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Analysis of Socio-Demographic and Pattern of Trip to Work by Civil Servants in Kaduna Metropolis, Nigeria

Olumide A. Oluwole
Department of Geography
Nigerian Defence Academy, Kaduna
Email: oaoluwole@nda.edu.ng

Apikins H. Tarfa
Department of Geography
Nigerian Defence Academy, Kaduna
Email: hassantarfa2015@gmail.com

Correspondence: Dr Olumide A. Oluwole (oaoluwole@nda.edu.ng)

Abstract

This study focused on the analysis of socio-demographic and pattern of trip to work by civil servants in Kaduna metropolis, Kaduna State, Nigeria. Data for this study were obtained through field survey and observation on the journey to work by the civil servants in Kaduna metropolis. Stratified random sampling technique was adopted for the collection of data on senior, middle and junior cadres of staff in the civil service. The results of the study showed 60.75% of the workers to be male, 70% with age not exceeding 45 years and 58% were married. Seventy per cent (70%) of the respondents have tertiary education and 58% had household size not exceeding 4. The choice of residence by the respondents was determined using variables such as the security of the area, location, proximity to the place of work and rental values. The workers that complained about traffic congestion during the journey to work constitute 53%, shortage of vehicles at peak periods constitute 15%, expensive transportation cost constitutes 26%, while few people complained about long-distance travel to work. Twenty-nine per cent of the workers used public buses to work, 26% used private cars, 24% utilized tricycles, and 13% used motorcycles while the rest utilized staff vehicles or trekked to work. The result of the analysis of the time of leaving home for work indicated 7% of the workers left by 6 a.m, 76% by 7 a. m and 17% departed for work not earlier than 8 am. Most of the respondents indicated that they close from the workplace at 4 p.m. The trip to work pattern showed that movement of people to a different area of workplaces in the morning and also moved toward different directions of home locations in the evening. The study suggested that gender inequality should be addressed in the civil service and that the existing public transport system should be improved upon by the State Government through adequate investment in the public transportation which would complement the existing stock by private providers.

Keywords: Socio-demographic, trip to work, civil servants, Kaduna metropolis

Introduction

A Trip is a journey between home and place of work. Jang (1996) for instance, describes a trip as travel originating at home and returning eventually to home. Also, Bautista-Hernandez (2020) refers to trip chain pattern as a sequence of trips that starts and ends at home within a day. According to Wang (2015), trip comprises mostly fixed daily destinations. Trip to work constitutes one of the most common movement patterns in cities (Tolley and Turton, 1995). In the context of daily travel, work trip remains very important,

and it continues to increase as workers are added to the existing workforce (McGuckin and Srinivasan, 2018). The trip to work is captured by an individual's location of usual residence, their location of workplace along with the method by which they commuted (Cooper and Corcoran, 2018). Trip to work is predominantly a weekday activity in cities. Trip to work is at its peak during the morning and evening periods (Transport Data Centre, 2010). Trip to work constitutes the key component of the peak period travel demand. Workers are an important and growing segment of the travelling public. Workers spend a large portion of weekdays in travel to and from work. However, workers, just like non-workers, are adding more trips for a variety of purposes into their day trips for shopping, errands, and social and recreational purposes (McGuckin and Srinivasan, 2018).

Trip purpose includes a trip to a shopping centre, as well as a trip to connect with social and recreational activities, school, hospital, worship places, to mention but a few. A different group of people engage in a journey to work trip within the city, and this reflects the different occupational groups such as civil servants, industrial workers amongst others. Ogunsanya (2002) posits that the trip to work is common in developed and developing countries. Trip to work plays a major role in the characteristics of vehicles in linking places of supply to the place of demand and the relationships between work and residence flow (Cervero and Tsai, 2003). Work trips are the most important category of journeys made from the home. Horton and Wittick (1969) indicated that amongst all the traffic generated from the home, trip to work could be said to dominate both in importance and magnitude. Work trip tends to be distributed unevenly throughout the day, mostly concentrated into few peak periods. In this regard, Horton and Wittick (1969) opined that dense traffic flow occurs in the mornings and evenings between the residential areas and workplaces. The daily trips usually involve pedestrians, bicycle riders, motorcyclists, tricycles, buses and private cars. According to Oyesiku (1995), trip to work generation is significant because it is a daily reality for civil servants with important social, economic and environmental consequences. Cooper and Corcoran (2018) opined that commuting data helps policymakers and planners make decisions related to transport infrastructure.

The problem of route choice faced by an automobile driver is very complex. First, there can be a large number of possible alternative routes from origins to destinations, and complex patterns of overlap typically exist between the various route alternatives (Antonisse, 1989). The ultimate route choice decision results from the consideration of both socioeconomic and trip characteristics. Important factors in the travellers' socioeconomic characteristics may be age, gender, income, personality, habits, preference, driving experience, and familiarity with the transportation network. Effective trip to work plays a great role in the social and economic development of any society. For instance, a trip to work makes it possible for all grades of employment to work where their services are required. It also promotes productivity and experience through the mobility of labour.

Several studies have been carried out on the characteristics of the journey to work. For instance, Kim and Heo (2003) estimated a multinomial profit model of work trip mode choice in Seoul, Korea, using a simulation-based method. They estimated direct and cross elasticity concerning travel cost and the value of time. The findings suggest that travel demands are sensitive to travel time change. Stopher (2012) carried out a study on determining the effects of travel costs in two communities in the north of Johannesburg, South Africa, using mail survey data. The findings revealed that trekking and waiting times (out-of-vehicle travel time) are observed to be more onerous than in-vehicle travel time. Haliru (1982) carried out a study on the factors influencing mode choice in Kaduna metropolis and found personal income to be the most determinant of the mode chosen by the workers. Findings that emanated from studies carried out almost four decades ago cannot be used for any useful planning in the present circumstance. Hence, it is important to investigate the socio-demographic and pattern of trip to work by civil servants in Kaduna metropolis.

The Study Area

Kaduna metropolis lies between latitudes 10°22′N and 10°40′N, and longitudes 7°20′E and 7°28′E (see Figure 1). It is made up of four Local Government Areas: Kaduna North, Kaduna South, part of Igabi, and part Chikun Local Government Areas. The metropolis occupies an area of about 450km^2, and the distance between the eastern and western limits of the city is approximately 13.7km, although this keeps changing as physical development increases (Adewuyi, 2008; Oluwole, 2014). Kaduna, the capital of Kaduna State, is one of the most important political, industrial and economic centres in Nigeria (Bununu and Ahmed, 2014). It also serves as one of the most important trade centres in northern Nigeria (Bununu and Ahmed, 2014).

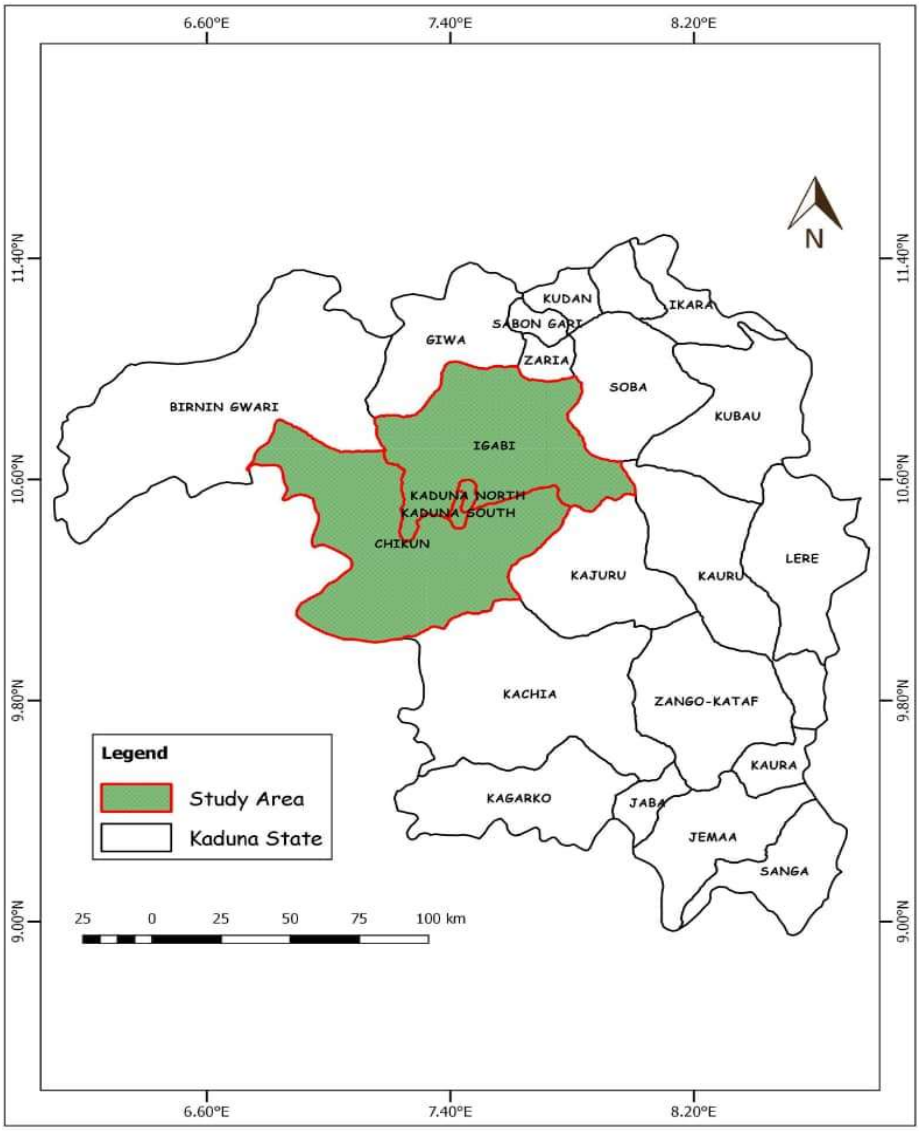

Figure 1: Kaduna Metropolis
Source: Digitized from Map of Kaduna State, produced by the Department of Geography, Kaduna State University (KSU)

Kaduna is a city characterized by rapid urbanization. The metropolis has a good network of roads/streets and thus making all parts of the metropolis to be easily accessible. However, the quality of these roads/streets is very poor in some parts of the metropolis. The metropolis is well accessed in the west by the western-by-pass, in the east by the eastern by-pass and at the heart of the metropolis by the Ahmadu Bello way. At the moment, there is urban renewal ongoing in the metropolis transforming the road network to a good quality standard.

Kaduna metropolis is an administrative, commercial and industrial centre (Bununu and Ahmed, 2014). Most of the office workers are civil servants. The Central market is the main market where buying and selling take place. There are Kanti koro (morning market), Kasuwa Barci market, Sabo market, Mando market, Monday market and Kawo market among others. Commercial banks notably First Bank, United Bank for Africa, Access Bank, Union Bank, Polaris, Zenith, Ecobank and Guaranty Trust Bank are located at various locations within the metropolis for cash transactions (Olukosi and Isitor, 1990). The industries in the metropolis include Aluminum Manufacturing, Oil Refinery, Steel Manufacturing, Kaduna dry Inland Port, Brewery, Textiles though moribund, Peugeot Automobile, Furniture and Carpets, Block moulding, Food and beverages, repairs workshop, tailoring, shoemaking and carpentry. There are also recreational facilities in the form of parks, hotels and cinema halls (Olukosi and Isitor, 1990). People were employed in all these places and daily would need to make trips to and from work.

Methods

This study is aimed at analyzing the socio-demographic and pattern of journey to work by civil servants in Kaduna metropolis. There were numerous Federal and State Government establishments located within Kaduna metropolis. These establishments were grouped into six (6) clusters, namely cluster A, B, C, D, E and F and to ensure adequate representation of each cluster, two establishments were selected from each of the clusters based on their strategic locations within the metropolis. Data were obtained through a questionnaire survey and field observation on the journey to work pattern of civil servants in Kaduna metropolis. The questionnaire was administered on the senior, middle and junior cadres of employees. The questionnaire consists of open and close-ended questions. The information obtained from the questionnaire includes information on socioeconomic and demographic characteristics of respondents notably gender of respondents, age of respondents, educational attainment of respondents, cost of transportation, marital status, place of work and place of residence, time trip begin and time trip end and characteristics of the transportation system used in the study area.

This study adopted the Yamane (1967) formula to calculate the sample size. From the population of 11,038 civil servants (see Table 1) spread across various establishments, 400 respondents were sampled. Stratified random sampling technique was adopted. The method was chosen because the civil servants were grouped into senior, middle and junior cadres of staff. Samples were randomly selected from each stratum of employees to ensure adequate representation of the entire workers. All the 400 copies of the questionnaire were returned. Although few of the workers failed to cooperate, they were substituted by other respondents.

Table 1: Establishments, number of workers, sample size and proportion sampled

Establishments	Total number of workers	Sample Size	Proportion sampled
National Water Research Institute, Mando	356	13	0.032
Federal secretariat	1670	61	0.151
Kaduna Geographic Information System	550	20	0.050
Kaduna State Media Corporation	294	11	0.027
Barau Dikko Teaching Hospital	967	35	0.088
National Steel Raw Materials Exploration Agency	257	9	0.023
Kaduna State Independent Commission	470	17	0.043
Kaduna State Ministry of Works	384	14	0.035
Nigerian Postal Service	1243	45	0.113
Kaduna North Local Government secretariat	752	27	0.068
Federal Polytechnic (college of science and technology) Tudun Wada	1737	63	0.157
Nigerian National Petroleum Cooperation (NNPC)	2356	85	0.213
Total	**11038**	**400**	**1.000**

Source: Authors Analysis, 2019

Results

The result obtained on the socio-demographic characteristics of the respondents is displayed in Table 2.

Table 2: Socio-Demographic Characteristics of the Respondents

Gender	**Age**	**Educational Status**	**Marital Status**
Male = 243	25-29 = 35	Primary = 7	Single = 89
Female = 157	30-34 = 94	Secondary = 98	Married = 233
	35-40 = 65	Tertiary = 295	Divorced = 78
	41-45 = 85		
	46-50 = 49		
	51-55 = 45		
	56-60 = 27		
Household Size	**Cadre**	**Residential Choice**	**Transport fare to Work**
1-2 = 97	Junior = 125	Official residence = 21	₦50-₦100 = 22
3-4 = 135	Senior = 189	Owner Occupier = 89	₦100-₦150 = 45
5 and more = 168	Managerial = 86	Closeness to work = 37	₦151-₦200 = 98
		Cheaper rent = 118	₦201-₦250 = 182
		Security = 135	₦251 and more = 53

Source: Author's Analysis, 2019

The table reveals that almost 61% of the respondents were males; about 58% were married while the rest were single, widowed or divorced and people of the age not exceeding 45 years constitute 70% of the workforce. About 70% of the civil servants have undergone tertiary education and 58% have a household size not exceeding 4. Almost 34% of the respondents claimed their residential choice was determined by the security of the area, while about 30% claimed low rental charges for the choice of their residence. Almost 60% of the civil servants spent above ₦200 on a trip to work. Fifty-three per cent (53%) of the respondents complained of traffic congestion during work trips, about 15% indicated a shortage of vehicles at peak periods, while about 26% complained that transportation cost is expensive. Few people indicated long-distance travel to work as the problem encountered.

The result on the mode of trip to work by the civil servants indicated that almost 26% of the respondents used private cars, about 29% took public buses to work, about 13% used motorcycles, and almost 24% used tricycles while the rest trekked to work or use staff vehicles (see Figure 2). The study discovered that about 7% of the respondents leave home for work by 6 am, 76% leaves home for work by 7 am, while the remaining 17% of the respondents leave home for work not earlier than 8 am. Most of the civil servants indicated closing from work as from 4 pm.

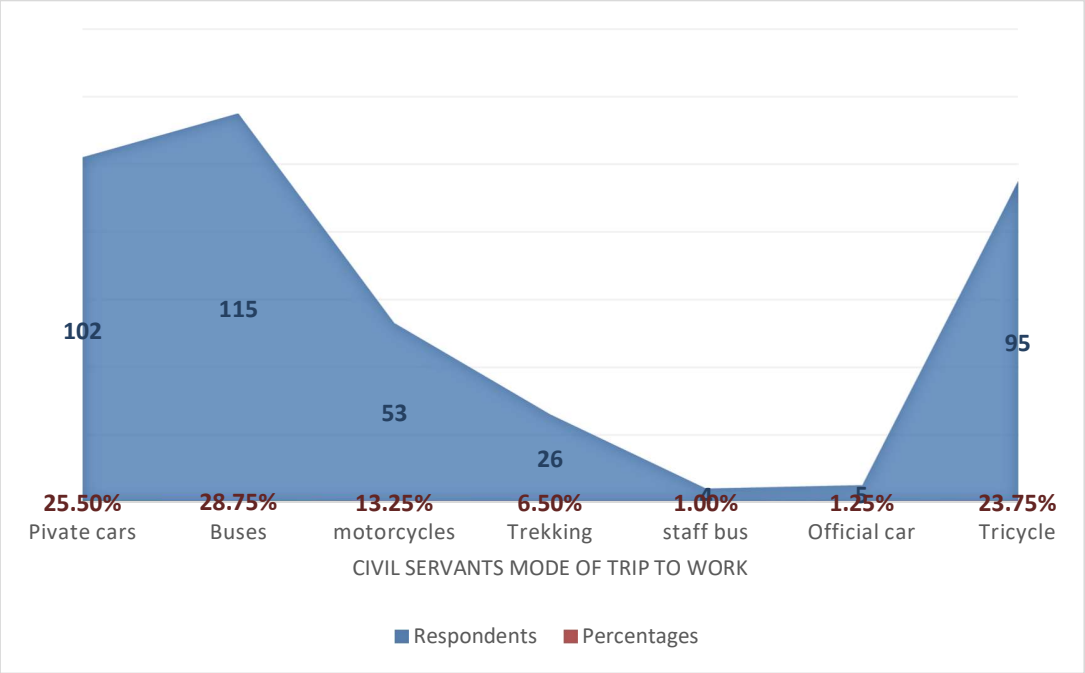

Figure 2: Mode of transportation to work in Kaduna metropolis

Discussion

This section is devoted to the discussion of findings that emanated from the study. The result on gender revealed a low rate of women participation in the civil service. It is an indication of gender inequality and possibly, discrimination against women in the workforce. Majority of the workforce are youths. This is an indication of a vibrant and agile workforce, hence, it is expected that the level of productivity will be high. There was a large number of unmarried in the workforce. The idea of managing a stressful job and also dedicating quality time to the family could account for the large number of civil servants that were yet to be married. Many of the civil servants were highly educated. The high level of education among the civil servants has implication on the rate at which civil servants would be favourably disposed to their work.

Realizing that we live in a period of rapid and significant economic and social change, the effects on trip to work by household members cannot be ignored. Small household size may reduce the number of intermediate stops on the trip. The choice of residence by civil servants also has a significant effect on trip to work. It was found that civil servants' choice of residence was determined by the security of an area, low rental charges, proximity to the place of work, owner-occupier and official residence. This finding is in agreement with Mannering (1989) and Weinberger (2006). Notwithstanding, their studies differ from the present study in terms of scope, but similar in terms of methods adopted for investigation on the journey to work by civil servants in the metropolis. The respondents' relative daily cost of trip to work varies depending on the relative location of their residences to the place of work. The relative cost of trip to work was found to be one of the factors influencing where people will work. It is also evident in Table 2 that majority of the civil servants spent above ₦200 on a trip to work. This is expensive and also an indication that they could not get or afford a house very close to the place of work, or likely staying in their own house which is relatively far from the place of work.

Traffic congestion occurs because the majority of the civil servants moves on to the road about 7 a.m and close from work at about 4 pm. The challenges encountered during the trip could result to stress, decrease workers' morale, as well make workers hunt for alternative jobs that will reduce the challenges. This will increase job mobility and temporary disruption to the efficient job delivery of the current office. An important issue that is often raised in the study of the trip to work is what mode is preferably used by most people. The proportion of the respondents that used private cars in Kaduna metropolis was similar to results obtained in Mexico City Metropolitan Area (MCMA) where affluent households tend to predominantly use private cars (Guerra, 2014; Guerra, 2015; Bautista-Hernandez, 2020). The categories of workers that leave home for work by 6 am usually do not experience traffic congestion; majority leaves home for work by 7 am, hence, experienced traffic congestion between the hours of 7 am and 8 am. Few of the respondents leave home for work at about 8 a.m when traffic congestion must have subsided. Most of the civil servants indicated closing from work as from 4 pm. Hence, traffic congestion is experienced from 4 p.m. This is coupled with the fact that most of the workers that are not civil servants would also be on the journey back home at that period. Likewise, the study found that most of the civil servants that travelled a long distance to work in the metropolis were males.

The trip to work pattern shows the movement of people to concentrated centres of the workplace in the morning and their movement toward homes at various points of location in the evening. The spatial pattern of location of respondent's places of work is shown in Figure 3.

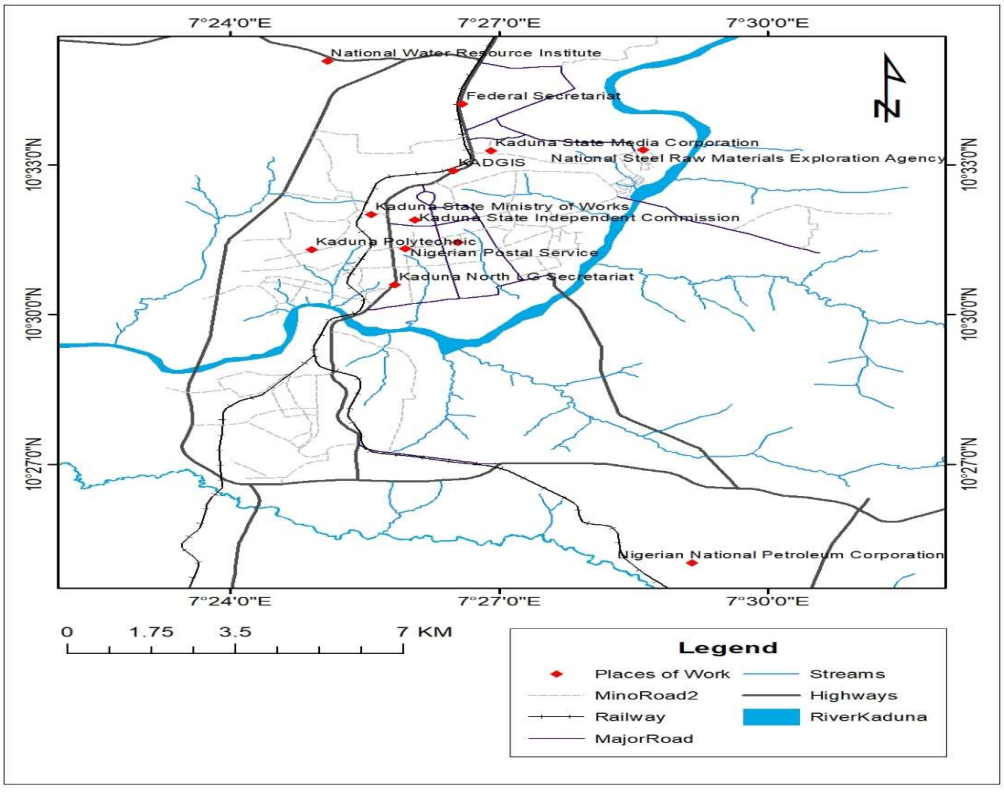

Figure 3: Location of places of work

Source: Authors' Analysis, 2019

The study, however, present graphs for three out of the numerous locations for analysis. The pattern of inflow of workers making the trip to work from their places of residence to Kaduna State Media Corporation Murno road is shown in Figure 4. As evident from Figure 4, the density of workers is thin at this point of job location because it is a media outfit that does not require much workforce. However, because it is a State Government Corporation, the spread of the workers is across the metropolis. For instance, workers' inflow is from Mando, Kawo, Tudunwada, Angwa Shaba, Television, Kakuri, Angwa Sarki and Malali.

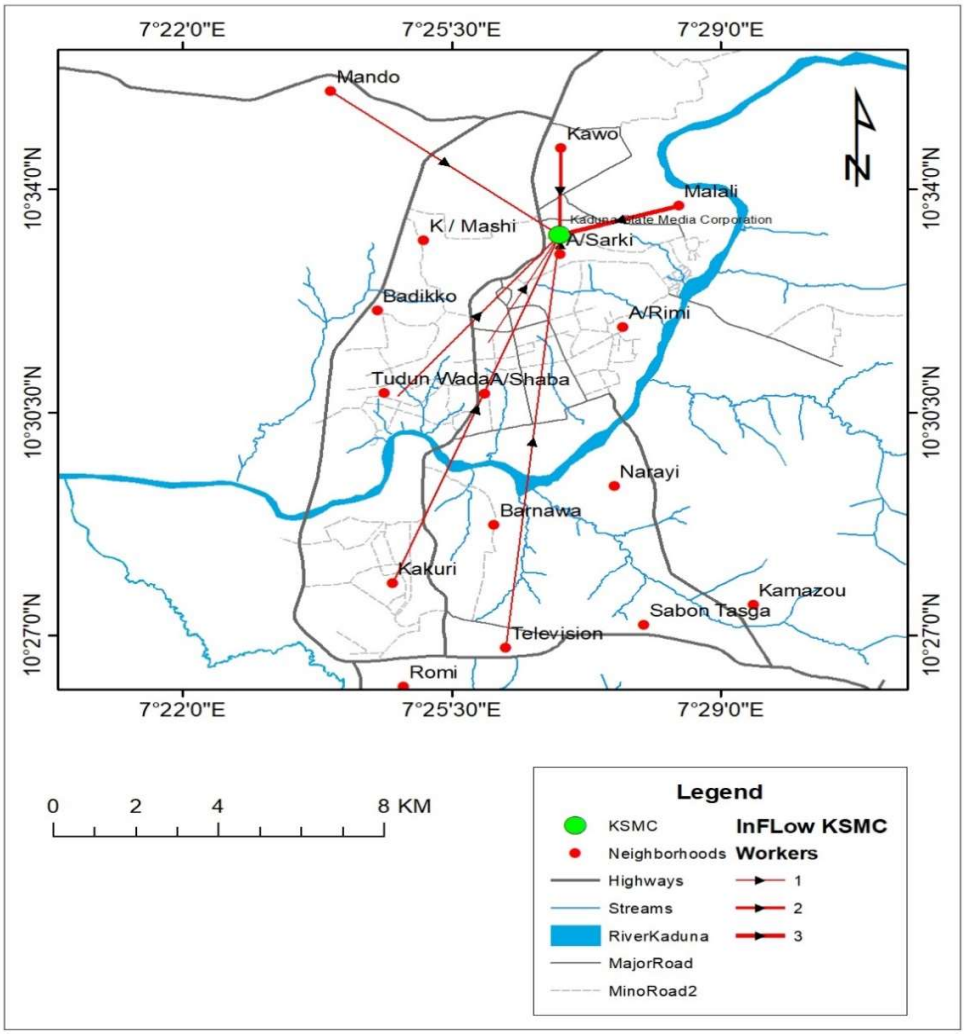

Figure 4: Pattern of trip to work by the staff of Kaduna State Media Corporation Murno Road

Source: Authors' Analysis, 2019

The pattern of inflow of workers making trip to work from their places of residence to Kaduna State Media Corporation Murno road can be compared to the workers' inflow into National Steel Raw Materials Exploration Agency (see Figure 5) which has fewer numbers of workers with their residence concentrated in Angwa Sarki and Malali and very few workers from Barnawa.

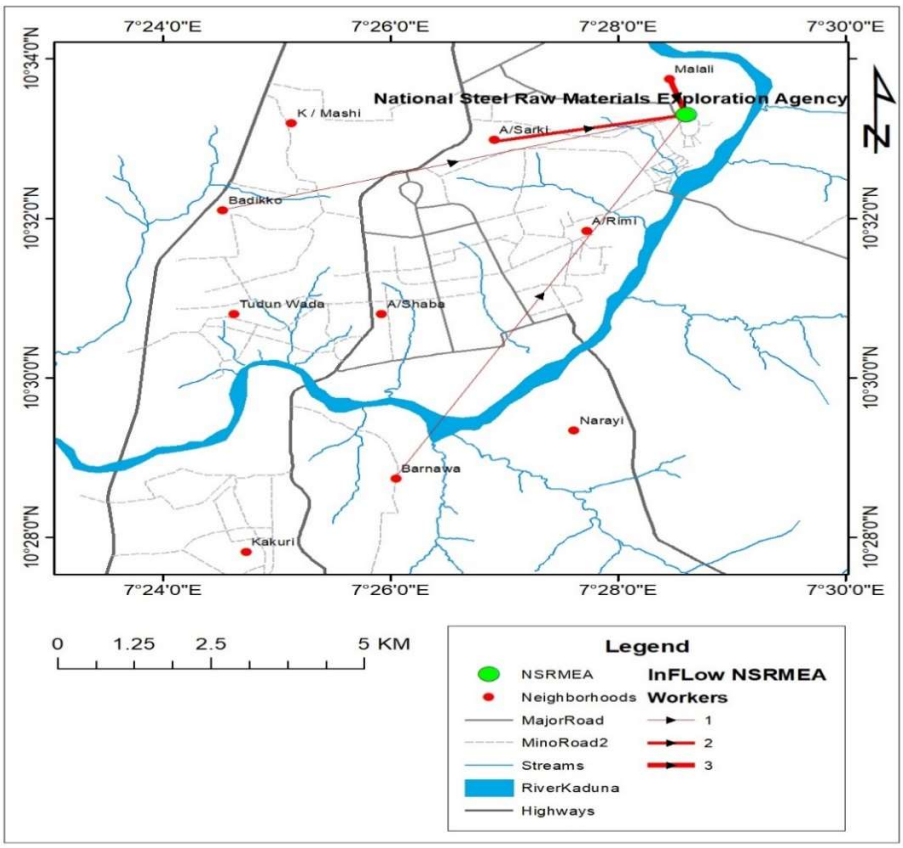

Figure 5: Pattern of Trip to work by the staff of the National Steel Raw Material Exploration Agency, Malali

Source: Authors' Analysis, 2019

The next is the Nigerian National Petroleum Corporation [NNPC] (see Figure 6). The NNPC is a mega-corporation. It has a large number of workers, and that is why the pattern of trip to work by the staff is very thick spanning across the metropolis even as far as Rigachikun in the extreme north of the metropolis.

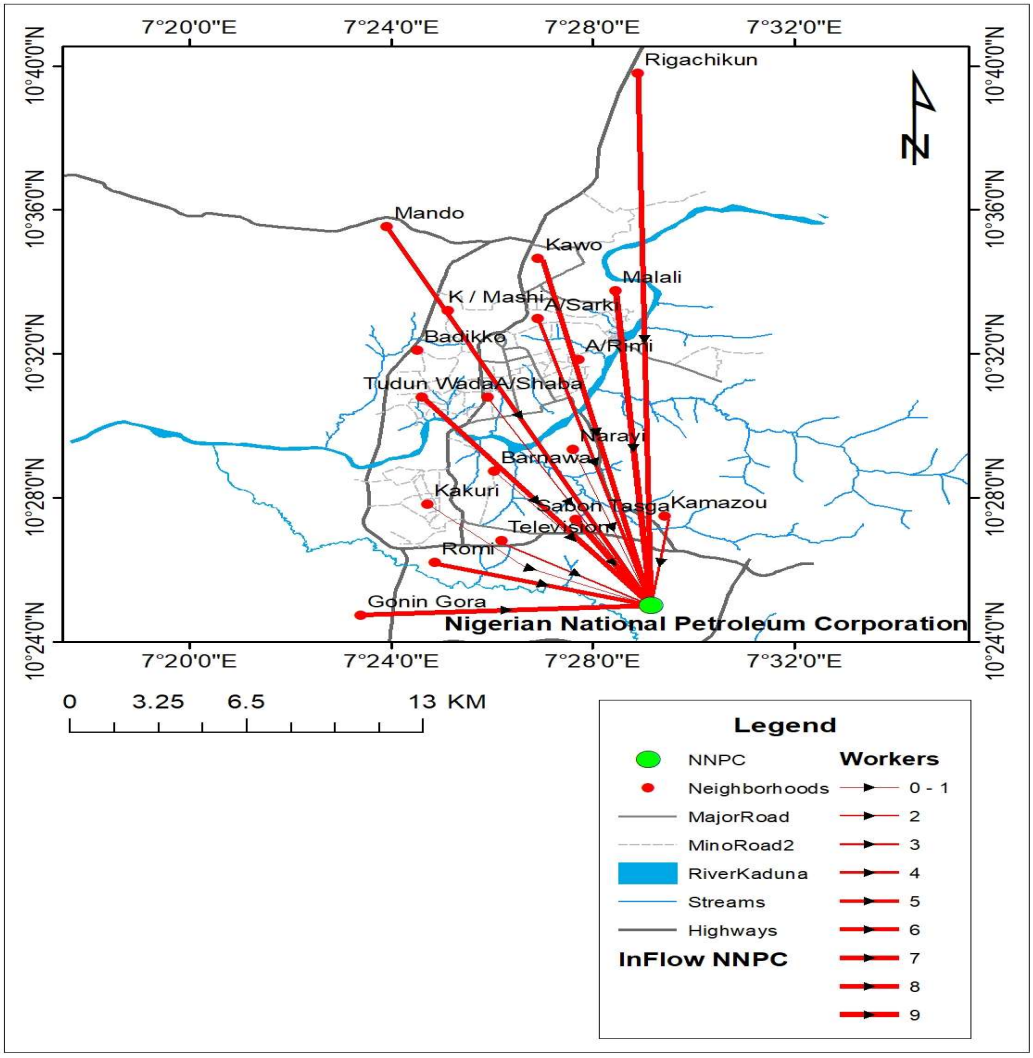

Figure 6: Pattern of Trip to work by the staff of the Nigerian National Petroleum Corporation, Sabon Tasha

Source: Authors Analysis, 2019

The corporation had a fleet of buses that conveyed staff to and from work, thereby making it easy to come to work from any part of the city. NNPC has the largest spread of workers across the metropolis. Workers residences are located in Rigachikun, Mando, Kawo, Malali, Kurmin-Marshi, Angwa-Sarki, Angwa-Rimi, Badiko, Tudunwada, Angwa Shaba, Barnawa, Narayi, Kamazou, Angwa Romi, Television and Gonin-Gora. Distance from the place of residence to the place of work is not a barrier because the corporation has a fleet of buses to move the staff to and from work

Conclusion

In the context of daily travels, a work trip is very important. This study therefore aimed at analyzing the socio-demographic and pattern of the journey to work by civil servants in Kaduna Metropolis. The study identified the peak periods of movement and traffic congestion encountered by the civil servants to be from 7 am to 8 am and from 4 pm to 6 pm. The civil servants aggregate at localized points of work in the mornings and moved in the evenings to their respective points of residence. The study also revealed gender inequality in civil service. This negates the Sustainable Development Goal 5 which stipulates gender equality and empowerment of all women. To reduce inequality, women should be appointed into the civil service when there is a vacancy. The study discovered that public buses were inadequate in the metropolis. This creates a gap in the fulfilment of Sustainable Development Goal 11 of making cities and human settlements inclusive and sustainable. More public buses should be made available, if possible by the Kaduna State Government to complement the existing stock by the private transporters. The findings from this study could be utilized as providing additional information to the city's transportation network forecast model and also help policymakers and planners make useful decisions relating to transportation infrastructure. Future researches are necessary, most especially in the area of analyzing trip complexity of non-work trips and also in the area of the interplay of travel mode choice to work.

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