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(Research Article)

The viability of service supply and travellers satisfaction in mass transit system in north-central Nigeria: The quality puzzle

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Abstract

This paper investigates transport system and sustainable improvement in North-central, Nigeria with specific reference to Abuja, Nasarawa and Niger State. Survey research device was utilized with questionnaire as main instruments applied for data collections which were dispensed to four hundred travellers carefully picked randomly making total of 1200 travellers that were studied. From demographic figures for each of the three zones, female travellers more than men, Self-employed travellers has the highest, between 25 and 40 years travelled most, Christian travellers are more than other religions, while travellers with at least degree certificate travelled most and the highest income is below minimum wage. Nevertheless, from the opinion about public transportation system, majority testify that fare is too costly, deficient bus service and inaccessibility or costly parking space, whereas safety and cleanliness is zero percent.

Keywords: Transport; Mass transit; Survey; Viable; Traffic congestion; North-Central; Nigeria

1. Introduction

Public transport is indispensible to the wellbeing of any country, the benefits of a carefully planned and resourcefully managed transportation system expanse far further than the transport scope, as it is vital for industry, for publics' mobility and for effective communications [1-3]. The condition of public means of transport service in Federal Republic of Nigeria has advanced to a level of focusing on the quality of service offered [4-6]. Bielen and Demoulin [7] express public transportation as a transmission that proposes continuing general or distinctive transportation to the municipal such as Trolleys, rails, busses, subways, and ferry boats. Concerning frequency services it increase satisfaction and built-up transportation patronage [8-10]. Ardreassen [11], asserted that customer or user (dis) satisfaction in civic transit finalized the design or arrangement of any platform or the station, specifically for buses [12-14]. Likewise, reliability, convenience and receptiveness are also considered to be imperative in passenger or user satisfaction [15&16]. Quality has been assessed from different perspective and areas [17]. Edvardisson [18], termed quality as sought after meeting the criteria that passengers want. Thus, evaluating the quality of service is very vital in making passenger patronizing the business for repeat and constantly purchases [19-21]. Because there are applied principles in the transportation business, for instance, if the customer or passenger is satisfied with the performance of the bus or any mass transit, the purchaser will return and use the same bus or the mass transit [21-24]. Correspondingly, likely clients will discontinue using the bus service which he or she feels will not satisfy their needs. Similarly, long waiting time, unable to provide information about occasional delays to the users and poor or bad waiting environment is other factors that are initiator of customer dissatisfaction [2, 17-20]. Anderson et al, [21] describes service as the backbone of the industries which as well as ensuring the lifting and development of the economies.

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There have been numerous studies in the area of customer or passenger satisfaction in Public Transportation but we do not aware of any study done in this aspect in North-central Nigeria. Thus this study will add to the meager literature in this area. Study such like this is very imperative for evaluation, contribution, and improving service design and delivery. Since it will supply policies and decision maker with data or information that they can make use in suppositions about the passengers.

2. Material and methods

2.1 Study Area

North Central Nigeria, also named Middle Belt is a region with convergence of cultural purviews and also maintains a tremendous degree of ethno-linguistic multiplicity. Such as Niger–Congo, Afro-Asiatic and Nilo-Saharan languages are all spoken in this region, also served as three primary African language families [1,24&25]. Nigeria states within this region are; Niger, ancient Plateau (now Plateau and Nasarawa), Kogi, ancient Gongola (now Adamawa and Taraba) [24-26], Kwara, Benue and the Federal Capital Territory. Though Southern Yobe State, Southern Kaduna, Southern Gombe, Southern Bauchi, Southern Kebbi, and Southern Borno [24&25], are all ethnically considered as part of the Middle Belt. North-central comprises of numerous cultural groups speaking of over 230 dialects, with the inhabitants of 17.3 million as of 1991 [24-26], but now anticipated to be over 45 million populaces living in the North-central region, with a predominant Christian inhabitants of 65%, Animist populace of 10% and Muslim populace of 25% of the whole population. In this study out of seven states within North-central region, three states that are the swiftest growing built-up centers was picked which is Abuja, capital of the country Nigeria and other two neighboring states, Nasarawa and Niger [25&26].

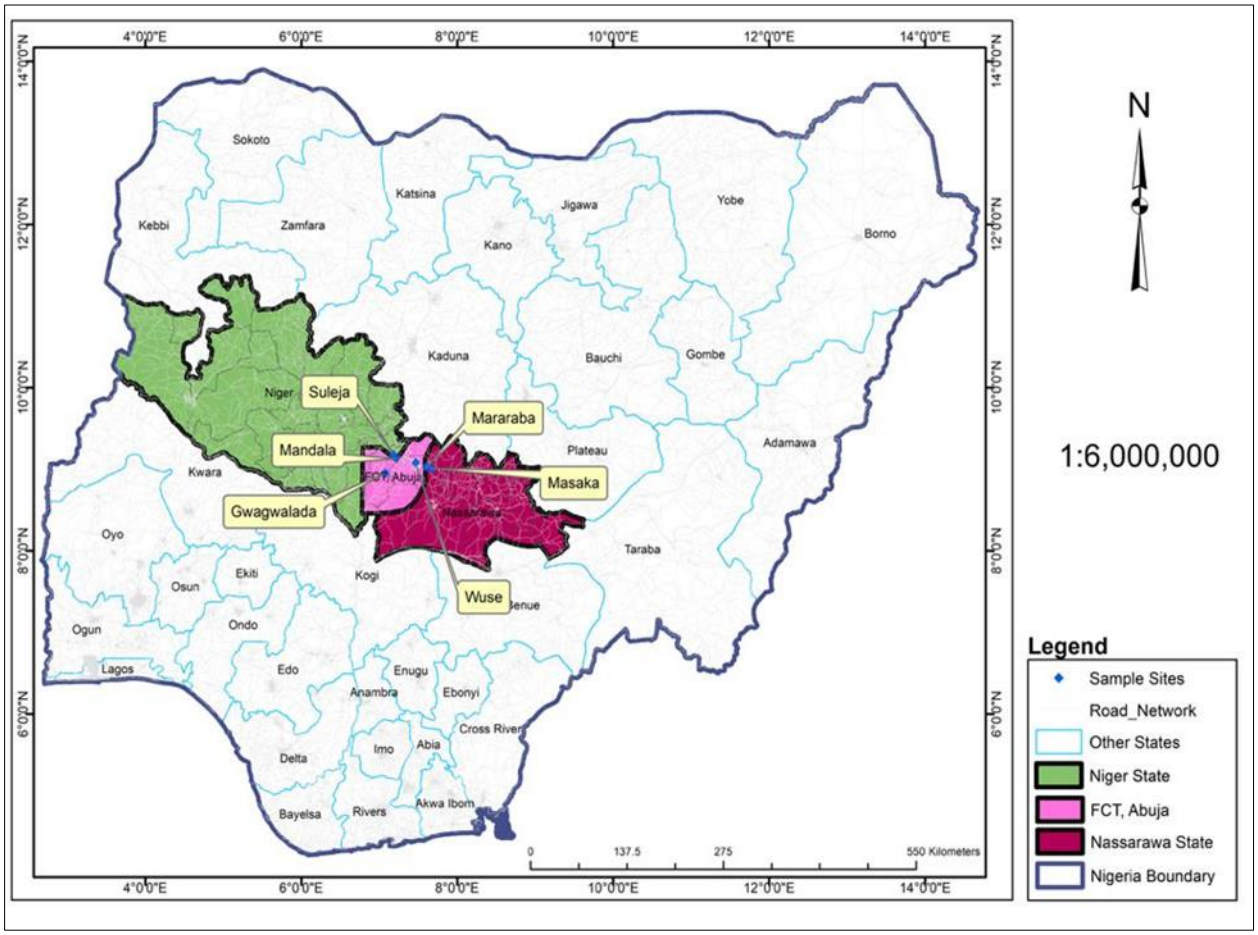

Figure 1 Map of Nigeria showing study locations in FCT Abuja, Nasarawa and Niger States

Abuja, the Federal Capital Territory came into being due to a need to find a substitute for the capital city of Lagos which had become clogged and had slight space for enlargement. Occupants were repositioned to nearby metropolises like Suleja in Niger state and New Karshi in Nasarawa State on the peripheries of the territory. This territory is situated just

north of the confluence of the Benue River and Niger River, besides geographically positioned in the center of the nation (KLMP 2020; Population census 2006). Bordered by Kaduna to the northeast, Kogi to the southwest, Niger state to the West and North, and Nasarawa to the east and south. It is between longitude 6.45 and 7.39 east of Greenwich Meridian, and latitude 8.25 and 9.20 north of the equator. Abuja has a landmass of roughly 7,315 km2, and it is positioned within the Savannah district with moderate climatic conditions. Hausa and English language is widely spoken in the FCT (KLMP 2020; Population census 2006).

Nasarawa is one of state in north central Nigeria, and is capital is Lafia. It is bounded in the south by Kogi and Benue States, the north by Kaduna State, in the east by Taraba and Plateau States, and in the west by the Federal Capital Territory. Agriculture serves as the backbone of its economy with the production of diversities of cash crops all through the year. Nasarawa state home some institutions such as College of Agriculture in Lafia, Bingham University at Karu, College of Education in Akwanga, Nasarawa State University, Federal Polytechnic Nasarawa, a newly established Federal University of Lafia, Mewar International University at Masaka, Maloney Hill, Farin Ruwa Falls in Wamba Local Government region of the state and salt Village in Keana Local Government Region of the State that produces naturally iodized salt from the lake situated near it, with area total of 27,117km2 and Populaces of 1,869.377 as of 2006 (KLMP 2020; Population census 2006). Niger is the largest state in the country, and its state's capital is at Minna. It was created in 1976 when the then North-Western State was bifurcated into Niger State and Sokoto State. It is home to Abdulsalami Abubakar and Ibrahim Babangida, two (2) of Nigeria's previous military rulers. The renowned Gurara Falls is in Niger State, and Gurara Local Government Region is titled after the Gurara River, on whose course the fall is positioned [25&26]. Also located there is Kainji National Park, the prevalent National Park of Nigeria, which encompasses the Zugurma Game Reserve, Kainji Lake and, the Borgu Game Reserve. Greater part of various indigenous tribes of Niger State are from the Koro, Hun-Saare, Gbayi, Kambari, Nupe, Kamuri and Hausa [25-26], the locations are presented in Fig. 1.

2.2 Research Methods and Sampling approaches

The techniques encompasses of travellers within case study provinces, data was gathered through questionnaire as well as field investigation. The questionnaire utilized was from prior studies but it was upgraded to suite this scrutiny purpose. Field survey encompasses of trip to city and points collection within North-central Nigeria.

Table 1 Questionaire format

Section	Description	Scale Type	No. Of Items
A	Demographic Information	Categorical	9
B	Socio-Economic Pattern	Categorical	6
C	Transport survey	Binary	10

3. Results and discussion

3.1 Demographic Analysis

3.1.1 Occupation and Sex

The demographic investigation (occupation and sex) formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 2 and 3.

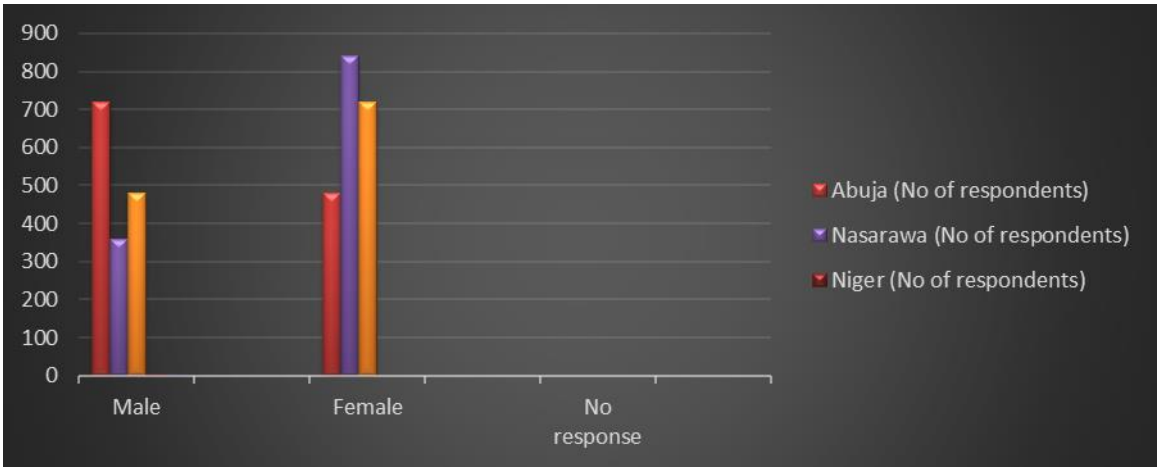

Figure 2 Gender of respondent in North-Central Nigeria

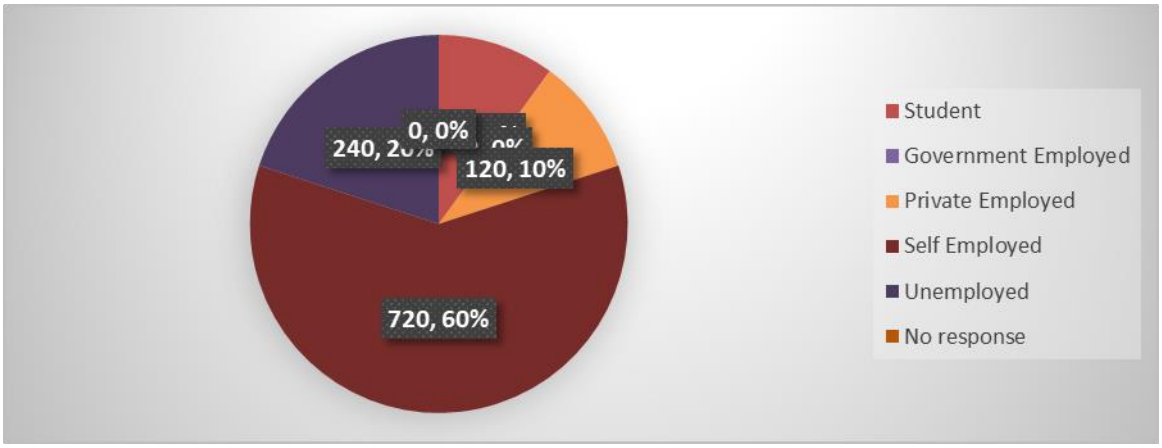

Figure 3 Profession of respondent in North-Central Nigeria

3.2 Age Group and Religions

The Age group and religions formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 4 and 5.

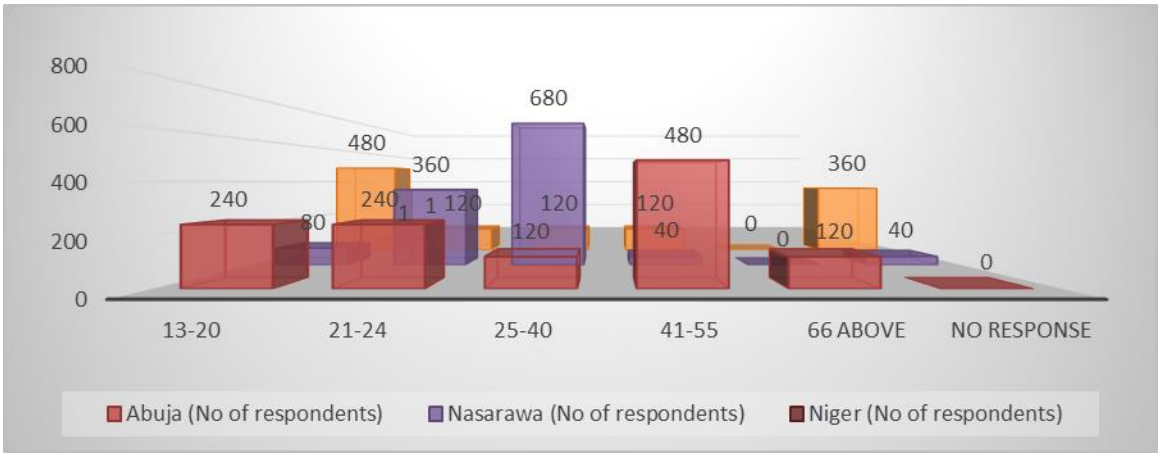

Figure 4 Age group of North-Central Nigeria respondents

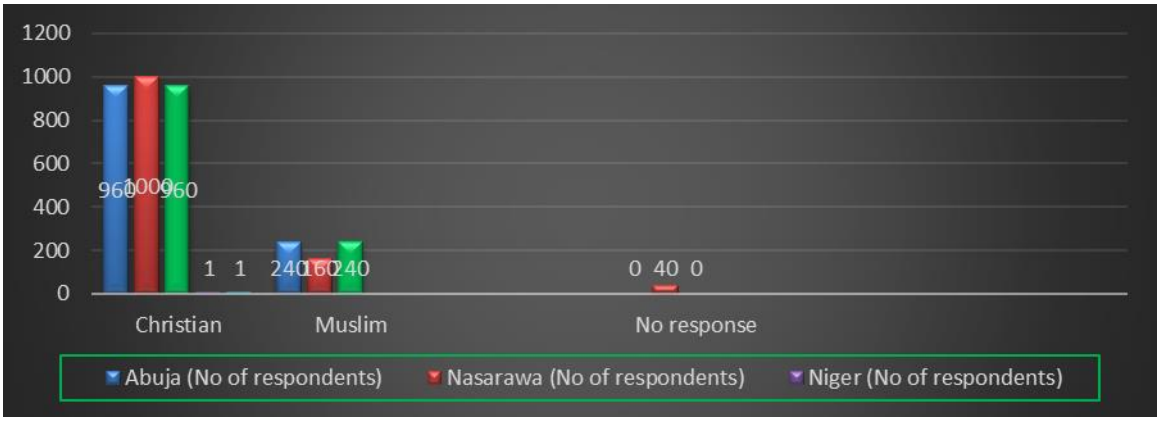

Figure 5 Religions of North-Central Nigeria respondents

3.2.1 Education

The Education level produced using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 6.

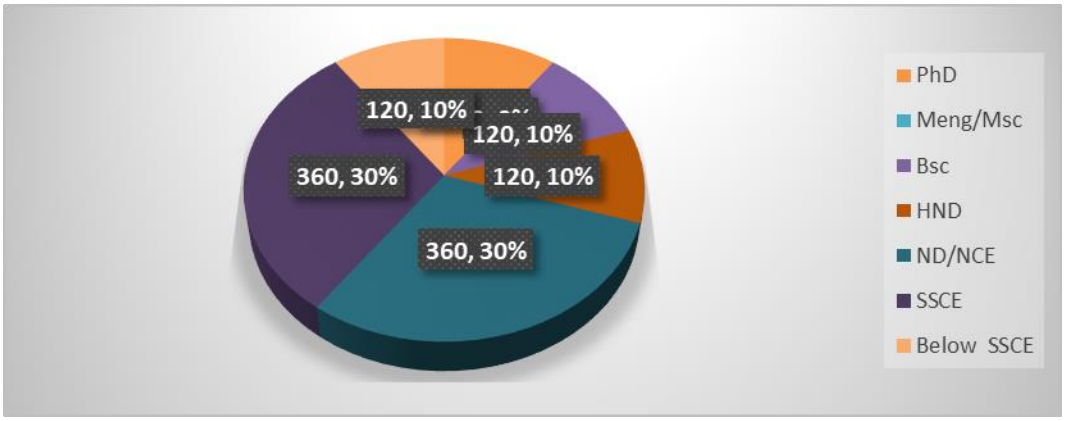

Figure 6 Schooling Level of North-Central Nigeria respondents

3.2.2 Salary

The salary produced using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 7.

Figure 7 Income level of North-Central Nigeria respondents

Figure 2 – 7 shows that demographic figures (sex, profession, age, religion, education and salary) for each of the three zones, female travellers more than men, Self-employed travellers has the highest, between 25 and 40 years travelled

most, Christian travellers are more than other religions, while travellers with at least degree certificate travelled most and the highest income is below minimum wage.

These results specify that profession, age and education level of the populace regulate travel management which is in agreement with paper work by [15-18].

3.3 Other socio-economic pattern

3.3.1 Language, nationality, community safety

The socio-economic pattern (language, nationality and community safety) formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 8, 9 and 10.

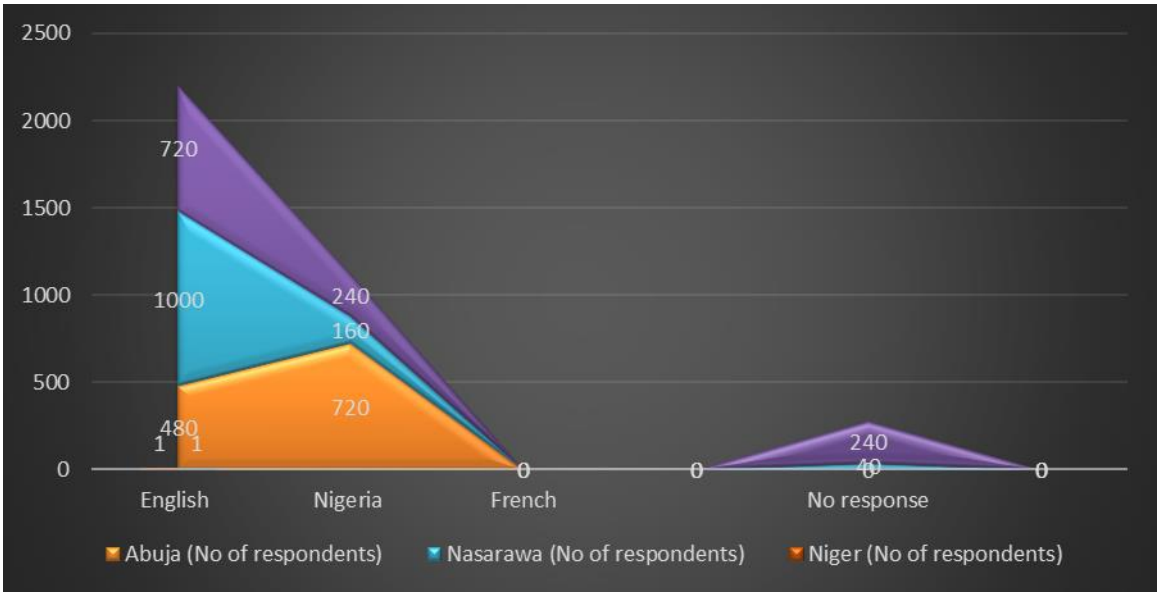

Figure 8 Language of North-Central Nigeria respondents

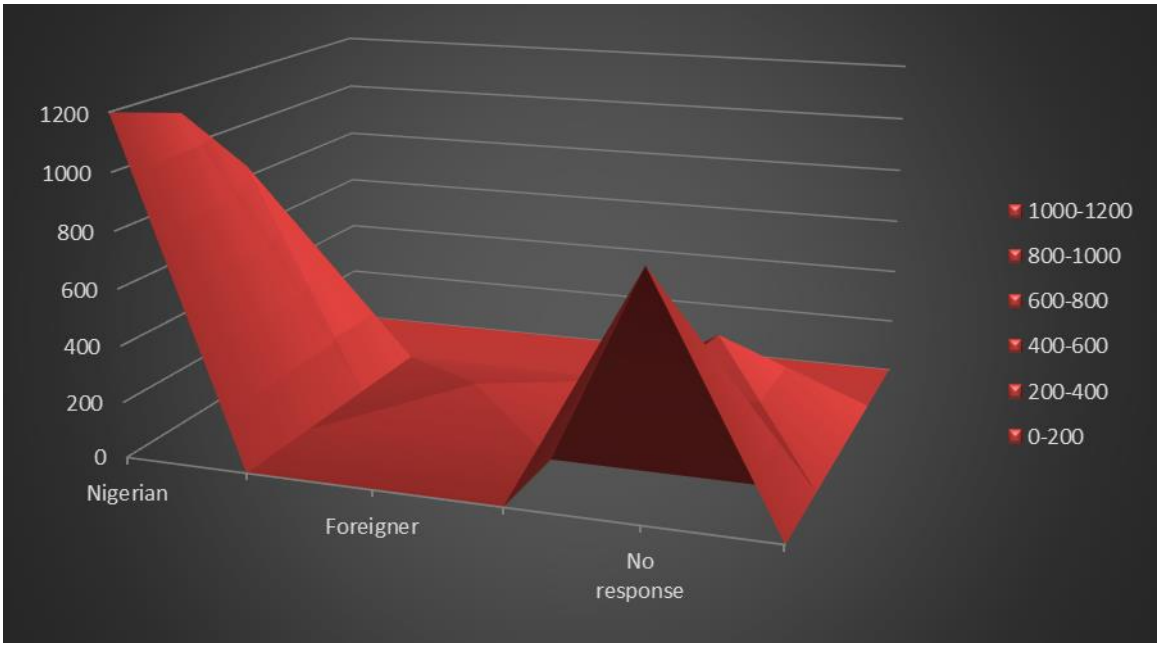

Figure 9 Nationality of North-Central Nigeria respondents

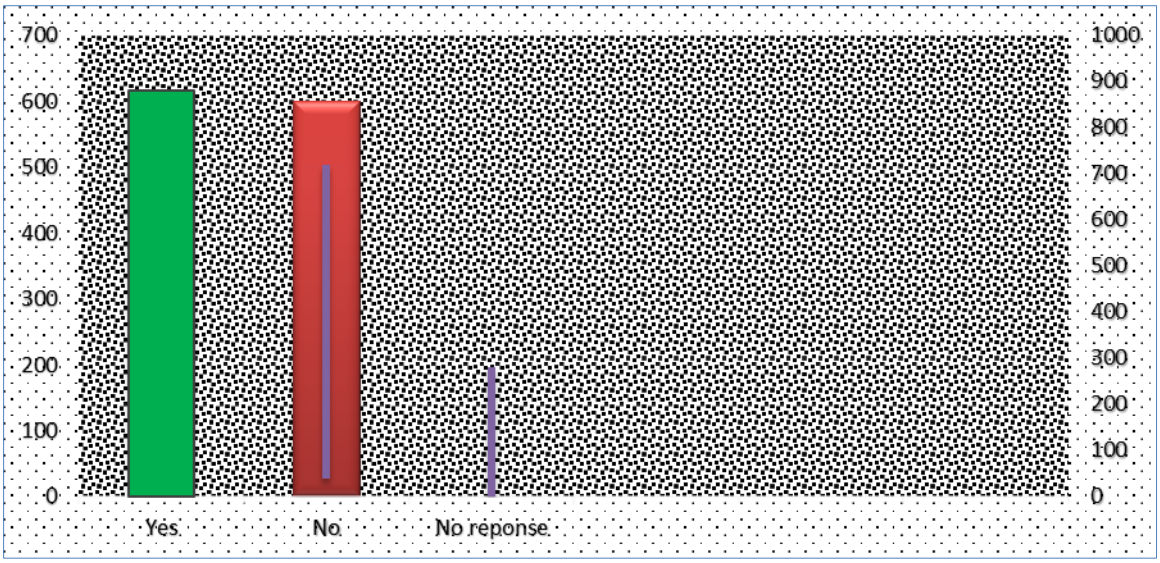

Figure 10 Community safety of North-Central Nigeria respondents

3.3.2 State, disability, tribe of North-central respondents

The state, disability and tribe formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 11, 12 and 13.

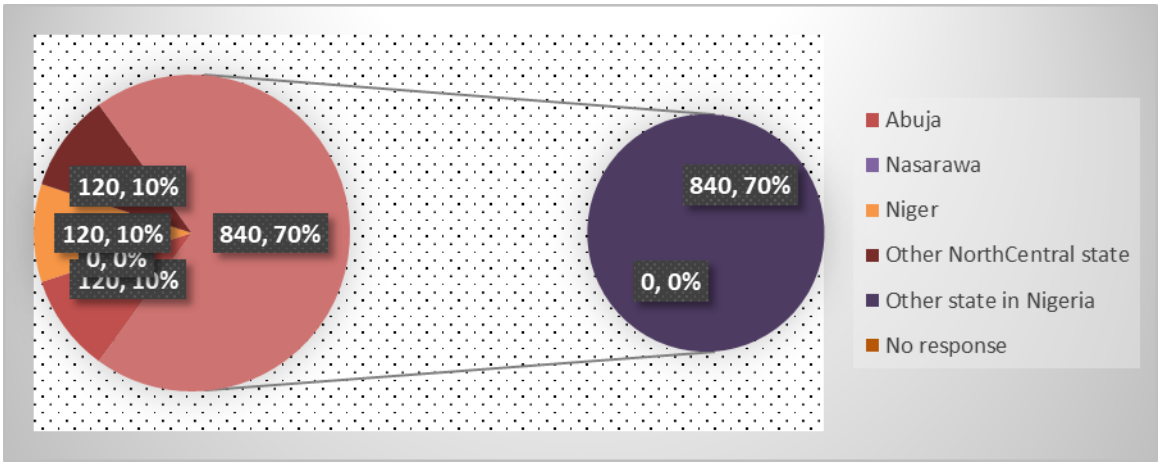

Figure 11 State of North-Central Nigeria respondents

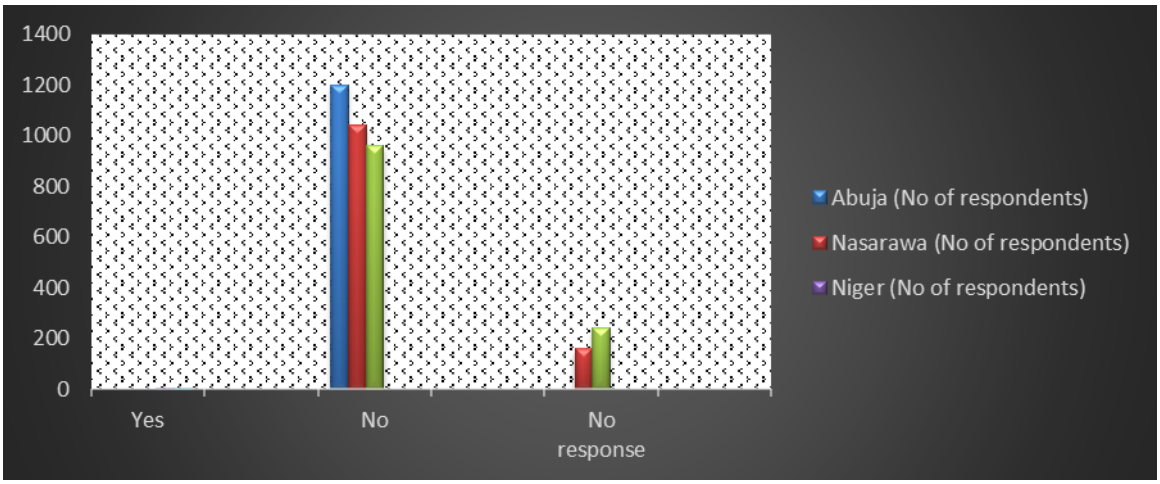

Figure 12 Disability of North-Central Nigeria respondents

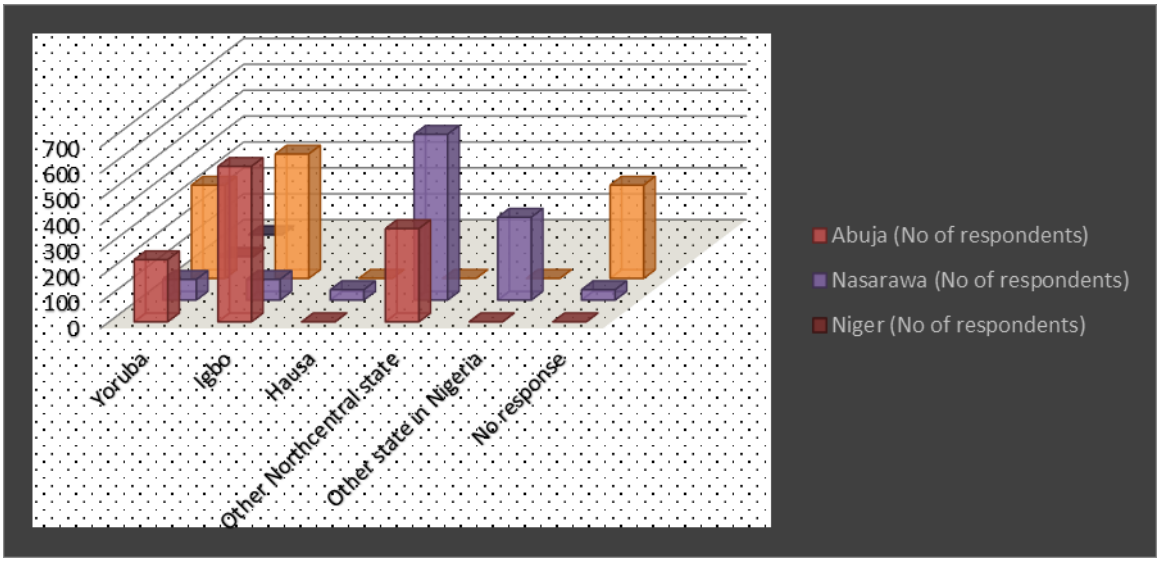

Figure 13 Tribe of North-Central Nigeria respondents

Figure 8 – 13 shows that state, disability and tribe for each of the three zones, majority are from other tribe or state within Nigeria and disable people hardly travel which is in agreement with paper work by [1, 21-23].

3.4 Mass transport Survey

3.4.1 Taken survey before

Taken of survey before or not formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 14.

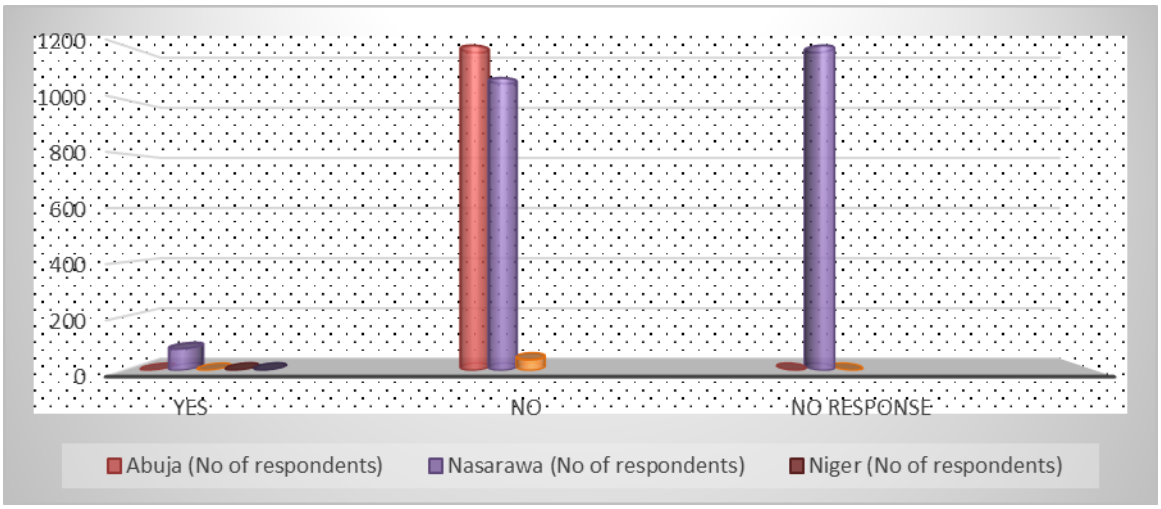

Figure 14 Survey taken of North-Central Nigeria respondents

3.4.2 Mass transit often used

The mass transit utilized often by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 15.

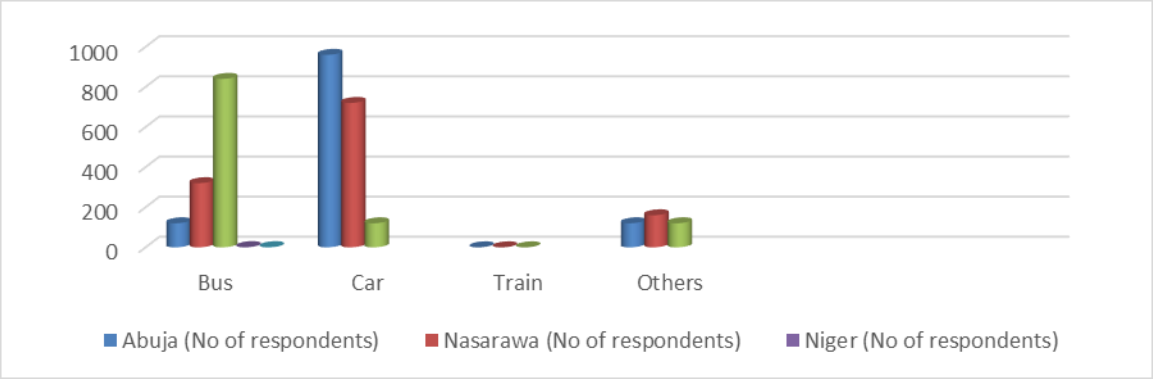

Figure 15 Mass transit of North-Central Nigeria respondents

3.4.3 Usage of bus daily

Bus daily usage by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 16.

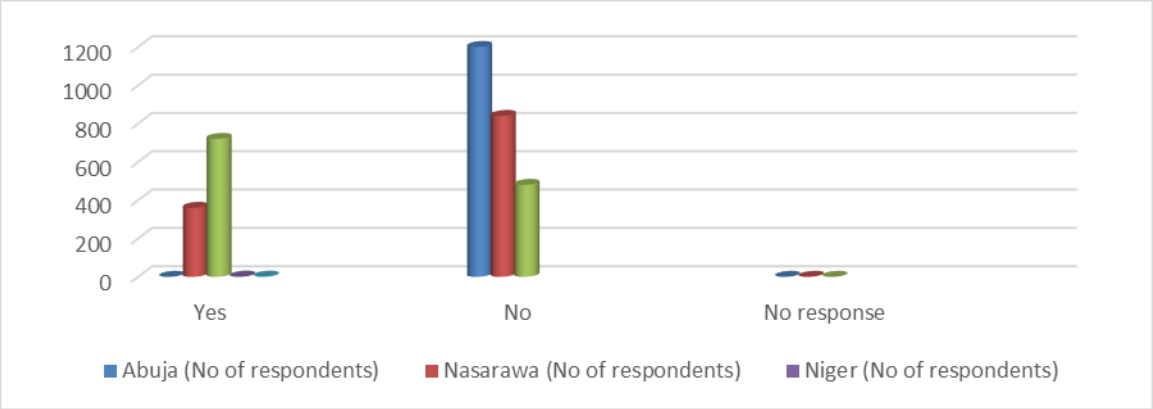

Figure 16 Daily bus usage of North-Central Nigeria respondents

3.5 Mode of transport used to arrive at location without bus

Other mode of transport utilized without bus by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 17.

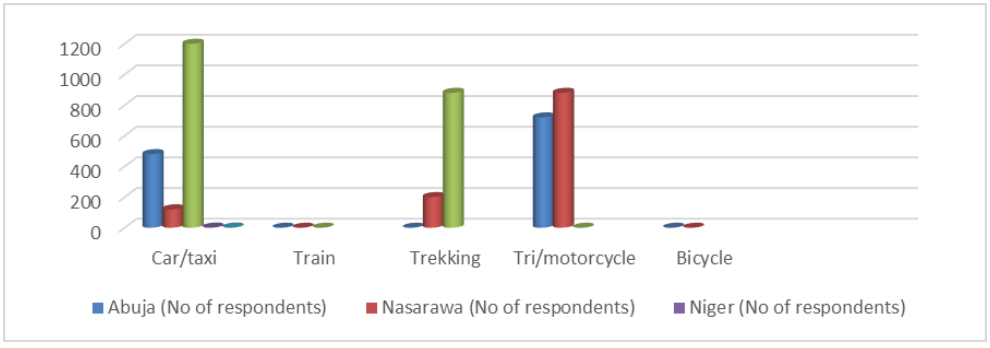

Figure 17 Other mode of transportation of North-Central Nigeria respondents

3.5.1 Have cars or access to cars

Car owner or have access to cars by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 18.

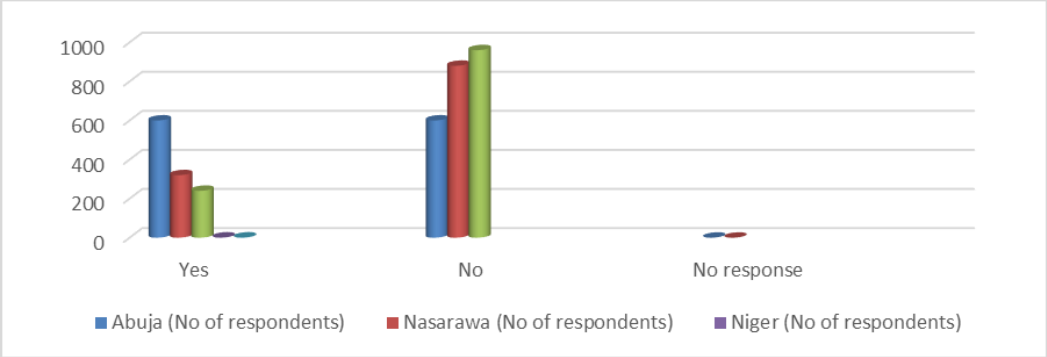

Figure 18 Car owner of North-Central Nigeria respondents

3.5.2 How often North-central people used car

How often cars being used by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 19.

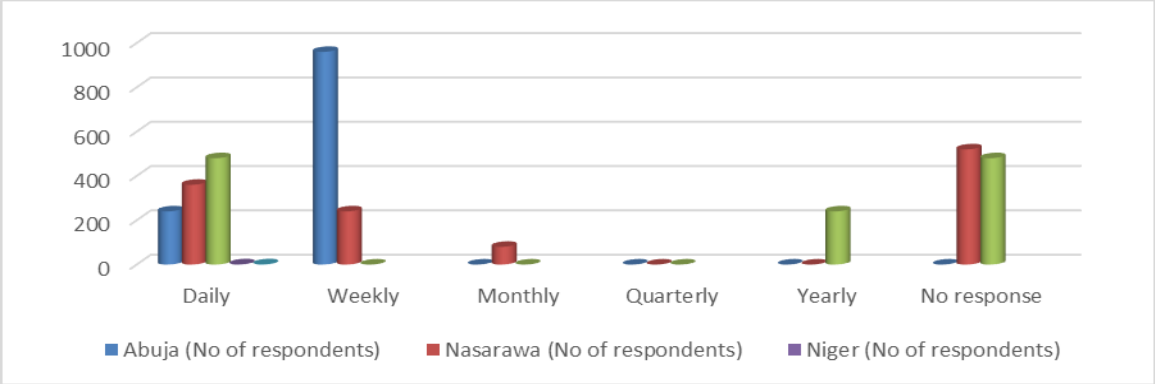

Figure 19 Often usage of cars of North-Central Nigeria respondents

3.5.3 Without cars what North central people use

What respondents used without cars by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 20.

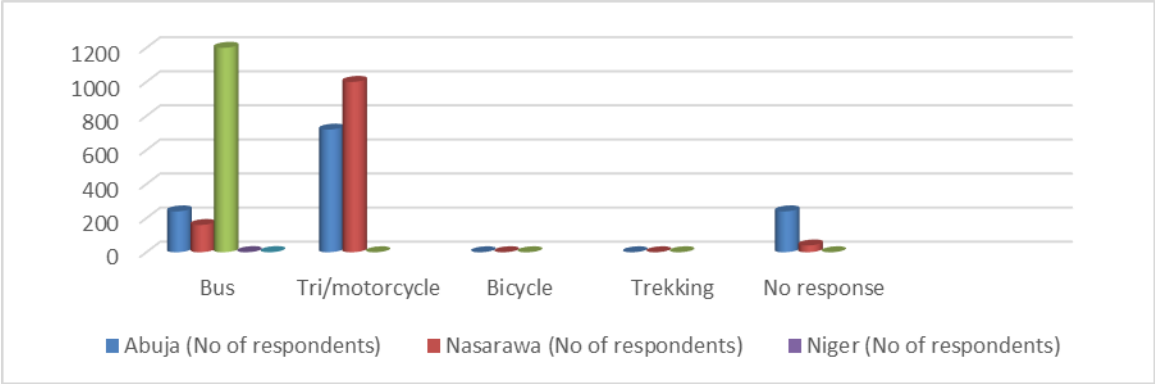

Figure 20 Without car of North-Central Nigeria respondents

3.5.4 Payment method

Payment techniques utilized often by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are presented in Figure 21.

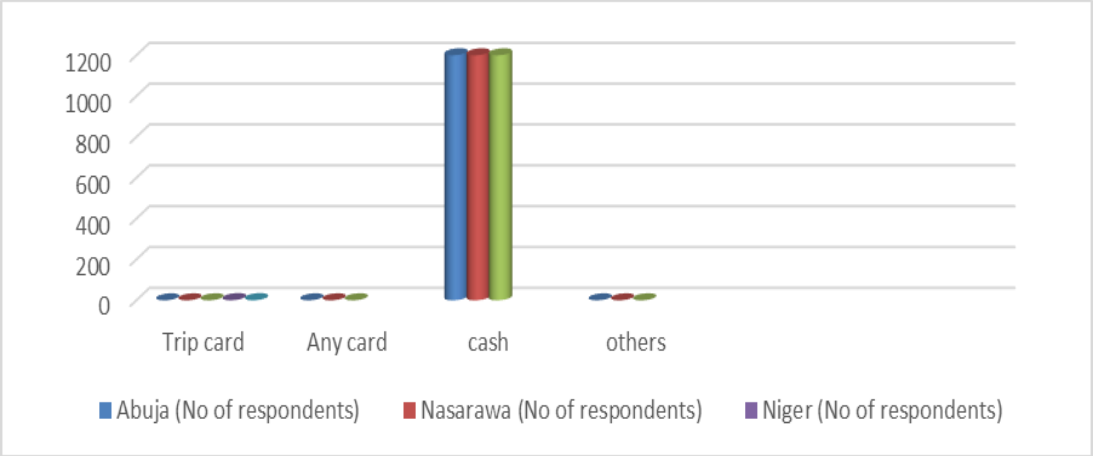

Figure 21 Payment option of North-Central Nigeria respondents

3.5.5 How often North-central people use public transportation

Public transportation frequency by North-central, Nigeria dweller using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents arepresented in Figure 22.

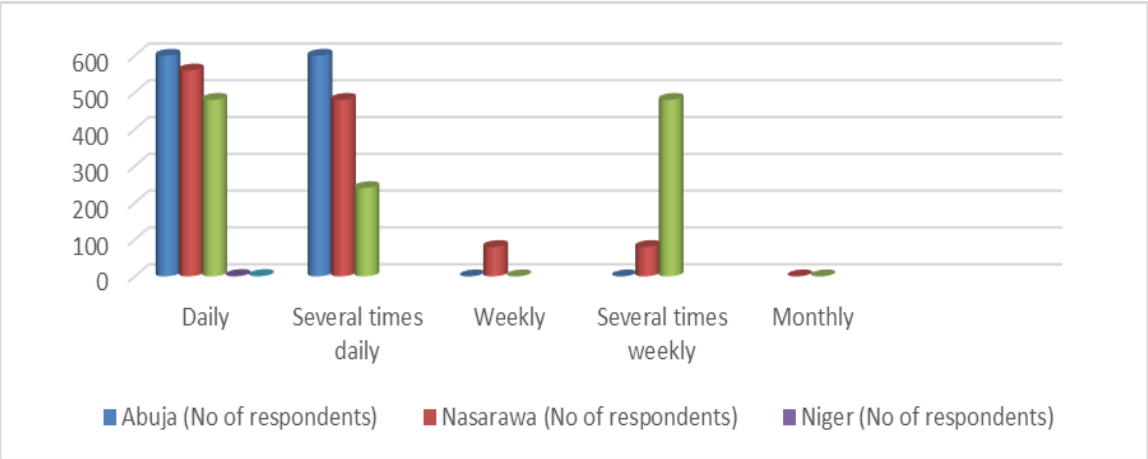

Figure 22 Public transportation frequency of North-Central Nigeria respondents

3.5.6 Opinion about public transportation

General opinion of respondents from North-central Nigeria formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are shown in Table 2 and graphically indicated in Figure 23.

Table 2 General opinion of passengers

North Central	Fares too expensive		No bus service		Lack of parkling		Parking costly		Cleanliness		Safety	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	Numbers of respondents											
Abuja	1200	0	1200	0	1200	0	1200	0	0	1200	0	1200
Nasarawa	1200	0	1200	0	1200	0	1200	0	0	1200	0	1200
Niger	1200	0	1200	0	1200	0	1200	0	0	1200	0	1200

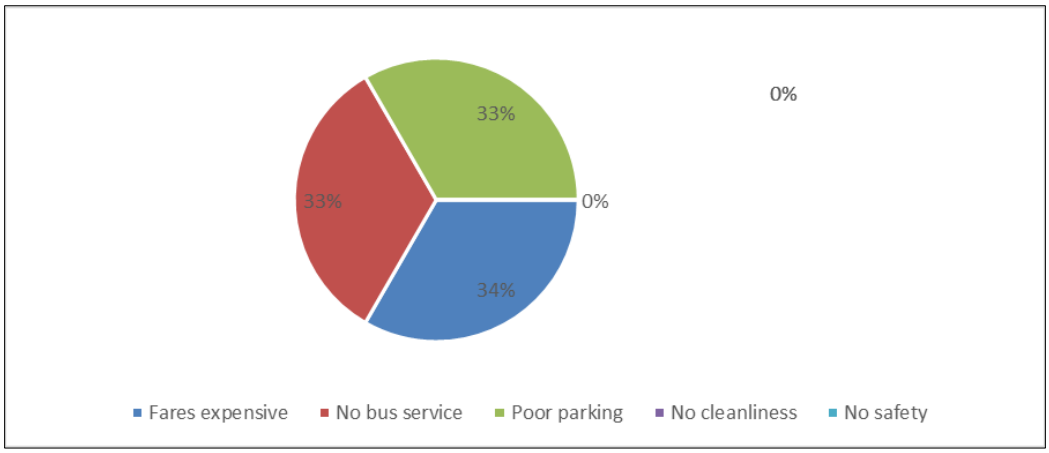

Figure 23 Opinion about public transportation from North-Central Nigeria respondents

Figure 13 – 22 demonstrates that majority from each of the three zones have never participated in travel survey before, respondents prefer car/taxi on weekly basis, though a lot of respondents are not car owners nor have access to cars. All the same North-central dweller paid with cash as well as use public transport daily, with tri/motorcycle as the alternative transport mode so as afford traffic jam.

Also from Table 2 and Figure 23 opinion about public transportation system, majority testify that fare is too costly, deficient bus service and inaccessibility or costly parking space, whereas safety and cleanliness is zero percent which is in agreement with paper work by [2,6-8].

3.6 Multivariance analysis

3.6.1 Descriptive statistics

The statistics formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are shown in Table 3 & 4 and graphically indicated in Figure 24.

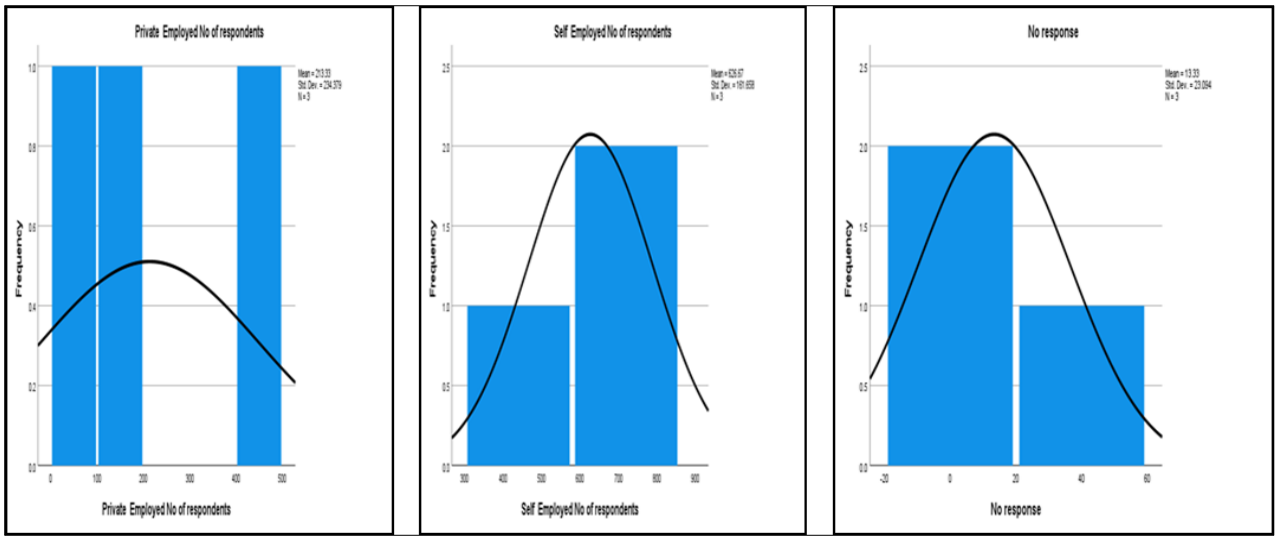

Figure 24 Private employed, self-employed and no response

Result Table 3 and 4, which was represented graphically in Figure 24, displayed that self-employed has the extreme mean (626.67 respondents), then students (226.67 respondents), while no response is the lowest with value at (13.33 respondents). Similarly, students have the maximum Standard deviation (294.845 respondents). It was seconded by private employed (234.379 respondents), while no response have the least value of (23.094 respondents).

Table 3 Descriptive statistics of North-central Nigeria respondents

North--central	Statistic values							
	N	Minimum	Maxmum	Sum	Mean	Std Deviation	Variance	Skewness
Student	3	0	560	680	226.67	294.845	86933.33	1.415
Government Employed		0	80	80	46.188	46.188	2133.33	1.732
Private Employed		40	480	640	234.379	234.379	54933.33	1.508
Self Employed		440	720	1880	161.658	161.658	26133.33	1.732
Unemployed		0	240	280	128.582	128.582	16533.33	1.545
No response		0	40	40	23.094	23.094	533.33	1.732

Table 4 Frequency of North-central Nigeria respondents

Frequency	Student		Government Employed	Private Employed	Self Employed	Unemployed	No response
	Respondents numbers						
Std. Deviation		294.845	46.188	234.379	161.658	128.582	23.094
Variance		86933.33	2138.33	54933.33	26133.33	16533.33	533.33
Skewness		1.415	1.732	1.508	-1.732	1.545	1792
Std. Error of Skewness		1.225	1.225	1.225	1.225	1.225	1225
Minimum		0	0	40	440	0	0
Maximum		560	80	480	720	240	40
Percentiles	25	0	0	40	440	0	0
	50	120	0	120	720	40	0

3.6.2 Regression and CorrelationAnalysis

The linear and multiple regression formed using the three regions Questionnaire that were dispensed to four hundred travellers selected randomly making total of 1200 respondents are shown in Table 5 & 6 and graphically represented in Figure 25.

Table 5 Power Analysis - Linear Regression

Power Analysis Table					
		Test Assumptions			
	Power[b]	N	Std. Dev.	Effect Size	Sig.
Test for Mean[a]	.212	10	294	0.408	0.05

a. Two-sided test; b. Based on non-central t-distribution.

Table 6 Bayes Factor inference on pairwise correlations

	Baves Factor inference on Pairwise Correlations						
Student		**Student**	**Government Employed**	**Private Employed**	**Self Employed**	**Unemployed**	**No Response**
		Number of Correspondent					
	Pearson Correlation	1	0.679	-0.783	-0.979	-0.162	0.979
	Baves Factor	0	0.543	1.461	0.545	2.630	0.545
Government Employed	Pearson Correlation	0.979	1	-0.640	-1.00	-0.369	1.00
	Baves Factor	0.546	0	1.884	0	2.435	0
Private Employed	Pearson Correlation	-0.783	-0.640	1	0.640	-0.487	-0.640
	Baves Factor	1.461	-1.884	0	1.884	2.227	1.884
Self Employed	Pearson Correlation	-0.979	-1.00	0.640	1	0.359	-1.00
	Baves Factor	0.545	0	1884	0	2435	0
Unemployed	Pearson Correlation	-0.182	-0.359	-0.487	0.369	1	-0.359
	Baves Factor	2.630	2.435	2.227	2.435	0	2.435
No response	Pearson Correlation	0.979	1.0	-0.640	-1.0	0.359	1
	Baves Factor	0.546	0	1.884	0	2.435	0

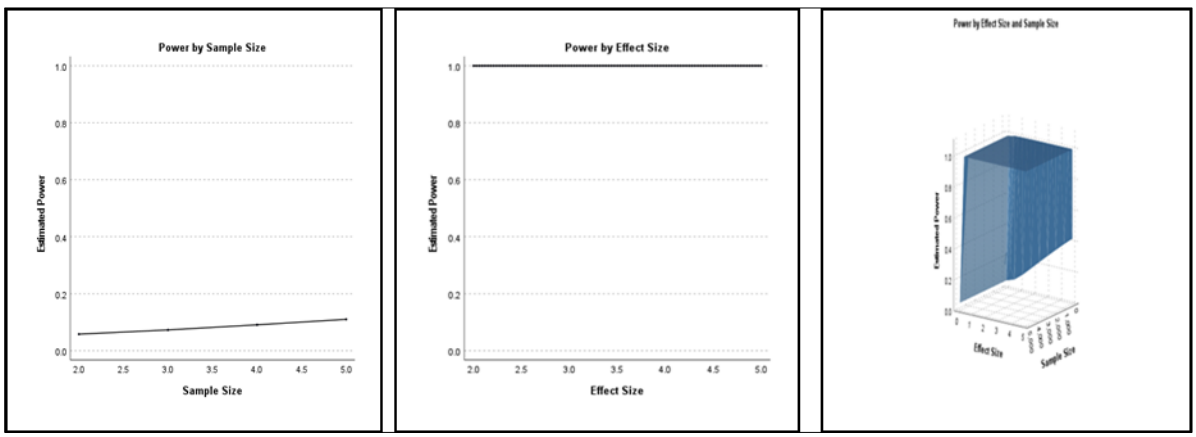

Figure 25 Multiple partial correlation coefficient and sample size by North-Central Nigeria respondents

Result from Table 5 & 6 which was graphically represented in Figure 25 achieved via power analysis two side test, which was based on non-central t-distribution techniques. Showed standard deviation of 294 respondents with 408 sample

size and less than one significant level. Students / Government employed respondents correlated with mode of 0.98, and mean of 0.783, whereas no response has lowest connectivity level with mode and mean values of -0.276 and -0.070 respectively.

4. Conclusion

This study examined public transportation system and passenger perspectives in North-central, Nigeria. Demographic information of the three regions showsthat female travellers are more than men travellers, Self-employed travellers has the highest, between 25 and 40 years travelled most, Christian travellers are more than other religions, while travellers with at least degree certificate travelled most and the highest income is below minimum wage. Also, these results specify that profession, age and education level of the populace regulate travel management. Though, majority are from other tribe or state within Nigeria and disable people hardly travel. On the other hand from the opinion about public transportation system, majority testify that fare is too costly, deficient bus service and inaccessibility or costly parking space, whereas safety and cleanliness is zero percent. Conclusively, standard deviation results displays 294 respondents with 408 sample size and less than one significant level. Students / Government employed respondents correlated with mode of 0.98, and mean of 0.783, whereas no response has tiniest connectivity level with mode and mean values of -0.276 and -0.070 respectively.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declares that there is no conflict of interest in their research study

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