

Effect of sustainable housing development along major transport routes, in Oba-Adesida Road in Akure, Ondo State, Nigeria

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ABSTRACT

This research work aims to examine the effects of transport activities on sustainable housing development along major transport routes to suggest ways to improve the situations, along the Oba-Adesida Road in Akure South. The scope of the study was limited to the safety, environmental, and technical effects that the major Oba-Adesida transport route has on existing housing, south of Akure, Ondo State. The target population i.e. Akure-south which is the local Government of the study area has a land size of about 311 square kilometers, and the 1991 national population census, however, put the population of Akure-south at 250,356 whereas, the 2006 census put the Akure-south population to be about 353,211. This study is survey design in nature, as it uses quantitative data gathering methods. The quantitative method will consist of structured close-ended questionnaires. The secondary data research method was used to review existing documents of related institutions and departments, some national and international records. The internet also served as a good source of data. As regards the primary source of data gathering, structured questionnaires were used to obtain data from residents of existing housing developments along the transport route, to recognize their opinions on how the transport activities and movements have affected and are affecting them and the sustainability in terms longevity and durability of their housing structures. The data collected on the field during the survey was edited and coded using Statistical packages (SPSS v.16) which was the quantitative analysis. Considering the main target of this study, the respondents said the effects they encounter on the existing housing development, from the transport activities are mostly the noise level arising from the moving vehicles. This does not deny the presence of other effects. In conclusion, as a positive effect, we see that the value of these buildings increases, also due to location factor, there increasing revenue for individual owners and indirectly increasing economic revenue for the government/public sector of the region, amongst other benefits. However, one cannot but neglect the negative effects as discovered in the course of this study. Governments should look into the construction of sustainable housing along major transport routes in Nigeria by providing all the logistics for smooth development or take-up.

Keywords: Sustainable, transport, development, housing, major.

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INTRODUCTION

Background of study

Housing is very fundamental to the welfare, survival and health of individuals, this is why international concern has been growing over the deteriorating housing conditions in

urban areas of developing nations (Aribigbola, 2011). Housing or more generally living spaces, refers to the construction and assigned usage of houses or buildings collectively, to shelter people; the planning or provision delivered by an authority, with related meanings. The

literature on housing quality revealed the commonly used indicators of housing quality to include structural adequacy, neighbourhood quality, residents' perception of neighbourhood safety, level of public services provided, access to work and other amenities, room density and housing affordability (Aribigbola, 2011). Housing is therefore central to sustainable development (Golubchikov and Badyina, 2012).

Sustainable housing development (SHD) can be defined as the development and implementation of policies, programs, or initiatives designed to deliver safe, viable and affordable houses for individuals within it (Ojoko et al., 2016). A straightforward way to define sustainable housing follows the Brundtland Commission's definition, defining it as "housing development that meets the housing needs and demands of the present generation without compromising the ability of future generations to meet their (housing) needs and demands" (Chiu, 2004). If both housing and transportation work together, in concert with closely related issues such as economic development, environmental quality, education, and workforce development, transportation and housing can create places of delight, prosperity, justice, and opportunity (Bicknell et al., 2013). It has been argued that locating affordable housing near transit reduces greenhouse gas emissions by causing residents to drive less, besides, unless affordable rental rates are close to the prevailing market rates, affordable units will be viewed as costly by developers because they generate less cash flow than could otherwise be achieved (Boarnet et al., 2017).

Statement of the research problem

Sustainable housing along transport routes should be socially acceptable, economically viable, environmentally friendly, and technically feasible. (Jamaludin et al., 2018). While the travel patterns and needs of low-income households have been documented in research, taking into consideration economic and financial viability, this information has yet to be incorporated into methods for reviewing the impacts of new housing development, along transport routes, accounting for environmental and technical (safety) viability and feasibility (Howell et al., 2018).

This is a problem that exists in the study area, as housing developments occur, without proper consideration for the safety and physical well-being of residents, as well as the housing structures themselves in the study area.

Research questions

To address the objectives of this study, the following

research questions were posed for the study:

- i) What are the existing situations of sustainable housing development along major transport routes in the study area?
- ii) What are the existing situations of major transport routes along Oba-Adesida Road in Akure?
- iii) What are the socio-economic characteristics of the residents in the study area?
- iv) What are the planning effects of sustainable housing development, likewise, in the study area?

Aim of the study

The aim of this research work is to examine the effects of transport activities on sustainable housing development along major transport routes in a view to suggesting ways to improve the situation.

Objectives of this study

To achieve the above aim, the objectives pursued are to:

- i. Assess the existing situations of sustainable housing development along major transport routes in the study area.
- ii. Evaluate the existing situations of major transport routes along Oba-Adesida Road, in Akure.
- iii. Examine the socio-economic characteristics of the residents in the study area.
- iv. To analyze the planning effects of sustainable housing development, likewise, in the study area.

Justification for the study

Various studies have explained the transport-housing relationship in light of socio-economic characteristics, economic characteristics, or transit wise in favour of new emerging transportation concepts such as the eco-city transport (where non-motorized transport is encouraged), the compact city transport concept which has its scope intertwined with that of the eco-city concept, etc. (Cytron, 2010).

These studies have explained the economic and socio-economic aspects while neglecting the technical, and environmental-safety dimension of the effects of the transport-housing relationship, a gap this study aims to cover, as it will reveal various effects that transportation has on housing.

Scope of study

The scope of the study was limited to the safety,

environmental, and technical effects that the major Oba-Adesida transport route has on existing housing, at south of Akure, Ondo state. This is sufficient since other studies cover such scopes as the economic, and socio-economic, aspects of the housing-transportation relationship.

Area of study

The area is along Oba-Adebiyi Adesida road off Oduduwa road with latitude 07,17.47 and longitude 05,08.31 NE and latitude 07,17.42 and longitude

05,08.23 SW (Wayback Machine, 2010). Oba–Adebiyi Adesida road is a major transport route located in Akure, Ondo State, located in the southwestern part of Nigeria, lying approximately on latitude 7°15' north of the equator and longitude 5°15' east of the Greenwich meridian. (Sharp Edge News, 2010). Ondo state covered an area of 20,555 square kilometers. Osun, Ogun and Ekiti States at the west, Kwara and Kogi at the North, Edo and Delta at the East, and the southern part by the Atlantic Ocean, bound it (Adeoye, 2016) Topographically, the land rises steadily from the shores of the Atlantic Ocean to the highlands of the Akoko area in the Northern part of the State (Wayback Machine, 2010) (Figures 1 and 2).

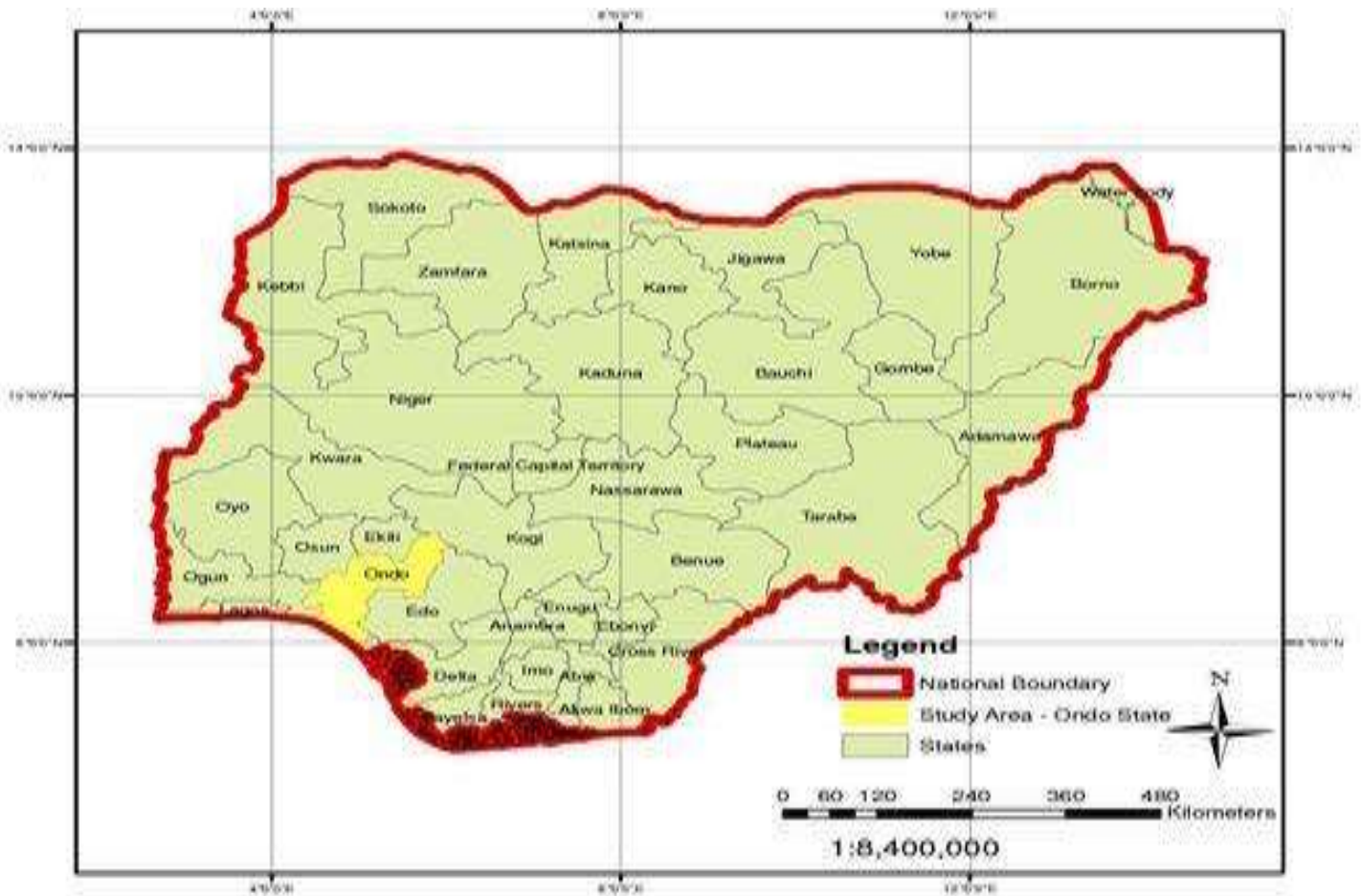


Figure 1. Map of Nigeria indicating Ondo State. **Source:** ESRI GIS digitized by author, 2021.

LITERATURE REVIEW

Sustainable housing, which is often defined as a multi-dimensional bundle of services, is also a bundle of contradictions and paradoxes. This is because the exogenous variables, acting in concert with or in

contradistinction from the endogenous variables, often create paradoxical situations (Ajayi et al, 2023). Likewise, Omowa et al. (2023) concludes that housing is a combination of characteristics that provide sustainable houses along major transportation routes within any neighborhood; it is an array of economic, social and

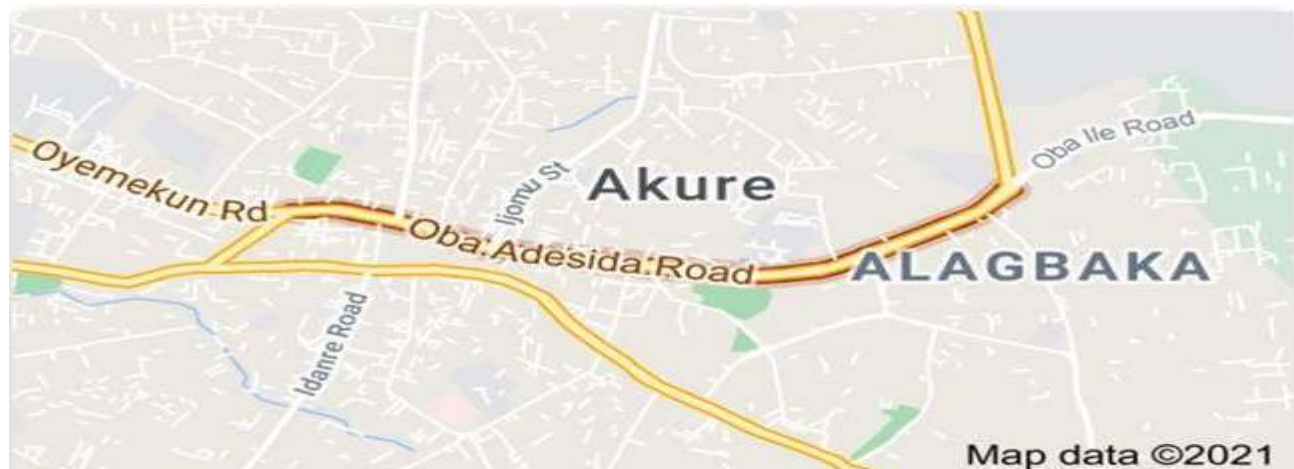


Figure 2. Study Area within the Context of Akure showing Oba Adebisi Adesida Road. Source: Author's field survey, 2021.

psychological phenomena, in other words, housing could be seen as a multidimensional package of goods and services extending beyond shelter itself.

Hence, the need to appreciate the relevance of habitable (qualitative) and sustainable housing, therefore requires an understanding of the concept of "quality and sustainable", according to (Owolabi, 2020), "is a mental or moral attribute of a thing which can be used when describing the nature, condition or property of that particular thing". Omowa et al. (2023) noted that reaching a definition of quality depends not only on the user and his or her desires but also on the product being considered in the area of housing provisions. In essence, sustainability is a product of subjective judgment that arises from the overall perception of housing, which the individual holds towards what is seen as the significant elements at a particular point in time.

While the challenge to provide sustainable affordable housing is common for all countries, the need for decent sustainable housing is particularly acute in developing regions. These are experiencing rapid and continuing urbanization, driven by population growth and migrations from rural to urban areas (Ajayi et al., 2023).

The Transit-Oriented Development (TOD) is to facilitate the movement of people between origins and desired activity locations, and to make travel convenient without the use of the automobile. However, there are more options for public transportation and living does not mean that everyone has choices. For example, lower-income residents, are disproportionately dependent on transit (Omowa et al, 2023). If both sustainable housing and transportation work together, in concert with closely related issues such as economic development, environmental quality, education, and workforce development. Transportation and housing can create places of delight, prosperity, justice, and opportunity. But if misused, work at cross-purposes, or fail to take

advantage of their reinforcing linkages. They can create ugly, dysfunctional, unhealthful environments that diminish the quality of life, shut people out of opportunities for housing and work, and deny them a sense of community while raising household and community costs (Owolabi, 2020).

MATERIALS AND METHODS

This is the general strategy that outlines how research is to be undertaken and, among other things, identifies the methods to be used in the research (Hanmer and Booth, 2002). It may include interviews, surveys, articles in journals and other research techniques, and could include both present and past information (Ebong, 1983). It also referred to procedures used in making systematic observations or otherwise obtaining data, evidence, or information as part of a research project or study. Research methodology in more detail is "a studious inquiry or examination; especially investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws" (Jiboye, 2004).

Sources of data

Secondary data

Secondary data were obtained from journals, books, articles, newsletters, magazines, the internet and published and unpublished materials. The secondary data research method was used to review existing documents of related institutions and departments, some national and international records. The internet also

served as a good source of data.

Primary data

As regards the primary source of data gathering, structured questionnaires were used to obtain data from residents of existing housing developments along the transport route. To recognize their opinions on how the transport activities and movements have affected and are affecting them and the sustainability in terms of longevity and durability of their housing structures.

Research population

The target population which is the research population includes the total number of people that the researcher will administer his questionnaires in the area of study. Akure-south which is the local Government of the study area has a land size of about 311 square kilometers, and the 1991 national population census however put the population of Akure-south at 250,356 whereas, the 2006 census put the Akure-south population to be about 353,211. Using the normal percentage population

projection by the National Population Commission which is (3.2%). At present, the city is estimated to have about 399,074 people using the population projection formula below which goes thus:

Population projection formula:

$$P_2 = p_1(1+r)^n$$

r = Growth Rate

n = Projected Year

p = Base Year Population

P₂ = Population Projection

As per the case study area, a total of 4 bus stops were identified with the aid of digitized satellite imagery of Oba-Adesida road, Akure South Local Government Area, all of which were made use of in this study, and this amounts to 601 buildings, and as derived from the Nigerian Demographic Health Survey, an average household size in Nigeria was estimated at five persons per family (Ppf), which was adopted for this study. Based on field findings, having about five families living in a building, amounts to 15,025 individuals. This study includes residents of the listed bus stops, Futa Junction Bus stop, Council Bus Stop, Agape Bus stop, And Ilesha-Garage Bus Stop (Figure 3).



Figure 3. Google imagery of Oba-Adesida Transport Route, Akure. Source: Author's field survey, 2021.

Sampling frame

For this study, all bus stops were used. The sample

frame will comprise the houses and commercial buildings in the area, between the bus stop of FUTA Junction to Ilesha-Garage. Stratified Random Sampling Technique

was used to obtain a representative sample from each street. In these places, questionnaires were administered, focusing on members of the community who are mainly adults. An interview was conducted in the area and with the agency in charge of waste management, and probably suggest solutions to some of the challenges facing waste management in the study area.

Sampling techniques

A multi-stage sampling technique was used. First, the stratified random sampling technique was used for all bus stops along the major transport route. A total of 601 buildings are present between the bus stops along the major transport route, with an estimated population of 15,025. 1.0% of the estimated population along the transport route will be involved in the research, it was because of the size of the residents (Hanmer and Booth, 2002). This amounts to 150 questionnaires for all the residents. Then the Simple Random Sampling Technique

was used to obtain the samples from the residents.

Sample size

It will be necessary to take a part of the population from which information was drawn to represent the entire population in the selected areas. A sample size of 150 will be drawn from the sample frame. The estimation of the total sample size was derived from the formula below:

$$n/100 \times b$$

where,

n = percentage considered

b = the number of buildings along the major transport route in the study area per bus stop.

Mathematically;

$$(a) 1.0/100 \times 2375 = 9.5 \approx 24$$

$$(b) 1.0/100 \times 7525 = 30.1 \approx 74$$

$$(c) 1.0/100 \times 5125 = 20.5 \approx 52$$

(Table 1)

Table 1. The sample street names and the number of buildings.

| S/N | Bus Stops | Number of buildings | Number of estimated residents | % considered | Residents involved |
|-------|-------------------------|---------------------|-------------------------------|--------------|--------------------|
| 1 | Futa Junction – Council | 95 | 2375 | 1.0 | 24 |
| 2 | Council- Agape | 205 | 5125 | 1.0 | 52 |
| 3 | Agape – Ilesha Garage | 301 | 7525 | 1.0 | 74 |
| Total | | 601 | 15025 | 1.0 | 150 |

Source. Author' Field Survey, 2021.

RESULTS

In this section, the views and opinions of the resident of houses along the Oba-Adesida major transport route, as well as the physical characteristics of the study area were examined. Considerations were also given to variables such as age, sex, educational status, occupation, income level, sanitation facilities and sanitation motivators and preferences. However, the analysis of data embraced the usage of statistical package for social science (SPSS). Both pie charts and bar charts, produced by the origin graph plotter package were employed in displaying the results of the analysis.

Socio-economic characteristics of respondents

Age distribution

This research shows that 22.4% of respondents were 18

to 30 years while 54.1% were 31 to 40 years. 18.7% and 4.8% of respondents were 41 to 55 years and >55 years respectively. This simply implies that these age brackets are a active part of the population that contributes to the economy. This is shown in Table 2. With respect to the study, it means that transportation activity in the study area would be relatively high, creating notable effects on the buildings in the study area.

Table 2. Age distribution.

| Age (Yrs.) | Frequency | Percentage |
|------------|-----------|------------|
| 18-30 | 34 | 22.4 |
| 31-40 | 81 | 54.1 |
| 41-55 | 28 | 18.7 |
| Above 55 | 7 | 4.8 |
| Total | 150 | 100 |

Source: Author's Field Survey, 2021.

Gender distribution

From this study, it was found that 58.6% of the respondents are female while 41.4% are males. This gives the impression that women are the predominant sex in the study area at the time of this research. The result of the finding is in consonance with the provisional figure of the national population census figure (NPC, 2006) which indicates that the female population is higher than the male counterpart. This implies that most of the buildings are likely to have abutting shops in front of them since women occupy the petty trading field (Figure 4).

Level of educational qualification

Table 3 shows that 28% of the respondents were secondary school certificate holders, 27.1% were first degree/post-secondary, 38% had primary certificate, and 6.9% of respondents had no formal education. This implies that considerable inhabitants of the study area were literate, meaning they would have corporate jobs causing them to travel, once again increasing transit from home to workplace, leading to increased transportation activities.

Occupation of respondents

Employment status is a basic indicator of the economic soundness of households. The dominant occupations of residents are trading and civil servants with 30.6 and 25.5%, respectively. Next to this are farming and processing with 16.3 and 15.3% of respondents, respectively; 7.5% of the respondents claimed to be artisan, and processing 3.8% respectively and others 1.0% (Figure 5).

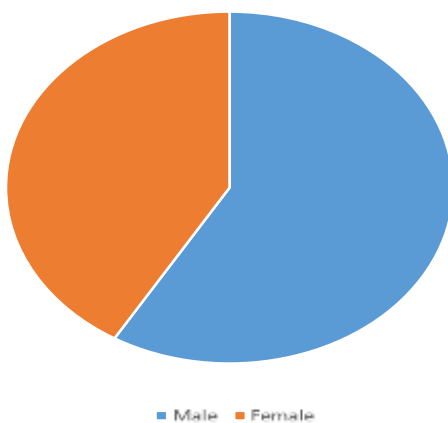


Figure 4. Gender distribution. Source: Author's field survey, 2021.

Table 3. Level of education.

| Level of Education | Frequency | Percentage |
|--------------------|-----------|------------|
| None | 10 | 6.9 |
| Primary | 57 | 38 |
| Secondary | 42 | 28 |
| Post-Secondary | 41 | 27.1 |
| Total | 150 | 100 |

Source: Author's Field Survey, 2021.

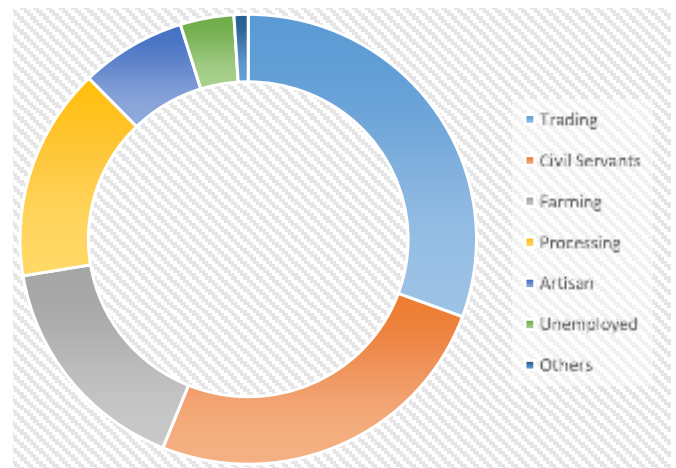


Figure 5. Occupation of respondents. Source: Author's field survey, 2021.

Monthly income of respondents

Table 4 revealed that the majority of respondents were medium-income earners which accounts for 31.8% < ₦20,000, and 40.5% of the respondents earn between ₦20,000 and ₦60,000. 22.7% of the respondents realized ₦60,000 to ₦100,000 while 5% of the respondent earns above 100,000 (Naira). The majority of the respondent investigated at the time of the research are medium-income earners. This means that there is more public transport than private since most of them cannot afford private vehicles based on their incomes.

Presentation and analysis of data according to research questions and objectives

Building use type

Table 5 shows that the majority of the buildings along Oba-Adesida's major transport route are residential which accounts for 38.9 and 55.1% are commercial while 6.0% are for other uses.

Table 4. Monthly income of respondents.

| Monthly income of respondents (₦) | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| < 20,000 | 48 | 31.8 |
| 20,000 - 60,000 | 61 | 40.5 |
| 60,000 - 100,000 | 34 | 22.7 |
| Above 100,000 | 7 | 5 |
| Total | 150 | 100 |

Source: Author's Field Survey, 2021.

Table 5. Building use type.

| Type of building | Frequency | Percentage |
|------------------|-----------|------------|
| Residential | 58 | 38.9 |
| Commercial | 83 | 38.9 |
| Others | 9 | 6.0 |
| Total | 150 | 100 |

Source: Author's Field Survey, 2021.

Building setback to road

Figure 6 indicates that 30.5% of the buildings had a setback of <1 to 2 m, while 65.5% had a setback of 2 to 3 m, and 4.0% had a setback of >3 m.

Rate of transportation activities around existing housing developments

In Table 6, 19.5% of the respondents disclosed that the rate of transportation is very high, 29.5% perceive it to be just high, and 48.9% say it is moderate, 2.1% see it as minimal. None of the 150 respondents sees it as very minimal. This is very important as it affects the quality and sustainability of the buildings, especially considering the short distance in setbacks of most of the existing housing developments (Figure 7).

Frequency of housing maintenance and expenditure bracket

One of the objectives of this study assess the existing situations of sustainable housing development along major transport routes in the study area., and knowing the level of maintenance these existing structures undergoes will aid greatly in assessing their existing situations. Field research reveals that most of the respondents do serious maintenance work on their building bi-annually while having a maintenance expenditure of 101,000 to 150,000 on aggregate. Figure 8 shows the summary of the assessment by the researcher based on the questionnaires administered to

the respondents in the field.

Age of building

Table 7 reveals that 8% of the respondents claim the age of their building is below 10 years, 7% say theirs is 11-20 years, 31%, 24% and 19% claim theirs to be 21-30 years, 31-40 years, and 41-50 years respectively, while 12% have theirs to be above 50 years, which implies that most of the buildings in the study area, have their ages to be 21-30 years old, based on field research work. The age of an existing building is also an important factor in assessing the quality and sustainability of the building.

State of road infrastructure

Figure 9 indicates that the road infrastructure is in a good condition, based on field findings, as 55% of the respondents agree with such judgment, while 9%, 25%, 10% and 1% say it is very good, fair, poor and very poor, respectively. A road in good condition would encourage transport workers and private road users to put their vehicles on the road, increasing the level of transportation activities, and creating a wave of effects on the buildings.

Road surface cover condition

Based on the research carried out in a field survey, 87.9% of the respondents acknowledge that the existing transport route in front of their existing housing

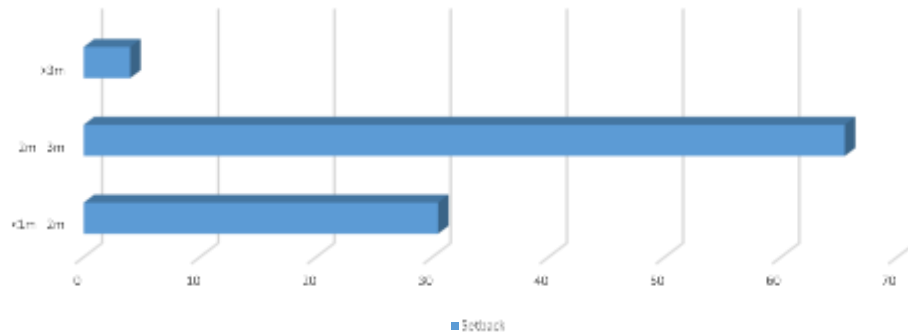


Figure 6. Setback of existing Housing Developments along major transport routes. Source: Author’s field survey, 2021.

Table 6. Rate of transportation activities.

| Rate of transportation activities | Frequency | Percentage |
|-----------------------------------|------------|------------|
| Very High | 28 | 18.6 |
| High | 45 | 30 |
| Moderate | 73 | 48.8 |
| Minimal | 4 | 2.6 |
| Very Minimal | 0 | 0 |
| Total | 150 | 100 |

Source: Author’s Field Survey, 2021.



Figure 7. Moving vehicles along the major transport route of the study area. Source: Author’s field survey, 2021.

development is tarred with drainage, 12.1% have the road surface cover condition of the road infrastructure in front of their house to be partially tarred. None of the respondents have the road surface condition to be neither untarred, untarred but graded, nor tarred without drainage, once again encouraging road transport

activities (Table 8, Figure 10).

Frequency of road accidents

The frequency of the occurrence of road accidents was

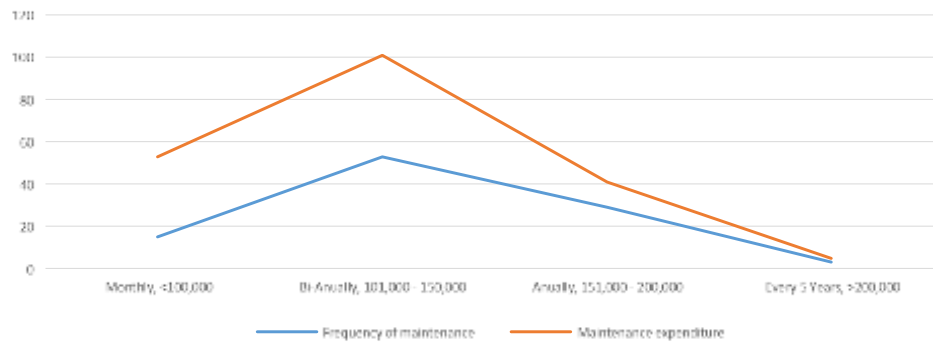


Figure 8. Housing maintenance interval / frequency. Source: Author’s field survey, 2021.

Table 7. Age of building.

| Rate of transportation activities (Years) | Frequency | Percentage |
|---|-----------|------------|
| <10 | 12 | 8 |
| 11 – 20 | 10 | 7 |
| 21 – 30 | 47 | 31 |
| 31 – 40 | 36 | 24 |
| 41 – 50 | 27 | 19 |
| >50 | 18 | 12 |
| Total | 150 | 100 |

Source: Author’s Field Survey, 2021.

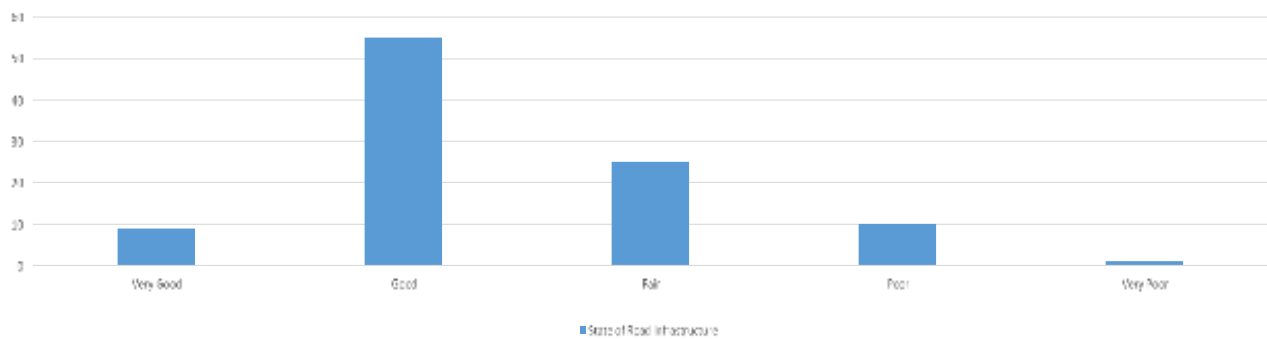


Figure 9. State of road infrastructure. Source: Author’s field survey, 2021.

Table 8. Condition of road surface cover.

| Road surface cover condition | Frequency | Percentage |
|------------------------------|-----------|------------|
| Untarred | 0 | 0 |
| Untarred but graded | 0 | 0 |
| Partially tarred | 18 | 12.1 |
| Tarred without drainage | 0 | 0 |
| Tarred with drainage | 132 | 87.9 |
| Total | 150 | 100 |

Source: Author’s Field Survey, 2021.



Figure 10. Road surface cover condition is being tarred. Source: Author's field survey, 2021.

assessed to be very rare, as 75.3% of the 150 respondents say likewise, while 23.7% of the remaining respondents agree that it is rare, and the last 1% say it is often. Figure 11 shows this statistic, as this encourages more construction of roadside or abutting shops, with little or no setback to the road, putting the buildings at risk.

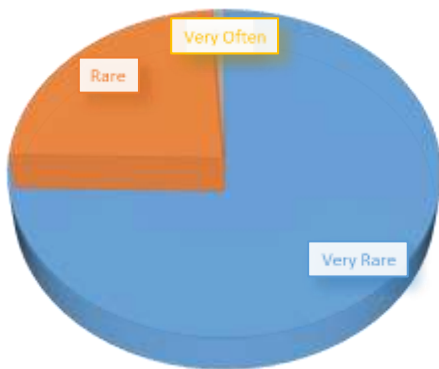


Figure 11. Frequency of occurrence of road accidents. Source: Author's field survey, 2021.

CONCLUSION

Based on all research carried out in the course of this study, we realize that existing housing development is prone to good location since they are directly abutting the existing roads, thereby reducing the distance of transit, as it is easy to get public transport. Likewise, the value of these buildings increases, also due to location factor,

there is increased revenue for individual owners and indirectly increasing economic revenue for the government/public sector of the region. However, one cannot but neglect the negative effects (as highlighted above) of having these housing developments along major transport routes in the study area. Hence there is a need for one or two adjustments in the development pattern for existing housing along major transport routes.

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