

Field diagnosis of the criteria for selecting affordable housing in less developed countries: evidence from homeowners and renters in Ghana

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Abstract

Purpose – In the Global North, affordable housing has evolved and thrived, and it is now gaining traction in the Global South, where governments have been vocal supporters of the concept. Therefore, this paper aims to investigate the important criteria for selecting affordable housing units in Ghana.

Design/methodology/approach – A quantitative research approach was used, and a survey was administered to the residents. The data was analysed using both descriptive and inferential statistics. The relative importance index technique was used to rank the important criteria, and the EFA technique was used to create a taxonomy system for the criteria.



Findings – The hierarchical ranking of the most significant criteria for selecting affordable housing includes community safety, waste management and access to good-quality education. Furthermore, the important criteria for selecting affordable housing are classified into two groups, namely, “sustainability criteria” and “housing demand and supply and social service provision”.

Research limitations/implications – This study has implications for the real estate industry and construction stakeholders, as this will inform decision-making in terms of the design of affordable housing and the suitability of the location for the development.

Originality/value – These findings provide a baseline to support potential homeowners and tenants in their quest to select affordable housing. Furthermore, these findings will aid future longitudinal research into the indicators or criteria for selecting suitable locations for the development of low- and middle-income housing.

Keywords Affordability, Affordable housing, Low- and middle-income earners, Criteria, Ghana, Less developed countries

Paper type Research paper

Introduction

Globally, demand for housing has surpassed supply, causing housing purchase, accommodation and rental prices to be on an upward curve. A recent report published by JP Morgan reveals that rentals across all home types in developed countries, particularly Europe, have sharply risen by approximately 14.5% during the first quarter of 2023. This rise in rentals is not only in developed countries but also in the least developed countries (LDCs). With the number of people living in cities expected to reach 68% by 2050 (UN DESA, 2019) and approximately 90% of the increase expected to come from Asia and Africa (UN, 2019), demand for housing is expected to rise steeply, exacerbating the problem of housing deficits. Satterthwaite (2016) stated that more than a billion people in LDCs live in substandard housing. This is corroborated by a report compiled by the United Nations Environment Programme (UNEP, 2022), which revealed that more than half of African citizens live in informal housing. Furthermore, housing is scarce in several African cities because of high land and rent prices, limited access to financing, an overreliance on imported building materials and insecure building regulations (Koroso *et al.*, 2021; Gillespie, 2018; Ugochukwu and Chioma, 2015). Evidently, housing shortages are a common feature in all countries, which will help to counterbalance downward price pressures and prevent a crash. In this context, there is a growing call for more government intervention in affordable housing development (Allianz SE, 2023).

Many authors have advocated for affordable housing as a solution to the global housing crisis (e.g. King *et al.*, 2017; Gilgoff, 2016; Samarasinghe, 2020). Affordable housing projects are designed to meet the fundamental necessities of the low and middle class, such as housing, not just for their existence but also for the quality and security of their beneficiaries (Herbert *et al.*, 2018). Multiple facets of an individual's well-being are linked to affordable housing. For instance, Mueller and Tighe (2007) provided evidence on the association between affordable housing and community benefits in education and health. Similarly, Lubell *et al.* (2007) found that affordable housing provisions have a favourable externality to health. Access to health care, education and a sense of control and fulfilment in one's life have all enhanced giving credit to affordable housing (Rohe and Stegman, 1994). Other researchers argued that affordable housing also helps in terms of minimizing crime as well as having considerable wealth benefits for inhabitants owing to job stability (Horner, 2009; Berry, 2003; Rohe and Stewart, 1996). This is corroborated by Alhajri (2022), who opined that access to affordable housing contributes to the growth and development of individuals and the country at large.

Affordable housing is defined as any housing that satisfies some form of affordability criteria, such as the family's income level, the size of the dwelling unit, affordability in terms of the size of Equated Monthly Instalments (EMIs), or the ratio of home price to yearly income (Parekh *et al.*, 2008). Similarly, Assaf *et al.* (2010) defined affordable housing as housing that is adequate and accessible to those who cannot meet their needs without government assistance or special arrangements made by housing providers, or who cannot afford the mortgage payments or rent for such housing. Mulliner and Maliene (2011) postulated that housing affordability has traditionally been defined and assessed using economic criteria, specifically housing costs in relation to income. The authors argued that the ratio of house prices to income is perhaps the most basic measure of housing affordability. In the context of the study, affordable housing is defined as a household spending less than one-third of its gross annual income on rent or housing costs (including taxes, insurance and utilities), thereby improving social integration, interaction and acceptance (GoG/MWRWH, 2015; Arman *et al.*, 2009). This definition was chosen because, first and foremost, the description is based on a rent/income benchmark of 30% to define affordable housing. Second, the description is consistent with the UN-Habitat definition. Third, the definition emphasizes the social constructs of affordable housing, which are viewed from different income levels (GoG/MWRWH, 2015).

Affordable housing is a challenge in LDCs such as Ghana, where many structures have been built to promote the initiative because of a severe housing scarcity. According to Mohammed *et al.* (2017), there is a lack of affordable housing in Ghana because of a number of factors, including high unemployment rates, high home prices and mortgage costs, high land prices and limited access to land, a lack of housing finance and mortgage options, a lack of developed infrastructure and a lack of affordable building materials. In Ghana, the initiative to develop affordable housing has been solely in the hands of the government, with support from a few groups (Hope, 2020). Many of the housing structures are still being built, with only a handful being completely operational (Hope, 2020). The government established an affordable housing programme for households with a median income below the government's limit because of the poor condition of housing in Ghana. The rent has not fulfilled the requirements it was chosen for since its commencement and implementation because many households in Ghana, however, cannot afford the so called "existing cheap housing units" with basic acceptable criteria (Boamah, 2010). Previous studies with regard to the criteria for selecting affordable housing have been conducted in recent years. Although the identified criteria from previous studies (e.g. Ramzanpour and Rahimi, 2023; Chan and Adabre, 2019; Osman *et al.*, 2018; Mulliner and Maliene, 2012; Esruq-Labin *et al.*, 2014) are comprehensive and applicable to most housing projects, not all might be relevant for affordable housing projects because of differences in project characteristics and other peculiarities such as demand and supply, availability of mortgages and credit facility and social dynamics. Ahadzic *et al.* (2008) added that housing projects are speculative in nature because decisions on land acquisition, design and construction of the houses are mostly made without a specific customer in mind. Against this background, the research reported in this paper is to investigate the important criteria and determine a suitable classification of the criteria for selecting affordable housing in LDCs such as Ghana.

Literature review

Criteria for affordable housing

The identification of affordable housing criteria is important so that homeowners and renters can choose their housing needs based on the relevance of the criteria. As a result, investigating the criteria for affordable housing will aid in understanding how homeowners

and renters make decisions. According to [Oyetunji et al. \(2023\)](#), various determinants influence investment motivations and decisions, making the process dynamic, complex and difficult. Furthermore, there are a plethora of variables that may influence the decision to invest in housing. These variables, according to [Kamali et al. \(2008\)](#), can be classified as environmental, neighbourhood, accessibility or location and property variables. Previous studies with regard to the criteria for selecting affordable housing have been conducted in recent years. Among the studies that have examined the criteria for selecting affordable housing in both developed countries and LDCs are [Ramzanpour and Rahimi \(2023\)](#), [Chan and Adabre \(2019\)](#), [Osman et al. \(2018\)](#), [Mulliner and Maliene \(2012\)](#) and [Esrug-Labin \(2014\)](#). For instance, [Chan and Adabre \(2019\)](#) investigated the critical success criteria for affordable housing using a survey of experts around the world. The study revealed that house price in relation to income, rental cost in relation to income, maintainability of housing facility, end user's satisfaction with housing facility and functionality of housing facility were the top ranked criteria ([Chan and Adabre, 2019](#)). Notably, this study focused on academics and industry professionals' perceptions.

In a more recent study in Iran, [Ramzanpour and Rahimi \(2023\)](#) assessed and prioritized the physical resilience criteria for affordable housing locations based on an analytic hierarchy process. The survey included 22 experts from academia and local government. The important criteria were categorized as infrastructure and services, region context, natural environment and surrounding uses. Furthermore, the findings revealed that among the variables of service and infrastructure, rescue and security facilities, access to health care, efficient roads and public transportation and urban equipment were the most important ([Ramzanpour and Rahimi, 2023](#)). Elsewhere in Malaysia, [Osman et al. \(2018\)](#) conducted a study to examine the important housing criteria based on respondents' preferences and satisfaction levels with the current rental houses. In spite of the study's focus on homebuyer perceptions, only 11 important criteria in the provision of affordable housing were examined. The following criteria were considered: house type, house price, house location, house design, number of bedrooms and bathrooms, construction quality, total floor area, security level, access to public facilities, distance from the working area and access to public transportation. House price, security level and access to public facilities such as a school, clinic and others were among the top-ranked criteria ([Osman et al., 2018](#)). In the UK, [Mulliner and Maliene \(2011\)](#) and [Esrug-Labin \(2014\)](#) develop a system of criteria for evaluating affordable housing in a comprehensive and long-term manner. In the case of [Mulliner and Maliene \(2011\)](#), it is important to highlight that the study was more focused on housing and planning professionals to verify and prioritize the criteria that are important to sustainable housing affordability. The findings revealed that house prices in relation to income, rental costs in relation to incomes, access to employment opportunities, availability of rented accommodation and quality of housing were the top five housing affordability criteria.

[Esrug-Labin et al. \(2014\)](#) compiled a list of criteria based on secondary data on affordable housing measurements and proposed that the criteria can be divided into six affordable housing measurement components, including safety and comfort, loans and accommodations, facilities and services, quality management, income ratios and grow home. According to [Mulliner and Maliene \(2012\)](#), community safety, crime rates and the presence of environmental hazards are all components of safety and comfort. This necessity influences housing design in particular countries, where a large amount of money is spent on security. Depending on how affordability is defined, it affects regional social structure as well as safety at various spatial scales. [Lau and Li \(2006\)](#) stated that the component loans and accommodations include interest rates and mortgage availability, availability of rental lodging (private and social), availability of low-cost home ownership products and availability of market-value home ownership goods. According to [Mulliner and Maliene \(2011\)](#), access to work opportunities,

public transportation, excellent education, shopping facilities, health services, early childhood care services, leisure facilities and open green public spaces are among the components of facilities and services. [Yuan et al. \(2020\)](#) study of the amenity effects of urban facilities on housing prices in China discovered that housing quality, energy efficiency, trash management and neighbourhood deprivation are all components of the quality management component. Different variables, such as engineering practices, the social environment and resident behaviour, all have an impact on quality management ([Yuan et al., 2020](#)). [Mulliner and Maliene \(2012\)](#) stated that the component income ratios include the price of a home in relation to its income and the cost of renting a home in relation to its income.

Previous studies have identified variables/criteria that have been shown to influence selection decisions in general and assessed whether they can contribute to the selection of affordable housing amongst the low- to middle-income group. These studies, however, are primarily focused on the perspectives of built environment professionals, with little attention paid to the perspectives of homeowners and renters regarding their selection decisions. More so, previous studies with regard to affordable housing in the Ghanaian context are mainly focused on critical success factors for sustainable affordable housing, policies and barriers in the provision of affordable housing, self-help housing affordability and public-private partnerships in affordable housing ([Adabre and Chan, 2019](#); [Adjei et al., 2015](#); [Dafeamekpor et al., 2023](#)). There is currently little research that has been conducted to examine the perspectives of homeowners and renters on the criteria for selecting affordable housing. As a result, there is a scarcity of research and information on the criteria that could assist homeowners and renters in making decisions about affordable housing, particularly in Kumasi, Ghana. Given the surge in housing deficits, the constant demand for affordable housing and the need for sustainability, this research gap requires attention.

[Table 1](#) presents a summary of the criteria for selecting affordable housing based on literature from both the developed and developing worlds, as well as the intrinsic and extrinsic features of the Asokore Mampong housing project. These criteria were chosen based on previous research (see [Mohammed and Abdulridha, 2018](#); [Mulliner and Maliene, 2014](#); [Gan et al., 2017](#)) that found a direct link between affordable housing development initiatives and the sustainable development agenda. [Mulliner and Maliene \(2011\)](#) proposed that it is critical to align affordable housing development initiatives with the sustainability agenda by establishing stronger links between affordability and sustainability issues, specifically goals 3 and 11 ([Rassanjani, 2018](#)) and 12 and 13 ([Smets and van Lindert, 2016](#); [Gan et al., 2017](#); [Mohammed and Abdulridha, 2018](#)). [Arman et al. \(2009\)](#) proposed broad criteria for affordable housing based on environmental, economic and social sustainability. According to [Arman et al. \(2009\)](#), environmental sustainability criteria include the following: selecting a site for maximizing low-energy transportation and minimizing biodiversity losses; energy efficiency through sun shading and passive solar design; water use efficiency; and waste management throughout all phases of construction, occupation and demolition. Aspects of economic sustainability include meeting ongoing financial obligations of both individuals and governments ([Arman et al., 2009](#)). According to [Mulliner and Maliene \(2014\)](#), key criteria associated with social sustainability include: access to open green public spaces; access to leisure facilities; access to early years' child care; access to public transportation services; quality of housing; access to good-quality education; access to shopping centres; community safety; access to employment; and access to health services. Access to public transportation, community safety, low crime rates in the neighbourhood and access to health facilities and services have all been linked to good health and well-being ([Lubell et al., 2007](#); [Rohe and Stegman, 1994](#)). According to [Bredenoord \(2016\)](#), affordable housing development should be planned in such a way that easy access to social infrastructure is provided, such as designing for neighbourhood parks, playing

Criteria for housing	References
Community safety	Mulliner and Maliene (2012); Colquhoun (2004); Musa <i>et al.</i> (2015)
Crime rates in the neighbourhood is minimal	Fisher <i>et al.</i> (2009); ODPM (2005a; 2005b); Winston (2010)
Availability of interest rates and mortgage	National Housing and Planning Advice Unit [NHPAU] (2010); Shelter (2006); Mulliner and Maliene (2014)
Availability of rental lodging	Maliene and Malys (2009); Winston (2010); Mulliner and Maliene (2014)
Availability of low-cost home ownership	Sani (2013); Esruq-Labin <i>et al.</i> (2014); Mulliner and Maliene (2014)
Availability of market-value home ownership goods	Maliene and Malys (2009); ODPM (2005b); Winston (2010)
Access to shopping centers	ODPM (2005a; 2005b); Samuels (2005)
Access to health facilities and services	Osman <i>et al.</i> (2018); Ramzanpour and Rahimi (2023)
House prices in relation to income	Whitehead <i>et al.</i> (2009); Musa <i>et al.</i> (2015); Osman <i>et al.</i> (2018); Chan and Adabre (2019)
Rental cost in relation to income	CLG (2007); Whitehead <i>et al.</i> (2009); Mulliner and Maliene (2014); Chan and Adabre (2019).
Access to good quality education	Fisher <i>et al.</i> (2009); Samuels (2005); Osman <i>et al.</i> (2018)
Access to employment	Fisher <i>et al.</i> (2009); ODPM (2005a; 2005b); Winston (2010); Mulliner and Maliene (2011)
Access to public transport services	CTOD and CNT (Center for Transit-Oriented Development and Center for Neighborhood Technology) (2006); ODPM (2005a; 2005b); Osman <i>et al.</i> (2018); Ramzanpour and Rahimi (2023); Arman <i>et al.</i> (2009)
Access to open green public spaces	CLG (2007); Maliene and Malys (2009); Bredenoord (2016); Winston (2010); Ramzanpour and Rahimi (2023); Gan <i>et al.</i> (2017)
Access to leisure facilities	Bredenoord (2016); Mulliner and Maliene (2011); Mulliner and Maliene (2014)
Access to early years child care	Mulliner and Maliene (2011); Esruq-Labin <i>et al.</i> (2014)
Energy efficiency of housing	Maliene and Malys (2009); Pullen <i>et al.</i> (2010); Mohammed and Abdulridha (2018); Arman <i>et al.</i> (2009) Gan <i>et al.</i> (2017)
Water efficiency of housing	Mulliner and Maliene (2011); Darko <i>et al.</i> (2018) Arman <i>et al.</i> (2009); Gan <i>et al.</i> (2017).
Quality of housing	CLG (2006); Winston (2010); Osman <i>et al.</i> (2018); Chan and Adabre (2019); Mohammed and Abdulridha (2018).
Waste management	Winston (2010) Mohammed and Abdulridha (2018); Arman <i>et al.</i> (2009)

Source: Authors' own creation

Table 1.
A summary of the criteria for selecting affordable housing

fields; educational facilities; and shopping centres. Smets and van Lindert (2016) maintained that these factors contribute to achieving SDG 11, which calls for all people to have access to adequate, safe and affordable housing and basic services. According to Bredenoord (2016), good orientation of housing facilities will aid in improving energy efficiency, and the implementation of sustainable practices such as minimizing water usage in housing will help in lowering operational costs and supporting the affordable housing agenda. Smets and van Lindert (2016) also stated that effective waste management practices are important components of long-term settlement. These aspects are particularly relevant to Agenda 12, which aims to contribute to responsible consumption and production.

Profile of the study area and the rationale for its selection

The Asokore Mampong housing project, which commenced in 2000, is designed to be a gated community. The gated community has 91 blocks with a total of 1,024 one-bedroom

and two-bedroom flats spread out over a beautifully landscaped area, with only 225 units occupied, while the rest of the 799 units are left unoccupied, with some not completed. A facility management firm is responsible for managing the buildings, which include a police station and neighbourhood stores. It is also worth noting that the Asokore Mampong affordable housing estate includes shopping facilities, early childhood care services, leisure facilities and open green public spaces among its facilities and services. A paved walkway, paved parking lots and an internal road network with drains are among the auxiliary infrastructure features. Furthermore, the affordable housing estate is close to health services, educational facilities (including early childhood care services, first cycle, second cycle and tertiary institutions), worship centres, supermarkets and shopping malls, all of which are within a 2-km radius. These intrinsic and extrinsic characteristics of the housing project served as a foundation for selecting the criteria used in this study. The Asokore Mampong housing estate was chosen for the study based on the following parameters. To begin with, Kumasi is Ghana's second largest city, with a regional population of approximately 5,440,463 (Ghana Statistical Service, 2023). The country's housing deficit is estimated to be 2 million, with the urban population expected to rise from 58% to 70% by 2050 (Asiamah, 2023). Second, the area in which the affordable housing units were built continues to expand as one of the Ashanti Region's largest slum-developing areas and has been regarded as one of the region's largest affordable housing projects. Furthermore, because of the high pricing of the units and the high rent charged, the facility, which opened in 2020, has received a lot of media attention. As a result, the municipality's study had a need and a purpose that were influenced by this. Consequently, this provided justification for using homeowners and renters to investigate their perceptions of the criteria that influenced their decision to settle in the study area.

Research methodology

The study used a quantitative methodological approach to achieve the study's aim. The rationale for adopting this approach is emphasized by Leedy and Ormrod (2010), who acknowledge that quantitative research methodology seeks explanations and predictions that will be generalizable. The intent is to establish or validate causal relationships and to develop generalizations that contribute to existing theories. According to Babbie (2012), quantitative research is concerned with gathering numerical data and applying it to comprehend a single occurrence or generalize it across groups of people. In this study, the study's methodology was survey research. Survey research is a versatile medium that can examine respondents' attitudes, knowledge and preferences regarding a phenomenon (Collis and Hussey, 2009). Survey research was used to quantitatively describe a segment of the population, which involved examining relationships among the variables. In conducting the study, a variety of households were questioned to gather pertinent information about the selection of affordable housing units. It is important to highlight that 20 criteria were identified from the literature review, followed by a questionnaire survey on the identified criteria.

Sample size and techniques

The sample size of the study comprised persons (owners or end-users) residing in the municipality's affordable housing unit, with a particular emphasis on the low and middle-income groups. The goal was to profile their opinions regarding their personal housing experiences in the Asokore Mampong housing project to determine the important criteria used in selecting the housing units. It is important to highlight that a total of 225 units are currently being occupied by owners and tenants. Hence, the 225 units constitute the sample size. Different classical sampling techniques are frequently used in research. Some of the techniques involve random, systematic and purposeful sampling. For the purpose of this study, purposive sampling was selected for the investigation.

Survey instrument and administration

A structured questionnaire survey was designed for the data collection. The first section asked survey participants for socioeconomic information such as gender, age cohort, level of education, number of years in the facility and occupation status. The second section investigated the perspectives of homeowners and renters on the criteria for selecting affordable housing using a five-point scale: 1 = Not important, 2 = Least important, 3 = Neutral, 4 = Important and 5 = Most important. It is worth noting that a cover letter outlining the definition of affordable housing and what it entails was attached to the survey instrument to provide respondents with a clear overview and knowledge of affordable housing. The questionnaire was printed and distributed to the 225 households during the data collection period. This approach resulted in a low response rate (57) because the majority of respondents were unavailable during the day and would refuse to respond to the questionnaire during the evening. To encourage the respondents to complete the survey, the facility officer then created a platform on which the questionnaires were displayed so that the respondents could complete them whenever it suited them. However, the number of respondents did not increase, leaving the interviewer with no choice but to visit the respondents on weekends, which some respondents would also be reluctant to do because they felt their weekend was being disrupted by work-related issues or other issues they did not want to deal with. The data gathering, which was supposed to take one month, ended up taking one and a half months as a result of the back and forth. A total of 124 completed questionnaires were received after the cut-off date for the data collection, equating to a 55% response rate.

Data analysis

The Statistical Package for the Social Sciences (SPSS) was used to decode the quantitative data from a closed-ended questionnaire, and descriptive and inferential statistics were used to thoroughly analyse the data. The analysis of the socio-economic data was presented using frequency tables. Subsequently, the relative importance index (RII) was used to rank the important criteria for selecting affordable housing in a hierarchical order. RII has been used to calculate the weighted average of all the attributes based on the ranking given by the respondents to prioritize the factors or criteria. RII is one of the commonly used tools to rank the factors on the basis of their weighted average in previous studies (Shah *et al.*, 2021; Olomolaiye *et al.*, 1987). These rankings made it possible to cross-compare the relative importance of the factors as perceived by respondents (Shah *et al.*, 2021). Using the equation below, the RII was computed:

$$RII = \frac{\sum W}{(A*N)}$$

where:

RII = relative importance index;

W = weighting given to each factor by respondents (ranging from 1 to 5);

A = highest weight (i.e. 5 in this case); and

N = total number of residents.

To reduce the large number of criteria into smaller groups, the exploratory factor analysis was used thereafter. The Cronbach's alpha test was used to check the reliability of the survey instrument. Cronbach's alpha is among the most widely used methods for assessing scale reliability. As a result, using the Cronbach's coefficient alpha, an internal reliability test on questions of the Likert scale was conducted in this study. According to Maree and

Pietersen (2007), a Cronbach's alpha coefficient of 0.9, 0.80 and 0.70 would indicate high reliability, moderate reliability and low reliability, respectively. It is worth reporting that the alpha value for the 20 criteria for affordable housing was 0.918 illustrating that the measurement using the five-point Likert scale was highly reliable.

Results and discussion

Socio-economic background

The socio-economic information of the survey participants was analysed using descriptive statistics, and the results are presented in [Table 2](#) using frequency distribution and percentages. With respect to gender, 57% of the respondents are males, while the remaining 43% are females for a total of 124 respondents. Concerning the age of respondents, it is evident that 49% are among the ages of 18 and 25, 20% are among the ages of 26 and 35, 19% are among the ages of 36 and 45, 6% are among the ages of 46–55 and 6% are 56 and older.

With regard to the level of education, most of the respondents have attained tertiary level (65%), followed by those who have no educational background (16%), as shown in [Table 2](#). It can be inferred that there are more highly educated people in the area because 65% have attained a tertiary level of education. In terms of the number of years that end-users have

Socio-economic background	Frequency	%
<i>Gender of respondents</i>		
Male	71	57
Female	53	43
Total	124	100
<i>Age cohort of respondents</i>		
18–25	61	49
26–35	25	20
36–45	24	19
46–55	7	6
56 and above	7	6
Total	124	100
<i>Level of education</i>		
Basic level	4	3
Senior high school (SHS)	7	6
Technical/vocational	12	10
Tertiary	81	65
Never	20	16
Total	124	100
<i>Number of years in the facility</i>		
Less than 6 months	22	18
6 months to 1 year	43	35
1–2 years	32	26
More than 2 years	27	22
Total	124	100
<i>Occupier's status</i>		
Owner	35	28
Renter	89	72
Total	124	100

Table 2.
Socio-economic
background of
respondents

Source: Authors' own creation

occupied the facility, it can be seen that approximately one-third of the occupants are new, with 35% of respondents being occupants between six months and one year, 26% being occupants between one and two years, 22% being occupants for more than two years and 18% staying for less than six months. In terms of occupier status, the majority of respondents (72%) are tenants, while the remaining 28% are owners.

Criteria for affordable housing

Table 3 shows the criteria for the selection of affordable housing, and in total, 20 factors were evaluated based on a five-point Likert scale, where 1 = not important, 2 = least important, 3 = neutral, 4 = important and 5 = most important. Subsequently, the significant criteria for selecting the housing units were ranked in a hierarchical order using the RII. According to the respondents and with reference to Table 3, community safety was ranked first with an RII score of 0.695. This implies that homeowners and renters place a higher premium on community safety in terms of decision-making in selecting affordable housing. Community safety, as one of the important criteria, is to ensure that the location of affordable housing is violence-free to enhance the property's value for money. The criterion "waste management" was ranked second, with a RII of 0.677. To improve and maintain the quality of affordable housing, it is recommended that sustainable waste management practices be incorporated into the design and construction of affordable housing. The third-ranked criterion is access to good-quality education, with a score of 0.656. This implies that the location of affordable housing units in close proximity to social infrastructure, such as educational facility, is important. A further interrogation of the table revealed that the water efficiency of housing (RII = 0.656) and access to public transport services (RII = 0.644) are ranked 4th and 5th, respectively. Water efficiency is an important criterion for both homeowners and renters. The implementation of sustainable practices, such as reducing water usage, helps to reduce operational costs and supports the affordable housing agenda.

Criteria for housing	1	2	3	4	5	ΣW	RII	Rank
Community safety	4	34	123	100	170	431	0.695	1st
Crime rates in the neighbourhood is minimal	14	60	96	104	110	384	0.619	12th
Availability of interest rates and mortgage	13	56	108	116	90	383	0.618	13th
Availability of rental lodging	12	48	129	96	105	390	0.629	7th
Availability of low-cost home ownership	13	64	129	56	110	372	0.600	15th
Availability of market-value home ownership goods	14	66	120	68	100	368	0.594	17th
Access to shopping centers	9	60	120	100	100	389	0.627	8th
Access to health facilities and services	14	50	111	108	105	388	0.626	10th
House prices in relation to income	10	64	111	116	80	381	0.615	14th
Rental cost in relation to income	25	30	135	80	95	365	0.589	18th
Access to good-quality education	7	62	93	120	125	407	0.656	3rd
Access to employment	12	56	111	112	95	386	0.623	11th
Access to public transport services	12	38	132	112	105	399	0.644	5th
Access to open green public spaces	13	60	114	116	70	373	0.602	16th
Access to leisure facilities	14	64	123	92	70	363	0.585	19th
Access to early years child care	14	72	99	108	70	363	0.585	20th
The energy efficiency of housing	14	46	123	100	105	388	0.626	9th
The water efficiency of housing	8	44	144	76	135	407	0.656	4th
Quality of housing	12	62	84	104	135	397	0.640	6th
Waste management	8	32	144	96	140	420	0.677	2nd

Table 3. Relative important index of criteria for affordable housing

Source: Authors' own creation

The proximity of housing to public transportation services is critical because it reduces travel distance and time while also supporting Agenda 13 of the SDGs by reducing carbon dioxide emissions from vehicles. Notably, the least ranked criterion is access to early years' child care, with an RII score of 0.585. Thus, RII scores of 0.5 and above were considered significant in this study, while scores less than 0.5 were considered insignificant. All RII values are clearly greater than 0.5, indicating that all selection criteria for affordable housing are important.

Classification of the criteria using exploratory factor analysis

EFA was used to identify the underlying components of a set of 20 criteria. This allowed the most important criteria used in deciding which facility to investigate further to be reduced and further classified. The principal components analysis extraction technique was chosen because it allowed for the evaluation of the variables' convergent and discriminant validity. Notably, there are three key processes in performing EFA, and the first step, according to Pallant (2020), is to determine whether the study data are appropriate for EFA. As a result, Bartlett's sphericity test and the Kaiser–Meyer–Olkin (KMO) sampling adequacy test were applied to the variables of affordable housing criteria. According to Kaiser (1974) and Field (2013), in order for an EFA to be considered satisfactory, the KMO value must be greater than the acceptable cutoff point of 0.50. Tabachnick and Fidell (2012) state that a good factor analysis requires a KMO value between 0 and 1, with 0.60 being the minimum. The Bartlett test reveals the degree to which variables are correlated, and the significance level for the Bartlett's test should be $p < 0.05$ for EFA to be regarded as appropriate (Field, 2013). Table 4 shows a KMO value of 0.951, which is greater than the minimum allowable level, and a Bartlett's sphericity value of $p = 0.000$ (i.e. $p < 0.05$). These results suggest that EFA could be used to interpret the data.

Factor extraction is the next phase, according to Pallant (2020), after determining the relevance and usefulness of the research data. The most widely used methods for extracting the factor within the proposed items are the Kaiser's criterion, where eigenvalues greater than 1 are deemed relevant, and the Catell's scree test, which keeps all factors above the elbow in the structure (Pallant, 2020). The criteria for affordable housing were evaluated using an analysis of the main components. The variables that load on each distinguishable component were extracted using varimax rotation and the "Kaiser's criterion leveraging eigenvalues". The most important factors, as determined by Kaiser's criterion, are those whose eigenvalues are greater than 1. The variables for affordable housing were used to extract the components with initial eigenvalues larger than 1. Table 5 provides the result for this factor structure. The two extracted components' eigenvalues are 12.629 and 1.183. The total variance table shows that component one can account for 63.146% of the variance, and component two can account for 5.914% of the variance. However, the two factors worked together to account for 69.060% of the variance, demonstrating that they have a big impact on the requirements for affordable housing. Based on the factor analysis and with specific

Kaiser–Meyer–Olkin measure of sampling adequacy		0.951
Bartlett's test of sphericity	Approx. Chi-square	2,210.222
	df	190
	Sig.	0.000

Table 4.
KMO and Bartlett's
test

Source: Authors' own creation

Component	Extraction sums of squared loadings			Rotation sums of squared loadings				
	Total	Cum %	Total	% of variance	Cum %	Total	% of variance	Cum %
1	12.629	63.146	12.629	63.146	63.146	7.184	35.920	35.920
2	1.183	69.060	1.183	5.914	69.060	6.628	33.140	69.060
3	0.890	73.509						
4	0.634	76.678						
5	0.532	79.337						
6	0.477	81.723						
7	0.444	83.944						
8	0.426	86.077						
9	0.387	88.010						
10	0.349	89.755						
11	0.303	91.269						
12	0.281	92.674						
13	0.253	93.941						
14	0.250	95.191						
15	0.224	96.313						
16	0.188	97.253						
17	0.166	98.084						
18	0.145	98.810						
19	0.138	99.501						
20	0.100	100.000						

Source: Authors' own creation

Table 5.
Total variance explained for criteria for selecting affordable housing

reference to [Table 6](#), component one is referred to as sustainability criteria, whereas component two is known as housing demand and supply and social service provision.

Discussions of findings

The RII and EFA were used in analysing the 20 criteria, which were based on a five-point Likert scale. Community safety is ranked first with an RII score of 0.695; this is followed by waste management with a score of 0.677; and the third ranked criterion is access to good-quality education with a score of 0.656. The discussion of these criteria is presented below.

Community safety

In this study, low- to middle-income groups ranked community safety as the most important criterion for selecting affordable housing (RII = 0.695). It implies that it is given greater weight than all other criteria. This only proves that community safety is the most important criterion homeowners and tenants consider in selecting affordable housing, the reason being that it is concerned with the quality of life and the ability to pursue and reap the full benefits of our social and domestic lives without fear or interference because of disorderliness and violence. This is surprising and contradicts the normative literature, where house price to income and rental cost to income were the highest-ranked criteria. Studies conducted by [Whitehead et al. \(2009\)](#), [Mulliner and Maliene \(2011\)](#), [Musa et al. \(2015\)](#), [Osman et al. \(2018\)](#) and [Chan and Adabre \(2019\)](#) provide empirical evidence. Compared to previous studies, neighbourhood safety was ranked second by [Mohammed and Abdulridha \(2018\)](#). In another study conducted in the UK by [Mulliner and Maliene \(2011\)](#), community safety was ranked 13th. The reason for this choice is that, in recent years, safety has been a major concern in most Ghanaian communities. As a result, regardless of income level, homeowners and tenants are willing to pay more to buy or rent a home in safer communities. This is also the case because this

Table 6.
Rotated component
matrix of criteria for
selecting affordable
housing

Factors	Component	
	1	2
Access to open green public spaces	0.816	
Access to leisure facilities	0.775	
The water efficiency of housing	0.754	
Access to early years childcare	0.739	
Access to public transport services	0.734	
Quality of housing	0.700	
Access to employment	0.698	
The energy efficiency of housing	0.695	
Access to good-quality education	0.625	
Access to shopping centers	0.620	
Community safety	0.543	
Availability of rental lodging		0.828
Availability of interest rates and mortgage		0.805
Availability of low-cost home ownership		0.783
Availability of market value home ownership goods		0.762
House prices in relation to income		0.759
Access to health facilities and services		0.708
Crime rates in the neighbourhood is minimal		0.635
Rental cost in relation to income		0.628
Waste management		0.616

Source: Authors' own creation

affordable housing estate is a gated community, as reported by [Otchere et al. \(2023\)](#), with security personnel at all entry points and a police station on-site. This supports [Ramzanpour and Rahimi's \(2023\)](#) claim that security facilities are one of the most important criteria. In their study, [Owusu et al. \(2015\)](#) confirm this, citing a growing concern for community safety in Ghana. According to the study, rising security and safety concerns, as well as a fear of crime, have led to the implementation of target-hardening measures such as high walls, metal burglar-proofed windows and doors, security doors/special door locks and so on, which tend to create "security islands" with little impact on community crime incidence.

Waste management

Waste management was ranked as the second most important criterion by respondents. This suggests that waste management is more important to homeowners and tenants in their communities. It is critical to emphasize that the affordable housing estate has an effective waste management system in place for collecting both solid and liquid waste. Notably, each apartment is provided with a solid waste bin, and collection occurs once a week. In the case of liquid waste, grey and black water from each block of flats is directed into a central sewer system with a recycling plant for the purpose of recycling grey water for irrigation of the premises' lawns. Empirical evidence revealed that cities in the developing world have a serious problem with solid waste management, making it difficult to achieve goals like the Clean City program. Waste management, for example, is a major issue in the majority of Ghanaian communities ([Amoah and Kosoe, 2014](#)). [Norsa'adah et al. \(2020\)](#) add that many governments in the Global South struggle with adequate solid waste management. Nonetheless, this finding contradicts previous studies, as [Mohammed and Abdulridha \(2018\)](#) ranked waste management system 8th and [Mulliner and Maliene \(2014\)](#) ranked this criterion 19th.

Access to good quality education

The third most important criterion for selecting affordable housing was access to high-quality education. This demonstrates that homeowners and tenants recognize the value of a high-quality education for their children. The availability of high-quality education in close proximity implies that the travel distance to educational facilities is greatly reduced, lowering transportation costs for parents. In their study, [Osman *et al.* \(2018\)](#) discovered that access to public facilities such as schools was one of the top-ranked criteria for the provision of affordable housing in Malaysia. Similarly, in a study of Amenity-Based Housing Affordability Indexes in the United States, Fisher (2009) prioritized access to good quality education as one of the housing selection criteria. [Mueller and Tighe \(2007\)](#) also provided evidence on the relationship between affordable housing and community benefits in education. However, [Mulliner and Maliene \(2014\)](#) and [Mohammed and Abdulridha \(2018\)](#) ranked this criterion 9th and 13th, respectively.

Water efficiency of housing

The water efficiency of housing is ranked fourth. This is because Ghana's water utility service has increased water tariffs by more than 100% in the past two years, and further tariff increases are possible in the coming years. This demonstrates that homeowners and tenants understand the importance of water conservation and how this practice will help them save money on water usage. [Gan *et al.* \(2017\)](#), [Thoo and Killick \(2012\)](#) and [Chan and Owusu \(2018\)](#) all support this.

Access to public transport services

The respondents ranked access to public transportation as the fifth most important criterion, implying that the majority of them value having public transportation close to their place of residence. Previous research has found that this criterion is important in the selection of affordable housing. For example, [Ramzanpour and Rahimi \(2023\)](#) identified access to public transportation as an important criterion for affordable housing selection. This finding is consistent with the findings of [Osman *et al.* \(2018\)](#), who discovered that access to public transportation is an important criterion for selecting affordable housing in Malaysia. Access to public transportation, on the other hand, was ranked 10th by [Mulliner and Maliene \(2014\)](#) in the UK and 8th by [Osman *et al.* \(2018\)](#) and [Mohammed and Abdulridha \(2018\)](#) in Malaysia and Iraq, respectively.

Taxonomy of the underlying criteria for selecting affordable housing

The factor analysis was used to analyse the criteria for affordable housing, and two components emerged as the principal factors. These two extracted components are responsible for 69.060% of the variance in the 20 affordable housing criteria. The first component was classified as sustainability criteria, while the second component was designated as housing demand and supply and social service provision.

Sustainability criteria

The first component had the largest percentage of variance explained and was defined by 11 variables, namely, access to open green public spaces (0.816); access to leisure facilities (0.775); water efficiency of housing (0.754); access to early years' child care (0.739); access to public transport services (0.734); quality of housing (0.700); energy efficiency of housing (0.695); access to good quality education (0.625); access to shopping centres (0.620); and community safety (0.543). Notably, the corresponding factor loading for each variable has

been enclosed in parenthesis. The findings imply that the homeowners prioritize sustainability and environmental consciousness in their decision-making in terms of selecting their place of residence. They are open to adopting criteria that promote energy and water efficiency practices, indicating a willingness to reduce their environmental footprint and contribute to sustainable living. More so, homeowners can reduce greenhouse gas emissions and energy use related to long-distance transportation if infrastructure provision is closer to their place of residence. Furthermore, low-income households can spend more of their limited income on non-housing needs when transportation and energy costs are reduced. This move can support a broader sustainability agenda, such as limiting climate change (SDG 13), promoting sustainable cities and communities (SDG 11) and promoting well-being (SDG 3) for all at all ages. One aspect of sustainable communities is the availability of low-cost housing options. This is because of the fact that homes are essential to the survival of present and future generations (Ihuah *et al.*, 2014). According to UN-Habitat (2011), housing is both fundamental to and intrinsic to society. The findings are consistent with the normative literature and supported by Yuan *et al.* (2020), CAHF (2020) and Mulliner and Maliene (2012). For instance, Yuan *et al.* (2020) and Mulliner and Maliene (2012) identified social environment, housing quality, energy efficiency, water efficiency of housing and community safety as components of quality management. Aspects relating to infrastructure provision identified by Mulliner and Maliene (2011) include access to open green public spaces, access to leisure facilities, access to early years' child care, access to public transport services, access to good-quality education and access to shopping centres. CAHF (2020) and Gürsoy and Akıncı (2022) reported that access to quality housing has a positive bearing on other social services and consequently improves the quality of the lives of individuals.

The objectives and targets set for the Sustainable Development Goals (SDGs) and the United Nations New Urban Agenda, according to Wakely (2020), call for comprehensive urban housing policies based on inclusion and participation. As a result, Bredenoord (2016) stated that long-term goals for affordable housing and applications are attainable. The findings are consistent with Gan *et al.*'s (2017) broad categorization to reflect affordability criteria under environmental, economic and social sustainability. Notably, social sustainability is linked to criteria such as access to open green public spaces, access to leisure facilities, access to early years' child care, access to public transportation, housing quality, access to good-quality education, access to shopping centres and community safety. Water efficiency and energy efficiency of housing criteria, on the other hand, fall under the purview of economic and environmental sustainability (Mulliner and Maliene, 2014).

Housing demand and supply and provision of social services

The second component was defined by nine variables, including: availability of rental lodging; availability of interest rates and mortgages; availability of low-cost home ownership; availability of market value home ownership goods; house prices in relation to income; access to health facilities and services; minimal crime rates in the neighbourhood; rental cost in relation to income; and waste management. Notably, the contributing factors that are most significant were the availability of rental lodging (0.828), closely followed by the availability of interest rates and mortgages (0.805) and the availability of low-cost home ownership (0.783). It is instructive to note that six factors, including the availability of rental lodging, the availability of interest rates and mortgages, the availability of low-cost home ownership, the availability of market value home ownership goods, house prices in relation to income and rental costs in relation to income fall within the domain of housing demand and supply. Subsequently, these criteria are directly linked to economic sustainability as

they are geared towards meeting the financial obligations of both individuals and the government on an ongoing basis (Mulliner and Maliene, 2014; Arman *et al.*, 2009). In addition, these findings are in consonance with those of Mulliner and Maliene (2012) and Lau and Li (2006). The authors identified the price of a home in relation to its income, the cost of renting a home in relation to its income, interest rates and mortgage availability, the availability of rental lodging, the availability of low-cost home ownership products and the availability of market-value home ownership goods as factors related to housing demand and supply and the provision of social service. Mulliner and Maliene (2011) postulated that housing affordability has traditionally been defined and assessed using economic criteria, specifically housing costs in relation to income. The ratio of house prices to income is perhaps the most basic measure of housing affordability. The remaining three variables are related to social service provision (access to health facilities and services, low crime rates in the neighbourhood and waste management). In terms of the sustainable development agenda, these criteria fall under the domain of social and environmental sustainability, as this agenda aims to improve social integration, interaction and acceptance, as well as waste management during the operational stage of the building (Arman *et al.*, 2009).

Conclusion and recommendation

This paper examined the important criteria for selecting affordable housing in LDCs such as Ghana and determined a suitable classification of the criteria. Using a relative importance index approach, the majority of the respondents identified community safety as the base criteria for selecting affordable housing, followed by waste management and access to good-quality education. This means individuals are concerned about their safety, quality of educational system and living in a clean environment. Subsequently, the EFA was adopted to develop a suitable taxonomy system for the criteria. Based on the EFA, Component 1 is referred to as sustainability criteria, whereas Component 2 is known as housing demand and supply and provision of social services. Impliedly, these two components can support a broader sustainability agenda, such as SDGs 3, 11, 12 and 13.

This study's findings are significant in terms of industry practice and theory. In practice, stakeholders such as estate developers will have a clear understanding of the selection criteria discovered, such as community safety, waste management and access to high-quality education, among others, and will capitalize on them by incorporating them into their projects.

Furthermore, this could be used as a business case to help investors with future investments in affordable housing. Policymakers, on the other hand, will benefit from the study's empirical evidence as they develop and implement laws and policies that prioritize sustainability criteria such as access to open green public spaces, water efficiency in housing, access to public transportation, energy efficiency in housing and other important criteria. Overall, the research will benefit affordable housing investors, consumers and society as a whole on a local, national and international scale. It would assist investors, home buyers and renters and other interested parties in making purchasing and renting decisions, as well as monitor affordable housing development that is also sustainable. This study was limited to Ghana's Ashanti Region. The findings, however, have practical implications for affordable housing projects in other regions of Ghana and may serve as a useful guide for other LDCs. Further research would focus on gathering data from other stakeholders, such as real estate developers, investors and policymakers, about the importance of affordable housing criteria.

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