cities and metropolitan cities. *Eur. Plan. Stud.* 23 (3), 568–596. doi:10.1080/09654313.2013.878691
- Stone, M. E. (2006). What is housing affordability? The case for the residual income approach. *Housing policy debate*, 17 (1), 151–184.
- Sud, I., and Yilmaz, S. (2013). Institutions and politics of metropolitan management. *Financing metropolitan Gov. Dev. Ctries.*, 107–133.
- Tabachnick, B. G., and Fidell, L. S. (2007). *Experimental designs using ANOVA (Vol. 724)*. Belmont, CA: Thomson/Brooks/Cole.
- Ugochukwu, I. B., and Chioma, M. I. B. (2015). Local building materials: affordable strategy for housing the urban poor in Nigeria. *Procedia Eng.* 118, 42–49. doi:10.1016/j.proeng.2015.08.402
- UN-HABITAT, National Trends in Housing Production Practices (2006). *UN-HABITAT, national Trends in housing production practices*. Nairobi: United Nations Centre for Human Settlements.
- United States Department of Housing and Urban Development (2006). *Housing impact analysis*. Washington, DC: U.S. Government Printing Office.
- Wetzstein, S. (2017). The global urban housing affordability crisis. *Urban Stud.* 54 (14), 3159–3177. doi:10.1177/0042098017711649
- Wilkins, J. R. (2011). Construction workers’ perceptions of health and safety training programmes. *Constr. Manag. Econ.* 29 (10), 1017–1026. doi:10.1080/01446193.2011.633538
- Yong, A. G., and Pearce, S. A. (2013). A beginner’s guide to factor analysis: focusing on exploratory factor analysis. *Tutorials quantitative methods Psychol.* 9 (2), 79–94. doi:10.20982/tqmp.09.2.p079
- Zanganeh, M., Varesi, H. R., and Zangiabadi, A. (2013). Strategic housing planning through sustainable development approach in Iran Metropolitans: case study of Metropolitan Mashhad. *J. Basic Appl. Sci. Res.* 3 (9), 52.
- Zhao, X., Hwang, B. G., Pheng Low, S., and Wu, P. (2015). Reducing hindrances to enterprise risk management implementation in construction firms. *J. Constr. Eng. Manag.* 141 (3), 04014083. doi:10.1061/(asce)co.1943-7862.0000945