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# BUS RAPID TRANSIT AND THE OPPORTUNITIES AND CHALLENGES OF SUSTAINABLE URBAN TRANSPORTATION IN METROPOLITAN KANO, NIGERIA

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## ABSTRACT

Kano metropolitan area is witnessing increasing population growth with transportation problems that has continued to pose serious mobility crisis of ever-increasing congestions on her roads. With growing inadequacy of public transport services, benefits of efficient planning for sustainable transportation system for a city like Kano cannot be overemphasized. This research assessed the likely challenges and opportunities of proposed Bus Rapid Transit Operations in Kano Metropolis. Through quantitative data survey and analysis, the study revealed that Kano metropolis public transport are commonly used by the low-income city residents and often fall short of demands. Although, the Kano State Road Traffic Agency (KAROTA) has been managing traffic problems in the metropolis, introducing BRT can further accelerate successful realization of the goals of 21st urban transport services that can become model for similar cities in Nigeria and beyond. Even though Kano is ancient city, it is anticipated that there would be little challenges in the introduction, building and operations of the proposed BRT in regards to structural construction and similar road expansion exercise. Generally low-income level of the city residents and the equally low revenue base of the state are also issues that, although, important but, can hardly derail the present and future prospects of the project. We concluded that, just as the pre-colonial Trans-Sahara trades and the 20th century north-south movements were aided by camels and trains for the city of Kano, this same ancient city is yet on the verge of receiving another veritable impetus of urban and regional economic development in this 21st century of urbanization through the BRT.

**KEY WORDS** BRT, economic growth, Kano, urban management, urban traffic congestion

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## 1. INTRODUCTION

The need for efficient urban transport has evolved as more population demands provision of more facilities and increasing innovations in the transport sector. This has brought about huge investment in transportation infrastructure in urban areas across the world with the creation, innovation and advancement of automobile and other forms of urban transportation relatively helped in shaping and recreating the settings of cities across the world. As the movement of people, goods and services from one location to the other through different means, transportation has been described as the engine room of growth of any environment be it city, town or village (Bolade, 2015). There is no escape from transport because it goes far beyond the movement of goods and people from a particular location to another, it also influences how people live, how they spend and enjoy their free time and run day-to-day activities in and around the city (Oyesiku, 2001, 2003). Due to population explosion in many urban settlements, urban traffic control has further become a daunting challenge. According to the Joint Transport Research Centre of the Organisation for Economic Cooperation and Development (OECD, 2007) and the European Conference of Ministers of Transport (ECMT, 1953), cities and traffic have developed hand-in-hand since the earliest large human settlements. The same forces that draw inhabitants to congregate in large urban areas also leads to sometimes intolerable levels of traffic congestion on urban streets (Oyesiku, 1995, 2003), with journey times within these towns becoming unreliable and residents forced to face disturbing inconveniences in transportation (Rodriquez & Targa, 2004).

The contributions of road transportation to environmental degradation in cities of Nigeria has been highlighted by Onokala (2001), as the problem is no longer limited to traditional cities (Ogunsanya, 2002), virtually every city in Nigeria today faces the problem of traffic congestion (Muktari & Kawu, 2013). As urban traffic congestion continues to evolve with different causes (Ukpata & Etika, 2012), thriving cities are expected to develop veritable transportation network that has little or no stress for the residents (Olufemi & Oluseyi, 2007; Rodríguez & Targa, 2004). This is can help avoid loss of resources resulting from transport bottleneck, and can reposition the city economy to having efficient transport network capable of ensuring effective and sustainable movement of people, goods and services.

Urban centres across the world have advantage of economy of scale having growing effects on the need for efficient movement that reduces undue hindrance to smooth flow of traffic. Presently, transport systems in metropolis like Kano (Okunola *et. al*. 2012; Ukpata & Etika, 2012) are faced with inherent problems like congestion, poor maintenance of existing road facilities, poor driving habits, inadequate road capacity, and lack of facilities that have further aggravating levels of road traffic congestions, losses of lives, property and travel time. The ever-pressing need for improvement on urban transport facilities and infrastructure has warranted the introduction of BRT for novelty in achieving sustainable urban mobility in these and similar cities; to help identify opportunities and challenges of providing solutions to the sector and other dependant sub-sectors of the larger urban economy. However, in order to achieve success of the scheme, there is the need for assessment, amongst others, the state of the present public transport facilities available to the residents. This can help in highlighting the problems of public transport services, the other possible challenges and opportunities of BRT services in Kano and similar regional capitals in west African economic sub-region.

Works have shown that access to public transport can be measured in terms of ease of entrance (Tanner, Vann, and Kizilova 2020; Cope and Lee 2016), economic access or affordability of fares (Vuchic 2005; Cartwright et al. 2018; Valencia et al. 2019) and access by all including persons with disabilities (Bizzego, Lim, Schiavon, & Esposito, 2020; Hollomotz, 2021; Wolbring, Mackay, Rybchinski, & Noga, 2013; Litman, 2012). Although, the major goal of public transport management is to reduce dependence on private car and increase use of a more environmentally sustainable transport (Rodríguez & Targa, 2004)., such systems need to be evaluated to support efficiency, safety, mobility, economic growth, protection of the natural environment (Adeniji, 1983, Oyesiku, 1995, 2001, 2003). And with the increasing dependence on city transit; the present age of urban century can achieve more by ascertaining opportunities and the likely hindrances to this main element of physical communication in this time of widespread urban mobility crisis.

## 2. THE EMERGENCE OF BUS RAPID TRANSIT IN METROPOLITAN KANO

### 2.1. THE PECULIAR CASE OF KANO

Kano Metropolis in northern Nigeria is located on 120001N 80311E in the Sahelian region of west Africa, south of the Sahara. As a major commercial nerve centre of the region, Kano also serve as a link to many surrounding cities and regions covering about 500km2 (193 and spanning eight (8) Local Government Areas (third tier of regional sub-divisions in Federal Republic of Nigeria). The historic urban centre is also home to over four million (4,000,000) residents (NPC, 2016; Yusuf, 2019) mostly Hausa language speakers as the capital of the ancient Kano Emirate founded over 2,000 years ago (Hassan, 1990; Salisu, 2012; Yunusa, 2015; Prasad, Gray, Ross, & Kano, 2016). Kano metropolis has a tropical savanna climate with about 980mm (38.6in) average annual precipitation occurring mostly from June through September and typically hot throughout the year (Barau et al. 2015). However, from December through February, the city is noticeably cooler due to the effects of the dry and

dusty north-eastern harmattan winds. The warmest month of the year is April with average temperature of 30.90C while January is usually the coldest month with the temperature averaging 21.50C (Bird, 1961; Yahaya, 1988).

Kano is fast growing and housing millions of inhabitants that are daily requiring a form of mobility that is available and sustainable (Hassan, 2016). The dualization of main roads, introduction of flyovers, use of traffic control devices and the strengthening of indigenous traffic warders (KAROTA) and the nation's Federal Road Safety Corps (Ahmad, Afolabi, Nda, & Daura, 2018) are unable to fully address the mobility crisis in Kano (Yusuf, Adamu, Babanyara, Yahaya, & Kawu, 2021; Yusuf, 2019). See figure I.

**Figure I: Commercial Tricycles at a congested Kwari Market (CBD), Kano**


*Source: Fieldwork, August 2019*

The choice of BRT as a roadway system becomes inevitable (Badejo, 1990, 2014). BRT in Kano will be the first of its kind in Northern Nigeria, and about the only option for easy urban mobility, access, delivery of goods and services (Oyesiku, 2003). According to Mobereola (2009), Lagos BRT's cost of delivery is very low when compared to other BRT projects in other parts of the world but yet proving its difference in the effective transportation delivery of the city.

While many works have highlighted types (Mabogunje 2008, 2021), products (Singh, 2016) and problems (Oyesiku, 2001, 2003; Hall, 2007; Olesen, 2019; Patel, Saluja, & Kapadia, 2018) of urban transportation; studies on emergent solutions to mounting problems of accessibility in this urban century like the BRT are not only scarce but outside the purview of assessing possible potentials and threats in a developing economy like that of Nigeria. Only by this assessment can urban authorities and other stakeholders be well informed with the knowledge of eminent possibilities and diverse alternative solutions. For example, Hari, et al (2011), found that the BRT in Cape Town, South Africa; was not initially clearly beneficial to the urban poor in the area of service levels improvement. Similarly, Mobereola (2009) have shown that Lagos BRT passengers have attested to unhindered access to safer, timelier, and cheaper services; this has yet to be highlight vis-à-vis other possible beneficial effects on the people of similar metropolis. It has been emphasized that inputs from different socio-economic groups in planning and implementation no doubt will enhance equal access and efficiency in transport services and prevent waste and total collapse of public investment (Legacy, 2016; Olesen, 2019; Radulescu, Ovidiu, Radulescu, Radulescu, & Radulescu, 2016; Tong et al., 2015).

## 2.2. URBAN TRANSPORTATION AND THE CONCEPT OF MOBILITY

The Bus Rapid Transit (BRT) is a system that can help achieve mass movement of people as it relies on the use of dedicated free lines to ensure fast and reliable bus travel. The Lagos BRT- Lite system, for example (Africa's first Rapid Bus Transit Scheme), took examples of Bogota, Columbia and Curtiba in Brazil but took cognisance of the African context and launched to achieve efficient service delivery through - high frequency, speed, occupation, safety, low emissions and low cost (LAMATA, 2008). With virtually all these achieved, the marketing campaign for BRT has helped to detach itself from the common stigma of dirty, bumpy buses and is beginning to pay off with increases in ridership particularly in Lagos Metropolis (Mobereola, 2009). This success has made it recommendable for Kano city – the second largest metropolitan and commercial centre in the country and west African sub-region where commuters are continuously facing challenges in using public transport (Adetoro et al, 2018). For the city to achieve and maintain efficiency, the fast-growing metropolitan region needs a transportation system that is efficient, affordable and demand responsive to enhance her current social and economic status and development.

Urban mobility is known to play important role in achieving growth and economic competitiveness of human settlements. As a concept, mobility is closely related to the concept of accessibility which is the extent of movement with which persons can get to a particular destination through proper planning (Oni, 2009). The concept includes travel to one's desired places and people, access economic and social gains possible, psychological benefits of movement, and, participation in local communities (Muili, 2005, 2013). These differentiates the concept of mobility from that of access which is the capability and opportunity to gain detailed knowledge or having an opportunity to information, material or resources of something. Hence, there is no access if an authority

or a physical, technical or procedural measure prevents a person from obtaining knowledge. In the realm of access to public transport, the concepts of access and that of mobility implies that all urban residents are provided with the opportunity to attain the highest reachable mobility status across all urban sub-groups (Vide, Kemi, Olusegun & Joyce, 2014). This obliterates any systematic disadvantage to persons or group of persons in their ability to reach market, work, recreational, or other destinations due to their income level, employment status, geographical location and physical disability (Litman, 2012; Muktari & Kawu, 2013).

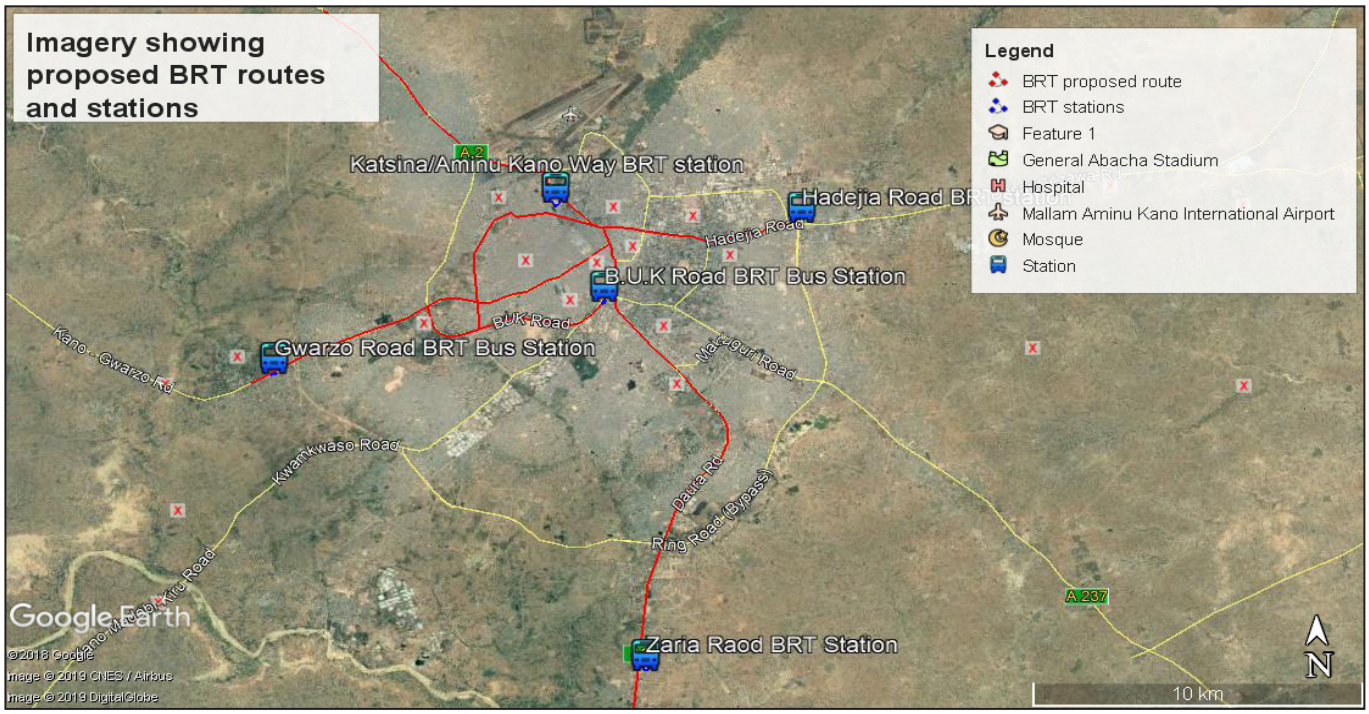
A fall out of these concepts is the issue of Urban mobility stress seen as the sum total of all non-specific biological phenomena elicited by adverse external influences (Odufuwa, 2006); and further expressed as undue subjection of public transport infrastructure users to psychological, emotional and physical experiences (Filani, 1988; Fagbemi, 1989; Humphrey, 1992; Blumgart, 2017). Hence, mobility stress is an inevitable scene for both poor and non-poor in cities of developing countries like Nigeria as it spares none (Tanimowo, 1997, 200 & 2005). Thus, the need for appropriate planning, design and management of sustainable BRT system in large cities in Nigeria (Vide et al, 2014), and inevitably calls for incisive analysis of the propensity of people to making intra-urban journeys, nature of the intra-urban trips made in relation to the mass of different urban zones (Tanimowo, 2005) in order to help in arriving at a feasible and sustainable BRT system planning and management (Filani, 2005).

## 3. EMPIRICAL EVIDENCE

### 3.1. DESCRIPTION OF THE DATA

The study essentially relied on primary and secondary data through: physical observations, questionnaire administration, oral interviews and the use of satellite imageries on the available major public transit nodes (major destinations and bus stops) as focal points for the realization of the research objectives. Through the use of public transits to the proposed BRT routes, the research team were able to observe travel behaviours, traffic problems, passengers and drivers' relationships, available road infrastructure for detailed primary data acquisition. The sample frame for this study comprises of nine (9) earmarked or possible BRT routes; Zaria, Katsina, Gwarzo, Hadejia, B.U.K., Maiduguri, Ibrahim Taiwo, Tudun Wada/Airport roads, and finally Aminu Kano Way (Figure II). Using Three Hundred and Sixty (360) structured questionnaires at seventy-two (72) randomly sampled Bus stops out of the existing 278 (one out of every four) along the listed routes for commuters; and, oral interview conducted for staff of the government agencies like KAROTA and KNUPDA that are in charge of the proposed development.

**Figure II: Routes and stations of the proposed Kano BRT**

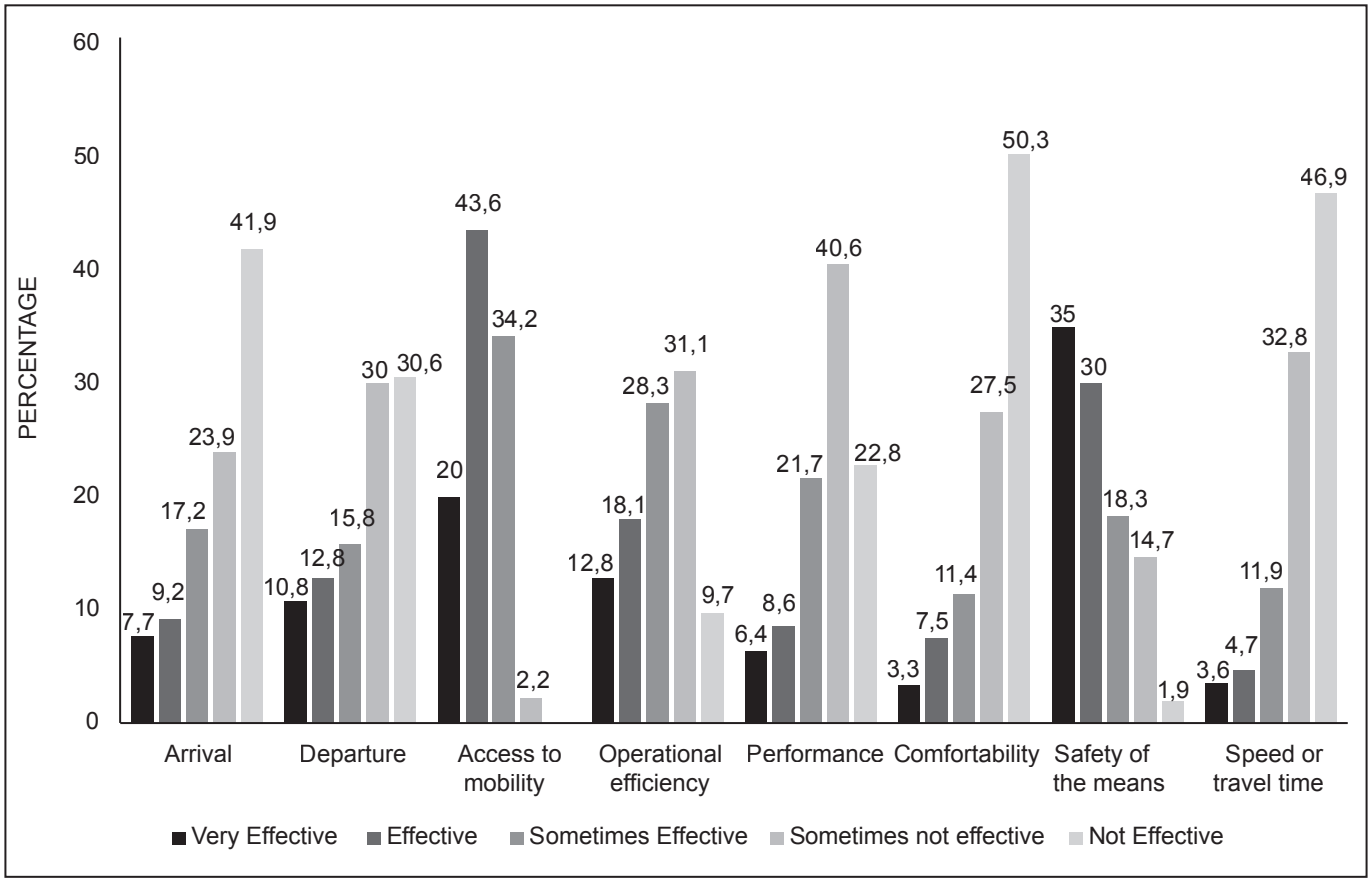



*Source: Google Earth & KNUPDA, 2019*

## 3.2. EXISTING PUBLIC TRANSPORT SERVICES IN KANO METROPOLIS

Field assessment shows that most of the commuters are adults aged 18-40 years (51.7%), the under 18 years accounted for only 3.6% with 65.6% married while only 31.1% are single. Secondary school is the highest form of education obtained by over 49% while those with only primary school accounted for about 26.9% and tertiary education was less than one-fifths (18.6%). More than half are self-employed (53.3%) with civil servants in the federal, state and local government agencies accounting for another 31.4%. However, there is high percentage of low-income earners as the majority earns between N5,000 – N20,000 monthly (52.5%) and only about one-fifths (19.2%) earn above N30,000 with the majority (54.4%) having lived in Kano for above 20 years. Most of the commuters (over 80%) do not own a personal means of transportation and had to rely on public transport for the movement of goods and services making commercial buses (45%) the commonest public transportation followed by tricycles (32%), taxis (18.9%) and 13.3% uses government public transport. Overs 60.8 % of these commuters have their places of work farther than 2km to their places of residence and 4.7% live within less than 500m. According to spatial spread, about half (51.9%.) of the public transport users live and work in wards and residential areas within the inner Kano (Kano CBD), the periphery areas accounted for 26.4% and those working outside Kano metropolis constituted only 2.2%. Again, over 66% users of public transport spend over 50 minutes in transiting from home to work. Presently, commuters waste time before they could access public transport or depart after boarding (58.3%) and mostly arrive their destination late behind normal schedule time (41.9%). Generally, operational efficiency, comfort and safety of the presently available means of urban public transport are rated very low just as speed or travel times was rated ineffective (Figure III).

**Figure III: Effectiveness of Available Public Transport means**




*Source: Fieldwork, August 2019*

### 3.2.1. PROBLEMS OF PUBLIC TRANSPORT IN KANO METROPOLIS

Besides the unfortunate incidence of road traffic congestions, urban public transport in Kano is faced with the problems of inexperienced drivers, overloading of the vehicles, insecurity, poor night lighting due to the erratic performance of street lighting systems, the extortion of motorist by Road Transport Workers and the law enforcement agents, poor and inadequate motor parks, poor and lack of road signs. These incidents often lead to unhealthy competition between vehicular movement and pedestrians and sometimes involving confrontations with heavy duty vehicles. Apparent shortage of trained man-power and personnel for effective vehicular operations and maintenance have further exacerbated the problems. Hence, avoidable traffic congestion

is still a serious and growing menace (Figure VI) despite the presence and continued operations of the most impactful traffic regulatory agencies in Kano metropolis, that is, Kano State Road Traffic Agency (KAROTA), Police Traffic Warders, and the Vehicle Inspection Officers (VIOs).

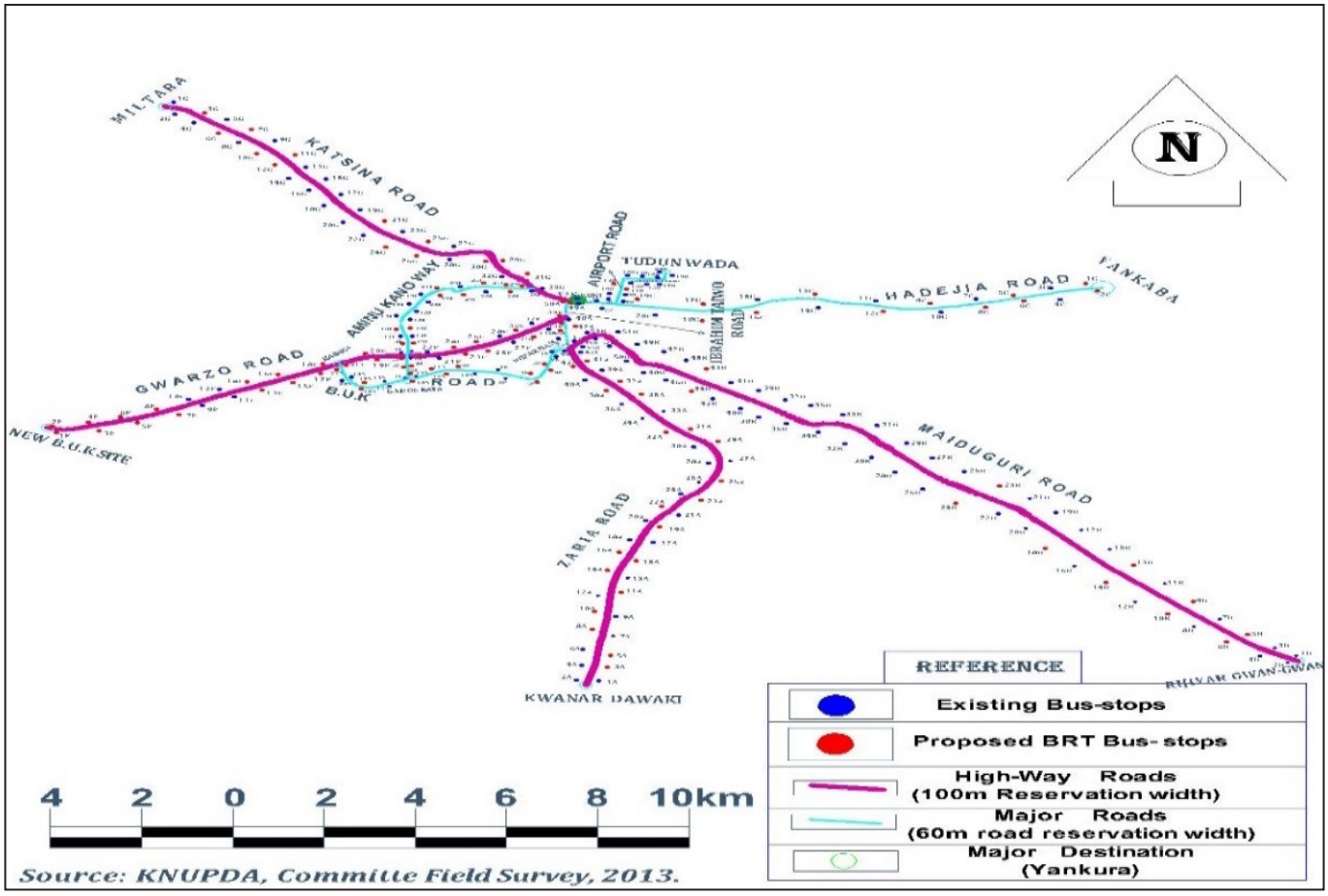
**Figure VI: Pedestrian and vehicular traffic congestion in Kano**


*Source: Fieldwork, August 2019*

### 3.3. BIRTH OF THE BRT

Kano State Road Traffic Agency (KAROTA) was created in restore order in road usage motorists and other road users; and the attention of new comers to the state capital is usually drawn to the group of youths in yellow uniforms - officials of KAROTA. The Agency is guided by section 17(2) of 1999 State's constitutions and KAROTA Laws. These legal instruments specified that all physical development permits in the city must satisfy road reservation requirements before issuing approval (KNUPDA, 2012). Thus, all the proposed routes for BRT operations meet adequate road reservation width (at least 60m) (Obateru, 2003; KNUPDA, 2012, 2019) making the BRT operation feasible for implementation and provisions for BRT special lanes (Figure V). Kano State Urban Planning & Development Authority (KNUPDA) professionals in charge of the city and the State's physical planning development and management and KAROTA officials are totally in support of introducing BRT in Kano metropolis due to the large number of daily commuters and the growing number of existing less organized transportation operators.

**Figure V: Existing and proposed bus stops along proposed BRT Routes**




*Source: Fieldwork, August 2019*

### 3.3.1. SOLUTION TO URBAN TRAFFIC CONGESTION

Field interviews revealed that urban traffic agencies operating in metropolitan Kano have no doubt that the BRT operations will reduce several traffic problems presently creating and sustaining hindrances to free movement. The increasing road congestion will be eliminated as all the proposed BRT routes are highways and major roads that give clear access to the primary and secondary roads that depends on them. The BRT route are roads that also feeds the city as they attract larger traffic volumes on a daily basis, hence, having a faster and more reliable means will make journeys faster and safer besides other environmental and social benefits.

### 3.3.2. ELIMINATION OF UNWANTED BUS STOPS AND BUS PARKS

For a long time now, government and urban authorities have been battling the menace of illegal bus stops that continuously create and prolongs traffic hold ups in the city of Kano. The BRT has the advantage of arresting this trend as its accompanying facilities would provide much bigger and faster urban transit system with fewer bus stops and also serving as a linkage for other smaller primary and secondary road networks of the town. Presently, the proposed BRT bus stops at Hadejia and Airport roads will reduce the number of bus stops from 14 to 12 and 11 to 3 respectively. See Figure V.

### 3.3.3. INTER-CITY AND INTRA-CITY TRANSPORT AND COMMERCE

Besides being a solution to the persistent traffic problems that commuters encounter on daily basis, the proposed BRT routes are also linked to the Central Business District that housed business and activities magnets of the metropolis and beyond. As the routes were derived from the existing ones, the project will be more affordable to government and the people of the state as no demolition or compensation would be paid to any existing structure. Another aspect of the intercity linkage is the opening of more areas to BRT services to sections of the metropolis that were hitherto ill-served. For example, Gwarzo road presently have only 13 bus stops but, the proposed BRT has given the area 27 bus stops which is more than twice the present number of such facilities (Figure V).

#### 3.3.4. PEOPLE-AWAITED SOLUTION TO URBAN MOBILITY CRISIS

In addition to this, if constructed the BRT will reduce intra-city and intercity transport hitches like arrival and departure delays, needless congestions, air and noise pollutions, and unhealthy competition with pedestrians. These has made virtually all the major routes within the metropolis preferred by the sampled commuters with the proposed BRT routes and bus stops literally replacing the existing congestion causing taxes and bus parks. This is more of a clue to the fact that Kano citizens has been awaiting the introduction of BRT as the solution to the road traffic ills of the city (Figure V).

#### 3.3.5. CONTROL TO ILLEGAL URBAN COMMERCIAL TRANSPORT MEANS

The Kano urban authorities have long been trying to control the activities of the outlawed urban commercial transport operations like the use of commercial motorcycles, with limited success. Part of the reasons for the slow progress in this is the apparent lack of alternatives. However, with the coming of the BRT the awaited alternative would be made available albeit at cheaper rate. This will go a long way in arresting issues of road crime, kidnapping, avoidable road accidents and its attendant road rage, that necessitated the banning of commercial motorcycles and the likes in Kano and similar cities across the nation.

#### 3.3.6. BOOST TO THE CITY'S REVENUE SOURCES

Mass transport especially in large cities brings in large number of people from varying socioeconomic background. This can create and improve the opportunity for exchange of goods and services. With the BRT in a regional commercial hub like Kano, activities like advertisement using on-board and bus stop means of information dissemination about products and activities available to consumers. This can also be extended to other communication services like internet connectivity services that will all add to the city's needed revenue for urban management and sustainability.

#### 3.3.7. A CHECK TO INCESSANT CHARGES BY TRANSPORT OPERATORS

City-wide mass transit operations usually come with the advantage of uniform and fair charges for transportation services. The present method of bargaining with customers and users of taxes and buses often exposes residents to unfair pricing, intimidation and sometimes physical combat especially with aggrieved parties. BRT services does not only eliminate these practices, it also ensures accountability and fairness to both the owners and users of the urban public transport. This becomes advantageous more with the use of digital billing and payment systems that is completely without the exchange of cash money.

#### 3.3.8. INTRODUCTION OF WALKING HABIT FOR URBAN RESIDENTS

The BRT is likely to come along with appropriate distancing of bus stops and the elimination of unnecessary and unguided parking of vehicles along the major roads as is now the practice. This entails commuters would be encouraged to take short distance walk to board these public transport facilities and, in a way, exercising their bodies thereby keeping fit health-wise. This is in a way re-introducing walking as a form of urban activities that has been lost due to the unguided incursions of house-to-house urban transport services characteristic of the commercial motorcycles and the Keke-NAPEP.

### 3.4. POSSIBLE CHALLENGES OF INTRA-CITY BRT IN METROPOLITAN KANO

Interviews of the officials from agencies saddled with the responsibility of the proposed BRT projects (KNUPDA and KAROTA) revealed that the only likely drawbacks of BRT operations in the metropolis are economic, socio-cultural and technological; physical or environmental matters are not likely to constitute any challenge. The economic aspects of the constraints has to do with poverty or generally low income levels of the prospective commuters, possible financial constraints on the side of the government in the commencement and completion of the project on schedule; that might further bring in likely poor maintenance scenarios and the overall sustainability of the project. Technological, there seems to be lagging areas in terms of the present levels of adequate technology for the running and maintenance of the vehicles to be used, and the needed adjustments for the interjection of BRT lanes in order to ensure unhindered safety and security throughout the metropolis and beyond.

The socio-cultural issues like the people's culture and religion and even the high presence of pedestrian activities is not seen to be of any likely hurdle for the construction and running of the BRTs. Only low levels of English language literacy are likely to hinder some commuters from fully accessing and utilizing this proposed urban-wide mobility system. However, this poses no threat as the street (and the bus stops that usually bear the street names) will still bear their former names since the envisaged route expansion exercise will not change the street name. While undue political interference might likely occur because of change in government administration, as the people's project, every government of the people is likely to uphold and sustain this and similar laudable projects by the people of the State. However, these and similar issues to be well tackled, any exercise that might negatively touch on the people like the demolitions of all encroached buildings and structures on the road reservations, need to be handled with care particularly through participatory bottom-up approach of conflict resolution.

# 4. CONCLUSIONS

## 4.1. SUMMARY OF FINDINGS

The highlights of the existing public transport as the main means of urban mobility in the rapidly growing Kano metropolis with its attendant problems has only necessitated the introduction of high potential BRT as the major option to improve mobility and sustainable transportation for the city and its dependant surrounding regions. The city is comprised of mostly self-employed residents that uses public transportation at regular basis and mainly youths with low income and have mostly lived in the city for more than twenty years. Majority of these residents use public transport for many trips everyday and they also live at far distances to their places of work within Kano Central Business District travelling for over 2 kilometres and for at least an hour arrive.

The BRT is well acknowledged by its prospective users and officials to be able to reduce urban transport and movement delays, hence its full acceptance for all the proposed routes as a way forward towards reducing many transport issues. Field works have shown that the BRT will address serious issues of lack of orderliness, ensure unhindered departures and arrival of passengers to their destinations safely and secured. These are all in addition to generating revenue for the growing city, serving as a veritable source of information dissemination, and a means for fairness in transport pricing. Virtually all the challenges of the proposed BRT operations can be successfully addressed from the onset of the scheme with full participation of all stakeholders.

## 4.2. RECOMMENDATIONS

To draw the city towards achieving sustainable road transportation system that meet today's demand as well as the future of Kano metropolis, there is the need to review the master plan of Kano main areas and the entire Kano metropolis in order to provide adequate expansion of more of Kano Metropolitan roads to accommodate proposed BRT system. The city's and the State's main physical development agency - serving as the guardian of her infrastructures and utilities, Kano State Urban Planning Development Authority (KNUPDA), need to be further enhanced and strengthened in order for it to be able to carry out the needed mobilization exercises, planning, development and maintenance of this project appropriately.

There is the need for government to immediately engage all stakeholders in order to prepare the recommended routes for expansion and for further extension to all deserving areas. The widely known KAROTA operatives can help in achieving this, to further ensure the smooth provision of BRT lanes without much hindrances, and, to also help the integration of smaller access roads together with pedestrian ways to bigger BRT routes to encourage needed 'park and ride' principle of urban transportation that are prevalent in inter-city transport services across the globe.

The need for a more serious approach to environmental improvement is recommended here to enhance the provision of effective management system of street lighting in the entire metropolis that will ensure efficient mobility and security. This goes along with other road facilities like functional drainages as the present inadequate and substandard drainages are known to induce flooding thereby negatively affecting the roads and reducing the life span of the road and other road facilities. In order to fully achieve this, the State's Kano Road Maintenance Agency (KARMA), should be fully empowered to carry out these and similar activities like the provision of more off-street parking facilities in designated areas, regular and adequate maintenance of the major and minor roads, educate motorists and pedestrians through radio and television broadcasts, workshops and seminars on the need and the peculiarities of the BRT.

For people-oriented continuity of the metropolitan Kano BRT project, the introduction of PPP – Public Private Partnership in urban infrastructure finance and management is necessary. This approach has the advantage of reducing opposition to government projects since the people are also part of the process. It further eliminates hitches due to lack of cooperation from the people or the likely affected communities, in addition to job creation and improvement in livelihood activities of the people.

By ensuring the effective and efficient operation of the BRT in a metropolis like Kano, urban transportation in Nigeria will be moving towards Green Transportations systems where there is a reduction in pollution and environmental problems with positive reduction in greenhouse gas emissions, global warming. This laudable urban public transportation project can aid further research and advancements towards having a totally eco-friendly urbanization at a larger scale through diligent replication in similar environments by its needed integration in both geography and the geopolitics of land use administration and management.

## 5. REFERENCES


Adeniji, K. (1983): Urban Development and Public Transport in Nigeria. Third World Planning Review, 5(4), 383-394.

Adetoro, A., Ashamu, O., & Lawan, M, (2018). Women, Religion and Contemporary Public

Transport in Kano Metropolis. IFRA-Nigeria Working Papers Series, N°49, https://www.ifra-nigeria.org/files/92/

Ahmad, K. A., Afolabi, S., Nda, M., & Daura, H. A. (2018). Economic Benefit of Introducing a Bus Rapid Transit (BRT) in Kano State, Nigeria. In IOP Conf. Series: Earth and Environmental Science (IConCEES 2017) (p. 140). https://doi.org/10.1088/1755-1315/140/1/012093

Badejo, B. A. (1990). Public Private Bus Operation in Lagos Metropolis. PhD Thesis, University of London, UK.

Badejo, B. A. (2014). Transporting the Future: Portrait of Nigeria. The 65th University Inaugural Lecture, Olabisi Onabanjo University, Olabisi Onabanjo University Press, Ago Iwoye, Nigeria.

Barau, Aliyu Salisu, Roy Maconachie, A.N.M. Ludinc, and Adnan Abdulhamidd. 2015. "Urban Morphology Dynamics and Environmental Change in Kano, Nigeria." Land Use Policy 42: 307–17. https://doi.org/10.1016/j.landusepol.2014.08.007.

Bird, 1961. "Kano Provincial Annual Reports in Northern Region of Nigeria". Government Printer: Katsina

Bizzego, Andrea, Mengyu Lim, Greta Schiavon, and Gianluca Esposito. 2020. "Children with Developmental Disabilities in Low- and Middle-Income Countries : More Neglected and Physically Punished." https://doi.org/10.3390/ijerph17197009.

Blumgart, J. 2017. "Nothing Lite About it". Planning, 83 (7): 36-40.

Bolade, T. 2015. Urban Mass Transit System in Nigeria. Ibadan University Press: Ibadan.

Cartwright, Anton, Ian Palmer, Anna Taylor, Edgar Pieterse, Susan Parnell, and Sarah Colenbrander. 2018. "Developing Prosperous and Inclusive Cities in Africa - National Urban Policies to the Rescue?" London and Washington, DC. http://newclimateeconomy.net/content/cities-working-papers.

Cope, Meghan, and Brian H Y Lee. 2016. "Mobility, Communication, and Place: Navigating the Landscapes of Suburban U.S. Teens" 4452 (June). https://doi.org/10.1080/24694452.2015.1124017.

ECMT, 1953. Guided Transport 2040. European Conference of Ministers of Transport.

Retrieved August 29, 2021, from https://www.itf-oecd.org/sites/default/files/docs/92guided2040_0.pdf

Fagbemi, A. A. 1989. "Improving Urban Public Transportation: A case Study of Lagos State

Transport Corporation". Unpublished M.Sc (Geography) Thesis, Obafemi Awolowo University, Ile-Ife Nigeria.

Filani, M. O. 1988. "Mobility and Survival: A nations Dilemma". Inaugural Lecture Series, University of Ibadan, Nigeria, 17th March.

Filani, M. O. 2005. "Road Transportation as a Medium for Sustainable Development of a Nation". Ago Iwoye Journal of Social and Behavioural Sciences, 1 (1): 4-10.

Hall, Peter. 2007. "Urban Land, Housing, And Transportation: The Global Challenge." Global Urban Development 3 (1): 1–11.

Hari, K., Luni, P., Budi, S., Ditdit, N. U. and Makoto, C. 2011. "Promotion of Bus Rapid

Transit (BRT) in a Large City: A Case Study of Yogyakarta". Journal of International Development and Cooperation, 18 (2): 43-51.

Hassan, N. I. (2016). Proposed Kano bus mass transit Bus Rapid Transit in Kano: matters arising. Retrieved 3 February 2022, from https://www.solacebase.com/2020/08/22/proposed-kano-bus-mass-transit-bus-rapid-transit-in-kano-matters-arising

Hassan, Na'Abba Sani. 1990. "The Effect of City Size Distribution on Regional Development of Kano State." MSc (URP) Thesis, Ahmadu Bello University, Zaria – Nigeria. http://www.abu.edu.ng/library/.

Hollomotz, Andrea. 2021. "Successful Community Resettlement of Men with Learning Disabilities Who Have Completed a Hospital-Based Treatment for Sexual Offending." British Journal of Social Work 51 (1): 150–69. https://doi.org/10.1093/bjsw/bcaa038.

Humphrey, J. H. 1992. "Stress Among Older Adults: Understanding and Coping". Charles Thomas: Illinois.

KNUPDA, 2012. "Kano Metropolis Mass Transit Committee Report". Kano State Urban Planning & Development Authority (KNUPDA): Kano.

KNUPDA, 2019. "Kano State Land Use and Reservation Standards". Kano State Urban Planning & Development Authority (KNUPDA): Kano.

LAMATA, 2008. "Launching of Lagos Bus Rapid Transit". Lagos Metropolitan Transport Area (LAMATA), Lagos, Nigeria.

Legacy, Crystal. 2016. "Transforming Transport Planning in the Postpolitical Era." Urban Studies 53 (14): 3108–24. https://doi.org/10.1177/0042098015602649.

Litman, T. 2021. "Evaluating Public Transit Benefits and Costs: Best Practices Guide Book". Victoria Transport Policy Institute: Victoria. Retrieved August 29, 2021, from https://www.vtpi.org/tranben.pdf

Mabogunje, Akin L. 2008. “The Challenges of Mobility within Nigeria’s Emerging Megacities.” In Integrated Transport System in Nigeria’s Emerging Megacities: Issues, Challenges and Options, 1–18. Lagos: Lagos Megacity Development Authority.

Mabogunje, Akin L. 2021. “A New Paradigm for Urban Development Sign in Oxford Academic Account Sign in via Your Institution Short-Term Access” 5 (Dec., 1991): 1–2.

Mobereola, D. 2009. “Lagos Bus Rapid Transit: Africa’s first BRT Scheme”. Urban Transport Series - Sub-Saharan Africa Transport Policy Program (SSATP) Discussion Paper, No. 9, The International Bank for Reconstruction and Development/The World Bank.

Muili, A. B. 2005. “The Operational Efficiency of Minibus within Ibadan Metropolis: A focus on Intracity services”. MSc (URP) Thesis, University of Ibadan, Nigeria.

Muili, A. B. 2013. “Intra-City Transportation System in Selected Cities in Nigeria: A focus on Kaduna, Enugu and Ibadan”. PhD (URP) Thesis, Ladoke Akintola University of Technology, Ogbomoso, Nigeria.

Muktari, Okeme, and Aliyu Mohammed Kawu. 2013. “Assessment of Inter-Campus Transportation: A Case of Federal University of Technology, Minna-Nigeria.” Journal of Logistics and Transport, Nigerian Institute of Transport Technology, Zaria. 5 (1): 30–41. www.nitt.gov.ng.

NPC, 2016. “The 2006 National Population Census of Federal Republic of Nigeria Official Gazette, FGP71/52007/255 (OL24)”, Retrieved from www.nigeriastat.gov.ng

Obateru, O. I. 2003. “Space Standards for Urban Development”. Penthouse: Ibadan.

Odufuwa, B. O. 2006. “Enhancing Mobility of the Elderly in Sub-Saharan African Cities Through Improved Public Transportation”. Journal of International Association of Traffic and Safety Sciences, 30 (1): 60-66.

OECD, (2007). Maintaining Properties in an Aging Society. Organization for Economic Co-operation and Development (OECD), Paris.

Ogunsanya, A. A. 2002. “Maker and Breaker of Cities”. The 59th Inaugural Lecture, University of Ilorin, Thursday, June 27.

Okunola, O. J., Uzairu, A., Gimba, C. E. and Ndukwe, G. I. 2012. “Assessment of Gaseous Pollutants along High Traffic Roads in Kano, Nigeria”. International Journal of Environment and Sustainability, 1 (1): 1-15.

Olesen, Kristian. 2019. “Infrastructure Imaginaries: The Politics of Light Rail Projects in the Age of Neoliberalism.” Urban Studies 57 (9): 1811–26. https://doi.org/10.1177/0042098019853502.

Olufemi, O. B. and Oluseyi, M. S. 2007. “The urban poor and mobility stress in Nigeria Cities”. Environmental Research Journal, 1 (1-4): 1-8. Retrieved August 29, 2021, from https://www.gtkp.com/assets/uploads/20091118-164422-8140-1-8.pdf

Oni, S. I. 2009. “Arterial Road Network and Commercial Property Values in Ikeja, Nigeria”. PhD (Estate Management), Covenant University, Ota, Nigeria.

Onokala, P. C. 2001. “Urbanisation and Urban Transportation Problems in Nigeria”. In Ezeani & Elekwa (eds). Issues in Urbanization and Urban Administration in Nigeria. Jamoe Enterprises: Enugu.

Oyesiku, Kayode. 1995. “An Analysis of the Demand for Inter-City Trip Generation Attributes of a Developing State in Nigeria”. Journal of Transport Studies, 1 (1): 17 – 28.

Oyesiku, O. Kayode. 2001. “City Poverty and Emerging Mobility Crisis: The Use of Motorcycle as Public Transport in Nigerian Cities”. The 9th World Congress of Transport Research, Seoul, South Korea, 22-27, July.

Oyesiku, O. O. 2003. “Sustainable transportation strategies for intermediate cities in Nigeria”. Journal of The Nigerian Institute of Town Planners, 16, 76-101

Patel, Shirish B, Jasmine Saluja, and Oormi Kapadia. 2018. “Affordable Housing Needs Affordable Transit” 30 (1): 123–40. https://doi.org/10.1177/0956247817738188.

Prasad, Amit, Chelsea Bettina Gray, Alex Ross, and Megumi Kano. 2016. “Metrics in Urban Health: Current Developments and Future Prospects.” Annual Review of Public Health 37 (1): 113–33. https://doi.org/10.1146/annurev-publhealth-032315-021749.

Radulescu, Corina M., Stefan Ovidiu, Gheorghe M.T. Radulescu, Adrian T.G.M. Radulescu, and Mihai V.G.M. RAdulescu. 2016. “Management of Stakeholders in Urban Regeneration Projects . Case Study : Baia-Mare , Transylvania.” Sustainability 8 (238): 1–22. https://doi.org/10.3390/su8030238.

Rodrigue, Jean-Paul, Claude Comtois, and Brian Slack. 2017. The Geography of Transport Systems. Routledge. https://www.routledge.com/The-Geography-of-Transport-Systems-4th-Edition/Rodrigue-Comtois-Slack/p/book/9781138669574.

Rodríguez, D. A. and Targa, F. 2004. “The Value of Accessibility to Bogotá’s Bus Rapid Transit System”. Transport Review, 24(5): 587-610.

Salisu, G. 2012. “Road Transport Problems in Kano Metropolis, Nigeria”. MSc (Geography) Thesis, Ahmadu Bello University, Zaria.

Singh, Mohinder. 2016. “Transportation: Mobility, Accessibility, and Connectivity.” In 50 Years of Urban Planning in Singapore, 127–51. WORLD SCIENTIFIC. https://doi.org/10.1142/9789814656474_0008.

Tanimowo, N. B. 1997. “The Pattern of Intra-Urban Human travels in Nigerian Pre-colonial cities: Case study of Oyo”. International Journal of Urban and Regional Affairs, 1(1).

Tanimowo N. B. 2000. “Transportation Pattern in the Central Business District of Pre-1900 Nigerian Cities. A case of Akesan in Oyo town”. Journal of Ife Community Development Study Team, 1 (2).

Tanimowo, N. B. 2005. “Traffic and Transportation in Oyo, a medium-sized Nigerian City”. A monograph, Department of U.R.P., LAUTECH, Ogbomoso, Nigeria.

Tanner, Emily C., Richard J. Vann, and Elvira Kizilova. 2020. “Consumer-Level Perceived Access to Health Services and Its Effects on Vulnerability and Health Outcomes.” Journal of Public Policy and Marketing 39 (2): 240–55. https://doi.org/10.1177/0743915620903299.

Tong, Michael Xiaoliang, Alana Hansen, Scott Hanson-Easey, Scott Cameron, Jianjun Xiang, Qiyong Liu, Yehuan Sun, et al. 2015. “Infectious Diseases, Urbanization and Climate Change: Challenges in Future China.” International Journal of Environmental Research and Public Health 12 (9): 11025–36. https://doi.org/10.3390/ijerph120911025.

Ukpata, J. O. and Etika, A. A. 2012. “Traffic congestion in major cities of Nigeria”. International Journal of Engineering and Technology, 2 (8): 1433-1438.

Valencia, Sandra C, David Simon, Sylvia Croese, Joakim Nordqvist, Tarun Sharma, Nick Taylor Buck, Ileana Versace, et al. 2019. “Adapting the Sustainable Development Goals and the New Urban Agenda to the City Level: Initial Reflections from a Comparative Research Project”. International Journal of Urban Sustainable Development 11 (1): 4–23. https://doi.org/10.1080/19463138.2019.1573172.

Vide, A., Kemi, A., Olusegun, A. and Joyce, O. 2014. “Access to Intra-Urban Public Transport across Varied Socio-Economic Groups: A Case of Lagos Bus Rapid Transit (BRT)”. Asian Journal of Humanities and Social Sciences (AJHSS), 2 (2).

Vuchic, Vukan R. 2005. Urban Transit : Operations, Planning and Economics. Wiley & Sons.

Wolbring, Gregor, Rachel Mackay, Theresa Rybchinski, and Jacqueline Noga. 2013. “Disabled People and the Post-2015 Development Goal Agenda through a Disability Studies Lens.” Sustainability 5 (10): 4152–82. https://doi.org/10.3390/su5104152.

Yahaya, Umar Farouk. 1988. “The Role of Urban Planning Authorities in Physical Development: The Case Study of Kano State Urban Development Board.” MSc (URP) Thesis, Ahmadu Bello University, Zaria.

Yunusa, Mohammed-Bello. 2015. “Physical Planning and the Development of Dankande Rest Stop Area in Kaduna, Nigeria.” City, Culture and Society 6 (1): 53–61. https://doi.org/10.1016/J.CCS.2015.01.002.

Yusuf, R., H. I. Adamu, Y. Y. Babanyara, A. U. Yahaya, and A. M. Kawu. 2021. “Urban Crime Incidence and Prevention Mechanisms in Kano Municipal Area Council.” Environmental Technology & Science Journal 12 (1): 29–37. https://etsj.futminna.edu.ng/index.php/current/item/18-etsj-volume-12-number-1-june-2021.

Yusuf, Rashidat. 2019. “Spatial Analysis of Crime Patterns in Residential Neighbourhoods of Kano Municipal Local Government Area.” M.Tech (URP - Urban Management) Thesis, Abubakar Tafawa Balewa University, Bauchi, Nigeria.