

The future of intra city motor transport in Abuja, the federal capital territory of Nigeria

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Abstract

Every human activity that demands movement is predicated on transport. Its supply depicts a fairly rigid framework on which very flexible sub systems depend. Building without speculating for its future expansion is an invitation to chaos for Nigeria, the most populous black nation in the world. Abuja, the federal capital, is only 13 years old. The city CBD is serviced by a grid road network. The zone services commuters from the satellite neighbourhoods located radially within a range of 3–80km. Entry and exit points of the city are basically dual carriageways which receive free and fast flowing traffic from several other dual carriageways. Within the city centre, peak periods are characterised by stagnant jams while the linkage access roads observe as many as 60–100 vehicles per minute at any given point. Centroids are used to evaluate travel time and distance which vary from zone to zone. This method is effective in compensating for minor differences in distances travelled by residents within the same neighbourhoods. The bulk of traffic is of car owner status. Origin (source) – destination matrices are established to confirm the volume and direction of flow.

The city transport system lacks inter modal integration. It is characterised by physical engineering weaknesses and journey hazards, which increase the cost and time of travel. Absence of mass transit operations account for greater congestion especially at peak hour periods. These occur twice a day.

Keywords: framework, rigid, chaos, grid, commuters, satellite, neighbourhoods, radially, centrifugally, centroids, matrix, components, ring road, peripheral.



1 Introduction

Abuja is a fast growing modern city created on a deliberate policy aimed at achieving an organised ecosystem, programmed development, maximum and efficient utilization of physical space, aesthetic image, geographic centrality and effective environmental management. Since its status of operation as a federal capital began, several opportunities have opened up whose efficiency is linked up to the state of transportation development.

Tiry [2] retorts that there is a positive correlation between the spread of transportation infrastructure and urban development. Remarkably, the grid road network in Abuja creates an impressive aesthetic value.

However, as an emerging city, the growing land uses give rise to varying travel patterns, which take place on the same traffic channels. There is a high mix of construction services in the central city district. These and associated activities tend to create a traffic sector conflict in what was designed to service office accommodation, utility services institutions, and organised light residences.

The heavy residential settlements were designed as satellite commuter zones radially located around the municipality and serviced by access roads which empty into a ring road between the city hub and the peripheral settlements.

The major components of urban transport in Abuja shows an annual increase of vehicle registration. These increasing vehicular units continue to operate on the fixed infrastructure.

In the year 2001, the figure of registered vehicles over 2000 is 22,081. In the year 2002, there was an annual increase of 6,553 vehicles above the preceding year. The annual vehicle registration values are as follows:

January to December 2000	-	15,788
January to December 2001	-	37,873
January to December 2002	-	44,426

The statistics suggest increasing pressure in the sector.

2 Methodology

Questionnaires, personal interviews and personal assessments were used to get necessary data. Public/government workers and some public corporations and construction staff whose offices are located within the central business zone of the city constituted the threshold population on whom questionnaires were served. The rationale is justified by their consistency in committing to work daily.

The questionnaire sought information from each respondent on residence, office location, travel time, daily commuter cost, and type/mode of transportation to work.

Distances from the different residential neighbourhoods to the various office locations of respondents were determined by the researcher using an auto car speedometer. Research support staff were also engaged to assess the volume of traffic inflow to the city business district. Individual vehicular unit counts were

undertaken at the entry points of the various access roads. This exercise was carried out in the range of the morning peak hour periods of 6.30 am and 10.30 am. The Motor Traffic Division and the Federal Road Safety Corps Commands of the Ministry of Federal Capital Territory were formally contacted for information on the annual motor vehicle registration from 2000 to 2003. Also received were the categorisation of such registrations into public (commercial) and private.

Centroids are nodal locations taken in each settlement from where passengers centrally wait for and join public transport. These centres are easy to identify due to the linear arrangement of most of the settlements.

Within the city metropolis and its peripheries, the radial distances of points from the circular ring road within which the offices are located and the office locations are recorded as intra city travel distances of residents from neighbourhoods.

Notably in each satellite commuter neighbourhood the expanse area of land occupation runs through a diameter of between 2kms and 5kms. The distances from such neighbourhoods are determined on the basis of centroids (most central location to the nearest kilometre).

The information gathered helped the researcher to determine average travel time, distances, travel costs etc. Radial distances are used to determine distances within the same neighbourhoods. Only neighbourhoods from where respondents are drawn are listed.

3 Synopses

There are two periods of high peak traffic flow in each work day. These periods are during journeys to and from work by commuters. In the hours of peak traffic flow normally between 7am and 9.30am to 10.30am along some routes and 4.30pm and 8.30pm, traffic is characterised by:

- Congestion along the major routes of flow.
- Breaking of traffic regulations.
- High volume of motorcycle flow within the city routes.
- Longer travel times etc.

In between these two periods, there is a period of low peak traffic flow within the city. This is associated with picking of children from school and daily recreation period for workers. This is between 1pm and 3pm.

The transport character of the city at this time is usually marked with congestion at roundabouts (otherwise intended to be traffic breakers), people trekking long distances and minor city accidents.

4 Characteristics

The character of transportation in Abuja and its feeder commuter settlements has the following attributes – (1) grid road network design (2) average intra city road width of about 3-4 meters (3) numerous junction points with even narrower access inlets to service neighbourhoods (4) absence of pedestrian walkways (5)



absence of concrete road embankments bounded by laterite surfaces (6) poor quality of construction (7) efficient and functional traffic control lighting system (8) rapid vehicular pile up at short intervals of obstruction (9) use of two wheeled mode of commercial motorcycle transport (10) high potterage level within the city neighbourhoods (11) poor drain channel for drainage collection in a tropical environment (12) unregulated vehicle vessel selection for the fragile road surfaces (13) gross inadequacy of parking/service spaces resulting in road side parking.

5 Indices of assessment

Time, cost and distance are the basic indices of assessing the efficacy of motor transport in Abuja. The radial location commuter zones around the city metropolis impose journey routes on commuters on the basis of which settlement a commuter resides in.

Indeed, there are five inroads for all journeys into the city. Each of these roads conveys commuters from the linear settlements along its access. See the grouping.

Table 1: Service roads for commuters.

Road/Route	settlements	(%)
Keffi/Nyanya	Nyanya, Karu Mararaba, Ado, Jukwoyi, Masaka	30.6
Gwagwalada Airport	Lugbe, Gwagwalada, Kuje, Chika	10.7
Kubwa/Suleja	Kubwa, Dutse, Bwari, Deidei, Suleja, Zuba	26.49
Mabushi/Kado	Gwarinpa, Kado, Mabushi	6.6
Jabi	Jabi, Karimu, Wupa	7.7

5.1 Travel time

The mean travel time for commuters in Abuja is 70.7 minutes (1 hour 10 minutes).

The road along Jabi/Karimu maintains the highest mean travel time of 68 minutes while commuters within the municipality record 21.38 minutes. Within this range, the Kubwa road has 66.36 minutes; Keffi/Nyanya road has 52.57 minutes, while Gwagwalada/airport road and Mabushi/Kado road have 46.09 and 29.15 minutes respectively.

5.2 Travel cost

Daily average travel cost of commuters is N190.3. The cost is assessed in groups on the route used by a set of people. The Kubwa road conveys 26.5% of commuters.

Table 2: Aspects of journeys.

s/no	Route	Volume of passengers	Mean travel time	Mean travel cost (N)
1	Keffi/Nyanya	30.6%	52.57 mins	182
2	Kubwa/Suleja	26.5%	66.36 mins	220.17
3	City neighbourhoods	17.9%	21.38 mins	159
4	Gwagalada/Airport	10.7%	46.09 mins	231.90
5	Karimu/Jabi	7.7%	68.00 mins	212.63
6	Mabushi/Kado	6.6%	29.15 mins	183.3

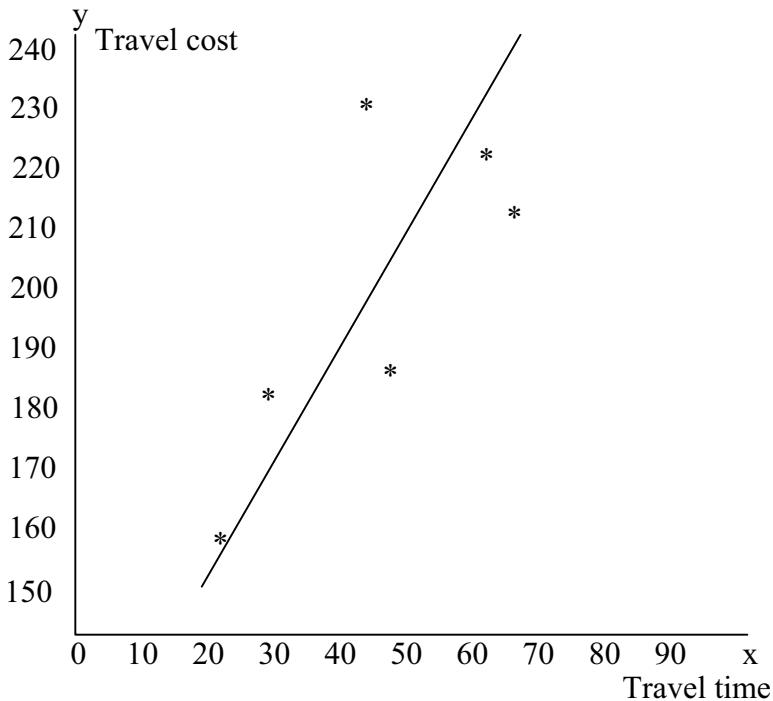


Figure 1: Scatter diagram of travel time and travel cost relationship.

Commuters from the Municipality's peripheries and the CBD neighbourhoods account for 17.88%. They are residents of Garki, Wuse, Central Area, Asokoro, Apo, Maitama, Durumi, Mpape, Wuye.

At this average daily journey cost of transport, the Abuja commuter spends about N4,186.6 (four thousand one hundred and eighty six Naira, six kobo) for the 22 working days in a month. This amount accounts for 55.8% of the lowest monthly income earning public servant at N7, 500.

5.3 Travel distance

Travel distances vary from about 6km to about 50km and sometimes 80km for commuters operating within the city centre neighbourhoods and the satellite

settlements respectively. In general, the mean travel distance to and from work is 21.6km per day.

Table 3: Origin (source) – destination travel matrix by percentages.

From – To	Maitama	Wuse	Central Area	Garki	%
Karimu	33.3	27.8	-	38.9	100
Nyanya	42.4	27.3	3	27.3	100
Kubwa	37.8	24.4	20.	17.8	100
Suleja	30.8	38.5	7.7	23	100
Gwarinpa	45.5	36.4	-	18.2	100
Jukwoyi	25	50	-	25	100
Garki	25	33.3	12.5	29.2	100
Lugbe	17.6	41.2	11.8	29.4	100
Kuchingoro	50	-	-	50	100
Wuse	13.3	53.3	13.3	20	100
Mararaba	30.3	51.5	3	15.2	100
Central Area	-	-	100	-	100
Asokoro	25	12.5	12.5	50	100
Apo	-	-	100	-	100
Karu	38.9	22.2	5.6	33.3	100
Jabi	75	-	25	-	100
Deidei	15.4	7.7	-	76.9	100
Pyakassa	-	100	-	-	100
Karshi	-	100	-	-	100
Mabushi	100	-	-	-	100
Ado	-	100	-	-	100
Wuyep	75	25	-	-	100
Maitama	-	-	-	100	100
Bwari	50	33.3	-	16.7	100
Durumi	-	-	-	100	100
Kuje	-	-	-	100	100
Zuba	-	-	-	100	100
Kado	50	50	-	-	100
Dutse	50	50	-	-	100
Mpape	50	50	-	-	100
Wupa	-	100	-	-	100
Masaka	25	50	-	25	100
Gwagwalada	50	-	-	50	100

6 Modal integration

Majority of the commuters from the satellite service zones use motorized complements such as buses, taxi, private cars etc, for direct distance journeys.



Motorcycles constitute an important form of transport service provider for doorstep transport of commuters. None motorized, person powered means of transport such as bicycles are virtually absent.

7 Mode of transportation

Persons who make use of public/commercial transport account for 64.6%, private cars/staff buses – 29.8%, motor cycles – 4.9% and potterage – 0.7%.

8 Passenger destination collection

The bulk of the commuters and their journeys in Maitama (the secretariat of the Federal Government Ministries) receiving 32.8%, Wuse (32.1%), Garki (26.9%) while the Central Area receives 8.2%.

9 Traffic flow intensity

Through the physical count of units of vehicles, the total average intensity of flow per minute is 78 units.

However, the peak is observed on Kubwa/Suleja route which records 130 units per minute, while Gwagwalada/Airport road has 126 units per minute. On Mabushi road, the intensity records 46 units per minute, Jabi road has 64 vehicles per minute while Keffi/Nyanya road records 45 vehicles per minute.

10 Conclusion

The rate of city growth is faster than its infrastructural development response. The growth is prominent in the area of immigration, which exerts more pressure on the transport facilities. Given the narrowness of access roads and the intra city network channels, characterised by lack of pavements, and no expansion programmes, the picture of impending conflict in the sector is imminent. In the ongoing trend, which has serious vehicular units increase and increasing city population there is need for practical steps at addressing the situation. Such steps must include:

- Functional operation of mass transit system for intra city commuting.
- Initiation of metro line project.
- Development of access by-passes to link up emerging neighbourhoods and absorb the resulting pressure from developing sprawls.
- Evolution of inter modal integration.

However, the heavy financial demands in an economy of competing sector needs for the lean available resources do not spell high hope.

It is incidental that what was a well thought and articulated plan to secure a new federal capital territory, devoid of human and infrastructural stress is running out of the provisional capacities for absorbing the unexpected growth rate of motor transport demands. The sorry state of this situation is that the city

is only in the second phase of the master plan development. The Lagos city traffic situation is bound to showcase earlier than imagined under the existing trend.

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