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Towards City Resilience: The Influence of Socio-cultural and Economic Features of Housing on Population Growth in Public Residential Estates

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Abstract. *Although there is increasing knowledge about the role housing plays in promoting resilience in cities, studies on the socio-cultural and economic features of housing that enhance the capacity of public housing schemes to absorb the impacts of rapid population growth in cities of developing countries are limited. This article, therefore, explored the features of selected public residential estates in Abuja, Nigeria with the aim of revealing the socio-cultural and economic features of housing responsible for attracting and sustaining increasing numbers of residents in public housing environments. A questionnaire survey was conducted among 345 residents in seven selected public housing schemes in the study area. In total, 13 variables were investigated and the data were analyzed using categorical regression analysis at 95% confidence level (i.e. p ≤ 0.05). With R2 = 0.716, the regression model revealed that the availability of economic activities, mixture of ethnic groups and quality of services made the most significant contributions to explaining the increasing number of residents in the public housing estates sampled. The findings are vital to inform housing designers and developers about the need to give adequate consideration to these features of housing in order to improve the capacity of such schemes to absorb the impacts of rapid population growth and thus contribute to enhancing city resilience in the face of growing negative impacts of rapid urbanization in developing countries.*

Keywords. *Housing, population growth, public housing, urbanization, resilient city.*

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Abstrak. *Meskipun ada peningkatan pengetahuan tentang peran perumahan dalam mempromosikan ketangguhan kota-kota, studi tentang dimensi sosial-budaya dan ekonomi perumahan yang meningkatkan kapasitas skema perumahan rakyat untuk menyerap dampak dari pertumbuhan penduduk yang cepat di kota-kota di negara-negara berkembang masih terbatas. Oleh sebab itu, artikel ini mengeksplorasi fitur perumahan rakyat terpilih di Abuja, Nigeria dengan tujuan untuk mengungkapkan fitur sosial-budaya dan ekonomi perumahan yang bertugas untuk menarik dan mempertahankan peningkatan jumlah penduduk di lingkungan perumahan rakyat. Studi ini didasarkan pada survei kuesioner terhadap 345 penduduk di tujuh skema perumahan rakyat terpilih di wilayah studi. Secara keseluruhan, 13 variabel diselidiki dan data dianalisis menggunakan analisis Regresi Kategorikal pada tingkat kepercayaan 95% (P ≤ 0,05). Dengan R2 = 0,716, model regresi mengungkapkan bahwa ketersediaan kegiatan ekonomi, campuran kelompok etnis dan kualitas layanan memberikan kontribusi paling signifikan dalam menjelaskan peningkatan jumlah penduduk di perumahan-perumahan yang dijadikan sampel.*

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Temuan ini sangat penting dalam memberi informasi kepada perancang dan pengembang perumahan tentang perlunya memberikan pertimbangan yang memadai terhadap fitur-fitur perumahan ini untuk meningkatkan kapasitas skema tersebut dalam menyerap dampak pertumbuhan penduduk yang pesat, dan, dengan demikian, berkontribusi untuk meningkatkan ketangguhan kota dalam menghadapi dampak negatif yang berkembang dari urbanisasi yang cepat di negara-negara berkembang.

Kata kunci. *Perumahan, pertumbuhan penduduk, perumahan rakyat, urbanisasi, kota tangguh.*

Introduction

Rapid urbanization comes with increasing numbers of people that require housing in cities in developing countries, including Nigeria. Evidence in the literature shows that the majority of people moving into these urban centres in countries in the Global South are low-income and vulnerable groups seeking opportunities for sustainable livelihoods (Tacoli, McGranahan & Satterthwaite, 2014; Adeokun & Ibem, 2016). The existing stock of housing and other basic social amenities are expected to meet the needs of these newcomers and the already established residents in these cities. To ensure that the growing number of residents does not compromise the quality of the existing stock of housing, infrastructure and social services, urban and housing experts are expected to consider many issues in the development of new housing schemes, including the provision of basic urban services that meet the specific needs of the population. Notably, how cities address their housing issues arising from rapid population growth has huge economic, social and environmental implications for the urban fabric (Litman, 2017). In fact, it is known that housing development strategies that respond and adapt to the myriads of socio-cultural, economic and environmental challenges associated with rapid population growth, would increase the city's capacity for resilience to the negative impacts of rapid urbanization (Ibem, Anosike & Azuh, 2011; Abubakar & Aina, 2019). Consequently, it is argued that since public housing schemes are meant to provide decent and affordable housing especially for low-income people and the poor (Purdy & Kwak, 2007; Lui, 2007), such schemes should be conceived and developed in a manner that responds adequately to their particular challenges, (Apparicio & Séguin, 2006) and help cities curb the growing rate of proliferation of unplanned settlements, slums and their associated negative impacts on the image of the cities and the well-being of their residents (Abubakar & Aina, 2019).

Just as the socio-economic status of the individual, their level of education, employment status, and income among others can influence the individual's choice of location of residence (Akinyode, Khan & Ahmad, 2015), so also are the features of housing capable of influencing the rate of influx of residents into residential neighborhoods. Essen (2019) has observed that a greater number of housing schemes developed in Abuja, Nigeria, remain unoccupied for long periods of time after completion. This situation was attributed to high cost of rent and associated service charges by Baridoma (2016). However, affordable housing for low-income people who constitute the majority of residents in this city is grossly inadequate (Ahmed, 2020). Apart from the shortfall in the number of housing units provided for low-income people, Ibem *et al.* (2011) insist that the targeted population does not usually benefit from the small number of housing units provided due to the high cost of the units. This situation contributes little to enhancing the capacity of the city to deal with the adverse impacts of rapid population growth. On the one hand, cost may be one of the key determinants of housing choice; on the other hand, certain other housing features are responsible for attracting a growing number of new residents moving into existing mass housing schemes. These features that attract more people often lead to over-congestion in those neighborhoods, in turn leading to the erection of cheaper illegal residential structures within the

neighborhoods (Aduwo, Ibem & Opoko, 2013). This goes to suggest that there is a challenge in the housing development approach adopted by housing developers in a country like Nigeria, especially when it comes to gathering adequate data on the housing needs, the socio-cultural and economic status of the target population, and housing features that satisfy the expectations and aspirations of the intended users. More so, Nguyen (2019) has observed that although socio-cultural and economic factors such as age, gender, employment, income, migration patterns and population growth tend to influence the types of residential properties that are in demand, these are often overlooked when developing public housing schemes, especially in developing countries. Consequently, such public housing schemes do not meet the needs of the target population (Agbola & Adegoke, 2007) and thus fail to promote city resilience when it comes to the impact of rapid population growth, which is a common phenomenon in cities in developing countries.

In the context of this research, city resilience is defined as the capacity of a city to respond to and cope with social, economic and environmental challenges as a result of natural disasters and human activities (Vale, Shamsuddin, Gray & Bertumen, 2014). In line with this, the Resilient City Housing Initiative (RCHI) (2012) has explained that housing development that responds and adapts to these social, economic and environmental challenges is considered important in increasing a city's capacity for resilience. This paper argues that in order to achieve United Nations Sustainable Development Goals (SDG) 11 that seek to make cities and human settlements inclusive, safe, resilient and sustainable for all categories of people by the year 2030, it is important to understand the specific socio-cultural and economic features of public housing projects that require attention in ensuring that such schemes enhance the capacity of cities in the Global South to cope with the impacts of rapid population growth.

The focus of this research was on city resilience to the impact of rapid population growth. From a review of the literature it was observed that in spite of the growing literature on the role of housing in resilient cities there are very few studies on the socio-cultural and economic features of public housing schemes that enhance the capacity of urban residential neighborhoods to absorb the negative impacts of rapid population growth in countries in sub-Saharan Africa. The aim of this paper, therefore, was to explore the socio-cultural and economic features of housing responsible for attracting and sustaining increasing numbers of residents in public housing environments. The key research question this study sought to answer was: What are the socio-cultural and economic features of housing that contributed to increasing the number of residents in selected public housing estates in Abuja, Nigeria? This study is valuable for identifying the specific features that people consider when choosing a public housing environment to live in. This information is vital in informing housing designers and developers on the types and features to be provided in public housing for low-income and vulnerable groups in the study area. Since rapid urbanization is a recurrent issue in Nigeria and other developing countries, measures to reduce its adverse effects on the urban fabric are receiving significant research attention. Therefore, the current study hopes to make a contribution towards promoting housing for inclusive, resilient and sustainable cities in developing countries.

Literature Review

Concept of City or Urban Resilience

The review of the literature revealed that the concept of resilience has been variously defined by authors in the different disciplines. However, two key perspectives to understanding this concept are engineering resilience and ecological resilience. Engineering resilience refers to an

engineering system having the ability to return to an equilibrium or a stable state after experiencing a disturbance (Davoudi & Porter, 2012). Ecological resilience deals with how long it takes for an ecological system to bounce back to its original state after experiencing a disturbance and the quantum of disturbance it can take and still remain stable (Pickett, McGrath, Cardenas & Felson, 2014). This means that unlike the engineering perspective of resilience, ecological resilience refers to the ability of an ecological system to persist and adapt to changes. Therefore, ecological resilience is concerned with the magnitude of disturbance; how much of it the system can withstand before it gives way as well as how that threshold point can be managed so that the system can remain stable and functional. Previous authors (Batty, 2013; Jabareen, 2013) have insisted that based on the dynamic and the socio-ecological nature of cities, ecological resilience is considered more appropriate to urban systems.

The concept of city or urban resilience came into being from studies on the manner in which ecological systems cope with stresses and disturbances caused by external factors such as natural disasters, anthropogenic forces or a combination of both (Jabareen, 2013). From the literature review, we understand that urban areas are constantly experiencing trauma, which could be in the form of natural disasters such as floods, fires, earthquakes and others, and/or as a result of human, reproduction, production and consumption activities such, greenhouse gas emissions and rapid population growth (Abubakar &Aina, 2019). In developing resilience, cities or urban areas can either recover from trauma or adapt to them (Lazzeretti & Cooke, 2017). This means that in the context of cities, resilience can be in the form of recovery or adaptability. Resilience of recovery refers to the capacity of an urban system or part thereof to bounce back after a shock, stress or disturbance resulting from natural disasters or human activities. In this case, an urban system has built-in mechanisms to recover from stress or disturbance; thus it is reactive and mostly applicable to trauma that is sudden, drastic and sometimes unpredictable. Such disasters include floods, fires and earthquakes (Pickett *et al*., 2014). The adaptability aspect of resilience connotes the ability of an urban system or part of it to persevere, adapt to or absorb trauma, stress or disturbance and still maintain its key function of meeting the needs of its inhabitants. Unlike the recovery aspect, adaptability is proactive and most suited to trauma that develops gradually over time. In this research, resilience is viewed as an adaptability criterion, as previously conceived by Lazzeretti and Cooke (2017), and thus the focus is on how public housing developments can enhance the capacity of cities to adapt to the impacts of rapid population growth.

Furthermore, Jabareen (2013) explained that urban resilience is determined by a multiplicity of economic, social, spatial and physical factors. This means that for an urban area to be described as resilient, it must have the ability to anticipate, respond, adapt, adjust or re-stabilize when affected by shocks or stresses affecting its social, economic and environmental components. Therefore, resilient cities are those cities that are capable of responding and adapting to changing circumstances (Yanez, 2012) and develop strategies for coping with shocks and stresses to their social, economic and environmental conditions (Vale *et al*., 2014) in order to be able to maintain essentially the same functions, structures, systems, and identity (Applegath, 2012). In addressing these shocks and stresses, a city becomes more responsive to adverse events or threats and is better able to deliver basic services to the population.

Nexus between Features of Public Housing and City or Urban Resilience

The link between housing and urban resilience is very complex, yet interesting. According to Vale *et al.* (2014), housing development has a strong link to a city's socio-economic and environmental attributes, which contribute to the resilience of the city to the impact of natural and human forces. Evidence in the literature shows that housing constitutes a huge proportion of physical

development in most cities and thus its quantity and quality are capable of promoting city resilience (Blake & Nicol, 2004). In spite of this, previous studies (Olayiwola, Adeleye & Ogunshakin, 2005; Ibem *et al*., 2011) have shown that a majority of mass housing schemes in a developing country like Nigeria marginally take cognizance of the social, economic and cultural needs of low-income people, who make up the vast majority of the population. This no doubt has implications for the capacity of cities to adapt to the impacts of rapid population growth in this country.

It is known that the characteristics of cities, including their capacity to withstand stress and shock resulting from natural disasters and human activities are determined by several socio-cultural, economic and environmental factors. Apart from natural disasters, cities are also known to be vulnerable to the impacts of rapid population growth (Kihato, 2007; Mulder, 2012; Litman, 2017). Some of the consequences of these impacts manifest themselves in different forms such as proliferation of slums, unemployment, high incidences of poverty, crimes and other anti-social behaviors as well as public health challenges (Abubakar & Aina, 2019). All these contribute to promoting exclusion, insecurity and lowering the capacity of cities to meet the needs of a diverse population. It has therefore been argued that mass housing schemes can promote city resilience by having features that can help cities respond and adapt to the social, economic, and environmental needs of the population (Blake & Nicole, 2004).

Notably, rural-urban immigration has tremendous effects on population dynamics in many cities in the Global South. Among others, it contributes to cultural diversity and plurality as well as heightened competition for space and basic social amenities in cities (Sassen, 2007). According to Adetula (2015), with the growing influx of people into cities, some sort of residential segregation along ethnic and cultural lines has emerged. Consequently, many urban residents are confronted with problems of making sense of the heterogeneous society and the experiences that come with it (Canclini, 2007). Resulting from this is the demand for different housing types and spatial morphologies that meet the needs of the diverse socio-cultural groups who lay claim to the urban space. Understanding the cultural values of the population is therefore essential in housing development and provisioning of basic social amenities that help to reduce stress on the social and environmental fabrics of the city. In line with this, several authors (Thornley, Ball, Signal, Lawson-Te Aho & Rawson, 2015) have contended that housing developments that take cognizance of the cultural diversity and plurality in cities will foster social cohesion and inclusion, promote tolerance, peaceful co-existence and reduce competition for space and resources. This will in turn make cities more sustainable and resilient to the impacts of rapid population growth.

Further, differences in the characteristics of the urban population suggests diversity in housing needs. In fact, Duruzoechi (1999) revealed that socio-economic characteristics such as age, gender, education, race, earnings and so on influence housing demand. This view was corroborated by Lindh and Malmberg (2008), who noted that residential construction should depend on the population's age structure, suggesting that a large group of young people are associated with higher construction rates, while a population with a higher percentage of residents older than 75 years means less demand for residential housing. In line with this, housing for city resilience should be responsive to population dynamics by providing housing for all and making sure that any increase in population does not adversely affect the quality and quantity of the basic infrastructure, services or facilities serving the city (RCHI, 2012). To achieve this, Ibem (2013) opined that public housing development should be the basis for meeting the housing and service needs of all categories of residents and by so doing helping to foster positive social relationships capable of enhancing the lives of the population, while reducing environmental risks (Vale *et al*., 2014).

Regarding the economic features of housing for city resilience, the employment pattern of residents is one of the considerations for enhancing urban resilience capacity toward the impact of rapid population growth. Adeokun and Ibem (2016) have noted that in developing economies, housing development should be responsive to the economic activities of the residents. This suggests that housing provision is effective and relevant when it is not alien to the economic activities of the residents. The World City Report (2016) indicates that in cities of most developing countries, there is mass movement of people from rural to urban areas in search for non-existing better job opportunities and improved living conditions. In fact, previous studies (Kihato, 2007; Edward, 2014; Dhananka, 2016) have reported that the greatest number of migrants in cities in these countries have low or no skills and depend on the non-state-regulated informal sector for their livelihoods. As a result, there is an increase in informal and small-scale businesses such as trading, artisanship, tailoring, photography, and the likes. These trades compete for space in cities leading to pressure on the existing housing and basic social amenities. Adeokun and Ibem (2016) have opined that one of the strategies of adapting to the impacts of huge population growth involved in the informal sector of the economy in cities is to ensure that public or social housing schemes are developed in line with the economic activities of the majority of the population by providing them with opportunities to engage in sustainable livelihoods within their residential environments. This means that making provisions for home-based enterprises in public housing schemes will promote economic activities within residential neighborhoods and thus enhance the city's resilience toward the impact of a rapid increase of those involved in the informal sector of the economy.

In addition, it is also known that flexibility in housing choice allows households to remain more mobile and being able to relocate in a bid to meet housing needs leading to increased economic resilience of a city. Flexibility in housing in this context entails providing a housing market that allows people to make choices in house size and cost based on their income levels, needs and aspirations without any negative externalities that could put undue pressure on the urban social and economic ecosystems (RCHI, 2012). Specifically, Schneider and Till (2007) made it clear that flexible housing engenders adjustment to changing needs (personal, practical or technological) and changing patterns (demographic, economic, or environmental). In the same vein, Thomas (2013) made it clear that rental housing allows people to remain mobile and such choices lead to community resilience. He also noted that rental housing could be more valuable than other options such as housing mortgages that increase the debt burden of households and individuals. In sum, it can be inferred from the literature reviewed here that housing that promotes city resilience toward the impact of rapid population growth must have features that meet the needs and aspirations of a culturally, socially and economically diverse population and the least-privileged in the community and at the same time reduce the vulnerability of the population to environmental risks associated with rapid population growth to the barest minimum.

Research Methods

This study drew its data from a larger research project carried out to evaluate public housing for resilience in Abuja, Nigeria. The research design adopted was a cross-sectional survey involving selected public housing estates in Abuja, Nigeria. Housing estates selected for the study were those developed solely by the government, through the Federal Housing Authority (FHA) – an agency owned by the Federal Government of Nigeria, charged with among other responsibilities the execution of public housing programs. The research population comprised 7690 housing units in seven public housing estates, namely Maitama Estate, Asokoro Estate, Kado Estate, Gwarimpa II, Gwarimpa Team 7, Old Karu Estate and Kubwa Estate (Phases 1, 2, 3, and 4) as shown in Table 1.

The Yamane (1967) formula for a finite population given in Equation (1) was used to determine the sample size for the research.

$$n = \frac{N}{(1 + Ne^2)} \quad (1)$$

$$n = \frac{7690}{(1 + 7690 \times 0.05^2)} = 380$$

where 'n' = sample size, 'N' = population size, 'e' = margin of error = 0.

An effective sample size of 380 housing units was derived using this formula. In order to make a provision for non-response, the adjusted value was derived using a non-response rate of 5%. The final sample size was 400 housing units. The housing units sampled were selected using a systematic sampling technique. A simple random method was used in selecting the first dwelling unit in each of the estates sampled. The other units were selected based on a calculated sampling interval of 19, obtained by dividing the population size of 7690 housing units by the desired sample size of 400 housing units. This means that after the first housing unit was selected, every other 19th housing unit was selected in each of the housing estates sampled.

Table 1. Distribution of number of residents sampled in each of the housing estates.

Public Housing Estates	Brief description of the housing estates	Number of housing units	Sample size
Maitama Estate	**Approximate land area:** 31.95 ha. **Building type**: 3-story block of 6 apartments with 2 apartments on one story, each apartment comprising 3 bedrooms	427	22
Asokoro Estate	**Approximate land area:** 7.8 ha. **Building type:** 3-story block of 9 apartments, with 3 apartments on one story, each apartment comprising 3 bedrooms.	162	9
Kado Estate	**Approximate land area:** not available **Building type:** 2-story block of terrace houses, with 3-bedroom apartments per story	1004	53
Gwarimpa II	**Approximate land area:** not available **Building type**: 3-bedroom semi-detached duplexes	3357	172
Gwarimpa Team 7	**Approximate land area:** not available **Building type:** 5-bedroom detached duplexes	351	18
Old Karu Estate	**Approximate land area:** 62.23 ha **Building type:** 3-bedroom detached bungalow	251	13
Kubwa Estate	**Approximate land area:** 50 ha **Building type:** 3-bedroom detached bungalows	2138	113
Total		**7690**	**400**

Source: Estate Department, Federal Housing Authority, Abuja, Nigeria

The data collection instrument used was a structured and pre-tested questionnaire designed by the researchers. Socio-cultural and economic impacts of rapid population growth were identified from the literature review and information obtained from preliminary investigations carried out by the first author. These were used in formulating the questions included in the questionnaire. Although the questionnaire used in the larger research project had several questions divided into various sections, the data used in this paper were those derived from a section of the questionnaire that inquired into the socio-cultural and economic features of the estates. A total of 13 variables identified from the review of literature were investigated. In collecting the data for this paper, the

participants were asked to indicate in the questionnaire their perceptions on the extent to which the identified socio-cultural and economic features of their neighborhood influenced the number of people living in the selected housing estates. The questionnaire was based on a 5-point Likert-type scale (1 = no significant influence, 2 = little influence, 3 = not sure, 4 = significant influence, and 5 = most significant influence). One copy of the questionnaire was administered by hand to the household heads or adult representatives found in the dwelling units at the time the survey was conducted. Of the 400 copies of questionnaires distributed, 345 copies were retrieved and analyzed. This represents a response rate of around 86.3%.

In view of the nature of the research question stated in this study, the data were analyzed using categorical regression analysis (CATREG). The analysis had a 95% confidence level (i.e. $p \leq 0.05$). In performing the analysis, the number of residents in the housing estates was the dependent variable while the 13 independent variables investigated were the relationship between neighbors, available socio-cultural activities, economic activities in the neighborhood, religious activities in the neighborhood, quality of services, quality of life, mixture of ethnic groups, and distance to place of work. Others were comparative cost of living, level of noise in the neighborhood, mutual trust among residents, level of crime/anti-social activities in the estate, and level of human/vehicular traffic in the neighborhood.

Results

Socio-Economic Characteristics of Participants in the Survey

Table 2 provides a summary of the social-economic characteristics of the residents who participated in the survey. Examination of the result showed that a majority of the participants were highly educated male Christians, who were in a marriage relationship and were more than 30 years old. The results (Table 2) also show that most of the participants in the research had a household size of between one and five persons, were employed in different sectors of the Nigerian economy, earned more than the minimum wage of ₦ 30,000.00 per month, and tenants living in detached and semi-detached bungalows. Based on the results in Table 2 it can be inferred that most residents of the estates who participated were middle- and high-income earners employed in public and private sector organizations, with a household size between one and five persons, and living in rented apartments.

Table 2. Socio-economic characteristics of participants in the survey.

Socio-Economic Variables	Frequency N = 345	Percentage
Gender		
Male	203	59.0
Female	124	36.0
No response	18	5.0
Marital status		
Widowed	10	2.9
Divorced or separated	14	4.1
Single persons living alone	30	8.7
Single persons living with relatives	77	22.3
Married and living with their families	214	61.4

Socio-Economic Variables	Frequency N = 345	Percentage
Religious affiliations		
Christianity	237	68.7
Islam	106	30.7
Others	2	0.6
Age groupings		
No Response	1	0.3
66 years +	7	2.0
56 - 65 years	35	10.1
44 - 55 years	89	25.8
18 - 30 years	98	28.4
31 - 43 years	115	33.3
Highest level of educational attainment		
Primary education	6	1.7
Secondary education	44	12.8
Tertiary education	295	85.5
Household size		
1 - 5 persons	254	73.6
6 - 10 persons	74	21.5
Above 10 persons	8	2.3
No response	9	2.6
Employment status		
No response	3	1.0
Retirees	16	4.0
Unemployed	20	5.8
Employees of private organizations	84	24.6
Public sector employee	109	32.0
Self-employed	113	33.0
Average monthly income in Naira (₦)*		
18,000.00 - 49,000.00	34	9.9
50,000.00 - 99,000.00	70	20.3
100,000.00 - 299,000.00	133	38.6
300,000.00 - 499,000.00	67	19.4
500,000 and above	22	6.4
No response	19	5.5
Tenure Status		
No response	4	1.2
Free occupation	10	2.9
Official resident	27	7.8
Mortgage holder	39	11.3
Owner-occupier	40	11.6
Tenant	225	65.2
Types of house occupied		
Detached bungalow	93	27.0
Semi-detached bungalows	83	24.1
Multi-story blocks of flat	70	20.3
Maisonette or duplex	54	15.7
Terrace row housing	45	13.3

* US$1 = ₦ 390.50 at the second week of May 2020

Influence of Socio-cultural and Economic Features on the Number of Residents in the Estates

The results of the analysis revealed that out of the 13 variables of socio-cultural and economic features of housing investigated, seven emerged as significant predictors of an increasing number of residents in the housing estates, with F (98.057, 246.943) = 27.355, $p < 0.000$, as shown in Table 3. The model summary in Table 4 shows that the proportion of the variance for the dependent variable, R^2, was 0.716, which means that the regression model explained around 72% of variance in the influence of the socio-cultural and economic features on the increase in the number of people living in the housing estates.

Table 3. ANOVA table.

	Sum of Squares	df	Mean Square	F	Sig.
Regression	246,943	29	8.515	27,355	0.000
Residual	98,057	315	0.311		
Total	345,000	344			

Table 4. Model summary.

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
0.846	0.716	0.690	0.284

The coefficients of the multiple regression analysis are presented in Table 5. The *p*-values in Table 5 show the seven socio-cultural and economic features that significantly predicted the increasing number of residents in the housing estates. Significant predictors are asterisked. The results in Table 5 also show the level of contribution of each of the seven socio-cultural and economic features to the explanation of the increasing number of residents in the housing estates.

Table 5. Coefficients of the multiple regression analysis.

Socio-cultural and Economic Variables	Standardized Coefficients		df	f	*p*
	Beta	Bootstrap Estimate of Std. Error			
Relationship with my neighbors	0.112	.088	3	1.634	0.181
Available socio-cultural activities	0.097	.058	3	2.778	0.041*
Economic activities in the estate	0.407	.136	3	8.976	0.000*
Religious activities in the estate	-0.082	.113	2	0.521	0.595
Quality of services in the estate	0.146	.069	2	4.464	0.012*
Quality of life in the estate	0.105	.092	1	1.305	0.004*
Mixture of ethnic groups	0.173	.049	2	12.326	0.000*
Distance to place of work from home	0.044	.075	2	0.355	0.702
Comparative cost of living in the estate	0.042	.061	1	0.465	0.496
Level of noise in the housing estate	0.133	.053	2	6.369	0.002*
Mutual trust among residents	0.031	.053	3	0.346	0.792
Level of crime/anti-social activities	-0.026	.156	2	0.028	0.972
Level of human/vehicular traffic	0.108	.062	3	3.053	0.029*

**Significant predictors*

From the beta (β) values in Table 5 it is evident that the economic activities in the housing estates (β = 0.407, p = 0.000) made the highest contribution to explaining the increasing number of residents in the housing estates sampled. This is followed by the mixture of ethnic groups of residents (β = 0.173, p = 0.000); quality of services in the estate (β = 0.146, p = 0.000); level of noise in the estate (β = 0.133, p = 0.002); level of human/vehicular traffic in the estate (β = 0.108, p = 0.029), and the quality of life of residents in the estates (β = 0.105, p = 0.004). The seventh factor that contributes to increasing the number of residents in the surveyed estates was available socio-cultural activities in the housing estate (β = 0.097, p = 0.041). It can be seen from the results in Table 5 that factors such as level of crime and anti-social activities, relationship among neighbors, distance to place of work, and religious activities within the neighborhood seemed not to make any significant contribution to explaining the increase in number of people living in the housing estates sampled.

These results mean that the number of residents will change by 0.407, 0.173, 0.146, 0.133 and 0.108 times per unit increase in standard deviation in economic activities, mixture of ethnic groups of residents, quality of services, level of noise and level of human/vehicular traffic in the housing estate, respectively. Similarly, the number of residents will also change by 0.105 and 0.097 times per unit increase in standard deviation in the quality of life of residents and socio-cultural activities in the housing estate, respectively.

Discussion

The key question this research sought to address was: What are the socio-cultural and economic features of housing that contribute to an increasing number of residents in selected public housing estates in Abuja, Nigeria? Based on the results it is evident that the top three out of the seven key features that emerged were, in order of their influence on the increasing number of public housing estates sampled: economic activities in the estate, the mixture of ethnic groups of residents, and quality of services in the estate. Firstly, the finding on the influence of economic activities in the estates surveyed in the current study seems to support the assertion by Vale *et al.* (2014) and Adeokun and Ibem (2016) that housing has to support the economic livelihoods of its residents if it is to promote city resilience. Also, Valentin and Valeria (2012) in their study on the influence of economic factors on the population in a neighborhood, established a statistically significant relationship between the number of people moving to a new place and a change in average income, and concluded that the envisaged new income could determine the level of movement to a new place. The finding in this study, therefore, implies that the prospects of making a higher income in a new locality could influence residential mobility.

Furthermore, it can be asserted that the increase in population in the surveyed estates was due to the availability or possibility of business opportunities within the neighborhoods where the estates are located. In support of this assertion is the fifth significant factor influencing an increase in the number of people living in the estates, which was found to be the increase in level of human/vehicular traffic. This suggests that available human patronage of business activities in the neighborhoods supported economic activities in the estates and influenced the increase in number of residents. This implies that, as indicated by previous authors (Schneider &Till, 2007; Adeokun & Ibem, 2016), flexible and dynamic use of residential neighborhoods for business activities can increase the number of people moving into a neighborhood. The result of this study thus suggests that supporting the economic activities of residents in residential neighborhoods can promote housing for resilience, by adapting, responding to, and providing a foundation for vulnerable groups such as those with a low level of education and skills, who form the majority of migrants into cities of developing countries. In addition, Yang, Song and Choi (2016)

investigated the effects of economic activities within residential neighborhoods and argued that mixed land use, emphasized in contemporary planning principles, influenced neighborhood residential house type and density, thereby supporting commercial activities. The authors further averred that such mixed land use can encourage a more walkable and sustainable community, as well as create spatial concentration. In other words, these authors were of the view that mixed land use in the residential layout can affect the house types and the density of neighborhoods, thereby increasing the population and supporting commercial activities.

Secondly, the result of this study also revealed that a mixture of ethnic groups within the housing estates is a significant predictor of an increasing number of people living in an estate. The migration of people from diverse backgrounds into cities in search for a better standard of living brings about a mixture of ethnic groups. This seems to be consistent with Mulder's (2012) argument that population influences housing via housing demand, while housing influences the number of people and households via attraction of migrants. In addition, the study by Kearns and Whitley (2018) found that perceived ethnic diversity was associated with safety and control, and thus attributed this to the positive neighborhood cohesion outcomes; and positive neighborhood cohesion outcomes are attributes of resilient cities. It is suggested that building social cohesion in a community can manifest itself as a result of strong social networks (Carpenter, 2013). Social networks represent the web of relationships that exist among people (Pollack, Green, Kennedy & Griffin, 2014), or social ties that link individuals. Social network theory is necessarily valuable since it explains how various individuals can come together to create a functional society (Borgatti, Mehra, Brass & Labianca, 2009). It is vital that the community's social structure is supported if housing for resilient cities is to be achieved (Wallace and Wallace, 2008; Vale *et al*., 2014). In support of this, the current study has revealed that multi-ethnic characteristics of the estates had a significant influence on the number of residents coming to live in the estates sampled. However, Carpenter (2013) warns not to mistake community interaction for a sense of community prima facie and, also, interventions for resilience building need to recognize their embeddedness in social inequalities and social processes (Bottrell, 2009).

Thirdly, the emergence of quality of services in the estates as one of the key factors that influence the number of residents in the housing estates did not come as a surprise. Previous authors (Lotfi & Koohsari, 2009) have shown that the provision of quality urban services promotes sustainable human settlement, which is essential in enhancing the capacity of settlements to cope with the service needs of the residents. Apart from the physical structures (houses), accessibility to basic sanitation, safe water, electricity and public facilities by the residents is a very important aspect of housing delivery that ensures that the housing performs its functions in meeting the physiological, psychological, protective and economic needs of the residents (Apparicio & Séguin, 2006; UN-HABITAT, 2010). Moreover, Ibem (2013) and Abubakar and Aina (2019) explained that access to basic social amenities and services in housing environments is vital in ensuring that residents are satisfied with their housing environment with the attendant positive impact on their quality of life and wellbeing. What this means is that the provision and access to quality services for all social strata in residential environments can have a positive impact on the extent to which mass housing environments can help to reduce, inequality, social exclusion and stress associated with poor access to basic services and competition for services by residents in urban areas.

Conclusions

This study investigated the socio-cultural and economic features that influence the increase of the number of residents in selected public housing estates in Abuja, Nigeria. Based on the results, it

can be concluded that although seven features were identified, the top three features with a significant influence on the number of residents in the housing estates were the availability of economic activities, the mixture of ethnic groups and quality of services in the housing estates. This finding firstly means that, among others, these three socio-economic features have significant influence on the capacity of mass housing developments to cope with a population influx in residential neighborhoods in cities in developing countries like Nigeria. Secondly, it means that these are the main socio-cultural and economic features that people consider when choosing the public housing environment to live in and thus tend to attract more residents to such housing developments.

These results can be considered to have some implications as they relate to the influence of social-economic features of public housing on urban resilience. As previously highlighted in this paper, cities, especially those in the Global South, are constantly under stress resulting from rapid population growth. For these cities to survive in the 21st century, urban planners and policy makers must engage in strategies that will enhance their capacity to cope with some of these challenges. In line with the foregoing, the findings of this study imply that to ensure that public housing schemes contribute significantly to enhancement of city resilience to the impact of rapid population growth, mass housing developers and built environment professionals should give adequate attention to promoting robust economic activities within residential environments through the provision of spaces for home-based activities within the dwelling units and their surroundings. This entails integration of domestic life with economic activities in mass housing schemes in a manner that will not expose the residents to environmental and health hazards associated with unplanned and non-regulated home-based enterprises.

Secondly, in view of the heterogeneous nature of contemporary urban populations in cities of developing countries due to the increasing mixture of ethnic groups among the residents, this study implies that for housing developments to enhance the capacity of cities to cope with stress associated with cultural diversity and plurality, there is a need for housing designers and developers to understand the socio-cultural values of the target population and incorporate this in the design, planning and construction of housing units and their surrounding environment in public housing schemes. Among other benefits, this will help to ensure that the needs and expectations of the various socio-cultural groups are adequately met, thereby reducing the adverse impacts associated with unsatisfactory housing conditions to the barest minimum. It will also foster greater socio-cultural activities, which can help reduce the vulnerability of the poor and less privileged to the impacts of rapid population in residential environments. In achieving this, it is suggested that a bottom-top (i.e. participatory) housing development approach should be adopted by allowing the target population of public housing schemes provide input at every stage of the housing development process so that their views, expectations and aspirations are adequately incorporated in such schemes.

Lastly, this study also implies that the provision of quality of services for residents in public housing environments should be one of the key objectives that must be vigorously pursued by housing developers and policy makers if the goal is to achieve housing for city resilience to the impact of rapid population growth. To achieve this, it is suggested that the same level of attention should be given to the design and construction of dwelling units and that their surroundings should be extended for the provision of basic social amenities such as utilities and other vital urban services in public housing schemes. In fact, housing developers in cities should endeavor to give priority to the provision of quality services for residents in the lifecycle of mass housing projects. Notably, this will enhance the environmental carrying capacity of the housing environment by ensuring that there is unhindered access by the residents to quality basic social amenities required

for a decent living environment with the attendant positive impacts on the quality of life and positive health outcomes among urban population.

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