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Analyzing dwellers' perceptions and challenges to sustaining condominium housing development in Gondar City, Central Gondar, Ethiopia

Bantayehu Ayalew Workineh[1]✉ & Kassahun Gashu[2]

Condominium housing is a type of housing that differs in terms of administration, resource sharing, and service delivery. This study aims to assess residents' perceptions of condominium housing and identify key challenges to its sustaining condominium development in Gondar City. A mixed research approach was used, and samples were collected using systematic and snowball sampling methods. The primary data were collected from condominium residents, officials, condominium committees, and fieldwork via questionnaires, interviews, and observations. The secondary data were gathered from various reports via document reviews. These data sets were analyzed using descriptive statistics, binomial logistic regression, and content analysis. The results indicate that approximately 50.29% of respondents had a negative view regarding the quality of the condominiums, 58.24% perceived poor management, and 61.11% believed that owning and renting a condominium is costly. The quality of the condominium house relates to the service, environmental quality, and space. The finding shows that the perception of dwellers on the poor quality of the houses relates to service, environmental quality, and open space. Similarly, ineffective sewerage, community participation, recreation, administration, and noise contribute to the negative perception of residents about the condominium management system. The challenges to sustaining the condominium housing development were affordability, quality of the house and neighborhood, and low loan return. Hence, the policymakers and different stakeholders can take lessons from the findings and design sustainable condominium development strategies. The scholars can use this study as a secondary source or reference for further research.

[1] Department of Geography and Enviromental Studies, University of Gondar, Gondar, Ethiopia. [2] Department of Geography and Enviromental Studies, Bahir Dar University, Bahir Dar, Ethiopia. ✉email: bantayal2006@gmail.com

Introduction

Housing is a basic necessity for human beings and a central part of urban development and quality of life. Globally, there are different housing typologies, among which condominium represents one type of common interest legal tenure that combines detached and individually owned property with undivided fractional ownership of common areas and infrastructure (Stefan & Randy 2019). Condominiums are a dominant form of home ownership in metropolitan areas, with an escalating popularity of owner-occupied homes in the last couple of decades, contributing to urban intensification and changing other forms of residential tenure (Yip et al. 2007; Lehrer & Wieditz 2009; Stefan & Randy 2019).

Contemporary housing development emphasizes a green strategy package, regulated land consumption, continuous government engagement, strategic activation of specialized instruments, affordability, environmentally responsive design, and infrastructure provision (Zhang et al. 2011; Arku 2020; Debrunner and Hartmann 2020). Affordability is a condition for making the transition to sustainable housing. It is critical to establish a link between affordability and other aspects of sustainability (UN-Habitat 2012; Haidar and Bahammam 2021). However, a sustainable housing strategy can significantly improve people's quality of life and provide a healthy environment while also improving social, economic, and environmental situations (Karji et al., 2019; Haidar & Bahammam 2021).

Regardless of their growing importance, condominium developments faced considerable sustainability challenges. Environmental problems, which stem from poorly designed open spaces and houses with limited greenery and indoor air (Weldeyesus 2019). Moreover, sustainability from an economic perspective is given more emphasis than social well-being and environmental protection (Arku 2020). Studies in Toronto (Qing 2018) indicated that condominium development influences the urban form and lives of residents, thus implicating various aspects of social sustainability to some extent. This research argument focused on the difficulties that existed in their country regarding environmental quality and sustainable living in communal condominium space management.

Perception is defined as the process through which people arrange and interpret their sensory impressions to make sense of their surroundings (Dhingra & Dhingra 2011). Individuals' favorable or unfavorable opinions of their home may or may not reflect the house's real condition. The study on housing perception investigates residents' perceptions of their housing conditions. Residents' perceptions of the quality of the houses and environment in condominiums either harm or help their development (Teklemariam 2021). According to Ingwani et al., the dwellers perceived that condominium housing led to insufficient traditional utilities, weak social interactions, and ineffectiveness in constructing quality and comfortable homes for beneficiaries (Ingwani et al. 2010). Perception plays a key role in condominium development, influencing residents' satisfaction, investment decisions, and community engagement (Gebrewold 2019; Shiferaw et al. 2023). Residents' views on affordability, construction quality, management, and amenities affect their willingness to occupy and maintain condominiums. Addressing challenges such as management, infrastructure, and social spaces is essential to ensure sustainable and socially acceptable condominium development (Bandara et al., 2020).

Previous studies have focused on housing satisfaction and socio-demographic and economic characteristics of the residents, such as income level, marital status, family size, gender, and ownership status, as well as residents' well-being and management problems (Kahlmeier et al. 2001; Teck-Hong 2012; Lee and Park 2010; Vergara et al. 2019). In the Ethiopian context, Gebrewold (2015) indicated that residents have varying opinions about the quality, affordability, accessibility, neighbors, sanitation, and location of condominium houses. However, it does not show the residents' perceptions of different housing factors and how factors are associated with each other.

Gondar is a historical city in Ethiopia (Pankhurst, 1990). The research conducted about condominium housing is limited except for Workineh (2022) and Shiferaw et al. (2023). These researches focused on the benefits of condominiums and waste disposal challenges, respectively. The method and content of the research differ from previous research conducted on the site. Methodologically, this research employed a mixed approach. In Gondar city, condominiums were constructed in 2007-2008 and transferred to beneficiaries in 2012–2013. The condominium housing development program was not sustained beyond the two phases, and the researcher aims to examine the reasons for the lack of sustainability of condominium development. Therefore, this research aims to analyze perceptions and key challenges towards sustaining condominium housing development. The research also emphasizes how the perception of the quality of housing is linked to service, environmental quality, and space; and management systems are linked to sewerage, community participation, recreation, administration, and noise. The results of this study can be used by policymakers to create suitable housing development plans that take people's opinions into account. Additionally, the finding of the research can also help scholars for further reference and direction for further research. It can also be used by local administrators who are interested in sustainable housing development, real estate developers who are designing demand-driven and sustainable housing frameworks, and residents who are looking for well-designed housing that suits their needs.

Theoretical Perspectives of the Study. Housing Quality Theory reveals the shaping of residents' perceptions with the quality of the surrounding neighborhood and the physical attributes of their housing (Teketel & Dong, 2021; Mridha, 2023). In condominium scenarios, sanitation, service delivery, environmental quality, and access to open spaces are particularly significant, since they have direct implications for perceptions of livability and housing quality (Galster, 2021). In condominium housing developments, shared facilities and collective services intensify residents' sensitivity to deficiencies in management and environmental conditions, in that way reinforcing negative perceptions (Yau, 2011).

Sustainable Development Theory underlines on meeting the demand of immediate housing needs without affecting long-term economic, social, and environmental considerations (United Nations, 2020). This theory is usually evaluated through three interconnected economic, social, and environmental dimensions. Economic sustainability relate to housing affordability and access to financing, ensuring that residents can meet their financial obligations without unreasonable stress. In this research economic sustainability relates with to affordability, loan repayment, and rental costs (UN-Habitat, 2012). Social sustainability emphasis about community participation, sense of belongingness, general quality of life, and engagement among residents. In this research, social sustainability is concerns with community participation, management efficiency, and safety (Colantonio & Dixon, 2011). Thirdly, Environmental sustainability addresses critical issues related to sanitation and waste management, ensuring that the residential environment is healthy and sustainable (Dempsey et al., 2021). In our research,

Environmental sustainability includes sanitation, sewerage systems, cleanliness, and noise control (Chiu, 2004).

The Theory of Planned Behavior reveals how individuals' evaluations and intentions on housing situations are shaped with attitudes, social influence, and perceived controls. This indicates that positive perceptions can increase residents' confidence in condominium living (Ajzen, 2020). The limited perceived control and shared dissatisfaction over management decisions contribute to negative attitudes toward housing quality and social pressure, which result in unfavorable perceptions of condominium housing systems (Yau, 2011).

Institutional Theory emphasizes the critical role of governance structures and administrative capacities in determining housing outcomes. Effective institutions are essential for successful service delivery and resident satisfaction (Scott, 2021). In condominium housing, institutions such as housing agencies and condominium management committees play a critical role in regulating service delivery and maintenance (Yau, 2011). The management failures and negative resident perceptions, in so doing frightening the sustainability of condominium housing development exist from weak institutional capacity, ineffective administration, and poor enforcement mechanisms (Yau, 2011; UN-Habitat, 2012).

These theories provide a broad framework for exploring condominium housing development. The residents' perceptions of condominium housing affected with housing quality, management efficiency, and economic conditions. These perceptions mediate the relationship between housing conditions and sustainable development outcomes. Institutional effectiveness moderates this relationship by shaping governance performance and implementation capacity.

Methods And Materials

Study Area. The study was conducted in Gondar city, Ethiopia, located at 12°45' north and 37° 45' east (Fig. 1). Gondar was established in 1636 and served as the permanent capital city from 1636 until 1855 in the history of the country (Getahun 2012).

The population of the Gondar city is rising rapidly. In the first national census of 1984, the total population of the city was 80,886, while in the second and third censuses of 1994 and 2007; the population was recorded as 112,249 and 207,044 respectively. The population of Gondar city was estimated to increase to 323,875 by 2015 and 360,600 in 2017 (CSA 2013).

Due to the lure of superior social services in metropolitan destinations, rural-to-urban migration considerably contributes to the progress of urbanization in Ethiopia (Hailemariam and Adugna 2011). The number of informal settlers is rising in direct proportion to the city's rapid population growth and the difficulty in obtaining urban land through legal routes (Adam 2014; Gebeyehu 2016).

The city of Gondar is challenged by high urban expansion, informality, high compensation payments, high cost of housing, and poor service provision (Abebie, & Getachew 2022). There are different housing types in the study area. The dominant house in Gondar city is an informal house next to a formal private house, but the share of condominium houses is very small. But the condominium can minimize the shortage of housing, reduce the cost of expropriation, and enhance social provision and can be relatively affordable (Workineh 2022).

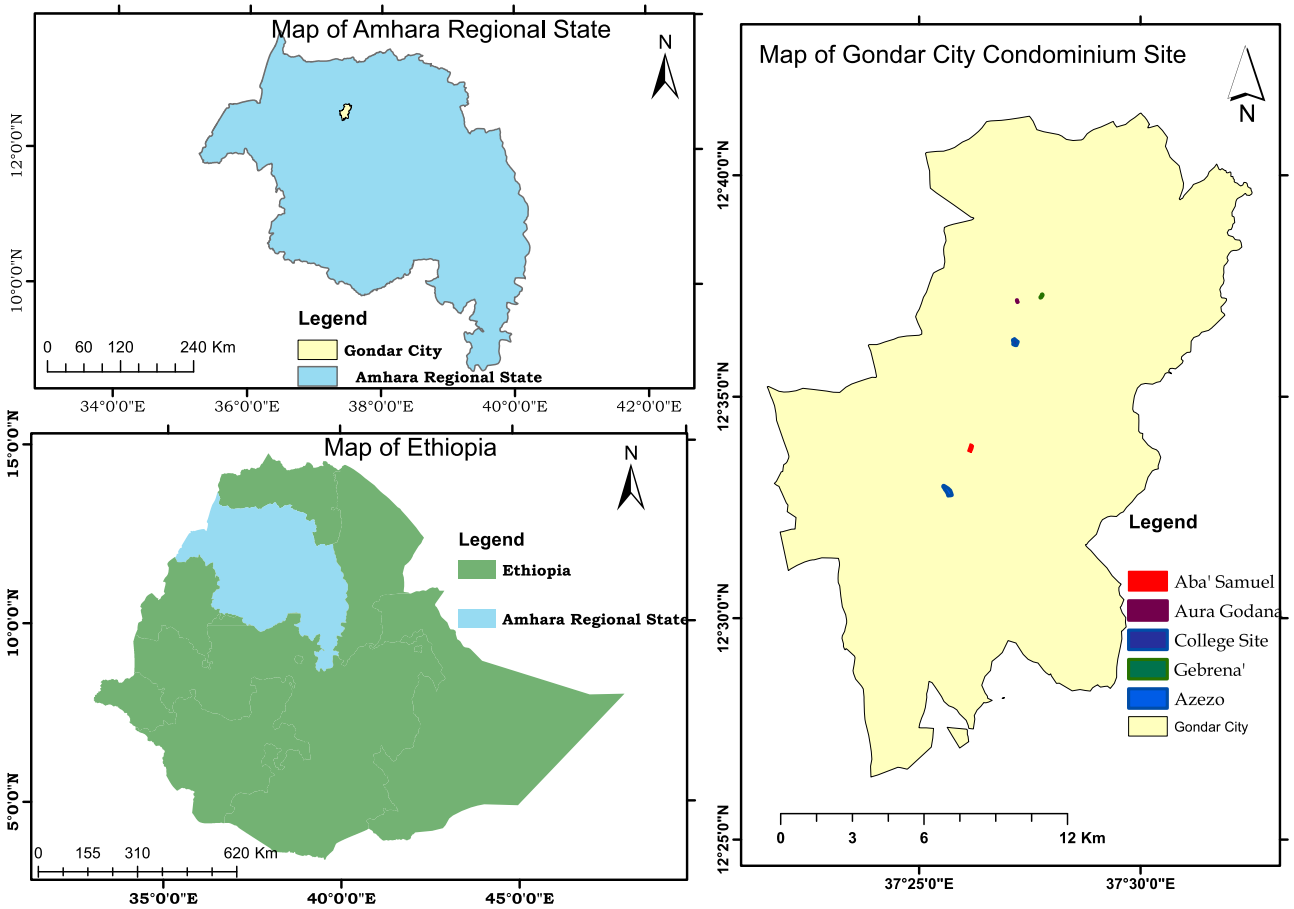


Fig. 1 Map of the study area (Source: Ethiopian Mapping Agency modified by Author).

Methodology. This research uses a mixed research method, that is, quantitative and qualitative, to analyze perceptions and key challenges in sustaining condominium housing development. This study employs a convergent mixed-methods design, combining quantitative surveys and qualitative interviews collected concurrently. Both data types were analyzed separately and then integrated to provide a comprehensive understanding of residents' perceptions and key challenges in sustaining condominium housing development. This approach allows for triangulation of findings, enhancing the validity of the results. The quantitative method was used to quantify the respondent survey questionnaire. The qualitative method was used to describe data collected through interviews and observations.

Both primary and secondary data were used. The primary data sources were collected from condominium resident households, committees, and officials, using questionnaires through closed-ended questions, interviews, and observations. The questionnaire was delivered to the systematically selected condominium residents. The survey was conducted among randomly selected dwellers that lived in the condominium units. The questions were initially tested with a pilot test, and a final field survey was conducted in March 2020 after checking and incorporating the feedback. Interviews were conducted with selected officials and condominium committees using snowball techniques. The officials were selected for interviews from relevant offices whose activities were directly linked to housing and its development. In addition, the condominium committees are taken based on their participation in the development and serving for a continuous year. The research team conducted direct observation of an environment, neighborhoods, and physical conditions in a physical setting of condominiums. The observation took place at three main condominium sites, that is, Azezo, Aba_Samuel, and Gibrna. In addition, the secondary data is collected from reports of different offices.

Sampling Methods and Sample Size Determination. In this study, both snowball and systematic sampling methods were employed. Snowball sampling helped reach respondents who were difficult to identify directly, while systematic sampling ensured representative coverage by selecting every k^{th} household across the study area. These methods together enabled the inclusion of relevant participants while maintaining a representative sample. The snowball sampling was used to select respondents among residents and government officials for the interviews. In addition, offices and officials were selected due to the existence of relevant data. The systematic sampling was used to take condominium household samples, and the sample size of the respondents was determined using Taro Yamane's formula with a 95% confidence level and 5% precision (Yamane, 1967).

$$n = \frac{N}{1 + (N * e2)}$$

Where: n is the sample size,
N is the total household in the condominium
e is the level of precision (5%).

$$n = \frac{3346}{1+(3346*0.05*0.05)}$$
$$n = 357$$

The total number of condominium housing units in the study area was 3346. Thus, the number of sample respondents computed using the above formula is 357.

Data Analysis. The findings of the research were analyzed using quantitative and qualitative methods. The quantitative analysis was conducted using the binomial logistic regression model. It was used to analyze the residents' perceptions on the quality and management of the condominium through checking fitness to the model using STATA software. A binomial logistic regression model was used because the dependent variables—residents' perceptions of condominium quality and management—are binary, representing positive or negative views. The model is appropriate for examining how various factors such as sewerage, administration, noise, service, environment, community participation, space, and recreation influence these perceptions. The model was used to analyze the association between the dependent and independent variables (Table 1). We tested the dependent and independent variables by giving a response of "0" if the person thought it was positive and "1" if they thought it was negative. The identified dependent variables were quality and management, whereas the independent variables include sewerage, administration, noise, service, environment, community participation, space, and recreation. In addition, simple descriptive statistics such as summation, mean, and percentage were used to analyze the socioeconomic and demographic data of the respondent. The qualitative data was analyzed through thematic analysis methods. Qualitative data from interviews and observations were analyzed using thematic analysis, where transcripts were coded and grouped into themes such as management and housing quality. Themes were validated through triangulation with survey data to ensure accuracy and consistency.

Table 1 Description of dependent and explanatory variables.

Variables in the model	Variable definitions	Expected Degree Influence	Variable type
Quality	The quality of the houses and surrounding area affected by other factors.		Dependent
Management	The managing of the condominium is determined by other independent factors		Dependent
Sewerage	The liquid waste deposing pipeline affecting the quality of houses and surrounding areas.	-	Independent
Administration	The institutional and organizational linkage in the managing of the condominium	+	Independent
Noise	The sound pollution that affects the quality of the houses.	-	Independent
Service	The amenity and facility in the condominium	+	Independent
Environment	The surrounding environmental condition in the condominium	+	Independent
Community participation	The involvement of the people in dealing of the condominium	+	Independent
Space	The area in the house, floor and ground of the condominium	+	Independent
Recreation	The suitability to provide pleasure for the community residing in the condominium	+	Independent

Result And Discussion

Respondents' Profile. The selected sample respondents were 357 and received questionnaires, but some of them returned incomplete questionnaires or did not respond at all. The total number of returning survey respondents was 340, and thus the response rate would be 95%.

Table 2 presents a summary of demographic and socio-economic data for the surveyed respondents. The majority of the respondents were females, who accounted for 58%. The ages of respondents range from 18 to 64+ years. The average age varied between 18 and 34 years. Most respondents hold a degree and above, while the remaining 18% and 20% completed high school and a diploma, respectively. The majority, that is, 70% of the respondents, were lower middle and upper income, earning 2301 (69.7 USD) and 6600 birr (200 USD) per month, respectively. Again, the 14% and 16% of respondents' monthly income was low and high, income. At the time of conducting research, the low-income have less than 2300 birr (69.7 USD) per month, and the high-income had more than 6600 birr (200USD) per month.

Table 2 Socio-demographic characteristics of respondents (N = 340).

Variables		Number	Percent
Gender	Male	144	42
	Female	196	58
	Total	**340**	**100**
Age (in years)	18-34	176	52
	35-60	152	45
	64+	12	3
	Total	**340**	**100**
Educational level	Secondary school completed	60	18
	Diploma	68	20
	Degree and above	212	62
	Total	**340**	**100**
Expected monthly income (in Birr)	below 2,300	48	14
	2,301-3850	120	35
	3,851-6,600	120	35
	6,601-26,000	52	16
	Total	**100**	**340**

Source: Field survey, (2020).

The Perceptions of Residents. People have different perceptions on condominium housing development. The perception of the user has an impact on the implementation of condominium development. The residents' perception on the condominium costs, quality, and management system is presented as follows.

Perception on Cost of Owning or Renting of Condominium House. In Ethiopia's urban areas, renters account for 51% of the urban population (CSA 2016). The presence of more renters and the increased demand for housing raised the cost of renting and owning a home. Housing costs make up a large share of the household budget, and the low-income population is often constrained by the level of resources left for other essential expenditures. High housing costs can thus threaten households' material well-being and economic security (Matsumoto & Crook, 2021).

As indicated in Tables 3, 61.11 percent of respondents agreed with the high price of renting and purchasing the condominium. Almost an insignificant number of the respondents had no information on the cost of purchasing. As the residents occupy the premises, they possess reliable information regarding the condominium, and the associated costs can be readily identified by the dwellers. The summarized interview regarding to cost were presented here below:

> *"The cost per square meter and the actual area and area on the plan varied between years, with the actual being less than the plan. The houses constructed in 2008, for instance, in one building, the area on plan for one bedroom was 43.64m^2, but the actual area on the ground was only 32.00 m^2. In this case, there was an 11.64 m2 difference, for which the house owner was supposed to pay an additional payment. Besides, in 2008, the cost per square meter for one bed was 3,553.05 birr (384.27 USD), but it was 1813.19 birr (196.104 USD) in 2007".*

As stated in the sustainable development theory of economic sustainability, the rental cost should be affordable with the demand and capacity of the dwellers (UN-Habitat, 2012). The respondents perceived that the costs for purchasing and even renting were high. In this regard, the residents claimed that the cost had varied by one year without any significant reason. Thus, rising housing costs negatively impact residents' well-being.

Generally, the cost of the price for condominiums was high, which resulted in the incorporation of a price beyond the actual area. This indicates the perception of the cost and rent price of the condominium was insignificantly different.

Table 3 Perception on the condominium rent prices and purchase costs.

Price of rent is very high	Price for purchasing is high			
	Agree	Disagree	Neutral	Total
Agree	208	20	4	232
Disagree	48	60	0	108
Total	256	80	4	340

Source: Field survey, (2020).

Perception of Quality of the Condominium House. Housing quality in Ethiopia is lower than in neighbouring countries (World Bank, 2020; UN-Habitat, 2021), with overcrowded and poor living conditions constituting the major housing challenges in large urban centres. The houses were constructed from wood and mud. The two most commonly used materials for flooring in urban housing units were "earth or sand" and "dung" (Matsumoto & Crook, 2021). Whereas the condominium was not constructed from such materials, the poor quality would not have resulted from the material of sand and dung. The poor quality resulted from the roof, column and height of beam alignment, downward pipe, floor of corridor, rendering, blocket alignment, light installation, septic tank and cleanness of the surrounding environment. The residents' positive perceptions of the quality of condominiums increased their desire to participate in and continue to participate in the condominium housing development program.

As the housing quality theory reveals, the perception of housing is associated with the quality of the surroundings and physical attributes (Dohr & Portillo 2011; Ibem 2012). In the study area, as shown in Tables 4, 50.29 percent of the respondents recognized the quality of the condominiums as poor. In this research, we define quality as services, the environment, and space, despite the fact that we can recognize house quality from different perspectives. The resident's perception is analyzed from

this perspective and checked using the binomial logistic regression model (Table 5). The fitness of the model is checked using log likelihood, Hosmer-Lemeshow, Pearson chi square and predictive efficiency or probability (see Table 6 and Table 7). All variables are significant, and the independent variables explained the dependent variable at the 0.05 level of confidence.

The relationships between the quality of condominium house perceptions and other independent variables, such as service, environment, and space are discussed below.

a. **Services**
Service quality positively influences customer satisfaction (Balathandayutham & Sritharan 2014; Mohit & Nazyddah 2011). In Addis Ababa, frequent electric interruptions, water supply shortages, inadequate water pressure, and poor mobile network connections are quite common and indicate poor services (Gebrewold 2015). In Gondar city, there is a similar problem. Furthermore, the margin effects show that those who are dissatisfied with the better status of service are more likely to perceive the existence of low-quality condominium houses. It is supported by housing quality theory that service delivery can affect the perception of quality in their living environment (Galster 2021). Generally, the residents perceived that the poor service of the condominium also implies that the quality of the condominium is poor.

b. **Environment**
The environment can be understood as both indoor and outdoor. The indoor environment can have an impact on the occupants' well-being (Arif et. al. 2016; Fujihira 2019). Cleaning products, construction activities, carpets and furnishings, water-damaged building materials, microbial growth, insects, and outdoor pollutants can all expose building occupants to a variety of contaminants. Other factors, such as indoor temperatures, relative humidity, and ventilation levels, can also influence how people react to their surroundings. Understanding and controlling the sources of indoor environmental contaminants can often help prevent or resolve building-related worker symptoms (CDC 2013). Indoor environmental conditions in developing countries, on the other hand, are incompatible with international standards. We perceive the indoor environment by considering the oddities of mold, ventilation, and dampness.

Residential satisfaction is a preliminary step for creating home attachments that can exist due to the exterior view (outdoor) of the house and neighbouring buildings, neighboring satisfaction, and the quality and good reputation of the neighbourhood (Saadati 2019). Neighbourhood environmental quality is vital for playing football, conducting different ceremonial events, and securing health and mental satisfaction. This has an effect on the perception of the dwellers and quality of the condominium houses.

In the study area, the environmental quality of the condominium houses was poor. The respondents disagreed on the environmental quality condition, with an odds ratio of 1.89, were more likely to perceive the poor quality of the

Table 4 Residents' perception on the condominium quality.

Quality of House	Frequency	Percent
High	169	49.71
Low	171	50.29
Total	*340*	*100*

Source: Field survey, (2020).

Table 6 Predictive efficiency.

Logistic model for quality

Classified	True		
	D	-D	Total
+	121	42	163
-	50	127	177
Total	171	169	340
Classified + if predicted Pr (D) >= .5			
True D defined as quality! =0			
Sensitivity		Pr (+|D)	70.76%
Specificity		Pr (-| ~D)	75.15%
Positive predictive value		Pr (D | +)	74.23%
Negative predictive value		Pr (~D | -)	71.75%
False + rate for true ~D		Pr (+|D)	24.85%
False - rate for true D		Pr (-|D)	29.24%
False + rate for classified +		Pr (~D | +)	25.77%
False - rate for classified -		Pr (D | -)	28.25%
Correctly classified			72.94%

Source: Field survey, (2020).

Table 5 Binomial logistic regression model of perception on quality of condominium.

Logistic regression — **Number of obs. = 340**; **LR chi ^{2} (4) = 84.84**; **Prob > chi ^{2} = 0.0000**; **Iteration 4= log likelihood = -193.2434**; **Pseudo R^2 = 0.1800**

Quality	Odds ratio	Std. Err.	Z	p > [z]	[95% conf. interval]	
Service						
Disagree	3.869205	1.056463	4.96	0.000	2.265721	6.607499
Environment						
Disagree	2.167336	.5648234	2.97	0.003	1.30046	3.612064
Space						
Disagree	3.679721	.9188025	5.22	0.000	2.255669	6.002807
_cons	.1921537	.0504609	−6.28	0.000	.1148463	.3214995

Source: Field survey, (2020).

Table 7 Predictive margins.

	Delta-method					
	Margin	**Std. Err.**	**z**	**P > [z]**	**[95% conf. interval]**	
Service						
Agree	.3948113	.0352049	11.21	0.000	.325811	.4638116
Disagree	.7162462	.0465745	15.38	0.000	.6249618	.8075305
Environment						
Agree	.3843504	.0500021	7.69	0.000	.2863482	.4823526
Disagree	.5750231	.03755007	15.33	0.000	.501523	.6485231
Space						
Agree	.3375453	.0415412	8.13	0.000	.2561259	.4189646
Disagree	.6521684	.0379364	17.19	0.000	.5778143	.7265224

Source: Field survey, (2020).

Table 8 Perception on the condominium management.

Condominium Management	Frequency	Percent
Good	142	41.76
Poor	198	58.24
Total	340	100

Source: Field survey, (2020).

houses than those who agreed on the good quality of the environment. Similarly, it is predicted that the disagreed-on goodness of the indoor and outdoor environment has a high probability of perceiving the poor condominium quality compared to agreeing on the good environmental quality. Generally, as supported by housing quality theory, the perception of the quality of the house is determined by the environmental conditions. Without a doubt, findings in the study area also show the more the environment was perceived as poor, the poorer the housing quality.

c. **Space**

The space in the neighborhoods creates a better atmosphere for walkability and investment (Li et al. 2014). Furthermore, the space in the building and surrounding areas is critical because it was used for housing activities, recreation, parking, and social meetings. As the house quality theory reveals, open space access has an effect on the quality of houses and their livability (Šiljeg et al., 2018). In the study area, the respondents who perceived there was not enough space were more likely to disagree with the quality of the houses. The respondents' perception of the narrow space of the houses is more likely to perceive the quality of the condominium houses as poor compared with those who recognised the enough space of the condominium houses. In general, the small size of condominium houses and their surroundings results in lower house quality.

Perception on Condominium Management System. Management is a broader concept that concerns the process and act of putting or utilizing resources to good effect. According to the theory of planned behavior, the positive perception can have potential to enhance residential confidence in residential decisions as well as management. In Gondar, 58.24 percent of the respondents perceived that the condominium management system in the study area was poor (Table 8).The resident's perception of the condominium management system is analyzed from this perspective and checked using the binomial logistic regression model (Table 9). The fitness of the model is checked using log likelihood, Hosmer-Lemeshow, Pearson chi-square, and predictive efficiency or probability (see Tables 10 and 11). All variables are significant, and the independent variables explained the dependent variable at a 0.05 level of confidence. The margin effect of the binomial logistic regression model shows the management system of condominiums is dependent on other variables like sewerage, community participation, recreation, administration, and noise as an independent variable. The perception of those respondents who disagreed on sewerage, community participation, recreation, administration, and noise was higher than those who agreed. In the model, each independent variable was significant at a 0.05 level of confidence.

In addition, observations by researchers in the study area identified the residents were storing wood on the floor and using the open spaces as abattoirs (see image one).The resident's perception towards the condominium management system is analyzed by considering other independent variables, which are sewerage, community participation, recreation, administration, and noise.

A. **Sewerage**
The previous studies in Addis Ababa indicate that the sewerage disposal in the condominium is not appropriately managed (Arup 2020). The sewerage harms the urban and surrounding rural areas (Abebe and Demoze 2017). Similarly, in the study areas, the sewerage management is poor. The residents are connecting the safety tank with the ditch and disposing of the waste. The residents' perception of the poor status of sewerage is more likely to be perceived as the existence of a poor condominium management system (see Tables 9 and 11). Generally, the sewerage is very sensitive, and sewerage management improvements can enhance the overall condominium management system.

B. **Community participation**
The condominium development affects sociocultural aspects such as sex, age, language, religion, and ethnic diversity (Qing 2018). Likewise, what makes it different from other housing types is that it requires more community participation in administration, development, and other tasks.
In the sustainable development theory of social sustainability, community participation is a means of sustaining development and regulating service and maintenance, which is also supported by institutional theory. In the study area, it was found that the perception of poor community participation has a high probability of being perceived as poor condominium management (see Table 9). Accordingly, the perception of community participation and the management system are related. As participation increased, so did the management of housing.

Table 9 Binominal logistic regression of perception on management of condominium.

Logistic regression				**Number of obs. = 340**		
				LR chi ^{2} (4) = 207.00		
				Prob > chi ^{2} = 0.0000		
Iteration 4= log likelihood = -127.53968				**Pseudo R^2 = 0.4480**		
Management	**Odds ratio**	**Std. Err.**	**Z**	**P > [z]**	**[95% conf. interval]**	
Sewerage						
Disagree	15.10717	5.405233	7.59	0.000[a]	7.492552	30.46048
Community participation						
Non-participated	11.07636	3.88211	6.86	0.000[a]	5.572662	22.01564
Recreation						
Disagree	3.159173	1.374041	2.64	0.008[a]	1.346959	7.409558
Administration						
Disagree	.3115446	.1150638	-3.16	0.002[a]	.1510578	.6425358
Noise						
Disagree	2.677648	.8988743	2.93	0.003[a]	1.386785	5.170089
_cons	.0287045	.0157589	-6.47	0.000	.0097867	.0841904

[a]Significant at 0.01 confidence level.

Table 10 Efficiency of the model.

Classified	**True**		
	D	**-D**	**Total**
+	180	39	219
-	18	103	121
Total	198	142	340
Classified + if predicted Pr (D) >= .5			
True D defined as quality! =0			
Sensitivity		Pr (+|D)	90.91%
Specificity		Pr (-| ~D)	72.54%
Positive predictive value		Pr (D | +)	82.19%
Negative predictive value		Pr (~D | -)	85.12%
False + rate for true ~D		Pr (+|D)	27.64%
False - rate for true D		Pr (-|D)	9.09%
False + rate for classified +		Pr (~D | +)	17.81%
False - rate for classified -		Pr (D | -)	14.88%
Correctly classified			83.24%

Source: Field survey, (2020).

C. **Recreation**
Green areas provide a natural solution to environmental problems and enhance the residents' mental satisfaction (Beute et al. 2022). In condominiums, the purpose of the open space is to serve as a recreational area for the residents. In the study area, the open space is limited and not comfortable for recreation. The residents perceived that the low existence of recreation sites has a higher probability of being poor management of the condominium as compared with those who did recognize the existence of recreation. The perception of poor recreational aspects of the condominium relates to the perception of poor condominium management.

D. **Administration**
The housing administration function is wide-ranging, covering aspects of estate and tenancy management at both a strategic level and day-to-day contact with individual tenants (Blomé 2010). In condominium houses, there are common resources that are different from other resources. According to Ostrom's design principles, the communal resource boundary should be clearly defined, and the use and provision of the resources should be adaptable to the local community (Foster & Iaione 2019). The involvement of the local community, especially residents of the condominium, fosters the management system. This collaborative approach not only enhances the sustainability of the resources but also promotes a sense of ownership among the residents. By actively engaging in decision-making processes, tenants can develop a stronger community bond and ensure that the management practices reflect their collective needs and values.
In condominiums, there were communal plots, infrastructure, parking, corridors, and shared walls. These properties require clear administrative frameworks and understanding by the residents. It brings negative externalities to its property management unless its administration is guided by an institutional setup and framework.
In the study area, respondents who perceive a lack of an effective administration system are less likely to perceive that the condominium is well-managed. Furthermore, as indicated in the institutional theory, the good administration system leads to improvements in the management of condominiums by enhancing the utilization of communal resources.

E. **Noise**

Pollution is an externality and has a negative effect on the system or institutions. One of the types of pollution is noise pollution, which has a negative impact on housing values (Wilhelmsson 2000). This return results in a negative effect on the housing management system. In the study area, the sound pollution is not significantly high. The result shows that those who agree on the existence of noise were less likely to perceive the existence of a good management system. That is, noise pollution has an effect on the low housing management system.

Generally, the management of the condominium has direct relationships with sewerage, community participation, recreation, administration, and noise.

In addition, observations by researchers in the study area identified the residents were storing wood on the floor and using the open spaces as abattoirs (see, image one).

Table 11 Predictive margins.

	Delta-method					
	Margin	**Std. Err.**	**Z**	**P > [z]**	**[95% conf. interval]**	
Sewerage						
Agree	.2176606	.0475348	4.58	0.000	.124494	.3108272
Disagree	.8078062	.032027	25.22	0.000	.7450345	.8705779
Community participation						
Participated	.2623895	.050871	5.16	0.000	.1626842	.3620948
Non-participated	.7975784	.0346321	23.03	0.000	.7297006	.8654561
Recreation						
Agree	.3657903	.0913492	4.00	0.000	.1867492	.5448314
Disagree	.6456542	.0404472	15.96	0.000	.5663792	.7249292
Administration						
Agree	.7546562	.0509087	14.829.02	0.000	.6548769	.8544354
Disagree	.4893488	.0542316		0.000	.383056	.5956408
Noise						
Agree	.4848373	.0559236	8.67	0.000	.375229	.5944457
Disagree	.7159113	.0488584	14.65	0.000	.6201506	.8116719

Source: Field survey, (2020).

Table 12 Residents perception on Condominium affordability.

Challenges	**Response**	**Frequency**	**Percent**
Price affordability	Affordable	140	41.2
	Not affordable	200	58.8

Source: Field survey, (2020).



Image one: Corridors as store and a guy is butchering a sheep in an open space (left to right).

The Challenges of Sustaining Condominium Housing Development. This subsection focuses on the hindering factors to the sustaining of the condominium housing development in Gondar city. The major identified challenges are affordability (from supply and cost perspectives), small loan return, and quality of the houses and neighborhoods.

Affordability. The main drivers of the urban housing shortage are the low incomes of urban residents, insufficient supply of serviced land, and requirements for costly and highly unrealistic housing units (World Bank 2019). The problem becomes severe for low incomes due to a lack of affordable and quality housing and difficulties in obtaining housing finance (World Bank 2015; Centre for Affordable Housing Finance in Africa 2019). Affordability is an issue for those looking to buy a home. The affordability is recognized in different ways in different countries. For instance, housing affordability in Organisation for Economic Co-operation and Development (OECD) countries is defined as the proportion of household expenditure on housing costs that does not exceed 30% of disposable income. But in the Ethiopian context, housing may appear relatively affordable at first glance: expenditures on "housing (rent), water, electricity, and gas" account for around 19% of annual household expenditures. The payment of upfront down payments and long-term mortgages is a challenge for low-income households (Matsumoto & Crook 2021). Affordability is a major issue in the housing market in Ethiopia. Most household incomes are too low to afford formal housing solutions, whether public or private. The problem of low-income urban residents is exacerbated by costly construction materials and unreasonably high land prices (Centre for Affordable Housing Finance in Africa 2019).

In the study area, condominiums were constructed in 2007 and 2008 at five sites. It is not sustained beyond two years (2007 and 2008), i.e., availability was limited for owning. The dwellers cannot access the limited number of housing units beyond 3346. During 2007, to be eligible for the condominium house beneficiary, there was a minimum first payment of more than 6,640 birr (718.14 USD), which is difficult for the poor. In addition, there is a minimum monthly payment of more than 400 birr (43.26 USD) per month for 25 years for the studio housing unit typology. In later years, the construction was conducted at the Azezo site, where the cost of houses is high, in addition to compromising the quality. In 2008, the prices of studio, one-bed, two-bed, and three-bed housing typologies increased by 199, 193, 183, and 191 percent, respectively, when compared to 2007. Furthermore, the commercial bank of Ethiopia announced that some of the owners of the condominium could not pay their long-term mortgage payments.

As shown in Table 12, nearly 59% of the respondents indicated that condominiums were not affordable to own. The remaining 41% said the condominiums were affordable to own.

The respondent gave the following response when asked about the condominium's affordability during the interview:

> *"Owning a condominium house is hard for low-income and even middle-income groups. Even though the cost of purchasing condominium houses is relatively lower than plot-based houses, many people want to have condominiums, but the demand and supply are not balanced".*

The cost of condominium construction in Gondar city has varied through time. These were identified through document review of committees and the agreement of beneficiaries with

Table 13 The Cost Variation of Unit Housing Typologies by Year.

Housing Typology	Housing Price per m^2 in 2007	Housing Price per m^2 in 2008	Housing Price difference between 2007 and 2008	
			Number	Percent
Studio	1269.23	2,487.14	1217.91	199.4
One Bed	1813.19	3553.05	1739.86	193.2
Two Bed	1903.85	3748.47	1574.62	182.7
Three Bed	1994.50	3801.76	1807.25	190.6

Source: Report of the Gondar City Condominium Complain Investigator Committees (2020).

the commercial bank of Ethiopia's Gondar district. The document review of the cost variation between the 2007 and 2008 condominium construction years is presented in Table 13.

As shown in Table 13, in all housing typologies, the cost significantly varied from 2007 to 2008. For instance, the cost of a studio in 2007 is 1269.23 birr (137.27 USD) per meter square (m^2); but it is increased to 2,487.14 birr (268.99 USD) per m^2 in 2008. This indicated that the cost of the house has been raised by nearly double after a year.

Based on reviewed documents, the goal of condominiums is to reduce the housing problem by affording houses to many. The inclusion of four-unit typologies is to address affordability, but the approach wrongly assumed that the smallest and cheapest units are occupied by the poor (UN-Habitat 2010).

Generally, the price of the condominium is raised over time without consideration of the country's inflation context. As a result, the complaint about its costs is raised, and they are not happy to pay the loan to the bank.

Small Loan Returns. In Ethiopia, a loan is provided to the condominium house development by the Commercial Bank of Ethiopia. All the condominium beneficiaries benefit from the loan. As per the document review from the Gonder City condominium complaints investigatory committee report (2020), 837 condominium beneficiaries were not paid based on the contractual agreement until 2020. They are not paying the loan due to complaints about the poor quality of their construction, in addition to their low capability. This indicates that the loan return is not fully and consistently made. As revealed in the sustainable development theory, condominium housing should be affordable with loan repayment capability.

The Commercial Bank of Ethiopia is a government-owned bank that provides loans for commercial purposes. The bank provided loans to condominium beneficiaries with an annual interest rate of 8.5 percent. This loan is not continuing as a result of low return (UN HABITAT 2010). Even though the Commercial Bank of Ethiopia finances condominium development in the form of interest deduction (Matsumoto & Crook 2021), the bank is claiming that the beneficiary of the condominium is not returning the loan. The facing of such challenges to the bank leads for the retreat from borrowing money for these types of housing development projects.

Quality of the Houses and Neighborhoods. Table 4 shows that most respondents perceive the condominium house's quality as poor. In addition, as an observation is conducted, the overall quality of the housing and neighborhood is poor.



Image 2: open space, safety tank and sewerage from left to right (photo by authors)

As the image two shows, the open space is covered with waste. Also, the ditches are filled with plastic and non-decomposable materials. This damages the outdoor and indoor environment. Furthermore, the space in the building and within the house is narrow.

Additionally, in the interview that is conducted, the respondents responded as follows:

> *"The last constructed condominium site has a bad odor because of sewerage problems of both liquid and solid waste. This is an indication of poor environmental quality. We complain about waste management, but the problem still exists. As a result, some of us are not paying the loans to the bank due to this problem".*

Good housing conditions are also essential for people's health and affect childhood development. Measuring housing conditions and their effects on people's well-being is complex. An ideal set of indicators to measure housing conditions should provide information about both the physical characteristics of the dwelling and the broader environmental characteristics of the area (OECD 2011). The population's satisfaction with housing quality is a perceived indicator and useful for assessment of quality of life in housing (Streimikiene 2015). In the study area, the quality is related to the sewerage, environmental condition, and space, which are considered poor. These problems make the condominium housing development unsustainable. The trust of the people becomes depleted.

Conclusion And Recommendation

The findings of this study reveal that the condominium housing development in Gondar city has faced significant challenges in achieving its intended goals. Although the initiative aimed to provide accessible housing for urban residents, particularly for middle- and low-income groups, issues related to cost escalation, poor construction quality, and weak management systems have undermined its success.

The residents' perceptions regarding cost, quality, and management systems underscore deep-rooted inefficiencies within the condominium delivery process. Despite the program's intention to provide affordable urban housing, cost remains a major concern. Many residents expressed that the cost of owning or renting condominiums is high and inconsistent, placing a financial burden on households and threatening the long-term accessibility and inclusiveness of condominium housing projects.

The residents perceived that the quality of the condominium houses was poor, which has been associated with factors like service, environment, and space. The negative perception about the installation and service of condominium houses is more probability to be associated with the poor quality of the condominium houses. Similarly, the residents' negative perceptions of both indoor and outdoor environmental quality are related to the poor quality of the condominium houses. Furthermore, the

residents' poor perception of space meant that they were more likely to perceive the house's quality as poor.

The residents perceive that the condominium housing management system was inefficient. Management inefficiencies have also been found to exacerbate the unsustainability of condominium housing in the city. The regression analysis confirmed that key variables such as sewerage management, community participation, recreation facilities, sound management, and administrative effectiveness significantly influence residents' perceptions of management quality. Poor coordination among these elements has led to the misuse of shared spaces and declining communal responsibility. Without proper administrative frameworks and participatory governance, condominiums risk deteriorating both physically and socially, eroding public confidence in future housing programs.

The challenges to sustaining condominium housing development include affordability, low loan repayment, and housing quality. Affordability poses a significant challenge for low-income groups, even though the programs were designed to target them. Many owners were unable to pay the loan interest and down payment, resulting in some housing units being put up for resale. Additionally, the price per square meter of condominium housing increased substantially between the 2007 and 2008 construction years, rising from 182% to 199%, while material costs remained low, leading to resident complaints and contributing to non-sustainability. The second challenge is the low repayment of loans to the Commercial Bank of Ethiopia, as loans were not consistently returned. The third challenge concerns the poor quality of houses, buildings, and neighbourhoods, which resulted in resident dissatisfaction. Both outdoor and indoor sewerage systems were cited as significant problems by residents. Based on findings, the researcher recommended the following points to the local administration and policymakers:

- It is preferable to run the program with the interests of poor urban dwellers in mind, particularly by improving their affordability through the implementation of a subsidizing mechanism.
- Implement rigorous oversight to stabilize construction costs, ensure price alignment with unit size, and adhere to a realistic affordability threshold that reflects the actual income of the target beneficiaries.
- Establish independent quality inspection bodies to enforce standards for construction, services (water, electricity), and essential neighborhood infrastructure (sewerage and waste management).
- The management system should be improved through the involvement of the community through establish community housing committees to oversee maintenance and administration. They have an indisputable role in bringing smart and viable living and recreation opportunities to the area.

Limitations and Recommendations for further research. The research focuses on the particular city of Gondar and does not address social and built environment aspects. Furthermore, since perceptions of housing quality, cost, and management are localized and varied, the challenges identified in Gondar city may not be uniform across other regions. To fill this limitation, the researcher recommends further research on a comparative study of condominium governance models.

Therefore, we recommend a comparative case study on condominium governance models. This research should specifically focus on analyzing management effectiveness (e.g., maintenance, sanitation) achieved by complexes with robust, institutionally supported Homeowners Associations (HOAs) versus those lacking active resident participation. The goal would be to isolate and define the specific bylaws, administrative structures, and engagement techniques that successfully foster the responsible, long-term management of communal resources. Furthermore, to validate the generalizability of our findings, similar studies examining resident perceptions and the association between key challenges should be replicated across other Ethiopian urban centers.

Data Availability

No datasets were generated or analysed during the current study.

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Author contributions

In this research, all authors listed contributed to the study. Bantayehu Ayalew Workneh did data collection, analysis, interpretation,writing the draft and revised manuscript. Kassahun Gashu wrote the revised the revised manuscript, the results and interpretation. All authors participated and approved the revised and edited version.

Ethics approval

The authors confirmed that the research was conducted in accordance with the 1964 Helsinki Declaration, as applicable when human participants are involved. The ethical review has been approved by the ethical review committee of the College of Social Science and Humanities, University of Gondar, with a letter issued on March 09, 2026, Ref. No.

C/S/S/H/R/P/001010/1946/2026. The fundamental reason we did not obtain ethical approval before data collection from the College of Social Sciences and Humanities at the University of Gondar is that this research is not a clinical trial, and ethical approval was mandatory for conducting clinical human and animal research. If the research is not a human and animal clinical trial, we can obtain approval from the department at our local institution. In this case, at the initial stage, we received approval from the Department of Geography and Environmental Studies to collect data and conduct research. Given the dynamics of research ethics, our institution now believes that ethical approval is necessary for any research involving human or animal subjects. Accordingly, we received ethical clearance from the College of Social Science and Humanities on the specified date and reference number. Besides, the collected data were secured and stored confidentially, and anonymized in any reports and publications.

Informed consent

This study did not involve any clinical trial. Prior to participation, all participants were informed about the purpose, procedures, and objectives of the study by the researcher. Written informed consent was obtained from all participants in their preferred language during the data collection period in March, 2020. The consent scope covered the use of data to publish the findings. Participation was voluntary, and participants were informed of their right to decline or withdraw from the study at any stage without any penalty or consequences. The researchers assured the participants that their responses would remain confidential and that all data would be anonymized and used solely for research purposes. No foreseeable risks or harm were associated with participation in the study, except for the time required to respond to the study questions.

Consent for publication

All authors confirm that this paper has not been published before and it is not under consideration for publication elsewhere, and therefore, we agreed to publish and approved the manuscript.

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to Bantayehu Ayalew Workineh.

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