Determinants that Influence Residential Mobility in a Typical Sub-Sahara City: Case of Enugu City

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Abstract

Residential location choice is a crucial topic in transportation planning research since land use as well as residential land use can signifcantly affect a city's attractiveness for development and residence. Understanding the factors that influence households in their residential location choice is essential for policymakers to evaluate the effect of their decisions. In this study, the predominant factor that influence residential mobility in Enugu was investigated. Survey research design was employed in this study. The data were derived from a questionnaire survey of 400 household heads in the areas that have had residential mobility. The questionnaire method was used to elicit both qualitative and quantitative data. Principal component analysis and multiple linear regression were also used to analyse the findings. The results indicated that the eight determinants that influenced residential mobility determinants were Quality of life, 32.7%; neighborhood design, 15.4%; travel mode, 12.9%; household demographics 10.2%; housing tenure, 9.9%; family/social contacts, 4.1%; non-personal control, 3.8% and ethnic/religious factors 2.7%. The understanding of the patterns would aid/help urban planners and policy makers in decision making with regard to neighbourhood and house design in Nigeria.

Keyword: location, determinants, households, residential

1. Introduction

The structure of cities throughout the world is likely to be influenced by the pattern of the residential land use which occupies a major proportion of its total urban land use. The factors determining urban land use are the residential location choice of households which appear to be important in determining the future physical form or urban spatial structure of cities. (Theodos and Turner, 2012). Moving from one area of residence to another is one of the major events in the life of city residents. In demographic studies and urban planning, these residential shifts are referred to as "residential mobility". (Melanie and Carey, 2006). Just as housing consumption is of prime importance to an individual's well-being, so also is the process of residential location and relocation central to our understanding of urban dynamics and the changing social and spatial stratification in our cities (Gbakeji and Ojeofo, 2007).

With the increase in urbanization, planners and policy makers face significant social, economic, and environmental challenges caused by the complex and dynamic interactions between the environment and humans (Ballesteros et al., 2023; 2019; Ourang, 2022). Choosing a place of residence is a part of the interaction in transportation planning and land use. Therefore, it is essential to provide better insight to policymakers and planners to help them make better decisions in line with sustainable urban development and related facilities (Dehghani et al., 2022; 2023; Le & Le, 2022).

Decisions related to residential location choice have been widely investigated and modeled using choice theory and based on the concept of utility maximization. Residential location choice models are essential for analyzing urban economic and housing policies, transportation policies, and urban social structure (Li et al., 2020; Schirmer et al., 2014). Understanding the households' choice in residential environments in travel demand models can indicate their preferred travel behaviors and access to jobs and household needs (ASLAM et al., 2019). Considering the importance of investigating the effective factors on the residential location choice for the residents of a city and the definition of different urban land uses that ultimately make an area in the city attractive or unattractive, investigating the effective factors for households on the residential location choice and the importance of each one, and finally, estimating the attractiveness of each area according to the existing features, can be very effective in evaluating the effects of policymaking.

Due to the importance of residential location choice and land use and its relationship with transportation planning, various studies have been conducted regarding the factors affecting people's residential location choice. Hunt, (2001) conducted a study to analyze the sensitivity of various factors in urban transportation by interviewing households in Canada using the stated preference (SP) method. These factors were housing type, street type, walking condition, traffic noise, air quality, municipal taxes, and trip cost and time. It was indicated that housing type was the most important factor, followed by traffic noise, air quality, and municipal taxes. The results also showed that people prefer local streets, especially with the speed bumps in front of their residential units, compared to collector roads. Khattak & Rodriguez, (2005) examined travel behaviors in neo-traditional neighborhoods in the United States of America (USA). They applied regression models for a household behavioral survey and showed that in comparison with the conventional neighborhood, single-family households in the neo-traditional neighborhood made fewer automobile and external travel. They also revealed that the proximity of stores to sidewalks positively affected the decision to stay in a neighborhood, and the presence of stores and similar facilities that are easily accessible on foot positively affected the neighborhood's attractiveness. (Brown & Robinson, 2006) presented agent-based models to indicate the process of residential developments in urban areas. The sensitivity analysis of environmental variation patterns showed that adding heterogeneity in an agent considerably influenced the results. Moreover, the positive role of public transportation and people's attitude toward public transit in the residential location choice was illustrated. (Walker & Li, 2007) applied choice models to indicate lifestyle preferences and decisions for household locations. Intriguing policy implications were observed in three lifestyles: transit-riders, urban dwellers, and suburban dwellers. Also, the effect of the diference in lifestyle and attitude toward public transportation for trips with the purpose of education and work in the residential location was examined. Additionally, (Hunt, 2010) used the SP survey in Canada to investigate the effect of various urban form and transportation factors, such as taxes, development density, treatment of neighborhood streets, traffic noises, air quality, and mobility. Results indicated the positive effect of a private house as a place of residence and the type of streets leading to the building of the place of residence on the attractiveness of a house for the residential location choice

(Hoshino, 2013) estimated the preference heterogeneities in stated choice data using semi parametric varying-coefficient techniques and conducted an economic valuation of landscapes with dichotomous choice contingent valuations. The results indicated access to non-motorized transportation as a determining factor in the residential location choice. Fu et al., (2014) carried out a study to understand multiple dimensions of residential choices. They considered various residential choice dimensions and found that social interactions significantly affect choosing a

place of residence. Social interactions between current neighbors also affect their next neighborhood choice, especially in households with higher education and income levels. Older people pay more attention to social interactions when they decide to choose the next neighborhood for their residence. (Lasley, 2017) explored the effect of transportation and variables affecting the residential location choice in urban areas of the USA. The results showed that house attributes mainly influenced decisions, and in most cases, the price was the most important factor, followed by neighborhood quality, including aesthetics, reputation, and amenities. Transportation and traffic concerns also ranked near the middle. Moreover, neighborhoods that were more accessible by any mode of transportation were more desirable to buyers. (Cockx & Canters, 2020) analyzed household location preferences in Belgium using discrete choice models. It was illustrated that household type, nationality, education level, and tenure status discriminated heterogeneous residential location preferences. Also, along with the socio-economic characteristics, the characteristics of the residential unit, transportation, and access had a heterogeneous effect on the residential location choices in this country. Masoumi, (2021) investigated the residential location choice and the impact of urban travels on house location decision-making in Cairo, Tehran, and Istanbul using binary probit regression. The results revealed that the accessibility to facilities, number of accessed facilities, commuting distance, number of driving licenses in a household, age, neighborhood attractiveness perceptions, frequency of public transits, and entertainment-shopping mode choice in a faraway place influenced the residential self-selection.

Most existing studies have focused on urban areas in western nations of the world, Egypt -Masoumi, (2021), Belguim - Cockx & Canters, 2020; and Canada - Hunt, (2010) which have different city structures and morphologies from those of Nigeria, a sub-Saharan African city. The obvious cultural, security, and city morphological differences between western societies and Africans will not make the findings and recommendations for western cities valid for urban cities in Nigeria. (Gbakeji and Ojeofo, 2007; Olatubara, 2008) Only very few studies have x-rayed the residential location choice among the residents on the different residential densities in the urban areas of Africa. This is lacking in the growing body of literature. A knowledge gap exists in terms of the factors that influence residential mobility in the sub-Saharan region and specifically in emerging cities in Nigeria. The study filled the gap by analyzing the determinants that influence residential location choice among the residents in Enugu urban, southeast Nigeria. The objective of the study was to determine the predominant factor that influence residential mobility in Enugu. The outcome of the study would be used to evolve tools and policy guidelines that would help planners and policy makers to formulate planning policies for our cities.

2. Literature Review

One of the classical attempts to describe mobility and the subsequent choice of a residential premise in developing countries was the John Turner's intra-urban migration model in the early 1960's, which was based on migrants' mobility in Lima, a Latin American city. It explained the relationship between urban growth, residential mobility, social and economic status; and subsequent location of low-income migrants. (Turner, 1968).

The Turner model of migration posited that most Latin American migrants moved into rental or shared accommodation on their first arrival into the city. The newly arrived migrants, whom he called 'bridgeheaders', first moved into cheap centrally located rental property in proximity of unskilled employment opportunities. After some years they become established in the city with regular, stable jobs and a young family and so moved out of the overcrowded central locations and settled on the urban periphery where they built a house of their own on self-help ownership. They were referred to as 'consolidators'. Another migrant category of the model was that of the 'status seekers' (middle-income) who gave priority to amenities rather than to location or tenure. Status seekers would either improve their dwelling to reflect their changing employment, income and family status or move into government housing after having acquired a salaried job.

The model reflected the choices of migrants. in the 50's and 60's. However over the years government policy and urban dynamics have changed the housing opportunities that would have otherwise been available at the city centre: saturation, high rent prices, growing commercial district and development of informal settlements in the urban periphery.

Gilbert and Crankshaw, (1999) found that, in some countries, the inner cities have ceased to be areas of reception and the inner suburbs are growing in importance as owners of formal and self-help houses provide rented rooms to migrants. Admittedly, South Africa is a unique case because of its legacy of apartheid where Africans were prohibited from living in the city, but even in other countries, the same pattern is observed.

Chapple & Weinberger (2000) have also observed peri-urban importance in Port of Spain, Trinidad where the city experienced different periods of urbanisation and subsequent urban structures. Clark (2006) had demonstrated in their studies of peril-urban residential development that migration to these areas by new migrants is attractive because of the availability of land and rooms at lower prices as well as land for economic activities such as urban farming.

3. Case study area

Enugu is the capital of Enugu State. It is located in the south-eastern geopolitical region of Nigeria, as shown in figure 1. Enugu City is located between $06^{0}21^{0}$ N and $06^{0} 30^{0}$ latitude and between longitude $07^{0} 26^{0}$ E and $07^{0} 37^{0}$ E. The land area of the city is estimated at about 72.8 square kilometers. Enugu Urban consists of three local government areas, namely: Enugu North, Enugu South, and Enugu East, as shown in figure 2. Enugu Urban has 18 prominent residential neighbourhoods. Enugu urban registered a population of 62,764 in 1952; the 1991 Census shows the population count of Enugu to be 462,514, accommodated in 28 residential patterns. This increased to 722,664 in 2006 and is estimated to be 1,414,785 in 2022.



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4. Methods

Survey research design was employed in this study. Data collected were more of cross-sectional data. Data for this research were collected from two sources and they include secondary and primary sources. The population that was considered in this research was the households in Enugu that have moved within or across the neighbourhoods and those that re-located from outside the study areas. This was because samples done on household bases gave a proper representation of the population. The sample size for this research was determined through application of Williams (1978) sample size determination formula. This formula is concerned with the application of the normal approximation with a level of confidence at 95%. An error margin of 0.05 was assumed while determining the sample size for the study.

The formula is given as: S = n

S

= n 1 + n/N

Where:

= Sample size

n = The proportion of households population that was

sampled which was 2.5 percent. 2.5% was used because of its aptness in calculating proportions that relates to household.

N = The total number of households

A sample of four hundred was be obtained for Enugu. An approximate 400 household heads were sampled and questionnaires were administered to them. The questionnaire method, according to Cooper and Schindler (2006), is considered the best measure to understand the preferences of a large population. Beside this, the questionnaire method affords the respondents time to articulate their answers adequately. (Mitra and Lankford, 1999). The study was carried out between May 2024 and August 2024. The questionnaire was administered face-to-face to ensure that sampling across the household heads represented different professional backgrounds, educations, and genders. The questionnaires were first of all pre-administered to a few household heads before being administered in all the selected neighbourhoods. This questionnaire was administered in English, and the research assistants helped interpret for the illiterate, which were very few. In the study, from the pilot study and the literature reviewed, it was identified that 43 variables influenced residential location and mobility choice. Stratified, systematic and simple random sampling techniques were used to proportionately select the residential densities and respondents used in the study. Simple random sampling technique was used to select streets/roads in the neighbourhoods. Systematic sampling technique was used to select the houses from each of the selected streets to be sampled. The 5th building was always selected, this was to ensure proper representativeness in the streets sampled. Proportionate allocation strategy was used to get the sample size for each of the neighbourhoods using their various household sizes. Enugu urban had 24 neighbourhoods. However, there were pockets of slums like Ugbo odogwu, Agu abor, Ugbo Obed. Stratified random sampling was used to divide these 24 neighbourhoods into residential densities- high, medium and low densities. In Enugu, the number of households for each of the selected neighbourhoods were obtained by dividing the projected population of the neighbourhoods by six (6) which is the average household size in Nigeria. (NPC, 2006). The study using the proportionate allocation strategy ensured that the households with greater numbers had more sample size. Table 1 showed the household population and number of questionnaires that was administered:

| NEIGHBOURHOOD | PROJECTED | HOUSEHOLD | SAMPLE |
|---------------------|------------|------------|--------|
| | POPULATION | POPULATION | SIZE |
| | (2024) | | |
| Abakpa | 182,836 | 30472 | 102 |
| Asata | 60,887 | 10147 | 35 |
| Ogui | 91,189 | 15198 | 52 |
| Maryland | 46,925 | 7820 | 25 |
| New haven | 85,022 | 14170 | 48 |
| Uwani | 83,491 | 13871 | 46 |
| Independence layout | 68,733 | 11455 | 38 |
| G.R.A | 52,049 | 8674 | 29 |
| Trans Ekulu | 39, 390 | 6565 | 25 |
| TOTAL | 710, 522 | 118,372 | 400 |

Table 1: The sampled neighbourhoods and the sample sizes for Enugu

Source: Researcher's Survey, (2025).

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Out of the 400 copies of questionnaires distributed, 394 were properly filled out and used for the study, representing a 96.4% success rate. Principal component analysis (PCA) was used to collapse the identified factors that influenced residential location and mobility choice in Enugu Urban into manageable and fewer factors. The PCA highlights the magnitude of each of the components (factor). This was observed from the percentages, factor loadings, and eigenvalues of each component. The researchers adopted factor loadings of 0.500 and above. Data processing and analysis for this study were performed using the Statistical Package for Social Sciences (SPSS) 22 for windows for statistical analysis of the quantitative data.

5. Results

5.1 Factors that influenced residential location and mobility choice in Enugu Urban

The result of the of hypothesis using the PCA identified and classified the predominant factors that influenced residential location and mobility choice in Enugu Urban into 8 components that explained 91.663 percent of observed variation in residential location choice variables. The identified and classified predominant factors that influenced residential mobility determinants were Quality of life, 32.7%; neighborhood design, 15.4%; travel mode, 12.9%; household demographics 10.2%; housing tenure,9.9%; family/social contacts, 4.1%; non-personal control, 3.8% and ethnic/religious factors 2.7%. These factors were further explained individually and its presented in table 2

| No | ENUGU | | | |
|----|------------------------|---------|------|--|
| | Factors | Loading | Rank | |
| 1 | Quality of life | 32.7% | 1st | |
| 2 | neighbourhood design | 15.4% | 2nd | |
| 3 | travel mode | 12.9% | 3rd | |
| 4 | household demographics | 10.2% | 4th | |
| 5 | housing tenure | 9.9% | 5th | |
| 6 | family/social contacts | 4.1% | 6th | |
| 7 | non-personal control | 3.8% | 7th | |
| 8 | ethnic/religious | 2.7% | 8th | |

Table 2. Factors that influence residential mobility in Enugu

Source: PCA results

Factor 1: Quality of life

This was highly and positively loaded on 7 variables out of the 43 variables in the study. A variable in this factor was purchase/live in own home with the factor loading of 0.791. Other variables in this factor include, investment opportunities with factor loading of .951, hostile neighbours, more secured building, dislike neighbours, local business opportunities and crime rate with factor loading of 0.394. This Factor 1 with an Eigen value of 14.066, explains 32.7% of the determining variables of factors that influence residential location decision in Enugu urban. Factor 1 is therefore the most significant housing satisfaction factor contributing to 32.7% of the factors that influenced residential location decision in Enugu urban. Factor 1 as defined by quality of life, is therefore identified and classified as one of the major factors that influence residential location decision in Enugu urban.

Factor 2: Neighbourhood design:

This was highly and positively loaded on 15 variables out of the 43 variables in the study. The defining variable in this factor was Neighborhood layout with the factor loading of 0.876. Other variables in this factor include, Size/Quality of home, Neighborhood services, Neighborhood character, Leisure opportunity, Quality and cost of municipal services, Population density, Upgrade dwelling quality, Neighborhood safety, Neighborhood amenity quality, Environmental condition/pollution, Size of dwelling, Features of dwellings, Age of neighborhoods and Recreational opportunities with factor loading of .697. This Factor 2 with an Eigen value of 6.615, explains 15.38% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 2 is therefore the second most significant predominant factor contributing to 15.38% of the factors that influence residential location decision in Enugu urban. Factor 2 as defined by neighborhood design, is therefore identified and classified as one of the major determinants that influence residential location decision in Enugu urban.

Factor 3: Travel mode

This was highly and positively loaded on 5 variables out of the 43 variables. The defining variable in this factor was traffic congestion with the factor loading of 0.973. Other variables in this factor include, distance to work, main mode of transport to work proximity to work and proximity to shopping areas with factor loading of .937. This Factor 3 with an Eigen value of 5.526, explains 12.85% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 3 is therefore the third most significant predominant factor contributing to 12.85% of the factors that influenced residential location decision in Enugu urban. Factor 3 as defined by travel mode, is therefore identified and classified as one of the major determinants that influenced residential location decision in Enugu urban.

Factor 4: Household demographics

This was positively loaded on 3 variables out of the 43 variables. The defining variable in this factor was Change in household size/structure with the factor loading of 0.909. Other variables included, change in income and affordability with factor loading of 0.776. Factor 4 with an Eigen value of 4.386, explains 10.20% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 4 is therefore the fourth most significant predominant factor contributing to 10.20% of the factors that influenced residential location decision in Enugu urban. Factor 4 as defined by Household demographics is therefore identified and classified as one of the factors that influenced residential mobility in Enugu urban.

Factor 5: House Tenure

This was positively loaded on 3 variables out of the 43 variables. The defining variable in this factor was Housing type with the factor loading of 0.936. Other variables in this factor include, Reduce rent payment and Length of occupancy with the factor loading of .777. Factor 5 with an Eigen value of 4.24, explains 9.86% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 5 is the fifth most significant predominant factor contributing to 9.86% of the factors that influence residential location decision in Enugu urban. Factor 5 as defined by House Tenure is identified and classified as one of the predominant factors that influence residential location decision in Enugu urban.

Factor 6: Family/social contacts

This was positively loaded on 3 variables out of the 43 variables in the study. The defining variable in this factor was Move close/away to family/friends with the factor loading of 0.856. Other variables in this factor include, preference for newer and larger home and change in marital status with the factor loading of .588. This Factor 6 with an Eigen value of 1.780, explains 4.14% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 6 is therefore the sixth most significant predominant factor contributing to 4.14% of the factors that influence residential location decision in Enugu urban. Factor 6 as defined by Family/social contacts is identified and classified as one of the major determinants that influenced residential mobility in Enugu urban.

Factor 7: Non/personal control factor:

This was loaded on 5 variables out of the 43 variables in the study. The defining variable in this factor was Forced eviction with the factor loading of 0.851. Other variables included, Health/disability reasons, previous dwelling not availability, legal restrictions, and Moved with job. This Factor 7 with an Eigen value of 1.655, explains 3.849% of the determining variables of factors that influenced residential location decision in Enugu urban. Factor 7 is therefore the seventh most significant predominant factor contributing3.849% of the factors that influenced residential location decision in Enugu urban. Factor 7 as defined by Non/personal control factor, is therefore identified and classified as one of the major determinants of factors that influenced residential location decision in Enugu urban.

Factor 8: Ethnic/religious factor:

This was loaded on 2 variables out of the 43 variables. The defining variable in this factor was Ethnic /cultural reasons with the factor loading of 0.729. Other variable was close to religious congregation. Factor 8 with an Eigen value of 1.146, explains 2.66% of the determining variables of factors that influence residential location decision in Enugu urban. Factor 8 is the eighth most significant predominant factor contributing to 2.66% of the factors that influence residential location decision factor is identified and classified as one of the major factors that influenced residential location decision in Enugu urban.

6. Conclusion

The study found out the determining factors of residential mobility in Enugu metropolis, south east, Nigeria. These determining factors in Enugu metropolis which represents a typical administrative city were predominantly eight in number. However, they were of different constituent. The eight factors in Enugu were quality of life, neighborhood design, travel mode, household demographics, housing tenure, family/social contacts, non-personal control and ethnic/religious factors. The understanding of the factors and patterns would aid/help urban planners and policy makers in decision making with regard to neighbourhood and house design in Nigeria

Future research can benefit from collecting information from heads of households and considering additional variables and personality factors to better understand the influence of these characteristics on residential location choice. Additionally, examining the effects of land use changes on neighborhood attractiveness can provide insights into urban policies and their consequences. Also, another direction for future research is to apply some spatial regression models for comparative performance studies, such as the spatial error model, spatial lag model,

and geographically weighted regression. These models can account for the spatial dependence and heterogeneity in the data, and provide more accurate and efficient estimates of the regression parameters. Moreover, different methods of statistical analysis and machine learning methods can be applied in the continuation of this study (Han & Fu, 2023; Jandaghi et al., 2023; Shen et al., 2018), which can help to discover the patterns, relationships, or trends in the data, and to predict or explain the outcomes of the residential location choice.

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