

Urban Fabric and Trip Pattern of Ibadan Residents, Nigeria

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Abstract

This paper assessed how the city fabric influences the travel behaviour pattern of Ibadan residents. A total of 271 respondents were sampled. Findings from the chi-square test showed that a significant difference exist in the number of trips made daily by respondents across the different residential neighbourhoods ($X^2=29.00$, $P = 0.01 < 0.05$). Most respondents from two suburban neighbourhoods (Apete and Ologuneru) surveyed in the study made between 2 to 4 trips or more before getting to their places of work/business. In a similar vein, ANOVA test results indicated a variation in daily average trip distance made by respondents across the different residential neighbourhoods in the city ($F=2.09$, $P = 0.04 < 0.05$). Majority of the respondents spent between 21-30 minutes on traffic daily while going or coming back from work/business. Some of the measures proposed by the paper that would help in enhancing movement of people within the city especially those living at the suburban areas include: encouraging inter-modal link, reassessment of the existing urban planning laws and expansion of the road networks within the city.

Keywords: Trip pattern, Traffic congestion, Suburban, urban fabric, Ibadan

1. Introduction

The movement and spatial interaction of urban residents are crucial to the effective functioning of the city. The high rate of urbanization being experienced in most developing countries has created mobility problems. This mobility crisis has posed a serious challenge to transport planners (Ipingbemi, 2010). While most developed nations could be said to have reached their threshold in terms of urbanization rate, most developing nations are still in the process. The global urban population is projected to increase from 2.9 billion in 2001 to about 4.9 billion in 2030 and in percentage terms (i.e. urbanization level), the world's urban population will increase from 48 per cent of the total world population in 2001 to about 60 per cent of the total world's population in 2030 and all the world's increase in population in the next three decades will occur in low and middle income countries (UN-HABITAT, 2008; UNFPA, 2007). In Nigeria, there has been rapid expansion of most cities' areal extent, which is now sometimes tenfold their initial point of growth (Egunjobi 1999; Ogunsanya 2002; Oyesiku 2002a). The implication of this is that city expansion and growth has not been controlled. Studies have also shown that inadequate planning of urban land uses in Nigeria and non adherence to existing master plans have increased urban problems (Filani, 1994, Oyesiku, 2002a). Fuller (2008), noted that the high rate of urbanization experienced over the years had resulted to longer journey and travel time within cities. The increase in spatial interaction triggered by urbanization and globalisation has resulted in increased movement of goods and people within and outside cities. Challenges of urban mobility are taking new dimension in many cities of developing countries as land uses along major traffic corridors become intense and change rapidly (Oduwaye, 2011). Distortion of master plans of Nigerian cities have led to negative outcomes including traffic congestion with attendant costs in energy and time spent on traffic. While past studies have examined the trip behaviour and characteristics of urban residents (Tanimowo, 2006, Asiyanbola, 2007, Ipingbemi, 2010) in Nigeria, the increasing number of urban neighbourhoods at the fringes due to population growth calls for a further study into the trip pattern of residents. The emergence of peri-urban neighbourhoods with large populations in major Nigerian cities reveals the spatial imprint of urbanization on the city structure. This change in city configuration has an impact on the travel behaviour of residents. The need to re-assess the trip pattern of urban residents is borne from the fact that most cities in Nigeria have reached their threshold in terms of land available for constructing residential homes. People are now moving some kilometres away from the city centre to purchase land and build their houses without proper planning; this has impact on transportation, economy and other activities in such cities. This study, therefore, provides an insight into the trip pattern of residents in Ibadan city with emphasis on: the average number of trips, trip distance and average time spent

on traffic per person per day. This paper is structured in to 5 sections. Section one provides the introduction while section two is on land- use pattern in the city .The adopted methodologyis discussed in section three. The results and discussion is presented in section 4 while section 5 forms the conclusion.

2. Land- use pattern / urban fabric

Ibadan was created in 1829 as a war camp for warriors coming from Oyo, Ife and Ijebu. The location of Ibadan on a forest site and several ranges of hills, varying in elevation from 160 to 275 metres offered strategic defence opportunities. Also, its location at the fringe of the forest promoted its emergence as a marketing centre for traders and goods from both the forest and grassland areas. Ibadan thus began as a military state and remained so until the last decade of the 19th century (Fourchard, 2003). Ibadan metropolis is made up of five Local Government Areas (LGAs) with a landmass of 463.33 km², representing 14.83% of the total land area of Oyo State. The growth of Ibadan metropolis reflects a situation of plannessness and ill structured (Fabiya, 2006). The unplanned areas of the city, which are also the core of the city, are located in the south eastern part which is predominantly inhabited by the indigenous population of the city. The core areas are the high density areas such as Beere, Oja'ba, Labiran, Oje, Inalende, Opo among others. The age of this zone (core areas) can be seen in the red roofs and antiquity of the buildings in compacted nature without access or space in between resulting in monumental ventilation and accessibility problems. Many of the buildings do not directly face the roads or streets because they are at the back of other buildings. The roads themselves are narrow and usually without drainage channels making transportation on foot temporarily difficulty anytime it rains (Ipingbemi, 2010). However, the medium density neighbourhoods are the creation of high wave of migration from neighbouring towns and villages during the dawn of the 20th century. This is where majority of the civil servants and businessmen live. Areas such as Ijokodo, Mokola, Apata, Eleyele and Ojoo fall within the medium neighbourhood. The low density neighbourhoods in the city are Agodi, Oluyole and Iyaganku Government Reserve Areas (GRAs) .The low density neighbourhoods exhibited some degree of planning with fairly good road networks. According to Filani (1994), the intra-urban movement in the city is somewhat related to the existing land use patterns, especially as it relates to areal distribution of housing, employment opportunities and recreation facilities . The movement of people to their places of work or business locations, markets, schools, churches, mosques etc creates traffic in the city at various time of the day and at some particular routes. The main traffic generating areas in the city are the state secretariat located in Ibadan North local government Area, Industrial areas at Apata and Oluyole axis, and various markets in the city. Equally, educational institutions located in the city such as University of Ibadan and The Polytechnic generate traffic .The interaction among these various centres and between residents generates the cross-currents of intercity movements in the city (Ipingbemi, 2010) . Road transport links the entire spatially differentiated land use pattern in the city. The rapid increase in population coupled with expansion of the city and the emergence of peri- urban residential districts affects the travel behaviour of the residents. People are now becoming separated from their homes in terms of distance to work, school, market and so on. Offices and major markets are concentrated within the central part of the city ie Agodi, Dugbe, and Mokola areas of city. This spatial and structural pattern of land - use has effect on the intra-city traffic, time, and trip distance. Nwankpa (1988) in his study found that roads occupied about 7.7 per cent of the total land area in Ibadan metropolis. This was seen as grossly inadequate considering the list of activities of various types that make use of the urban road network. An ideal percentage of total land area that roads in an urban centre should cover should be between 11 and 13 percent(Nwankpa1988). Land uses, by virtue of their occupancy, are taken to generate interaction needs (trip generation), and these needs are directed to specific targets by specific transportation facilities (trip distribution and modal split) (Oduwaye, 2011). Several works on the relationship between land use and transportation have been done especially in the developed countries of the world where cities are planned. However, the extent of this relationship varies (Bento, et al, 2004, TRL 2004, Turcotte, 2008).

3. Methods

Primary data were obtained through a cross-sectional survey of respondents in the city. The city has been classified in to three residential zones: low- income high density area (inner traditional core area), medium density (intermediate zone between the inner traditional core and the periphery) and the low

density high income area (newer residential districts) (Abumere, 1994, Olayiwola, 2006) . Ibadan city has a population of over three million with a vast land mass, conducting a survey that will capture all the neighbourhoods in the city is capital intensive, and therefore the researchers selected some neighbourhoods in the three residential areas of the city. The unit of analysis adopted for the study was adults from 25 years and above. In each residential area, respondents were randomly chosen till the required sample size was reached. 45 copies of questionnaire were administered in each of the eight neighbourhoods (Apete, Apata, Mokola, Bodija, Academy, Ologuneru, Bere and Ojoo). In all, 282 copies were retrieved and 271 were usable for the analysis giving a response rate of 75.3%. The SPSS (statistical package for social sciences) was used for the data analysis. The results were presented with descriptive statistics (charts, frequency counts) and inferential statistics (ANOVA test, chi-square test) to show variations across the three residential areas.

4. Results and Discussion

The demographic characteristics of the correspondents that were considered in this study include gender, age, marital status and occupation. 62 %of the respondents were males while 38 % were females. The age distribution showed that 27.3 % were between 41 and 50 years, 24.4% between 51 and 60 years, 20.7% above 60 years, 20.3% between 31 and 40 years and 7.4% between 25 and 30 years. Most (78%) of the respondents were married while 19% were widowed and 3% never responded to the question. On the various occupations the respondents are engaged in, results show that 30.7% were civil servants, 27.2% were engaged in business, 23.8% were artisans and 18.3 % were involved in one form of income generating activity or the other. The highest percentage recorded (civil servants) is based on the fact that the state like many other states in Nigeria is regarded as civil service state with low level of industrialization.

4.1 Average number of trips made daily

The average number of trips made daily by each respondent could either be to work, market, or other daily engagements. In this study, emphasis was on trip to work. The reason for choosing trip to work is because residents in the urban centres travel to work daily .Other trips could be occasional depending on the situation and the need for such trip. The chi-square test showed that a significant difference exist in the number of trips made among respondents across the low, medium and high density areas ($\chi^2=29.11, P=0.01 < 0.05$) . Looking at table 1 further, Ologuneru and Apete neighbourhoods in the medium density areas of the city had 58.1% and 52.7% respectively for those that made more than 4 trips daily. These two neighbourhoods are located in the suburban areas of the city and are thus some kilometres away from the city centre. Due to the high cost of purchasing land around the city centre, most homeowners move to these two neighbourhoods where the cost of land is relatively cheap. Hence, the number of trips most residents residing in these two neighbourhoods make before getting to the city centre where most offices, markets and other business concerns are located has increased. For instance, a resident living at Ologuneru needs to make at least two or more trips when going to work in the morning to get to the city centre likewise a resident at Apete. The changing urban fabric due to high urbanization rate experienced over the years in the city has an impact on the trip pattern of residents. The attractiveness of suburban areas to residents can be strongly attributed to the backlash against the living conditions of cities during the Industrial Revolution. Although this period of great change attracted unprecedented numbers of people to city, it has led to the city becoming an ugly place to live which resulted to the creation of suburbs, that allowed people to live in a reasonably pleasant location away from the pollution and poverty of the inner-city, but still allowed them to work in the economically booming urban areas (Arbury undated). Advancement in transport technology facilitated this separation between the home and work, leading to a completely different spatial structure of the urban environment: one based on the family unit rather than a productive household unit (Schaeffer and Sclar, 1975). The automobile made it possible to live anywhere in the city (or even out of the city), yet still work wherever employment opportunities existed. The main important effect of the automobile on urban development patterns was the total spatial disconnection between the home and the workplace, which was made possible through this new form of private transportation.

4.2 Trip distance to work/business

The ANOVA result revealed a significant difference ($F=2.09 P=0.04 < 0.05$) in the average trip distance travelled by respondents to work. For instance, respondents in Apete and Ologuenru neighbourhoods

(suburban areas) recorded the highest mean distance of 4.9302km and 4.5806km respectively when compared to other neighbourhoods in the low, medium and high density areas of the city. The reason for such a variation is not farfetched, as earlier stated, these two neighbourhoods are some kilometres away from the city centre where most of the commercial activities and offices are located. The movement of people over the recent years to the suburban neighbourhoods, due to the affordable price of land means that more distance will be travelled before getting to place of work. Ipingbemi (2010), noted in his study on the travel pattern of the elderly in the city that most of them in the low and high density areas travel less than 1 kilometre to banks and hospitals. The low and high density residential areas in the city centre are where most banks and government establishments are located. Residents in the suburban areas of the city will have to travel some kilometres to the central business districts (CBD) and other parts of the city centre for some certain services. This finding explains the growing interest in the relationship between urban form and commuting patterns (Giuliano and Small, 1993; Handy, 1996; Priemus, Nijkamp and Banister, 2001).

4.3 Traffic congestion

Managing traffic is one of the major challenges facing cities in developing countries where intermodal link is absent in most instances. In Nigeria, the problem of traffic congestion in urban centres and wasting of man hours is one of the developmental challenges facing the nation. In this study, residents were sampled to know the average number of minutes spent daily on traffic congestion to and fro to work. Results in table 2 revealed that more than 30% of the residents in the city spent between 21 to 30 minutes daily of traffic to work. However, there are variations across the neighbourhoods. For instance, 48.5% of respondents from Bodija and Bere respectively spent between 21 to 30 minutes on traffic congestion to work daily compared to 48.4% , 44.4%, 38.4%, 37.2%, 31.4% and 24.3% for Ologuneru, Apata, Mokola, Apete , Academy and Ojoo neighbourhoods. 21.2% and 20.9% of respondents from Apete and Bodija respectively maintained that they spent more than 30 minutes daily on traffic before getting to their places of work while less than 15 % each stated same from the remaining neighbourhoods. What this result has shown in essence is that more respondents from Bodija and Apete areas of the city spent longer time on traffic when compared with those from other neighbourhoods. One reason that may be adduced to this observed pattern is the very fact that New and Old Bodija housing Estates in the city are situated near the busy state secretariat road leading to the seat of government house on one end and Bodija food stuff market on the other end. This market is the biggest food stuff market in the state that attracts sellers and buyers from neighbouring towns and cities. For Apete neighbourhood, the area as earlier mentioned is one of the fast growing suburban areas in the city where most civil servants and business men have relocated due to the relatively cheap price of land. Over the years, there has been an increase in population in this area of the city without a corresponding road network expansion to accommodate the increase in the volume of vehicles along this route. The resultant effect is that residents spend longer period on traffic arising from narrow and single lane constructed many years when the area was still rural in nature. Oduwaye et al (2011), argue that transportation is a land use in itself and has the uniqueness of relating intimately with all other land uses and that this interaction is understood when the town planners and engineers are able to predict the types and locations of future transportation and land uses and travel patterns. Results showed that the use of buses was highest in Bere, Mokola, Apete, Academy and Apata (22%, 15%, 13%, and 12%) . On the other hand, car use at Bodija and Ologuneru accounted most (25.9% and 12.1% respectively). The high percentage of car ownership among respondents in these two neighbourhoods could be attributed to the class of people that constitute the majority of the population in them. Bodija is a high income neighbourhood where most professionals, technocrats and politicians reside while Ologuneru located in the suburban area of the city, over the years have assumed a medium income neighbourhood where civil servants and business men reside. The percentage using motorcycle popularly called "Okada" were more in Apete (27.3%), while Ojoo and Mokola neighbourhoods had the highest percentage for taxi (17.5% respectively) .

5. Measures to be taken for improved mobility in the city

The findings of the study showed that mobility pattern of residents living in the suburban areas of the city differ from those living in the core .Therefore, in order to reduce such variation and enhance movement of people within the entire city, the following measures are suggested: expansion of the existing road networks,

re-examination of existing town planning laws, encouraging inter-modal link and efficient urban mass transit system.

6. Conclusion

Transportation plays an important role in the daily movement of people and goods in the urban centres. The examination of the trip behaviour of residents and the changing urban land use pattern in Ibadan city is crucial because of its implication on transport planning. At present, urban planning in Nigeria has not really integrated transport system and facilities in to city planning. The master plan for most cities in Nigeria was not designed to capture future expansion of the cities or the emergence of suburban neighbourhoods. The research showed that more than half (58.1% and 52.7% respectively) of residents living in the suburban neighbourhoods (Apete and Ologuneru) made more than 4 trips daily to work. In terms of average distance travelled before getting to work, ANOVA test indicated a significance difference ($F=2.09$, $P=0.04 < 0.05$) in average distance made by residents across the different residential areas of the city. Most of the respondents stayed between 21-30 minutes on traffic daily. However, there are variations across the different neighbourhoods. The use of buses and taxi predominate in all the neighbourhoods surveyed except for Bodija and Ologuneru where car ownership was found to high. Considering the areal expansion of most cities in Nigeria due to population increase and economic activities, there is need for transport and town planners to come together and fashion out a new master plan which takes in to account the city suburbs. This is necessary because the city centres serve as hub of economic activities, and an efficient transport system with good road network is needed to connect residents in the suburbs.

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Table 1 Number of trips made daily to work

| Neighbourhood | Number of trips made daily | | | Total |
|---------------|----------------------------|------------|-------------|-------|
| | 1-2 trips | 3-4 trips | More than 4 | |
| Mokola | 22.2% (8) | 41.7% (15) | 36.1% (13) | 100% |
| Ojoo | 42.4% (14) | 39.4% (13) | 18.2% (6) | 100% |
| Academy | 26.1% (6) | 30.4% (7) | 43.5% (10) | 100% |
| Bere | 39.4% (13) | 27.3% (9) | 33.3% (11) | 100% |
| Bodija | 15.2% (5) | 48.5% (16) | 36.4% (12) | 100% |
| Apete | 20% (11) | 27.3% (15) | 52.7% (29) | 100% |
| Ologuneru | 12.9% (4) | 29% (9) | 58.1% (18) | 100% |
| Total | 26.2% (71) | 35.4% (96) | 38.4% (104) | 100% |

Source: Authors field work 2011

Table 2 Time spent on traffic

| Neighbourhood | 5-10mins | 11-20mins | 21-30mins | Above 30mins | Total |
|---------------|------------|------------|-------------|--------------|------------|
| Mokola | (7)19.5% | (10) 27.8% | (14) 38.4% | (5) 13.9% | (36) 100% |
| Ojoo | (16) 48.5% | (6) 18.2% | (8) 24.3% | (3) 9.1% | (33) 100% |
| Academy | (12) 34.3% | (8) 22.9% | (11) 31.4% | (4) 11.4% | (35) 100% |
| Apata | (4)14.8% | (8)29.6% | (12) 44.4% | (3) 11.1% | (27) 100% |
| Bere | (4) 12.1% | (9) 27.3% | (16) 48.5% | (4) 12.1% | (33) 100% |
| Bodija | (5) 15.2% | (5)15.1% | (16) 48.5% | (7)21.2% | (33) 100% |
| Apete | (7) 16.3% | (11) 25.6% | (16) 37.2% | (9) 20.9% | (43) 100% |
| Ologuneru | (4)12.9% | (8) 25.8% | (15) 48.4% | (4) 12.9% | (31) 100% |
| Total | (59) 21.8% | (65) 24% | (108)39.9 % | (39)14.3% | (271) 100% |

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