Implications of Transport Poverty and Social Exclusion in Lagos State Transportation System

By

Ege, E. E; Olujimi Samson; Chilaka, E. M.

Egemanuel2002@yahoo.com

Olujinmisamson@gmail.com
E.M.Chilaka@ljmu.ac.uk

Department of Geography
Faculty of Social Sciences
University of Lagos

Abstract

The link between transportation and social inclusion is well-established. Poor access to transportation services makes goods and services inaccessible, further marginalizing those who do not own motor vehicles. Sociologists look at social exclusion from these dimensions - poverty, inequality, lack of decent and accessible public services, inadequate public transport, the welfare and benefits system, and lack of good housing. These inequalities existed in our transportation system before the introduction of new technologies and business models, and they are exacerbated by present-day social disadvantages. This study examined the transport poverty metrics and housing quality index in some selected parts of Lagos Nigeria. The sample for the study was taken from six (6) locations with four hundred and eighty (480) questionnaires i.e., eighty (80) for each location. There were one hundred and sixty-eight (168) female respondents and three hundred and twelve (312) male respondents with four stated objectives and data for the study was collected through questionnaires. The research hypothesis and questions were tested using the Mann Whitney-U Test Analysis and Analysis of Variance ANOVA to compare differences between the Suburban neighborhood group and the Central neighborhood group. The findings show that households in the Central neighborhood group tend to live closer to convenient transportation options and don't have to drive/travel far to obtain basic services like hospitals, grocery stores, and places of work, but they pay higher housing rentage even when the transport externalities are minimal while the Suburban neighborhood group spend an average of more than 34.7% of their income on transportation and tend to travel farther and lack access to good transportation alternatives. However, one of the recommendations is that waterways transportation around the Suburban group must be revamped with realistic fares to attract people and reduce stress on road transport.

Keywords: Transport poverty, Lagos commuting, Oke-Afa Canal, Lagos megacity transportation, Nigeria transport poverty index

Introduction

The link between transportation and social inclusion is well-established. Poor access to transportation services makes goods and services inaccessible, further marginalizing those who do

not own a car. These inequalities exist in our transportation system prior to the introduction of new technologies and business models, and they are exacerbated by social disadvantage. Furthermore, the ability to use technology to access transportation services or jobs and services remotely is reducing inequality. Individually, transportation, social, and digital disadvantage can all contribute to exclusion, but when combined, the effects are amplified, limiting a person's ability to access life opportunities. When describing the effect of poor transportation planning in a supposedly developed environment, the terms transport poverty and social exclusion are used interchangeably.

Transport poverty is the negative effect of social exclusion in transportation planning in society. Especially in Lagos, with its diverse culture and social economics, transportation plays an important role in connecting people to opportunities and improving their quality of life. The transportation choices we make (or have the ability to make) have a significant impact on our individual and collective ability to fully participate in society. Transportation, on the other hand, is the most effective indicator of performance in any economy, business, or quality of life, such as getting to work, school, meetings, appointments, trade facilitation, transacting, moving cargoes, traveling, and even social service delivery.

With inadequate transportation, services such as rescues during emergencies can become extremely difficult. To promote social inclusion, transportation options should strive to reflect the needs of the diverse communities they serve, as well as meet the "four As": available, accessible, affordable, and acceptable. Without a doubt, every nation, regardless of population size, level of development, or industrial capacity, can benefit from an efficient transportation sector, whether by road, waterway, rail, or air. However, transport poverty exists when inefficiency in all modes of transportation is prevalent within an economy. Transportation is important in the ease of doing business in many developed countries. The government plays an important role in the implementation and administration of services. Certainly, where there is efficient transportation and fewer traffic jams, the economy and businesses benefit. However, in developed countries, public transportation, which includes buses, taxis, water ferries, trains, trams, and metros, is adequately regulated by the government and is not entirely private-sector driven, making it so efficient and reliable. When private companies participate in operations, it is usually on an agreed-upon model, such as the public-private partnership model.

Looking critically at transport poverty and social exclusion, they tend to relate in one way or the other. The existence of transport poverty leads to social exclusion. When the modes of transport are not properly integrated into a city, it leads to the social exclusion of some segments of society, especially where one mode is overstretched or always under pressure. This can be seen in Lagos where the roads are always under pressure with congestion being exhibited daily along the movement patterns in Lagos metropolis. Water transport has been neglected even though Lagos is surrounded by water. An example can be seen from the neglect of a popular canal which would have been a major carrier of passengers by water moving from Ikotun Egbe to parts of Isolo and Festac Town areas. This is the Oke-Afa canal. It was proposed by the colonial masters but was actualized by the Jakande administration. The most unfortunate situation concerning this canal is that it has been neglected to the extent that landlords who built their houses along the canal corridor use it as a waste dump. Sewage from these houses is piped to the canal like an open soak-away pit, neglecting the health hazard for people living in the area who could be affected by any outbreak of diseases there. The canal was originally constructed to remove traffic pressure from Oshodi - Apapa expressway. Inhabitants of this area have been denied affordable transportation and thereby suffer transport poverty and social exclusion.

Statement of Problem

People who live with transport poverty are unable to meet their daily demands and obligations because they lack access to transportation. It is unavailable, expensive, takes a long time, and the conditions for commuting are inadequate. “Essentially, transport poverty limits the quality of life as a consequence of being unable to access transport services.”

Transport poverty is not about being poor per se, even someone with multiple vehicles can be a victim of transport poverty. Households or persons who fall within the metrics of transport poverty are considered to be victims of transportation poverty as long as they meet at least one of the following requirements, they are deemed to be transport poor: (i) no transport option that meets their needs (ii) they cannot get to their destinations in time to fulfill daily obligations such as employment, health care, and education (iii) the amount they spend each week on transportation exceeds the official poverty line (iv) their travel times are lengthy, or (v) their travel conditions are unsafe, hazardous, or unhealthy.

Lagos is considered a commercial hub where major industries’ headquarters are situated. It has economic advantages for its residents, which are large markets and the provision of extensive employment opportunities. These advantages, large as they seem, increase the price of housing and many people tend to live in distant peri-urban areas where housing is cheaper than in the city centre. Hence, there is a common need to search for affordable transportation means. Most Lagos residents in the categories of low income suffer from transportation poverty, as their incomes vis-a-vis transportation fares are not proportionate. They spend more on transport fares, which renders the service unaffordable. Moreover, they spend more time in slow traffic due to congestion and wait longer at the bus stops for buses. Thus, residents who decide to rent within the city and pay less for transportation are faced with high rents while the most that could not afford the high rents live in shanty environments or slums with poor housing conditions lacking security, access to good water, good atmosphere, living spaces, paved streets, trees, or street gates.

In Lagos, the State Government’s development of transportation systems such as ferries and the Blueline and Redline metro rail systems tend to reduce stress and difficulties even though indigent households may not easily afford the fares. Nevertheless, persistent long queues at BRT stations and overcrowded commercial bus stops signify the underlying social exclusion of sorts – a situation that often leads to externalities such as kidnapping, accidents, and highway robbery. The population of the city and its environs are also dynamic and heterogeneous, with some areas having high population while others have low population density. Overall, the high cost of public transportation, limited coverage and reliability of services, and inadequate infrastructure are some of the key factors contributing to transport poverty in the city. As a result, many people are forced to spend a disproportionate amount of their income on transportation or rely on unsafe and informal modes of transportation, with negative indices for health and safety impacts. Hence, there is a need for innovative and sustainable solutions to address transport poverty and improve access to safe, reliable, and affordable transportation options for all.

The Study Area

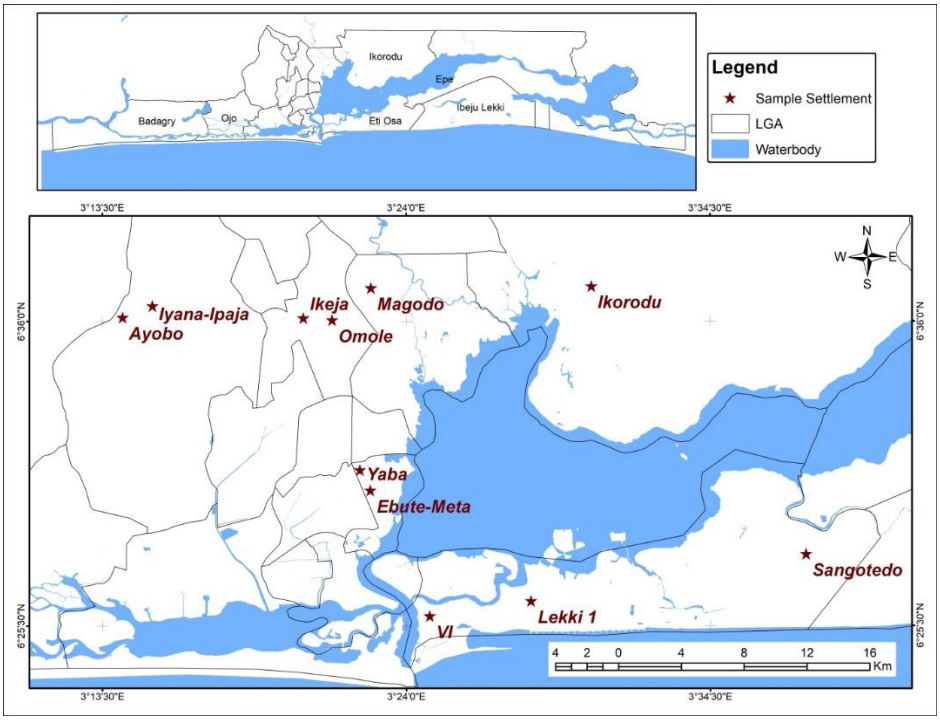


Figure 1: The Study Area

Lagos rose to the top of the list as a commercial hub with major headquarters, seaports, international and local airports, international markets, educational institutions, and the highest IGR state, among other things. Water makes up 40% of its topography, while land makes up 60%. Lagos, ostensibly a developed city, has attracted many immigrants from various states, including neighboring countries, putting strain on its infrastructure, particularly its roads. Because of the high cost of living and housing in the city, most people moved to the peri-urban or hinterland areas such as Ikorodu, Magboro, Arepo, Sango, Badagry, Ojo, Iyana Paja. They commute to work in the city's central business districts such as Ikeja, Ilupeju, Victoria Island, Lekki, and others where employment and basic amenities are guaranteed, resulting in the development of urban sprawls. However, based on the metropolitan structure, there has been a situation of hectic traffic congestion, even at the ports, poorly maintained roads, overstressed railways, underutilization of the waterways, long hours of waiting to have access to public transport and other infrastructures, which has resulted in paying more than affordable fares against the income earned and spending more hours in traffic. People are also exposed to externalities of transportation such as highway robbery, kidnapping, assassination, police brutality, and even accidents during transit, and most people in these peri-urban areas have little or no access to major infrastructures such as medical care, grocery stores, educational facilities, and recreational facilities due to mobility poverty. The cost of transportation influences access to opportunities.

Hence, high transportation costs make it difficult to get to essential services and grocery stores. People without cars have a more difficult time finding reasonably priced food. Transportation affordability is defined as the ability of people to purchase access to basic goods and activities (medical care, basic shopping, education, work, and socializing), which typically means that they spend less than 20% of their total income on transportation and less than 10% on transportation

and housing combined. Many households, particularly lower-income households in car-dependent areas, spend more on transportation than is affordable. Affordability is an important issue for transportation system users, but it is frequently overlooked in the planning.

Social exclusion in the Lagos metropolitan area has been a challenge because some segments of society have been excluded from transportation planning. People with disabilities, the elderly, job seekers, gender balance in transportation, and the poor are all at risk. Uber, Taxify, and other private transit companies excluded these people from planning, whereas there should be a simple and inexpensive technique to include them in transportation development to alleviate tensions on other modes of transportation.

When planning transportation infrastructure in certain areas, it is critical to understand travel patterns and the population involved; otherwise, some people may be excluded or marginalized. The Lagos metropolitan area has diverse communities with varying age ranges and income levels. The city's public transport system has been unable to cope with its growth, with the private sector heavily involved in handling the modes of transportation. Many of these modes have excluded segments of the population from the infrastructure. Waterway transportation from Ikorodu to Lagos Island, for example, is more expensive for lower-income earners, leaving them out of the development. Several studies have found that the poorest segments of society do not benefit equally from new or improved transportation infrastructure and services (e.g. Booth et al., 2000; Gachassin et al., 2010; Hettige, 2006; Khandker and Koolwal, 2011; Mu and van de Walle, 2011). This could be due to a lack of access to motorized transportation or an inability to afford transit services. The externalities of these major infrastructures, such as community severance and increased road casualties and deaths, as well as the resulting skewed land use, further marginalize and impoverish the poorest population groups (Starkey and Hine, 2014).

Literature Review

Transport poverty refers to the inability of individuals or households to access affordable and adequate transportation services which can limit their access to employment, education, healthcare, and other essential services (Lucas et al., 2012). This concept is rooted in the recognition that access to transportation is a critical component of social and economic participation and that inadequate access to transportation can lead to social exclusion and inequality (Litman, 2012). According to Okai (2023), transport poverty is where people are unable to satisfy their daily needs and activities due to lack of access to transport, unavailability of transport, the high cost of traveling, long time spent traveling, and the inadequacy of transport travel conditions. “Essentially, transport poverty limits the quality of life as a consequence of being unable to access transport services.” The World Economic Forum concluded that a discussion of “inclusion and opportunities” must include a component such as transport and mobility. It said further that inclusive access to transport and mobility would create more opportunities for the advancement and promotion of the overall economic health of communities.

Levinson and Krizek (2018) stated that transport poverty is a result of the unequal distribution of transportation resources and infrastructure across different regions and socio-economic groups. This argument suggests that transport poverty is not solely the result of individual-level factors such as low income or lack of access to a vehicle but is also shaped by structural factors such as spatial segregation, land use policies, and transport planning. For example, studies have shown that low-income households in suburban and rural areas face significant barriers to accessing public transportation, due to inadequate service provision and

infrastructure (Lucas et al., 2012; Schwanen et al., 2017). This suggests that addressing transport poverty requires a multi-dimensional approach that considers the role of structural factors in shaping transportation behaviour.

Moreover, Lucas et al. (2012) observed that transport poverty is closely linked to social exclusion and disadvantage. This argument suggests that inadequate access to transportation can limit individuals' ability to participate in social and economic life, leading to exclusion from employment, education, healthcare, and other essential services. For example, a study conducted in Indigenous communities in Australia found that transport disadvantage contributed to social exclusion and reduced well-being, due to the limited access to healthcare and other essential services (Smith & Vella-Brodrick, 2010). This highlights the importance of addressing transport poverty as a means of promoting social inclusion and reducing inequality.

Meanwhile, Lucas et al. (2012) argues that it is difficult to define and measure transport poverty, and that it may not capture the full range of factors that contribute to transportation disadvantages. For example, some scholars argue that transport poverty may not fully capture the experiences of those who do not use transportation due to other reasons, such as disability or personal preference. Additionally, some critics suggest that the concept of transport poverty may reinforce a narrow focus on individual-level factors, rather than addressing the broader structural and cultural factors that shape transportation behavior.

Overall, transport poverty refers to the inability of individuals or households to access affordable and adequate transportation services, which can limit their access to employment, education, healthcare, and other essential services. Addressing transport poverty requires a multi-dimensional approach that considers the role of structural factors in shaping transportation behavior, as well as individual-level factors such as income and access to a vehicle.

Prevalent Issue of Transport Poverty

While transport poverty occurs in developed countries, it is more prevalent in developing countries. Mobility plays a huge role in the volume of movement of people, goods, and services. The lack of access to vehicle ownership or mobility in developing countries, therefore, leads to poor quality of life for the most vulnerable groups of people especially “low-income earners, women, the elderly, persons with disabilities and young people,” according to Birchall (2019). In Nigeria, about 80% of mobility depends on road transportation. Owning a car or vehicle, therefore, contributes heavily to a person’s economic and social well-being. According to International Trade Administration, Nigeria has a total of 11.8 million cars. In a country of more than 200 million people, the vehicle per population ratio is just about 0.06. The yearly demand for cars in Nigeria is more than 700,000. The local car manufacturing companies produce just 14,000 cars per year. To meet this demand, the government, in the past, had to reduce the tariff on the importation of cars from 35% to 5%, Techpoint Africa reports. Even with this reduction, most Nigerians, especially the low-income groups, women, and those who live in rural areas are unable to buy cars.

For instance, Lagos is rapidly expanding and is expected to have a population of over 30 million people by 2030 and overtake Cairo as the biggest city in Africa. Unfortunately, Lagos does not enjoy the privilege of adequate urban and transportation planning it deserves in its initial stage of urbanization (Alade, Olaseni, Adeniji, Alade, & Olaseni, 2018). Consequently, the city has experienced a proliferation of slums, degradation of urban areas and facilities, and transportation

problems affecting all modes manifesting in the form of congestion, poor accessibility and mobility, inadequate road and terminal infrastructure, distressed public transport system, weak traffic management and safety and security challenges among others (Alade et al., 2018). Congestion is a major challenge in Lagos' megacity and occurs daily along major corridors.

In a report submitted to LAMATA by ALG Transportation & Logistics (2013), it is documented that the public transportation system in Lagos state is inadequately regulated and structured. Besides, the public transport system is highly fragmented comprising many unregulated routes dominated by minibuses (popularly Danfos). The result is an inefficient public transport service that compels people to depend on private vehicles, resulting in chaotic transportation and aggravated congestion. It is further noted in the 2013 report that the industrial status of Lagos in Nigeria accounts for the growing number of freight vehicles along the main transport corridors in the city. Freight vehicles jostle for the cramped road space with passenger vehicles.

Similarly, the absence of an organized non-motorized transport (NMT) infrastructure, the lack of integration of transport and land use, and weak regulatory mechanisms, among others, are factors that worsen the transportation challenges in Lagos. The 2013 report concludes that there is a need for an urgent urban and transport development plan in Lagos, to address the continuous degradation and congestion of the transport system. The report also emphasizes that the results of "No action" will not only lead to the extension of the current congestion levels of Lagos but will also result in the loss of a unique opportunity to develop the mega-city as the key economic hub of Africa.

Transport Poverty and Social Exclusion

Transport poverty and social exclusion are complex and interrelated phenomena that have significant consequences for the transport system. The theoretical framework for understanding these phenomena and their consequences involves several key concepts and theories from the fields of urban planning, sociology, and transportation studies. One important concept in this framework is the idea of social exclusion, which refers to the process by which certain groups of people are prevented from fully participating in social, economic, and political life due to various structural and systemic factors. Social exclusion is often linked to poverty, as low-income individuals and households may face barriers to accessing essential services and resources, including transportation (Stanley & Lucas, 2008).

Another key concept is the idea of mobility justice, which is concerned with ensuring that everyone has access to safe, affordable, and sustainable modes of transportation. This involves addressing structural inequalities and power imbalances in the transport system, as well as recognizing the different mobility needs and preferences of different groups of people. To understand the consequences of transport poverty and social exclusion in Lagos, it is also important to consider theories related to the spatial organization of cities and urban transport systems. For example, the concept of the "spatial mismatch" suggests that low-income households may face challenges in accessing jobs and other essential services due to the spatial distribution of these resources (Yigitcanlar, Mohamed, Kamruzzaman, & Piracha, 2019). Furthermore, the "transportation disadvantage" framework highlights how certain groups of people, such as those with disabilities or limited mobility, may face additional barriers to accessing transportation services (Castro et al.,

2022). These barriers can further exacerbate social exclusion and contribute to cycles of poverty and marginalization.

The research recognized that social exclusion is a relatively new social policy concept, having arisen from earlier work that sought to define, measure, and understand poverty. Stanley and Vella-Brodrick's (2007) paper pointed out that, while poverty is viewed as the difference between the amount of income needed to sustain an individual or household within their living environment, social exclusion is seen as a more comprehensive concept. The term social exclusion, while still heavily reliant on income measures, also acknowledges that there may be other barriers that make it difficult for people to participate fully in society. These barriers may include a lack of employment, suitable housing, education, health care, and transport.

Hagen and Kjorstad (2007) reported on immobility amongst certain sectors of the Norwegian community: aged, those with a disability, those living in an area of low density, and those who are unemployed or working from home. In other words, groups could be defined as at risk of social exclusion. Norway has responded to this need by setting a goal of universal accessibility. In another research from Norway, Priya and Uteng (2007) couched their exploration of the issue of the transport disadvantage of migrants living in Norway in terms of social exclusion and the resultant risk of loss of social cohesion due to isolation and the inability of these migrant groups to access employment.

In Australia, there is a growing interest in research and services which assist socially excluded people. Currie et al. (2007) reported on some early findings from a major study around the value of mobility for socially excluded people. Other research papers (Wang, 2007; Wear, 2007) and participants reported service systems and programs with the aim of social inclusion. The research by Filipe, Veras, and Maca´rio (2007) identified that the concept of social exclusion has not received much focus in countries with emerging economies, even though transport policy may target some disadvantaged groups. Indeed, the research reflected on the issue of social exclusion being not a minority but a majority problem in some countries. The value of social exclusion as a tool to understand transport issues was a matter of conjecture in countries where social exclusion is characterized by phenomena such as unemployment, informal work, loss of identity, urban violence, and unmet needs around food and shelter. The research believed that the concept of social exclusion was unlikely to be sufficient as the only theoretical basis on which to address social policy in transport.

Stanley and Vella-Brodrick (2007) talked about the need for three additional ways of understanding the association between transport and social policy: well-being, social capital, and psychological health. They argued that the outcomes for social policy and transport should be more broadly defined as contributing to well-being, a notion that encompasses wider issues than social exclusion. Social inclusion is one important component of well-being, which may also include notions as defined by Nussbaum (2005), such as mental health, environmental sustainability, and freedom from violence.

Moreover, travel needs, conditions, and behaviors are not uniform within societies. In particular, the travel patterns of lower socioeconomic groups, and women and girls, typically differ from their counterparts in ways that reflect, generate, and compound disadvantage worldwide (Di Ciommo

and Shiftan, 2017). Recognition of these differences is essential for planning and delivering economically, environmentally, and socially sustainable transport systems (Lucas et al., 2016). In low- and middle-income countries (LMICs) including countries in Africa, the evidence base is less developed than in high-income countries but similarly indicates travel behavior differs in these groups (Porter, 2008; Sietchiping et al., 2012).

Africa faces challenges related to high levels of absolute (43%) (Beegle et al., 2016) and relative (49% in sub-Saharan Africa) (Jolliffe and Prydz, 2021) poverty coupled with rapid and mostly unplanned urbanization (Cobbinah et al., 2015). This has facilitated the development of a large informal economy (International Labor Organization, 2018) which includes transport. Motorization rates in Africa are low but increasing rapidly (World Bank, 2019), with the majority of growth in used (rather than new) vehicles (United Nations Environment Programme, 2020). Approximately 80% of urban residents do not have access to private vehicles, leading to reliance on non-motorized modes such as walking, as well as formal and informal public transport (United Nations Habitat, 2010). An understanding of how transport poverty is embedded in these contextual conditions will facilitate integrated urban and transport planning, and ultimately help to build sustainable and equitable transport systems in Africa.

The Lagos State Transport Sector

The BRT Scheme came into operation in 2008. It is expected to operate along eight routes using specially designated BRT lanes running through the city, to expand to other routes in the future. The BRT scheme is estimated to transport about 10,000 passengers in each direction per hour during peak travel times. The Lagos Metropolitan Area Transport Authority (LAMATA) is the government agency established to deal with transport problems in the state and oversee the BRT scheme. The LAMATA BRT corridor covers about 22 kilometers in length. The system is run by two operators, Nigerian Union of Road Transport Workers (NURTW) Cooperatives and LAGBUS, a Lagos State Government-owned Asset Management Company that contributes about 180 high-capacity buses for the implementation of the first phase of Mile 12 to CMS BRT Lite system.

Motor parks or public transport garages abound all over Lagos Metropolis. These facilities are poorly designed, badly maintained, and poorly located. In some cases, bus stops are located too close to interchanges or at a point difficult to access from primary corridors. The bus stops that are commonly used operate inefficiently because bus drivers maintain no order and there are no pre-designed bus stops serving destinations. This results in many bus passengers milling about, searching for buses and the opportunity to board a bus before it has entered the bus stop. The operation of the Lagos State Traffic Management Agency (LASTMA) has impacted positively on the traffic situation in Lagos. Total time wasted in traffic is estimated at 3 billion hours annually. Saving just 20% is equal to 1 billion USD of economic benefit to Lagos (ROM Transportation Engineering, 2010). The activities of LASTMA have reduced the excessive total travel time on journeys being made on major corridors in the Lagos metropolis.

The transport situation in Lagos is expected to get better with the expansion of the BRT scheme and the completion of the light rail transit. The rehabilitation of inland waterways and the introduction of private sector ferry services with the new taxi scheme are also efforts directed at enhancing urban mobility in Lagos. To consolidate these efforts, some agencies and institutional

frameworks were put in place, including the establishment of LASTMA, the State Traffic Safety Advocacy Programme, the Lagos State Drivers Institute, and the Motor Vehicle Administration.

Research Design and Methodology

Research Design

Research designs are plans and procedures for research that span the design from broad assumptions to detailed methods of data collection and analysis (Creswell, 2011). It serves as a framework for the study, guiding the collection and analysis of the data, the research instrument to be utilized, and the sampling plans to be followed (Pant and Wolf, 2007). It is also the structuring of investigation aimed at identifying variables and their relationship to one another. This is used for the purpose of obtaining data to enable the researcher to test hypotheses or answer research questions (Asika, 2005).

The research design for this study was a descriptive survey design. This is because the researchers could not manipulate the variables for the simple reason that they had already occurred. Descriptive survey design involves the description of the state of affairs as it exists. Therefore, this research design simply reports on findings on a particular problem and was chosen because the researchers sought to examine the implication of transport poverty and social exclusion on Lagos' transportation system.

Target Population

The target population for this study is made up of all residents, business owners, students, workers, employment seekers, and the aged that commute along Lekki/Victoria Island, Sangotedo , Iyana Ipaja, Ayobo, Yaba, Ebute Meta, and Ikorodu areas of Lagos State.

Sample Size and Sampling Techniques

The sample size for the study was determined through the use of simple random sampling technique in which the information was gathered at the bus stations, religious centers, offices etc. eighty (80) questionnaires were distributed for each study area, which total of four hundred and eighty (480) questionnaires were shared among the six (6) study locations.

Research instrument

The instrument used for collecting information for the study was a questionnaire and objective questions to examine the research objectives and research questions.

Suburb Neighborhood and Central Neighborhood

Both the Suburb neighborhood (SN) and the Central neighborhood (CN) served as research and comparison groups. As their travel habits were investigated, the low-income household group serve as the suburban neighborhood group, while the Central neighborhood group serves as a comparison of the community beyond the marginal group. It is possible to compare the travel habits of those exposed to transport poverty and those who are not, the SN group and the CN group. In this study, the Suburb neighborhood group of low-income households live in informal settlements (Ikorodu, Iyana Ipaja, Ajah Sangotedo), and the Central neighborhood resided in

formal settlements (Omole Estate Ikeja, UNILAG Quarters, Magodo 1 & 2, Ikeja GRA, Victoria Island and Lekki phase 1)

Collection of Data

The questionnaire and the objective test served as media of communication and interaction with the sample in the area of study to get the desired information. The researchers personally administered the questionnaires and tried to get all the necessary feedback from the respondents. The respondents were given the questionnaires and writing pens although the researchers got consent from the respondents before handing in the questionnaires which were collected immediately after the respondents were through. The 'on the spot' administration allowed the researchers to respond to any area of confusion, incidence of loss, or damage of the instrument and also to reduce or eradicate the opportunity for respondents to collude with each other and thereby create falsified or duplicated responses.

Data Analysis

The data collected from the study were analyzed and interpreted/visualized using percentages (%), graphs, bar charts, and tables. Analysis of Variance ANOVA, Mann-Whitney U-test, and spatial analysis tool (ArcGIS) were used for the data analysis.

Simple percentage: $= \frac{\text{Frequency of data}}{\text{Total number}} \times 100$

Mean = $\frac{\sum fx}{\sum f}$

Types and sources of data

The primary data sources:

These were obtained through questionnaires and were complemented with oral interviews of LAMATA officials and people living in some specific locations, people living with disabilities data was obtained from LAMATA, and house/car owners involved in the study.

The secondary sources of data:
The Secondary Data were collected from published and unpublished literature, textbooks, journals, and preceding studies to get background and existing information on transport poverty within and outside the study area also included the Survey Directorate in the Ministry of Transportation, Directorate of Land Information Systems in the Land Bureau, Ikeja, and West African Book Publishers Limited, Ilupeju Lagos from where the Lagos Road and Street Maps were obtained. Details of the road network were derived through the analysis of the satellite's road maps while data on the volume of traffic was obtained from Lagos State Traffic Management Authority (LASTMA). The data on the volume of traffic along the roads in the study area was obtained from LASTMA in a two-year study that helped us to have a deep understanding of lead time spent along these corridors.

The population of the last national census was used for different regions of Lagos state and the environs to have knowledge of the correction between the transportation infrastructures and the

population of these regions. See Appendix 2 for data collected from LAMATA and Ikorodu ferry service.

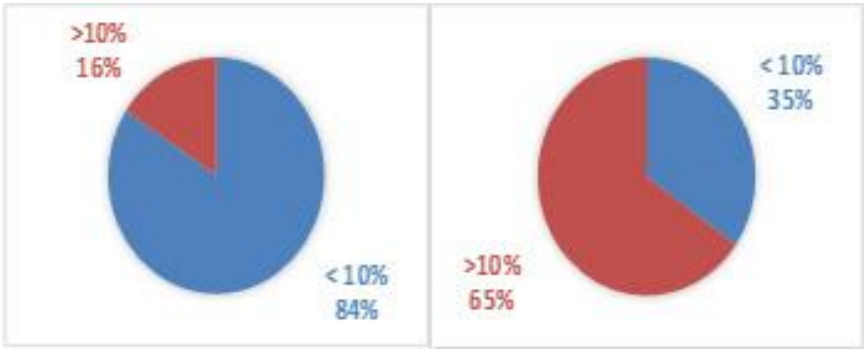
Data Analysis, Interpretation of Results, and Discussion of Findings

Research Objectives Analysis

Objective 1: Transport Poverty Metrics and Neighborhood Quality Index

Figure 2 below shows that more than half of the Suburban Neighborhood group had transportation costs that surpass 10% of their income. This situation is influenced by the different amounts of income received by each group with their travel destinations, as shown below. As a result, transport poverty is becoming increasingly prevalent in most households that need to travel far to their destinations to see their ends met or to get their basic needs, as opposed to households that travel closer to destinations because there is high accessibility, low affordability rates, in areas of the Central Neighborhood group. Significant disparities may be noted when compared to the Central Neighborhood group, where only a small fraction of respondents had transportation expenses surpassing 10% because majority of respondents in the Central Neighborhood group have transportation expenses below 10%.

Fig 2: Car ownership rate among control and experimental groups.



Left: Transport Poverty Index by Control Group; Right: Transport Poverty Index by Experimental Group.

Table 1: Transport alternatives and travel times in different households' locations.

NON-PRIVATE CAR TRIP

Locations	Available transport alternatives	Accessibility rate	Travel times	Externalities	Travel distance to Destination	Affordability
Ikeja, Magodo, Omole	Uber, BRT & Yellow Buses	Uber 43%, BRT 12%, Yellow Buses 35%	< 1Hr	Low	1.3 Km	4%
Ajah, Sangotedo	Ferry, BRT & Yellow Buses	Ferry 1%, BRT 28%, Yellow Buses 71%	> 3 Hrs	High	10 – 15 Km	15%
V I, Lekki 1	Ferry, BRT, Yellow Buses, Uber	Ferry 26%, BRT 3%, Yellow Buses 14%, Uber 57%	< 1 Hr	Low	1 Km	3.20%
Iyana Ipaja, Ayobo	BRT and Yellow Buses	BRT 46%, Yellow Buses 54%	>3 Hrs	High	15 – 25 Km	21%
Yaba, Ebute Metta	BRT, Uber, Yellow Buses	BRT 12%, Uber 23%, Yellow Buses 65%	>2 Hrs	Low	1 – 3 Km	11%
Ikorodu	Ferry, BRT, Yellow Buses	Ferry 2%, BRT 56%, Yellow Buses 42%	>6 Hrs	High	>25 Km	33%

Table 1 above shows that more than half of the central neighborhood group in the household Ikeja/Magodo/Omole/Yaba/VI Axis own a private car. While some choose alternative modes of transportation like ridesharing (Uber, In Drive Bolt Rida), etc. This is quite different from the experience of those in the suburban neighborhood groups, where very little car ownership is observed among the respondents, as seen in the data visualization, and where they are left with no choice, they are forced to use yellow bus where their fare changes at any time, incurring more cost on the respondents. On the other hand, more than half of the control group live in dwellings that are suited for formal and urban settlements. Significant disparities may be noted when contrasted to the experimental group, where only a tiny proportion have decent residences and do not live near their places of business in Lagos.

Table 2: Transport poverty metrics and neighborhood quality index in different households' locations**.**

LOCATIONS	TRAVEL TIMES	EXTERNALITIES	AVEL DISTA	LECTRICITY	GATED	HOUSE/OWNERSHIP	GOOD H20	GOOD ROADS
IKEJA/MAGODO/ OMOLE	<1HR	low	1.3 km	>20 hrs	Yes	70% rentatg	yes	yes
AJAH/SANGOTEDO	>3hrs	high	10-15km	5-10hrs	yes	50%rentatge	No	No
VI/Lekki 1	<1hr	low	1 km	>20hrs	yes	62% rentage	No	yes
Iyana ipaja/Ayobo	>3hrs	high	15-25km	< 10 hrs	no	67.42% ownership	Yes	yes
Yaba/Ebutte metta	>2hrs	low	1-3km	>20hrs	Yes	80% rentage	yes	yes
Ikorodu	>6hrs	high	>25km	<7hrs	no	87.6 Ownership	Yes	No

Source (Survey 2023)

According to the data presented in Table 2 above, most households with good access to public transportation travel very little from their houses to their destination, and their externalities are very low. The neighborhood qualities index of most of the neighborhood are very conducive, but the rate of housing ownership is very low, and they cannot afford the kind environment like experimental groups except for Ajah/Sangotedo areas where house ownership is at 50%, but Ikorodu and Iyana Ipaja have houses ownership of 87% and 80% respectively, making their journeys strenuous.

Table 3: Mann Whitney-U Analysis of the relationship between transportation poverty and independent explanatory variable in the study area

Transport **Poverty Metrics and Housing Index Statistics**	**Mann Whitney-U**	**Wilcoxon W**	**Z**	**Asymp. Sig (2 tailed)**
	110.000	320.000	-3.118	0.036

Significant at 0.05

Mann Whitney-U Transport Poverty and Neighborhood Quality Index Test shows Asymp. Sig. value < 0.05. This implies that there is a significant relationship between transportation poverty and independent explanatory variables in the study area. It can be concluded that the amount of transportation expenditure between the control group and the experimental group is different based on the income characteristics of each group.

Objective 2*:* Gaps in Transport Infrastructure and Transportation Mode Alternatives.

shows that the estimated F-value of 23.78 is bigger than the table value of 4.08 for 3 and 186 degrees of freedom, respectively, at the 0.05 level of significance. This means that there are differences in the experiences of the control and low-income groups in the state's transportation infrastructures. Many people have found the current public transportation systems to be inaccessible. Similarly, the majority of people are put off by alternate modes of transportation due to costly fares, different travel routes, and so on. Table 4 below clarifies the various types of transportation infrastructures and modes of capacity available in different households, as well as the level of utilization of these modes. It can be deduced that most public transportation infrastructures are limited in comparison to the population of some households, especially the experimental groups in particular, which have a greater degree of patronage because car ownership is quite low and they travel more than 25 kilometers to meet their wants.

Furthermore, control group Ikeja/Magodo/Omole respondents patronized ride-sharing apps more with 43% patronage, ride-sharing can easily be accessed around these localities because the ride is on a shorter distance and they utilized it, unlike experimental groups like Ajah and Ikorodu who have the best mode of travel which is the ferry, but the level of patronage is 1% due to fear of safety and high fares, BRT 28% patronage due to not easily accessible due to limitations in infrastructure capacity, control groups are compelled to use the yellow buses for their everyday journeys, which is not safe and have a very high level of affordability. Because of the ease of access to these modes, 57% of Victoria Island and Lekki Phase 1 respondents use ride-sharing apps, and 26% use waterways. Iyana Ipaja and Ayobo households are forced to use yellow buses despite their long travel times and distances because public transportation is not readily available to them due to limited capacity in infrastructure around these areas; 46% are BRT patrons, and 54% are exposed to transport externalities and price increases by yellow buses operators.

Table 4: One-Way Analysis of Variance ANOVA showing the state of current transport infrastructures and transportation mode alternatives

Variables	**N**	**Mean**	**SD**			
Transport Infrastructures	255	29.36	7.43			
Transportation Alternatives	118	27.09	8.75			
AvailableTransport Modes And Accessibility	107	25.11	5.39			
Sources of Variation	Sum of Squares	Degree of Freedom	Mean of Square	F-*Cal*	*F-tab*	Sig.
Between Groups	80.42	3	104.21	23.78	4.08	.000
Within Groups	461.45	186	30.35			
Total	541.87	189				

Significant at 0.05, df. = 3 and 186, critical F = 23.78

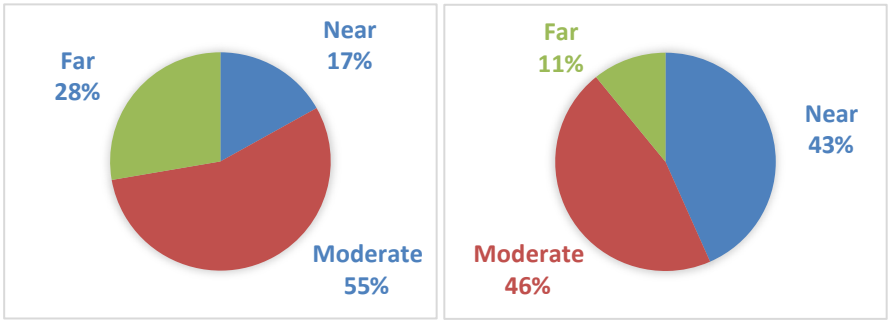
Table 5: Gaps in transport infrastructures and transportation alternatives among the respondents.

Locations	**Modes**	**Accessibility**	**Best Mode**	**Utilized**	**Reason**
Ikeja/Magodo/ Omole	Uber, BRT and Yellow Bus	Uber 43%, BRT 12%, yellow Bus 35%	Ride-sharing, BRT	Yes	Accessible
Ajah/Sangotedo	Ferry, BRT, and Yellow bus	Ferry 1%, BRT 28%, Yellow buses 71%	Ferry, BRT	No	Safety and high fares
VI/Lekki 1	Ferry, BRT, Yellow buses, Uber	Ferry 26%, BRT 3%, Yellow buses 14%, Uber 57%	Ride-sharing	Yes	Accessible
Iyana ipaja/Ayobo	BRT and Yellow Buses	BRT 46%, Yellow buses 54%	BRT	No	Not accessible due to limited infrastructure population
Yaba/Ebute Metta	BRT, Uber and Yellow bus	BRT 12%, Uber 23%, Yellow bus 65%	BRT, Ride-sharing	Yes	Accessible
Ikorodu	Ferry, BRT and Yellow bus	Ferry 2%, BRT 56 %, Yellow bus 42%	Ferry, BRT	No	Safety and high fares, BRT is limited

Source: (Survey 2023)

Objective 3: Transport Mobility Metrics and Travel Patterns

Fig 3: Composition of Transport



In this study, mobility is assessed by contrasting the travel habits of the suburban and central neighborhood groups. Utilizing the travel distance variable, mobility is assessed. The distance traveled is used to gauge each group's mobility. Three categories of distance-based mobility exist: far (> 20 km), moderate (7–15 km), and near (2 km). According to the chart (Fig. 3), most of the Suburban Neighborhood travel distances are considerable. Thus, most respondents who reside near Ikorodu, Sangotedo, and Ayobo travel considerable distances for education, work, and medical care. In contrast to half of the suburban neighborhood groups, most central neighborhoods traveled closer to their destinations. Far travel distance is another area where differences can be detected, but the Central Neighborhood group has more respondents.

When compared to the proportion of respondents in the Suburban Neighborhood group who travel far, near travel is preferred. This is determined by how each group can access public transportation and how affordable it is to rent an apartment in Lagos. Table 6 illustrates how the distance traveled by the Central Neighborhood group and the Suburban group varied based on travel conveniences when the transport mobility scores between the two groups were compared using the Whitney U-test.

Table 6: Mann Whitney-U Test for Transport Mobility Indicator and Travel Pattern

Transport Mobility Test Statistics	**Mann Whitney-U**	**Wilcoxon W**	**Z**	**Asymp. Sig (2 tailed)**
	277.000	838.000	-3.295	0.001

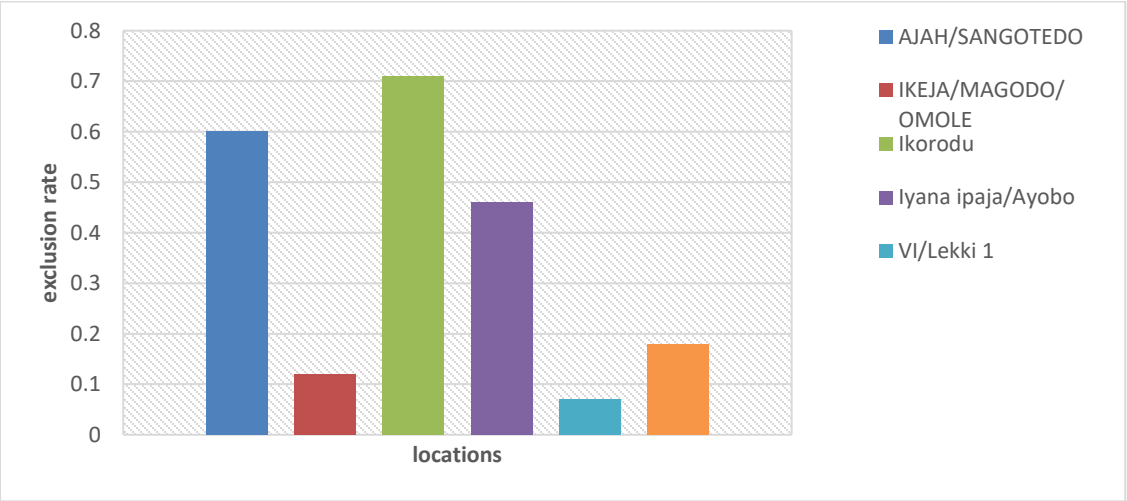
Mann-Whitney U test results have Asymp. Sig. values <0.05 which means that it can be concluded that the distance traveled between the Central neighborhood group and the Suburban neighborhood group is different based on travel convenience by each group.

Risks and Externalities of Travel

Moreover, Table 1 also shows that the longer these households travel to their destinations, the higher the risk, i.e., externalities. The control group has a lower externalities rate due to their house

proximity to their destinations, Ikeja/Magodo/Omole travel only 1hr or 1km distance to their destinations daily versus Ikorodu who spend more than 6hrs on the road on 25km daily, the latter are more exposed to externalities due to the situation of their accommodation.

Objective 4: Social Inclusion in Current Transport Modes



Source: (Survey 2023)

Fig 4: Transport exclusivity rates among the groups.

In Figure 4, the survey results of social inclusion and exclusion among various categories are shown in the graph above. Ikorodu has a 71% exclusivity rate, Ajah/Sangotedo has 60%, Iyana Ipaja/Ayobo axis has 48%, and from the control group, Yaba/Ebutte Meta is rated high amongst this group with 18%, Ikeja/Magodo/Omole 11%, and the lowest is VI/Lekki1 7%. The statistics shown above can be used to infer that the exclusivity rate varies amongst homes according to the types of transportation that are available and how frequently they are used. However, it was discovered from the survey that the accessibility of the present modes of transportation varies depending on the location. Ikorodu and Ajah/Sangotedo have waterways as one of their transportation modes, but patronage is very low because of their inability to use the resources that nature has provided. However, during the past few years, there has been a reduction in inclusivity as prices have increased across the board even for public transit in Lagos. Since many low-income groups are in areas remote from the city centre where many transport infrastructures are not present, accessibility of these transport systems by low-income societies is also a concern.

Summary of Findings

The following is the major summary of the findings:

People in the Central Neighbourhood group tend to live closer to convenient transportation options and do not have to drive or travel far to obtain basic services like hospitals, grocery stores, and

places of work, but they pay higher rent rates even when the transport externalities are minimal. The Suburban groups spend an average of more than 34.7% of their income on transportation and have a tendency to travel farther and lack access to a good transportation alternative. They also have a very high proportion of home ownership and are more likely to be affected by externalities because of their longer journey.

In addition, because of the Central group's housing proximity and good transport accessibility, the Central group's households will be more useful in their communities and their working environments because there is a tendency for them to arrive at workplaces or return home early and go to bed early, which helps them relax and lessen stress to be more productive, according to this analysis. Hence, although they spend more on house rent, there are immediate transportation options in contrast to experimental groups who travel more than 25 km per day and spend more than 6 hours on the road because they are not settled nearby. Even though the percentage of homeowners is very high in the latter category, their level of functionality and productivity at work would be lower because of stress.

Many low-income residents in Lagos are spending a significant portion of their income on transportation, with some spending more than 34.7% of their income on transportation costs alone, which has significantly perpetuated an increase in poverty levels in those households. Over 50% of residents in Lagos report difficulty accessing affordable transportation services, with many citing high fares, limited routes, and poor service quality as barriers. Marginalizing these households has successfully excluded them from getting better medical attention, good health, and well-being and negates sustainable development goals. Informal transportation services such as non-licensed taxis or motorcycles are often used by low-income residents in Lagos due to their greater availability, but these services can be dangerous and unreliable.

Many low-income residents are forced to make difficult choices between paying for transportation and meeting other basic needs such as food, housing, and healthcare. Transportation barriers can have significant impacts on low-income resident's ability to access education or employment opportunities as well as their overall health and well-being. This marginalization has reduced equality, decent work, and quality education which leads to economic underdevelopment of the city and the nation at large and negates the UN sustainable development goals.

Discussion of Findings

The findings from the analysis revealed that there is a significant relationship between transportation poverty and independent explanatory variables in the study area. This is supported by the findings of Lucas et al (2012) who opined that transport poverty refers to the inability of individuals or households to access affordable and adequate transportation services, which can limit their access to employment, education, healthcare, and other essentials. Findings from analysis specifically revealed that more than half of the experimental group incur transportation expenses that exceed 10% of their income. Usually, the groups affected by transport poverty are marginalized groups, one of which is low-income households. The findings reveal that low-income settlements have greater difficulty coping with transportation costs and the availability of alternative means of movement. This often influenced the experimental group's choices in low-quality transport services. Consequently, Okai (2023) corroborated that transport poverty is where people are unable to satisfy their daily needs and activities due to lack of access to transport,

unavailability of transport, the high cost of traveling, long time spent traveling, and the inadequacy of transport travel conditions.

The study also revealed that there are differences in individual contributions of explanatory variables to variability in transportation poverty in the study area. This finding is supported by Levinson and Krizek (2018) who stated that transport poverty is a result of the unequal distribution of transportation resources and infrastructure across different regions and socio-economic groups. The result of the analysis however suggested that travel patterns between control and experimental groups were different with relevance to how capable respondents are in affording travel around city areas with little or no good road infrastructure.

Many respondents in the experimental group however only travelled fewer distances as compared to the control group who resided in formal and urban settlements. The studies also revealed that participants of the control group mostly had private cars which aided their travel capabilities. Conversely, the participants in low-income settlements, as found in the experimental group, were posed with the challenge of transport poverty, thereby resulting in fewer travel distances and transportation alternatives.

Conclusion

The study examined transport poverty and social exclusion and its consequences in the transportation system of the Lagos megacity. Consequent to the results of the analysis, it can be concluded that transport poverty has an impact on communities' travel patterns, both from the indicator variables: transport affordability, transport mobility, transport accessibility, travel time, transport infrastructures, etc. Some factors influenced the travel patterns and experiences of the experimental group affected by transport poverty compared to the control group. The marginalized low-income settlements are revealed to have incurred higher costs of transportation when compared to their level of income, limited transport infrastructures, and availability of alternatives. Transport poverty also has an impact on social exclusion felt by communities in the city. From the study, the impact of social exclusion felt by communities affected by transport poverty is unequal access to travel locations, access to alternative transport infrastructure systems, travel costs implication on the income of low earners, etc.

It is therefore essential to enact policies and systems that would revamp the nature of transportation in Lagos, and concurrently, in Nigeria. Despite the establishment of certain modes of public transportation meant to ameliorate the challenges faced by low-income families, certain constraints still hinder the efficiency of the infrastructures. The problems that affect low-income earners include the unfavorable location of public transportation facilities, public transportation routes, non-suitability of public transportation modes, and high public transportation costs.

Recommendations

Transport poverty is one of the many factors that affect the living conditions of people. Thus, for the effects of transport poverty to be reduced to its barest minimum level, the following recommendations are suggested:

1. Transport providers in Lagos, both formal and informal, have critical roles to play in addressing transport poverty by providing affordable and reliable transportation services.
2. There should be a social inclusion policy in the Ojo-Badagry Blue Line / Ikeja Red Line projects and waterways with proper subsidy programs to reduce fares for some suburban group users.
3. Collaborating with community organizations and government agencies, and advocating for policy and funding changes.
4. Provision of affordable housing across Lagos to reduce the population of people living outside Lagos but working within the city centres.
5. Community engagement, grassroots engagement, and NGO involvement during the transportation planning process to deepen understanding of their transportation needs to create sustainable transportation solutions for the neighborhoods.
6. Provision of cheap alternative means of transportation e.g., trams across various locations within and around Lagos city.
7. Waterway transportation around the suburban groups needs to be revamped with realistic fares to attract people and reduce congestion on the road.
8. Proper real-time users per locations analysis needs to be done by LAMATA to identify times and locations for redistributed BRT bus services.
9. Increment of BRT redistribution to major areas in these areas by 23.3% to cater to the increasing population.

References

Abdullahi, M. Y. (2018). The design and management of poverty alleviation projects in Africa. Economic Development Institute of the World Bank. Washington, D.C.

Agyeman, J., Schaefer, L., & Wong, N. (2013). Urban food sharing and the emerging Boston food solidarity economy. In F. Moulaert, D. MacCallum, A. Mehmood, & A. Hamdouch (Eds.), *The international handbook on social innovation: Collective action, social learning and transdisciplinary research* (pp. 383-395). Edward Elgar Publishing.

Ajayi, J. O., Osabohien, R., Adebayo, I. T., Wojuade, C. A., &Aworemi, J. R. (2022). Urban population characteristics benchmarking inequity of access to public transport services in Ibadan, Nigeria. *Research Square, 1,* 1-13. DOI: https://doi.org/10.21203/rs.3.rs-2175321/v1

Akinlolu, O. J., & Maina, A. D. (2020). Transportation and poverty reduction in Yobe State. Direct *Research Journal of Social Science and Educational Studies, 7*(6), 153-167. DOI: https://doi.org/10.26765/DRJSSES5091231321

Akinyetun, T. S. (2021). Youth political participation, good governance and social inclusion in Nigeria: Evidence from Nairaland. *Canadian Journal of Family and Youth, 13*(2), 1–13. https://doi.org/10.29173/cjfy29648

Akinyetun, T. S., & Bakare, K. M. (2020). Identity crises and national development in Africa: An exploratory example of Nigeria and Sudan. *International Journal of Political Science and Development, 8*(1), 1–14. https://dx.doi.org/10.14662/IJPSD2020.010

Akinyetun, T. S., Alausa, J. A., Odeyemi, D. D., &Ahoton, A. S. (2021). Assessment of the prevalence of multidimensional poverty in Nigeria: Evidence from Oto/Ijanikin, Lagos State. *Journal of Social Change, 13*(2), 24–44. https://doi.org/10.5590/JOSC.2021.3.2.03

Alade, A. (2009). Household travel behaviour in Lagos. *Unpublished M. Phil Thesis*. Department of Urban & Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria

Alade, A., Olaseni, A., &Ilechukwu, V. (2019). Transport and sustainable livelihood In Lagos-Badagry peri-urban areas, Nigeria. *Journal of Sustainable Development in Africa, 21*(1), 95-114.

Alade, W., Olaseni, M., Adeniji, F., Alade, B., & Olaseni (2018). Making Lagos a cool city: A study of transport system and travel behaviour. *Proceedings of the 54th ISOCARP Congress 2018.*

Badejo, B. (2011): The transportation realities, challenges and opportunities of Lagos State: The leadership imperatives and synergies.*50th Anniversary Lecture of Great Independence Hall, University of Ibadan*, February 12, 2011, Pp 8-10.

Battellino, H. C. (2007). In search of an effective service delivery model to provide services for the transport disadvantaged. *Papers presented to the Workshop*, United State of America.

Beegle K., Christiaensen L., Dabalen A., et al. (2016). *Poverty in a rising Africa*. World Bank; Washington, DC, USA.

Birchall, J. (2019). Overview of social exclusion in Nigeria. *K4D Helpdesk Report*. Institute of Development Studies. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14809

Bowleg, L. (2012). The problem with the phrase women and minorities: Intersectionality—an important theoretical framework for public health. *American Journal of Public Health, 102*(7), 1267-1273.

Bowleg, L., Huang, J., Brooks, K., Black, A., & Burkholder, G. (2003). Triple jeopardy and beyond: Multiple minority stress and resilience among Black lesbians. *Journal of Lesbian Studies, 7*(4), 87-108.

Carastathis, A. (2014). The concept of intersectionality in feminist theory. *Philosophy Compass, 9*(5), 304-314.

Castro, A. B. R., Sandoval, A. D. O., &Odamtten, G. (2022). Up around the bend? How transport poverty can lead to social exclusion in a low-income community in Lagos, Nigeria. *Journal of Transport Geography, 102,* 103388. https://doi.org/10.1016/j.jtrangeo.2022.103388.

Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of Women in Culture and Society, 38*(4), 785-810.

Cobbinah P. B., Erdiaw-Kwasie M. O., & Amoateng P. (2015). Africa's urbanisation: Implications for sustainable development. *Cities, 47*, 62–72. doi: 10.1016/j.cities.2015.03.013

Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist, 64*(3), 170-180.

Collins, K. (2015). Intersectionality's definitional dilemmas. *Annual Review of Sociology, 41*, 1-20.

Crenshaw, K. (1989). *Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics*. University of Chicago Legal Forum, 139-167.

Crenshaw, K. W. (2011). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review, 43*(6), 1241-1299.

Currie, G., Richardson, T., Smyth, P., Vella-Brodrick, D., Hine, J., Lucas, K., et al. (2007). *Investigating links between transport disadvantage, social exclusion and well-being in Melbourne*. Preliminary results.

Daramola A. and O. Adeniji, (2009). Mobility issues for the elderly in Ibadan City, Nigeria. *Conference Proceeding on Emerging Global City: The African Challenge*. Department of Urban and Regional Planning, University of Lagos, Pp 361-377

Davis, A. (2008). *The meaning of freedom*. San Francisco: City Lights Books.

Di Ciommo, F., &Shiftan, Y. (2017). Transport equity analysis. *Transport Review, 37*(2), 139–151. doi: 10.1080/01441647.2017.1278647.

Fadare S.O. (2010). Urban form and households travel behaviour: Implications for Nigerian Cities. *Inaugural Lecture*. Obafemi Awolowo University, Ile-Ife, Nigeria

Filani, M. O. (2011). Transport and national development: Issues, challenges and the way forward. *A Commemorative Lecture delivered at the 70th Birthday Ceremony in honour of Dr. Tajudeen O. Bawa-Allah*, June 2nd, 2011.

Hagen, T. &Kjorstad, K. N. (2007). Accessibility for all: Effects of measures in the public transport field. *Journal of Transportation, 5*, 21-33.

International Labour Organization (2018). *Women and men in the informal economy: A statistical picture*. third ed. ILO; Geneva: 2018.

Jolliffe, D., &Prydz E.B. (2021). Societal poverty: A relative and relevant measure. *World Bank Economic Review, 35*(1), 180–206. doi: 10.1093/wber/lhz018.

Khan, S. (2012). *Topic guide on social exclusion*. University of Birmingham: Governance and Social Development Resource Centre. http://gsdrc.org/docs/open/se10.pdf

Khan, S., Combaz, E., &McAslan Fraser, E. (2015). *Social exclusion: Topic guide*. Revised edition. GSDRC, University of Birmingham.

Lagos Metropolitan Area Transport Authority (LAMATA) (2009). *Lagos BRT-Lite Summary Evaluation Report*. Lagos State Government, Ikeja, Lagos, Nigeria.

Lagos Metropolitan Area Transport Authority (LAMATA) (2014). *Lagos Strategic Master Plan Extension and Travel Demand Model Final Report*. Lagos State Government, Ikeja, Lagos, Nigeria.

Levinson, D., & Krizek, K. (2018). Transport poverty and low-income households. *Transport Reviews, 38*(1), 3-18.

Litman, T (2018). *Evaluating accessibility for transport planning: Measuring people's ability to reach desired goods and activities*. Victoria Transport Policy Institute www.vtpi.org/access.pdf.

Litman, T. (2004). *Rail transit in America*. A Comprehensive Evaluation of Benefits. Canada: Victoria Transport Policy Institute.

Litman, T. (2012). *Transportation and social equity*. Victoria Transport Policy Institute.

Loader, C. & Stanley, J. (2007). Growing bus patronage and addressing transport disadvantage – the Melbourne experience, Thredbo 10. *Presented at the 10th international conference on competition and ownership in land passenger transport*, 12–17 August, Hamilton Island, Australia.

Lucas, K. (2004). *Running on empty: Transport, social exclusion and environmental justice*. Bristol, UK: Policy Press.

Lucas, K., Bates, J., & Jones, P. (2012). Transport and social exclusion: Where are we now? *Transport Policy, 20*, 105-113.

Lucas, K., Mattioli, G., Verlinghieri E., et al. (2016). Transport poverty and its adverse social consequences. *Proc Inst Civ Eng Transp., 169*(6), 353–365. doi: 10.1680/jtran.15.00073.

Lucas, K., Tyler, S., & Christodoulou, G. (2007). *Assessing the ''Value'' of new transport initiatives in deprived neighbourhoods in the UK*. Transport Review, 5, 121-132.

Lykke, N. (2011). Intersectional analysis: Black box or useful critical feminist thinking technology? *Journal of Women in Culture and Society, 36*(1), 178-185.

Mátrai, T., &Óhidy, A. (2018). Transport poverty in suburban areas of the United States. *Transportation Research Procedia, 31*, 75-82.

Mattson, J (2012), *Travel behavior and mobility of transportation-disadvantaged populations: Evidence from the National Household Travel Survey, Upper Great Plains*. Transportation Institute (www.ugpti.org), North Dakota State University; at www.ugpti.org/pubs/pdf/DP258.pdf.

McCall, L. (2005). The complexity of intersectionality. *Signs: Journal of Women in Culture and Society, 30*(3), 1771-1800.

Nash, J. C. (2017). Intersectionality as a buzzword: A sociology of science perspective on what makes a feminist theory successful. *Feminist Theory, 18*(1), 67-85.

Nworgu, B. G., &Nworgu, L. N. (2013). Urban-rural disparities in achievement at the basic education level: The plight of the rural child in a developing country. *Developing Country Studies, 3*(14), 128–140.

Ogionwo, T. (2016). Social problems and the rise of terrorism in Nigeria: Implications for international social work practice. *Bachelor's Thesis*. University of Gavle. Retrieved from http://hig.divaportal.org/smash/get/diva2:897006/FULLTEXT01

Porter, G. (2008). Transport planning in sub-Saharan Africa II: Putting gender into mobility and transport planning in Africa. *Programme Development Studies, 8*(3), 281–289. doi: 10.1177/146499340800800306.

Priya, T.&Uteng, A. (2007). *The dynamics of social exclusion: some insights from Norway*. Social Exclusion Report

Roth, F., Buehler, R., & Haupt, T. (2015). Transport poverty in Germany: Empirical evidence on the relationship between residential location and mobility constraints. *Transportation Research Part A: Policy and Practice, 82*, 16-26.

Schwanen, T., Lucas, K., Akyelken, N., Carrasco, J. A., &Neutens, T. (2017). Rethinking the links between social exclusion and transport disadvantage through the lens of social capital. *Transport Policy, 56*, 1-10.

Sen, A. (1985). *Commodities and capabilities*. Oxford: Elsevier Science Publishers.

SEU (Social Exclusion Unit). (2003). *Making the connections: final report on transport and social exclusion*. Retrieved from: http://www.socialexclusionunit.gov.uk/publications/reports/html/transportfinal/summary.

Sietchiping, R., Permezel, M. J., &Ngomsi C. (2012). Transport and mobility in sub-Saharan African cities: an overview of practices, lessons and options for improvements. *Cities, 29*(3), 183–189. doi: 10.1016/j.cities.2011.11.005.

Smith, T., & Vella-Brodrick, D. (2010). Transport and Indigenous disadvantage: assessing the barriers to healthcare access. *Australian Journal of Rural Health, 18*(5), 210-214.

Smith, T., & Vella-Brodrick, D. (2010). Transport disadvantage, social exclusion and subjective well-being: The role of the built environment and transport system in experiencing well-being in urban and rural contexts. *Social Indicators Research, 97*(2), 289-312.

Smith, T., & Vella-Brodrick, D. (2010). Transport disadvantage, social exclusion and subjective well-being: The role of the built environment and transport system in Indigenous Australia. *Transport Policy, 17*(4), 191-197.

Stanley, J. & Vella-Brodrick, D. (2007). The usefulness of social exclusion as a theoretical concept to inform social policy in transport. *Transport Review, 5*, 21-27.

Stanley, J., & Lucas, K. (2008). Social exclusion: What can public transport offer? *Research in Transportation Economics, 22*, 36–40.

TCRP (Transit Cooperative Research Program). (2006). *Cost benefit analysis of providing non-emergency medical transportation, research results digest 75, TCRP Project B-27*. Washington, DC: Transport Research Board.

United Nations Development Programme (UNDP). (2018). *National human development report: Achieving human development in North East Nigeria*. UNDP.

United Nations Environment Programme (2020). *Used vehicles and the environment*. A Global Overview of Used Light Duty Vehicles: Flow, Scale and Regulation. Economy Division, United Nations Environment Programme; Nairobi, Kenya.

United Nations Habitat (2010). *Sustainable mobility in African Cities*. United Nations Human Settlements Programme (UN-HABITAT); Nairobi, Kenya.

Uzochukwu, B. S., Okeke, C. C., Ogwezi, J., Emunemu, B., Onibon, F., Ebenso, B., Mirzoev, T., & Mir, G. (2020). Exploring the drivers of ethnic and religious exclusion from public services in Nigeria: Implications for sustainable development goal 10. *International Journal of Sociology and Social Policy*. https://doi.org/10.1108/IJSSP-02-2020-0036

Wang, F. (2007). Meeting older persons' mobility and access needs: A re-think on public transport. *Transport Policy, 3*, 1-19.

World Bank (2019). *Guide for road safety opportunities and challenges: Low- and middle-income countries country profiles*. World Bank; Washington, DC., USA.

Yigitcanlar, T., Mohamed, A., Kamruzzaman, M. & Piracha, A. (2019). Understanding transport-related social exclusion: A multidimensional approach. *Urban Policy and Research, 37*(1), 97-110.

Appendix 1.

The obtained data is shown below and evaluated using frequency counts and percentages for the respondents' demographic information. The Mann Whitney-U Test Analysis and Analysis of Variance ANOVA were used to analyze differences between the control group and the experimental group living in the formal and informal settlements in the study. The Statistical Package for Social Sciences (SPSS) was used to analyze the data.

4.1.1 Demographic Description of Respondents

This section describes demographic characteristics of the respondents using frequency counts and percentage as illustrated below:

Table 4.1: Gender Distribution of Respondents

Gender	**Frequency**	**Percentages %**
Male	312	65%
Female	168	35%
Total	**480**	**100%**

According to the data in Table 1, 65% of the four hundred and eighty (480) respondents who took part in the study were males, while 35% were females. This implies that the study sampled both genders in order to assure trustworthy and fair results.

Table 4.2: Age Distribution of Respondents

Age	**Frequency**	**Percentages%**

18 years and below	48	10
19 to 30 years	153	32
31 to 40 years	124	26
41 to 50 years	81	17
51 years and above	74	15
Total	**480**	**100**

Data presented in Table 2 shows that out of four hundred and eighty (480) respondents that participated in this study, 10% of the respondents were 18years and below, 32% were between age 19 and 30 years, 26% were 31 and 40 years, 17% were between 41 and 50 years while 15% of the participants were 51years and above.

Table 4.3: Distribution of Respondents by Academic Qualification

Highest Academic Qualification	**Frequency**	**Percentages%**
SSCE	43	9
NCE	62	13
ND	104	22
Degree	171	35
Masters	83	17
PhD	17	4
Total	**480**	**100**

Data presented in Table 3 shows that out of four hundred and eighty (480) respondents that participated in this study, 9%" of the respondents were SSCE holders, 13% were NCE holders, 22% were ND holders, 35% were Degree holders, and 17% were Master's degree holders while only 4% of the participants were PhD holders.

Table 4.4: Distribution of Respondents by Employment Status

Employment Status	**Frequency**	**Percentages%**
Employed	158	33
Unemployed	47	10
Self Employed	127	26
Student	148	31

Total	**480**	**100**

Data presented in Table 4 shows that out of four hundred and eighty (480) respondents that participated in this study, 33% of the respondents were employed, 10% were unemployed, 26% were self-employed while 31% were students.

LOCATIONS	SETTLEMENT TYPE	SALARY SCALE	CAR OWNERSHIP
IKEJA/MAGODO/ OMOLE	FORMAL	> minimum wage	97%
AJAH/SANGOTEDO	INFORMAL	<> minimum wage	41%
VI/Lekki 1	FORMAL	> minimum wage	91%
Iyana ipaja/Ayobo	INFORMAL	<> minimum wage	32%
Yaba/Ebutte metta	FORMAL	> minimum wage	58%
Ikorodu	INFORMAL	<> minimum wage	26%

Appendix 2

Data collected from LAMATA /Ikorodu ferry

1. What are the Trends of BRT users (customers) over the past 5 years?
2. What is the total number of BRT across Lagos city and distributions per location?
3. What are the Customers' waiting times at the bus stop i.e., how long do customers have to wait to get onto the bus (notable causes of delay)
4. What are the actual Travel times to different locations? maybe from Ikorodu -VI - Lekki-Ajah
5. What are the infrastructure capacities (Terminal spaces across the city, BRT buses, etc.) how many people these infrastructures can accommodate?
6. What are the social inclusion strategies to reduce marginalization of people living with disabilities, Aged, and unemployed?
7. What is the average coverage per kilometer for each BRT coverage daily.?
8. What is the average number of people transported daily?
9. How long have you been providing transportation services in Lagos?
10. What modes of transportation do you provide, and on which routes?
11. What is the average fare on your transportation service, and how does it compare to other providers?
12. Have you noticed any changes in demand for transportation services among low-income riders?
13. Do you offer any discounts or subsidies for low-income riders, and if so, how are they administered?

14. Have you received any complaints from riders related to the affordability or accessibility of services?
15. Have you ever collaborated with community organizations or government agencies to address transportation barriers for low-income residents?
16. What steps have you taken to improve service reliability and accessibility, particularly for low-income riders?
17. How do you perceive the issue of transport poverty in Lagos, and what role do you think transport providers can play in addressing it?
18. Are there any policy or funding changes that you believe could improve transportation access and affordability for low-income residents in Lagos, and if so, what are they?

It discussed the approaches required to answer the research questions and achieve the set objectives. The study used mixed methods, both qualitative and quantitative method.