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SOCIOECONOMIC VARIABILITY OF HOUSEHOLDS' TRAVEL BEHAVIOUR IN THE PERI-URBAN AREAS OF IBADAN, NIGERIA

Summary. The growth of peri-urban areas is increasingly recognised as one of the dominant land use planning problems, with significance in the area of transport planning. This has necessitated the studying of travel behaviour in peri-urban areas in cities around the world. This study particularly examined the travel behaviour of households in the peri-urban areas of Ibadan, Oyo State, Nigeria. It used both primary and secondary data. The primary data were obtained through a field survey from the administration of questionnaires on household heads in the study area using a multi-stage sampling technique. Findings revealed that 21.5% of the variability in the travel behaviour among the respondents could be attributed to socioeconomic characteristics such as age, household size, and length of stay, the number of cars owned and monthly income of households. It is recommended that the socioeconomic characteristics of residents in peri-urban areas should be considered when making transport policies in the State.

Keywords: households' travel, travel behaviour, peri-urban areas, transportation studies

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1. INTRODUCTION

The function of transportation in cities is to enable goods and services to move from a point of demand to that of supply, between various buildings within a locality and from one place to another. Apart from the movement of goods, urban centres require the movement of people to their different parts to carry out both socioeconomic and political activities, either voluntarily or out of necessity [1]. Significant efforts have been made in different parts of the world to manage urban transportation, especially in many developed nations through transportation demand and system management [1, 2]. These have led to several studies on the travel behaviour of urban households to determine the magnitude and dimension of the problems associated with urban travels [3, 4]. The study of travel behaviour over the last half century has yielded critical insights into the choices that individuals and households make about their daily travel [5]. The outcome of many of these studies has influenced to a great extent several transport planning decisions and policy issues in many countries of the world [6-8].

In several cities of the developing world, the rapid rise in population and limited financial resources available for investment in urban infrastructure has generated severe transport problems such as, among others, traffic congestion, accidents, and inadequate transport facilities [9]. These are exacerbated by the movement of people, especially the low-income earners, to the city fringes, far from employment opportunities. However, this movement causes considerable difficulties both for the residents of such areas in terms of mobility and accessibility and for the transport operators in terms of the need to provide low-cost public transport services [9, 10]. Ultimately, the inadequate transport facilities and services are capable of having adverse effects on the quality of life of the residents in such an area. The interplay between an urban area and its surroundings is made possible by transportation. Therefore, in developing an efficient and effective transport system in these areas, there is a need to understand the residents' travel behaviour. In recent years, research efforts have accelerated in size and scope due to the continuous growth of travel demand and its related adverse effects on the local and global environments [11]. Travel behaviour deals with the study of what people do over space and how people use transport [12]. It can also be seen as people's activity and movement in the public realm by all modes for all purposes [13]. The interaction between the urban area and its periphery should be studied in, among others, terms of daily commuting, trip purpose, mode of commuting, trip frequency, and length of travelling, origin and destination of trips. The interaction between space and the use of transport is important to establish the pattern of movement in an area.

The type of vehicular and pedestrian movements is a function of trip purpose, spatial distribution and location or places of residence of the people, the level of technological development in the city and the region. Additionally, the size and characteristics of the population are capable of influencing travel behaviour [14]. Hanson and Hanson [15] observed that individuals generate extremely different complex travel activity patterns as they participate in daily life activities at different locations. Moreover, different households usually have different transport needs. Scholars [16, 17] have identified, among others, household size, car ownership, income, age, gender, number of employed people in the family, occupation as major socioeconomic attributes of households that influence their travel behaviour.

Adaramo [18] asserted that the more radical the change in transport technology becomes, the more altered the urban form becomes. The fundamental change in urban form is the emergence of new clusters expressing new urban activities and new relationships between the elements of the urban system. He further observed that the extension and over-extension of urban areas have created "peri-urban areas". They are located well outside the urban core but

are within reasonable commuting distances. This phenomenon has resulted in what is now called "edge cities", which has been used to label a cluster of urban development taking place in suburban settings [18].

The growth of peri-urban areas is increasingly recognised as a dominant planning and urban design challenge for the 21st century [19]. The various forms of defining the peri-urban, and the various names used by writers in trying to define the concept of the peri-urban (rurban periphery, urban periphery, suburban, rural-urban fringe, satellites, pseudo-suburbs, pseudo-satellites, urban fringe, periphery, etc.), are a reflection of the complexity of the phenomenon being considered [20]. A peri-urban area is a physically defined area bordering a city, characterised by a mix of urban and rural forms and functions [21]. It is an area, generally outside the boundary of the mother city, which is under transition from rural to urban and from where people commute to the mother city for employment, business, education and use of other facilities and services. Further, it is a dynamic entity that keeps changing with the growth and development of the mother city [21]. The developments in the peri-urban areas are sometimes unplanned, haphazard, unmanaged, uncontrolled and unregulated [22].

The peri-urban areas in this study fall within the six Local Government Areas (LGAs) in the lesser city of the Ibadan metropolis [23]. The six LGAs are Akinyele, Egbeda, Ido, Lagelu, Ona-Ara and Oluyole. This was borne out of the fact that all six LGAs surrounded the Ibadan municipal and have elements of peri-urban characteristics inherent in them. Transportation as an important component of any space economy occurs to reach and satisfy an individual's socioeconomic, cultural and political needs in different places [24]. Therefore, the vehicular and pedestrian mobility within the peri-urban areas of Ibadan calls for immediate attention to know what exists therein and put in place if need be, the appropriate measures in meeting and planning towards their travel needs. On this basis, is this research work focused on households' travel behaviour in the peri-urban areas of Ibadan.

2. LITERATURE REVIEW

Individuals and families or households must work, shop, recreate, school and visit friends, forming what is known as the urban activity system [25-27]. Individuals or households involved in these activities are often influenced by their accessibility and proximity to the activity centres and their mobility, that is, the means of getting there. The level of the accessibility itself is a function of the urban characteristics, which have much influence on the travel behaviour of residents in a particular setting [12]. One of these characteristics is the spreading of activities from the boundary of the urban area to the periphery.

Cervero [28] studied travel behaviour in Montgomery County, Maryland using data from the Household Travel Survey of 1994. The researcher examined the impact of 'new urbanist' areas on travel modes, more specifically whether compact, mixed-use and pedestrian-friendly developments could significantly influence travel modes. It was found that the density and mixture of land use was a significant influence in determining travel mode particularly in the decision to use public transport, share a car or drive alone. The study also recorded that higher gross densities lowered the occurrence of solo-commuting, which is driver-only car commuting. Furthermore, it would be observed that some of the road infrastructural facilities and records of information on the travel behaviour survey that was considered by the author could be said to be available in the developed world, and very scanty in the developing world. This study will therefore consider what operates in the developing world as far as travel behaviour survey within the peri-urban areas is concerned using both primary and secondary data.

Concerted efforts have been made by several researchers to look into travel behaviour with a specific focus on gender [24, 29]. Asiyanbola [29] studied gender differences in intra-urban travel behaviour in the Ibadan metropolis. The study revealed that significant differences exist between women and men intra-urban travel behaviour for most of the purposes considered except for work and religious purposes. In another dimension, [24] worked on gender travel behaviour in Ilesa and observed that the mean travel to work for men and women differs in the city and women are dependent on public transport than men. The study concluded that gender variation in travel demands must be considered to improve the accessibility characteristics of women to transport services in Ilesa. From the foregoing, it could be deduced that these studies laid much emphasis on gender as it affects mobility in their respective study areas. However, a general approach to study households' travel behaviour that will concentrate not only on gender variation but also on other variables was employed in this study. The socioeconomic characteristics of the residents were adequately considered to establish their influence on households' travel behaviour.

Adetunji and Aloba [30] in their work on urban spatial structure and work trip patterns in South Western Nigeria using medium-size towns like Akure, Ilesa, Ondo and Osogbo observed that studies of urban spatial structure and work trip patterns have received little attention. This made it difficult to have access to adequate and appropriate information and database for effective and meaningful planning for urban mobility patterns in this category of cities in Nigeria. They concluded that socioeconomic characteristics of workers such as income determined the pattern of work trips. Their study only emphasised the work trips at the expense of other trip purposes like, among others, school, shop, healthcare, recreation, religious activities that residents are involved in which will be addressed in this study.

Furthermore, travel behaviour has also been related to telecommunications. [31-34] examined the practice of cell phone usage in Ondo State and its effects on travel behaviour. The study revealed that people prefer making interactions via mobile phones rather than embarking on physical travels. It has also reduced the frequency of using automobiles, which could have been more without the use of GSM. Wojuade [33] observed from his study on telephone usage and travel behaviour in Obafemi Awolowo University, Ile-Ife, that most University staff travel less than 10 kilometres for work, shopping and social trips, spend less than 20 minutes journey time and mostly used private cars for commuting to places of activities. He concluded that there is net substitution and a strong complementary effect of telephone usage on travel among the staff of Obafemi Awolowo University. This is in line with the study of [30] on the Global System Mobile telecommunication and fixed-line telephone uses of residents in Osogbo on their travel behaviour. It could be deduced from the above studies that telecommuting and travel behaviour was considered, emphasising their roles in resident mobility. However, the households' travel behaviour of the residents in the peri-urban areas was not considered; this is the focus of this study.

Efforts have also been made to consider issues arising from peri-urban areas. The study of [35] on housing quality in the urban fringes of Ibadan, Nigeria, noted that urban fringes have serious effects on people's health, their built environment and housing quality. It concluded by encouraging the government to see urban fringes as a solution to new city planning rather than a problem to the urban areas. Furthermore, the study only addressed issues relating to the housing quality in the urban fringes and gave less attention to households' travel behaviour in the areas. Kafui [36] similarly worked on harnessing local potentials for peri-urban water supply in Ghana. The study examined the growing phenomenon of peri-urban development and its associated challenges. It focused on how water supply in the peri-urban areas could be harnessed. However, less emphasis was laid on issues relating to residents' travel behaviour in

those areas. Hence, this study, therefore, ensured to look into the existing state of transportation services in the peri-urban areas of Ibadan taking into consideration the transport modes, operations and infrastructural facilities.

Fadare and Alade [37] in their study of Lagos revealed that residential density has a positive effect on the trip rate of households in the study area. It was established in their study that the higher the income, the higher the number of vehicles per household. It is very clear from the various studies above that travel behaviour issues have gained prominence in both developed and developing nations and that several factors affect the travel demand of households. From the foregoing, it could be observed that most of the works considered were carried out in urban settings and much attention has not been given to the travel behaviour of households living in peri-urban areas. Thus, information on the travel behaviour of households in this area is scanty; hence this study. It is on this note that an attempt was made to study households' travel behaviour in the peri-urban areas of Ibadan.

Study area

Ibadan consists of 11 LGAs for governance and administrative purposes. Five of the LGAs are located in the metropolitan core of the city, while the remaining six are either predominantly peri-urban or rural settlements. Ibadan's total land area is 3123 km^2, of which about 15% is urban and the remaining 85% is classified as peri-urban. The peri-urban LGA of Ido (865.49 km^2) covers the largest land area. This study focused on the six LGAs that fall within the lesser city of the Ibadan metropolis (National Population Commission, 2006). The six LGAs are Akinyele, Egbeda, Ido, Lagelu, Ona-Ara and Oluyole. This was borne out of the fact that all six LGAs surrounded the Ibadan municipal. Moreover, a cursory look at the six LGAs, which constitute the study area, revealed that they have elements or characteristics of peri-urbanism in them. The peri-urban areas within the context of the Ibadan metropolis are presented in Figure 1, while the population density of the areas is given in Table 1.

Tab. 1.

Population density of the peri-urban areas of Ibadan municipal

S/No.	Local Government Area	Population	Area in km^2
6.	Akinyele	140,116	427.26
7.	Egbeda	129,461	136.83
8.	Ido	53,584	865.49
9.	Lagelu	68,901	283.92
10	Ona-Ara	123,048	369.37
11	Oluyole	91,527	577.10
	Total	**1,211,934**	**2,659.97**

Source: Adapted from Tomori, 2009

Peri-urban areas are characterised by high, and often increasing population density, small landholdings, rich countryside homes, poor slums, diverse sources of income, lack of regulation, contested land tenure rights, uncoordinated conversion of farmland to housing, pollution, environmental problems, intensified resource exploitation, considerable economic dynamism and a severe lack of service provision [40, 41]. Other authors included proximity to

the city, rural values and tradition, proximity to highways, industrial developments, commercialisation, urban 'vices' and changing agricultural practices as characteristic features of peri-urban areas [39].

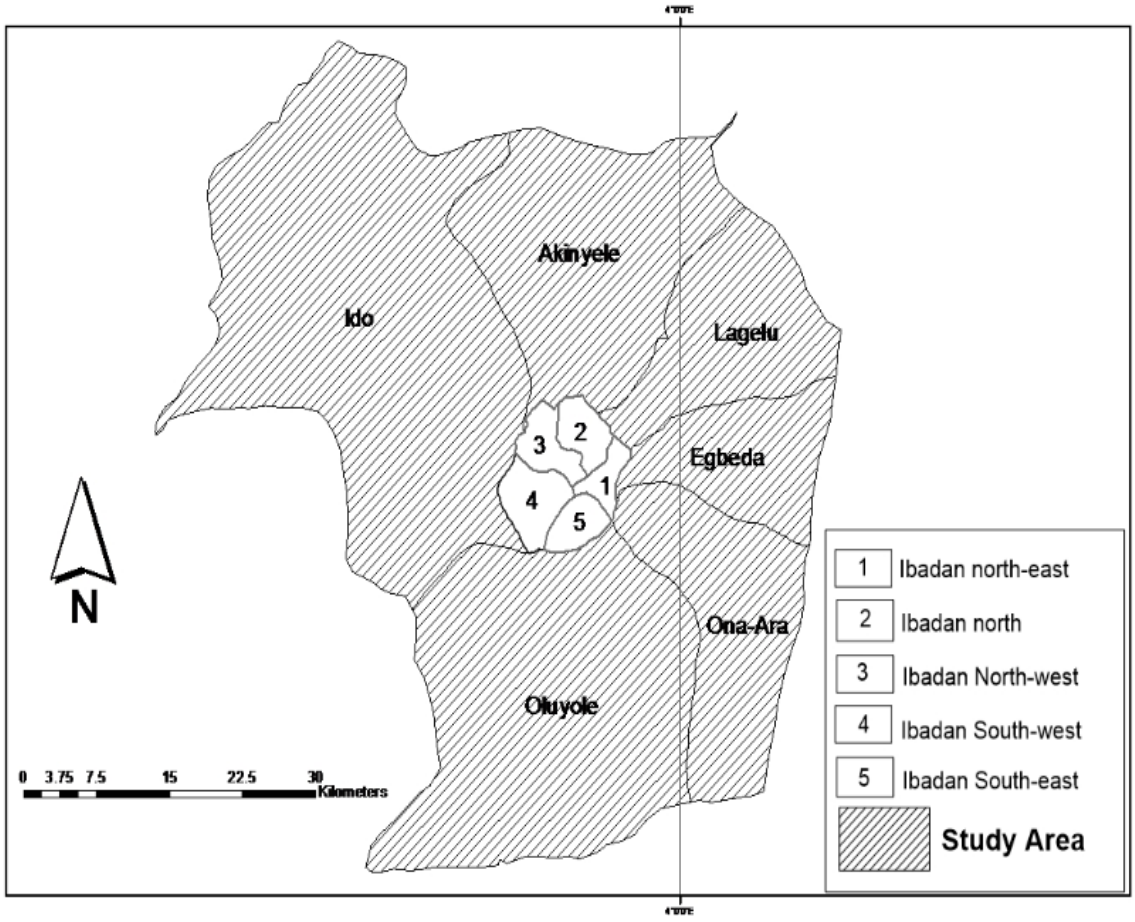

Fig. 1. The study area in the context of the Ibadan metropolis
Source: Ministry of Lands and Housing, Ibadan, 2009

The population of Ibadan's growth is gradually shifting to the lesser city with a growth rate of 4.7% per annum between 1991 and 2006 according to the census figure released by the National Population Commission in 2006. According to [38], "the population of Ibadan has continuously been on the increase and these low rates of growth are due to the implementations and inaccuracies of census estimates". From the above, the population density of the urban area increased by 9.47% while that of the rural area increased by 100% within a period of 15 years. This shows that the population is moving towards the lesser city because of the rapid urbanisation of the core area and industrialisation of the periphery of the urban centre where land is no more available for industrial development. Moreover, the dualisation of Monatan-Olodo Road, Mokola/Ojoo Road and Ibadan/Ife Express Road prompted the development of the rural areas.

The scattered nature of modern industries in Ibadan is due to the location of the industrial estates, namely: Oluyole, Old Lagos Road, Olubadan Industrial Estate near Express Toll Gate, Olubadan Estate along New Ibadan/Ife Express Road, Ajoda New Town and Eleyele Light Industrial Estate. The Nigerian Breweries PLC has a modern brewery located next to the

Olubadan Estate alongside some industries located around the place. The traditional craft (for example, the blacksmith industry, is organised on a cottage or compound basis, so that industrial and residential spaces are practically in the same place, while factory production, especially of the large scale types, is generally in buildings or premises separate from dwelling houses, for example, Sanyo Nig. Ltd. along Ibadan Lagos Express Road, Odo-Oba and Askar Paints Nig. Ltd. at Eleyele.

The constituent parts of the periphery or fringe of Ibadan have been changing in line with urban development. Some industries are now located in those areas, such as Gas Cylinders Ltd. located at Ejioku, Leyland Nigeria Limited at Iyana – Church, the Nigeria Wire and Cable Ltd. along Ibadan-Abeokuta Road at Owode, the Standard Breweries at Alegongo Village, Eagle Flower Mills at Toll Gate, The British-American Tobacco Company on Lagos-Ibadan Express Road, New Toll Gate, Ibadan, etc. The 11 LGAs grouped together is what is called the Ibadan metropolitan area, Ibadan region or Ibadan land. The overall population density of the Ibadan metropolitan area is 586 persons per km sq. The administrative and commercial importance of Ibadan has resulted in land being a key investment asset and a status symbol for the population.

3. METHODOLOGY

The study population constituted the residents of the housing units in the peri-urban areas of Ibadan while the sample frame constituted the household heads. Both primary and secondary data were obtained for this study. Primary data were obtained from the field survey through questionnaire administration. The questionnaire was administered to the household heads in the selected peri-urban areas. The questionnaire was used to obtain information on the households' socioeconomic characteristics, the trip characteristics of the household and the possible challenges confronting them.

A multi-stage sampling technique was adopted for this study. The first stage involved the adoption of the six LGAs in the study area. The second stage involved random selection without replacement of one out of every two LGAs, resulting in the sampling of Egbeda, Oluyole and Akinyele. The third stage involved the adoption of political wards from the selected LGAs as recognised by the Oyo State Independent Electoral Commission [38]. The peri-urban areas were selected from the political wards to form the sample population for the study. This implies that the political wards that have characteristics of peri-urban inherent in them were considered for sampling, leaving out those that are located in the rural areas, which are outside the scope of this work. The peri-urban wards are Arulogun, Eniola, Aroro; Ojo-Emo, Moniya; Akinyele, Isabiyi, Irepodun; Ojoo, Ajibode, Laniba; and Ajibade, Alabata, Elekuru, all in Akinyele Local Government Area. Olodo, Wakajaye; Egbeda; Olode, Alakia; Olubadan Estate; and Kumapayi in Egbeda Local Government Area. Moslem, Ogbere; Odo Ona Nla; Olomi Olurinde; Olonde, Aba Nla; and Ayegun in Oluyole Local Government Area. This is summarised in Table 2 under the selection of the peri-urban areas.

The fourth stage involves the purposive selection of three political wards that are within the peri-urban areas because the selected wards received most of the excess population and activities from the mother city (Ibadan Municipality). Besides, there is increased development in these areas as well. These represent 50% of the total political wards within the peri-urban areas of Ibadan. The selected wards are Arulogun, Eniosa, Aroro; Ojo-Emo, Moniya; and Ojoo, Ajibode, Laniba from Akinyele Local Government Area. Olodo, Wakajaye; Egbeda; and Olode, Alakia from Egbeda Local Government Area. Moslem, Ogbere; Odo Ona Nla; and Ayegun from Oluyole Local Government Area.

Tab. 2.

The selection of the peri-urban areas

LGA	Peri-Urban Political Wards	Rural Political Wards	Selected Peri-Urban Political Wards
Akinyele	Arulogun, Eniosa, Aroro Ojo-Emo, Moniya Akinyele, Isabiyi, Irepodun, Ojoo, Ajibode, Laniba, Ajibade, Alabata, Elekuru	Iroko Iwokoto, Talonta, Idi-oro Olorisa-oko, Okegbemi, Mele Olanla, Oboda, Labode, Ikereku Ijaye, Ojedeji, Olode, Amosun, Onidundu	Arulogun, Eniosa, Aroro, Ojo-Emo, Moniya , Ojoo, Ajibode, Laniba
Egbeda	Olodo, Wakajaye, Egbeda, Olode, Alakia, Olubadan Estate, Kumapayi	Osegere, Awaye, Owobaale, Kasumu, Olodan, Ajiwogbo Erunmu, Ayede, Alugbo, Koloko	Olodo, Wakajaye Egbeda, Olode, Alakia
Oluyole	Moslem, Ogbere, Odo Ona Nla, Olomi, Olurinde, Olonde, Aba Nla, Ayegun	Idi Osan, Egbeda Atuba Okanhinde, Latunde Orisunbare, Ojoekun, Idi Iroko, Ikereku, Onipe	Moslem, Ogbere Odo Ona Nla, Ayegun

Source: Oyo State Independent Electoral Commission (OYSIEC), 2012, and Authors' Field Survey, 2019

For the administration of the questionnaire, the systematic sampling technique was used in selecting one household head per building from a sampling frame of 7,567 residential buildings [35]. The first building in each selected area was randomly selected while the subsequent unit of investigation was every 20th residential building in each area, which represents 5% of all residential buildings in the selected wards. This brought the total number of questionnaires to 379. The breakdown of the sample selection is provided in Table 3.

Tab. 3.

Breakdown of sample size selection

LGAs	**No. of political wards**	**No. of political wards within the peri-urban areas**	**No. of selected political wards within the peri-urban areas (50%)**	**Estimated No. of residential buildings in selected areas**	**No. of buildings sampled (5%)**
Akinyele	12	5	3	3,211	161
Egbeda	10	5	3	1,241	62
Oluyole	10	5	3	3,115	156
Total	**32**	**15**	**9**	**7,567**	**379**

Source: [31], and Authors' Field Survey, 2019

Secondary data including information relating to the population in the study area were obtained from the National Population Commission (NPC); data on the number of political wards were generated from the Oyo State Independent Electoral Commission (OYSIEC); information on the names of areas was obtained from the Ministry of Physical Planning and Urban Development across the LGAs in the study area. Descriptive and inferential statistics were used in the analysis of the primary data using the Statistical Package for the Social

Sciences (SPSS). The results of the descriptive statistics were presented using tables comprising of frequencies and percentages. The inferential statistics involved using correlation and regression to analyse data collected on age, income, household size and travel behaviour.

4. RESULTS AND DISCUSSION

Socioeconomic characteristics and travel frequency

In this study, efforts were made to examine the factors that influence travel behaviour using cross-tabulation of the socioeconomic characteristics and travel characteristics such as travel frequency and travel length of households in the study area. The details of this analysis is presented in Table 4 below. It has been established in travel behaviour studies that gender affects people's mobility in a particular area [1, 24, 29]. Given the travel frequency of respondents, the results showed that the majority of the male gender generated more travel than their female counterparts. The dominance of the male gender could be attributed to the fact that they are, naturally household heads, and tend to be the voice of their households. This also ascertains the study of [24] that men traditionally dominate most households in Nigeria.

Respondents with Polytechnics/College education travelled more than every other respondent considering the level of their education. Similarly, it was affirmed that medium-sized (4-6) households made the dominant travel frequency, while respondents belonging to the government/civil servants group made the highest travel per day. Household income is known to be a major determinant of travel behaviour within the city. From Table 4, it could be deduced that the low-income earners (₦5000 and below) had the dominant travel frequency and this may be attributed to their use of the available public transport for their daily commuting. In addition, the age group between 41 and 50 years old made more travel than every other age group, while respondents that owned one vehicle made the highest travel frequency in a day.

Tab. 4.

Households' socioeconomic characteristics and travel frequency

VARIABLES	Number of travel per day					
	One	Two	Three	> Three	None	Total (%)
Gender						
Male	94 (31.4)	174 (58.2)	11 (3.7)	9 (3.0)	11 (3.7)	229 (100)
Female	17 (27.4)	38 (61.3)	1 (1.6)	1 (1.6)	5 (8.1)	62 (100)
Educational level						
Primary School	17 (28.3)	36 (60.0)	0 (0.0)	7 (11.7)	0 (0.0)	60 (100)
Secondary School	19 (19.2)	70 (70.7)	1 (1.0)	0 (0.0)	9 (9.1)	99 (100)
Polytechnic /College	41 (31.1)	75 (56.8)	10 (7.6)	3 (2.3)	3 (2.3)	132 (100)
University	26 (41.9)	31 (50.0)	1 (1.6)	0 (0.0)	4 (6.5)	62 (100)
Postgraduate	8 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (100)
Household size						
1-3	23 (57.5)	14 (35.0)	3 (7.5)	0 (0.0)	0 (0.0)	40 (100)
4-6	74 (25.7)	179 (62.2)	9 (3.1)	10 (3.5)	16 (5.6)	288 (100)
7-9	14 (42.4)	19 (57.6)	0 (0.0)	0 (0.0)	0 (0.0)	33 (100)
Occupation Category						

Service/Repair	11 (23.4)	32 (68.1)	2 (4.3)	0 (0.0)	2 (4.3)	47 (100)
Sales	27 (36.5)	38 (51.4)	0 (0.0)	0 (0.0)	9 (12.2)	74 (100)
Production/Craft	0 (0.0)	11 (84.6)	2 (15.4)	0 (0.0)	0 (0.0)	13 (100)
Manager/Administrator	3 (37.5)	5 (62.5)	0 (0.0)	0 (0.0)	0 (0.0)	8 (100)
Clerical/Administrative	0 (0.0)	20 (95.2)	0 (0.0)	0 (0.0)	1 (4.8)	21 (100)
Professional/Technical	8 (33.3)	16 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	24 (100)
Government/Civil Servant	55 (43.0)	59 (46.1)	7 (5.5)	3 (2.3)	4 (3.1)	128 (100)
Others	7 (15.2)	31 (67.4)	1 (2.2)	7 (15.2)	0 (0.0)	46 (100)
Monthly Income (₦)						
50000 and Below	73 (27.4)	170 (63.9)	5 (1.9)	6 (2.3)	12 (4.5)	266 (100)
50001-100000	36 (40.0)	39 (43.3)	7 (7.8)	4 (4.4)	4 (4.4)	90 (100)
100001 and Above	2 (40.0)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100)
Age Group						
40 and below	27 (55.1)	19 (38.8)	3 (6.1)	0 (0.0)	0 (0.0)	49 (100)
41-50	40 (29.6)	87 (64.4)	4 (3.0)	0 (0.0)	4 (3.0)	135 (100)
51-60	31 (23.0)	85 (63.0)	5 (3.7)	10 (7.4)	4 (3.0)	135 (100)
61 and above	13 (31.0)	21 (50.0)	0 (0.0)	0 (0.0)	8 (19.0)	42 (100)
Number of Cars owned						
One	24 (27.3)	45 (51.1)	8 (9.1)	7 (8.0)	4 (4.5)	88 (100)
Two	4 (66.7)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100)

The households' socioeconomic characteristics and their travel length presented in Table 5 revealed that female respondents made a shorter travel compared to their male counterparts that made a longer travel per week. Households with Polytechnic/College education had the longest travel length more than every other respondent considering the level of their education. The medium-sized (4-6) households and respondents that belong to the government/civil servants group likewise made the longest travel length per week. Most of the low-income earners (₦5000 and below) had the dominant travel length and the age group between 41 and 60 years old made the longest travel length compared to every other age group. Finally, most of the respondents that owned a vehicle made the longest travel length in a week.

Tab. 5.

Households' socioeconomic characteristics and travel length

VARIABLES	Daily travel distance (kilometres)		
	1-5	6-10	Total (%)
Gender			
Male	63 (21.1)	236 (78.9)	299 (100)
Female	17 (27.4)	45 (72.6)	62 (100)
Educational level			
Primary School	21 (35.0)	39 (65.0)	60 (100)
Secondary School	25 (25.3)	74 (74.7)	99 (100)
Polytechnic/College	21 (15.9)	111 (84.1)	132 (100)
University	9 (14.5)	53 (85.5)	62 (100)
Postgraduate	4 (50.0)	4 (50.0)	8 (100)
Household size			
1-3	9 (22.5)	31 (77.5)	40 (100)

4-6	59 (20.5)	229 (79.5)	288 (100)
7-9	12 (36.4)	21 (63.6)	33 (100)
Occupation Category			
Service/Repair	10 (21.3)	37 (78.7)	47 (100)
Sales	24 (32.4)	50 (67.6)	74 (100)
Production/Craft	5 (38.5)	8 (61.5)	13 (100)
Manager/Administrator	0 (0.0)	8 (100)	8 (100)
Clerical/Administrative	6 (28.6)	15 (71.4)	21 (100)
Professional/Technical	2 (8.3)	22 (91.7)	24 (100)
Government/Civil Servant	23 (18.0)	105 (82.0)	128 (100)
Others	10 (22.2)	36 (78.3)	46 (100)
Monthly Income (₦)			
50000 and Below	65 (24.4)	201 (75.6)	266 (100)
50001-100000	15 (16.7)	75 (83.3)	90 (100)
100001 and Above	0 (0.0)	5 (100)	5 (100)
Age Group			
40 and below	16 (32.7)	33 (67.3)	49 (100)
41-50	33 (24.4)	102 (75.6)	135 (100)
51-60	22 (16.3)	113 (83.7)	135 (100)
61 and above	9 (21.4)	33 (78.6)	42 (100)
Number of Cars owned			
One	20 (22.7)	68 (77.3)	88 (100)
Two	1 (16.7)	5 (83.3)	6 (100)

Regression analysis of households' socioeconomic characteristics and travel frequency

Stepwise regression was used to examine the relationship between age, income, number of cars owned, length of stay and household size as independent variables and travel frequency as the dependent variable. Length of stay, number of cars owned and age were retained in the final model, while monthly income and household size were dropped. The results of the regression are presented in the tables below. Tables 6 and 7 show the model summary of the relationship between the independent variables and the dependent variable and its coefficients. From the table, it can be inferred that there is a fair correlation between the independent variables and the dependent variable ($r = 0.464$). In addition, the independent variables accounted for 21.5% of the variation in the dependent variable, meaning that socioeconomic characteristics accounted for a small portion of the determinants of travel frequency among the respondents. The summary output of the multiple regression analysis obtained is shown in the equation as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

$$TF = \alpha + \beta_1 L + \beta_2 N + \beta_3 A$$

$$TF = 1.241 - 0.103L - 1.848N + 0.077A$$

TF – Trip Frequency
L – Length of stay
N – Number of car owned
A– Age

Tab. 6.

Model summary of socioeconomic characteristics and travel frequency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.333[a]	0.111	0.101	1.569
2	0.390[b]	0.152	0.133	1.541
3	0.464[c]	0.215	0.189	1.491

a. Predictors: (Constant), Length of stay
b. Predictors: (Constant), Length of stay, Number of cars owned
c. Predictors: (Constant), Length of stay, Number of car owned, Age
Source: Authors' field survey, 2019

Tab. 7.

Coefficients of socioeconomic characteristics and travel frequency

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
3	(Constant)	1.241	1.467		0.846	0.400
	Length of stay	-0.103	0.022	-0.540	-4.722	0.000
	Number of car owned	-1.848	0.661	-0.274	-2.794	0.006
	Age	0.077	0.029	0.305	2.683	0.009

a. Dependent Variable: Travel Frequency

Regression analysis of households' socioeconomic characteristics and travel length

Stepwise regression was similarly used to examine the relationship between age, monthly income, number of cars owned, length of stay and household size as independent variables and travel length as the dependent variable. Monthly income was retained in the final model, while number of cars owned, age, length of stay and household size were dropped. The results of the regression are presented in Tables 8 and 9. Table 8 shows the model summary of the relationship between the independent variables and the dependent variable. From the table, it can be seen that there is a weak correlation between the independent variables and the dependent variable ($r = 0.242$). Further, the independent variables accounted for 5.9% of the variation in the dependent variable, meaning that socioeconomic characteristics accounted for a small portion of the determinants of travel length among the respondents. Table 9 presents the coefficient characteristics of the model of the relationship between socioeconomic characteristics as independent variables and the trip length as the dependent variable. From the table, it can be seen that the predictors of trip length was monthly income ($\beta = 1.811E\text{-}5$, $t = 2.391$; $p < 0.05$). This implies that the travel length of the respondents can be significantly determined by their monthly income. The summary output of the multiple regression analysis obtained is shown in the equation as:

$$Y = \alpha + \beta_1 X_1$$
$$TL = \alpha + \beta_1 I$$
$$TL = 4.988 + 1.811E\text{-}5I$$

TL – Travel Length
I – Monthly Income

Tab. 8.

Model summary of socioeconomic characteristics and travel length

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.242[a]	0.059	0.048	1.01633

a. Predictors: (Constant), Monthly income
Source: Authors' field survey, 2019

Tab. 9.

Coefficients of socioeconomic characteristics and travel length

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.988	0.479		10.403	0.000
	Monthly income	1.811E-5	0.000	0.242	2.391	0.019

a. Dependent Variable: Travel Length

5. CONCLUSION

This study examined the travel behaviour of households in the peri-urban areas of Ibadan, Oyo State, Nigeria. It revealed through the regression model that the coefficient of determinations (R^2) is 0.215. This implies that 21.5% of the variability in the travel behaviour among the respondents can be attributed to socioeconomic characteristics such as age, household size, and length of stay, number of cars owned and monthly income of the households. Further, there was a fair correlation between the dependent and independent variables with (r = 0.464). The ANOVA and regression coefficient test similarly affirmed that socioeconomic characteristics like length of stay, number of cars owned and age among other variables were significant predictors of the travel frequency of the respondents. The analysis of the relationship between households' socioeconomic characteristics and travel length showed that there exists a weak correlation between the two variables with (r = 0.242). In addition, 5.9% of the respondents indicated that their socioeconomic characteristics affected their travel length with the coefficient of multiple determinations (R^2) of 0.059. The ANOVA and regression coefficient test also revealed that monthly income, as a socioeconomic variable, was a significant predictor of the travel length of the respondents. Consequently, when making transport policies in the State, the socioeconomic characteristics of residents in peri-urban areas should be of utmost consideration.

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