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"Analysis of Barriers to Accessing Urban Public Transport Services by Vulnerable Populations in Nigeria"

Analysis of Barriers to Accessing Urban Public Transport Services by Vulnerable Populations in Nigeria

By

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Abstract

This study analyzes the critical barriers hindering access to urban public transport services (UPTS) for vulnerable populations in Nigerian cities, specifically Lagos and Abuja. Focusing on groups including the elderly, persons with physical, sensory, and cognitive disabilities, the unemployed, and school children, the research identifies multi-dimensional barriers spanning infrastructural, economic, safety, institutional, and attitudinal domains. Using a survey of 364 respondents and Principal Component Analysis (PCA), the findings reveal that the most significant barriers vary by group but consistently include lack of investment in inclusive transport infrastructure, inadequacy of pedestrian support systems, safety concerns, poverty, and discriminatory practices. The study concludes that current urban transport systems systematically exclude vulnerable populations. It recommends that policymakers and urban planners prioritize targeted interventions, such as enforcing universal design standards, implementing fare subsidies, and reforming discriminatory policies, to develop an equitable and inclusive urban mobility framework in Nigeria.

Keywords: urban mobility, public transport, inclusive-mobility, vulnerable population, Nigeria

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1.0 Introduction

In most developing countries, including Nigeria, vulnerable populations face significant challenges in accessing and using urban public transport services due to mobility exclusion. This exclusion arises from the failure to adequately integrate the special mobility needs of these groups into urban transport planning, policy formulation, and operational frameworks. The vulnerable population comprises individuals such as persons with disabilities, the elderly, children, and low-income or unemployed persons, whose specific needs differ from those of the general commuting public. Consequently, these groups experience various forms of disadvantage when using urban transport systems designed without consideration of their unique requirements.

Persons with disabilities—those with long-term physical, mental, intellectual, or sensory impairments—encounter a range of physical, attitudinal, and institutional barriers that impede their ability to use public transport on an equal basis with others. These barriers could easily be mitigated by understanding and incorporating their additional mobility needs into urban transport design. Similarly, the elderly and children face age-related barriers that influence their comfort, safety, and accessibility while using public transport systems. Differences in boarding ease, travel time, and speed preferences between age groups underscore the necessity for inclusive and age-sensitive transport planning. In addition, the poor and unemployed segments of the urban population face affordability challenges, as their low-income status limits their capacity to pay prevailing transport fares, creating an income-related barrier to mobility.

In Nigeria, several cities have made commendable efforts to establish urban transport schemes aimed at improving mobility. For example, Lagos has developed an operational Bus Rapid Transit (BRT) system and is gradually expanding a metro rail network, while Abuja maintains a city-wide mass transit bus system serving its growing population. Despite these advancements, the design and operation of these systems often neglect the special mobility requirements of vulnerable groups. The low-income poor, the disabled, and the elderly continue to experience systemic exclusion in accessing affordable and safe transport services. Consequently, these populations often face immobility situations that limit their participation in social and economic activities, exacerbating poverty and social inequality.

Barriers to accessibility reflect the range of difficulties that vulnerable populations face in accessing and using public transport systems. These barriers are multi-dimensional—spanning economic, infrastructural, institutional, environmental, and attitudinal domains—and interact to compound the exclusion of vulnerable populations from urban mobility. Empirical studies such as Mamun and Lownes (2011) and Currie (2014) identified poverty, low income, and high transport fares as key determinants of transport exclusion among vulnerable groups, as affordability directly affects their ability to access urban mobility. Blumenberg and Pierce (2014) and LINKS (2021) further identified a wide range of specific barriers that constrain access to urban public transport, including:

(i) Lack or inadequate investment in transport infrastructure, such as roads, metro rail systems, and inland waterways, which limits connectivity between residential, employment, and recreational areas where vulnerable groups reside.

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(ii) Absence of adequate pedestrian support infrastructure—such as sidewalks, zebra crossings, and pedestrian bridges—especially in Nigerian cities like Lagos and Abuja, where pedestrians, vehicles, and motorcycles often share the same right of way, endangering physically disabled users.

(iii) Safety concerns, resulting from frequent road traffic accidents involving public transport vehicles and pedestrians, which discourage vulnerable groups from using urban transport systems.

(iv) Unemployment-related poverty and low income, which limit affordability and accessibility of transport services.

(v) Extent and level of disability, which inherently constrain the mobility and participation of persons with disabilities in society.

(vi) Discriminatory attitudes and remarks, which create psychological and social barriers for vulnerable users.

(vii) Failure to integrate the special mobility needs of vulnerable groups into transport design and policy frameworks.

(viii) Increased travel time and delays, which disproportionately affect individuals with mobility impairments or time-related limitations.

(ix) Institutional barriers, including discriminatory laws, policies, and practices that fail to consider the needs of the disabled and vulnerable populations (LINKS, 2021).

(x) Environmental barriers, such as the lack of accessible physical infrastructure (ramps, doorways, toilets, or transport facilities) and the absence of accessible communication and support services (LINKS, 2021).

(xi) Attitudinal barriers, which foster stigma and discrimination, often viewing persons with disabilities as dependents rather than active contributors to development. Such attitudes hinder social inclusion and discourage public participation by the vulnerable (LINKS, 2021).

(xii) . Educational and skills-training barriers, as limited access to education and training opportunities—caused by poverty, physical inaccessibility, and discrimination—reduces the employability and economic independence of persons with disabilities (Leonard, 2018; LINKS, 2021).

These interrelated barriers perpetuate the cycle of immobility, social exclusion, and economic deprivation among vulnerable populations in Nigeria's urban centers. Despite the recognition of these challenges, available empirical evidence remains inadequate in quantifying the extent to which these barriers impact

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access to urban public transport among different vulnerable groups. Consequently, there is a critical need to identify and analyze the most significant barriers to public transport accessibility for vulnerable populations in Nigerian cities.

This study, therefore, seeks to fill this knowledge gap by systematically analyzing the factors that constrain access to urban public transport services among vulnerable populations in Nigeria. The outcome is expected to guide policymakers, transport planners, and urban development agencies in formulating inclusive, equitable, and sustainable urban transport policies that promote mobility for all citizens.

2.0 Literature Review

2.1: Barriers to Accessibility of Public Transport

The concept of barriers to accessibility connotes the difficulties that those in need of public transportation encounter in their bid to access and use public transport infrastructure and services. For example, unemployment has been identified to breed poverty and lack of income earnings, low income consequently affects affordability of public transport fares, depending on the prevailing fare levels. High fares levels of cost of purchase on public transport services, can thus affect the access to and use of public transport services by the vulnerable poor, thereby constituting a barrier (Mamun and Lownes, 2011; Currie, 2014).

Studies by Blumenberg and Pierce (2014) identified the following as barriers to access and use of public transport services by the vulnerable populations in urban cities

(i) Lack of and inadequate investment in necessary transport infrastructure. The lack of or inadequate investment in the required public transport infrastructure such as road networks, metro rail systems, inland water transport systems, etc., to reach and link the spatially distributed zones and locations (residential, work, recreational, etc.,) where the vulnerable population are domiciled limit their access to and use of public transport services.

(ii) Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. In most roads in the urban cities in Nigeria, pedestrian walk ways, pedestrian bridges and zebra crossing are lacking and this constitute barrier to the access and use of public transport to the vulnerable population, particularly the disabled. For example, the private cars, tricycle operators, motorcyclists, and even bus share the same right of way with the pedestrians in most Nigerian cities like Lagos and Abuja. This endangers the safe use of the road by the disabled population and constitute barrier to the access and use of transport

(iii) Safety concerns. The high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability.

(iv) Unemployment related Poverty and Low income. The unemployed status and low-income status of some components of the vulnerable population affect their purchasing power and affordability of public transport. This constitute barrier to the access to mobility

(v) Extent and level of disability. Disability in itself is a barrier to access to transport participation in society. The extent and level to which an individual is affected by or suffers disability can limit their access to and use of public transport and thus constitute barrier.

(vi) Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled.

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(vii) Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system.

(viii) Increase travel time and the associated delay,

(ix) Institutional barriers**:** this includes the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities. LINKS (2021) note that even though discrimination may not be intended, the systems indirectly exclude people with disabilities by not taking their needs into account. For example, the planning and design of the public transport system in many Cities across Nigeria have over the years failed to consider the mobility needs of the disabled population and the vulnerable. This may not be intentional, but the transport policies of most states in Nigeria and the Nation have not considered developing policies that take care of the needs of the vulnerable population and the disabled.

(x) Environmental barriers: According to LINKS (2021), inaccessible environments reinforce disability by creating barriers to participation and inclusion. This includes but is not limited to physical access (such as lack of ramps, narrow doorsteps, lack of accessible toilets, or inaccessible transport), inaccessible communication and information and lack of affordable support services for people with disabilities (LINKS, 2021). In Kaduna State for example, the Association of the Blind assert that their greatest challenge is how to get our goods to the markets. They observed that their continual lack the support of the Government to do this independently increases our cost of doing business (LINKS, 2021).

(xi) Attitudinal barriers: This result in stigmatization and discrimination and deny people with disabilities their dignity and potential. Commonly expressed by an inability to see past the impairment, attitudinal barriers mean persons with disability are commonly misrepresented as people to be pitied rather than as people who can contribute to the development of Nigeria. Society widely views disability as a charity issue which is to some extent also reflected in the way DPOs work, often taking a welfare approach to the support of their members in the absence of any productive opportunities (LINKS, 2021). The study postulates that attitudinal barriers are the most significant barrier to the participation of people with disability in economic activities. It observed that an average of 1 in 3 people with disabilities reported that they received negative feedback or were given inadequate attention after disclosing their impairments to potential employers (LINKS, 2021).

(xii) Education and skills training: LINKS (021) notes that barriers to participation in education and training, place people with disabilities at a disadvantage in the job market and can hold them back as entrepreneurs. The access to education gap between people with and without disabilities in Nigeria is significant and increases at each level of education (LINKS, 2021). According LINKS (2021), studies by Leonard (2018) found that the literacy rate across Nigeria is 36% for people with disabilities compared to 64% for people without disabilities. The rate is lowest for women/girls with disabilities at only 21% across Nigeria. However, LINKS (2021) reported that the most significant barriers to acquiring an education are household poverty, inaccessibility with respect to physical structures, appropriate information formats, in-class communication support, assistive technology, and discrimination. These constitute barriers to access to and use of public transport in Nigerian cities. The extent to which each of the identified factors limits the access to and use of public transport to the different components of the vulnerable population in Nigerian cities will be examined in the study.

2.2 Barriers to urban mmobility and the Economic Consequences

Mirandaa, Marilia, and Olmos (2014) describe immobility as the condition of being fixed in place due to the inability to access and use available public transport systems to fulfill mobility needs. This occurs when barriers such as poor road connectivity, disability, or affordability constraints prevent individuals, particularly vulnerable groups, from achieving mobility.

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Immobility carries significant economic consequences. Castella et al. (2005) and Mirandaa, Marilia, and Olmos (2014) argue that populations experiencing immobility are unable to participate fully in social and economic activities, leading to poverty and associated health and social challenges. The economic cost of immobility can be quantified as the monetary value of income lost during periods of restricted mobility. Urban planners can use these cost estimates to advocate for compensation schemes or policies that support vulnerable populations affected by immobility.

Hidayati, Tan, and Yamu (2021), in their study titled "Conceptualizing Mobility Inequality: Mobility and Accessibility for the Marginalized," highlighted variations in the conceptual understanding of mobility inequality and its application in planning practices. Through a meta-analysis of 270 publications spanning five decades, they identified intrinsic and extrinsic factors influencing mobility inequality. Their findings revealed significant challenges in integrating inclusivity into public transport planning for marginalized populations. They concluded that future research and planning should prioritize inclusivity to minimize the inequality gap and enhance the economic participation of vulnerable populations in urban areas.

2.3 Public Transportation Options for the Vulnerable Population in Nigerian Cities

The definition of vulnerable populations in the context of mobility is multidimensional, encompassing economic, health, and social domains. According to AJMC (2006), vulnerable populations include the economically disadvantaged, racial minorities, low-income groups, the unemployed, children, the elderly, the homeless, people with HIV/AIDS, and individuals with chronic health conditions or severe mental illness. Such groups experience exclusion and reduced quality of life due to their limited access to essential services, including transportation. Burton et al. (2004) reinforce that vulnerable populations face barriers not only in healthcare or financial services but also in mobility, where inadequate transport access exacerbates poverty and inequality. Disability is widely considered a core component of vulnerability. LINKS (2021) redefines disability from a purely medical condition to a socially constructed disadvantage shaped by environmental, institutional, and attitudinal barriers. This perspective emphasizes that impairments become vulnerabilities when urban systems fail to accommodate them.

In Nigerian cities, vulnerable groups can be broadly categorized into:
- Economic domain: unemployed, low-income earners, uninsured individuals.
- Health domain: people with chronic diseases, physical or mental disabilities, or age-related impairments (Noland et al., 2016).
- Social domain: migrants, refugees, and socially excluded groups.

These classifications highlight the need for urban transport systems to incorporate tailored interventions that address the heterogeneous needs of vulnerable groups.

Nigeria's urban transport systems provide a range of options, including public buses, shared taxis, ride-hailing services, motorcycles, bicycles, and pedestrian pathways. Lagos, the country's commercial hub, has made limited advances in metro rail and Bus Rapid Transit (BRT) systems, though such modes remain largely unavailable in other cities (Mackett, 2021; Hwang, Reuscher & Wilson, 2016). While these services technically exist for the general population, vulnerable groups often struggle to access them due to affordability, infrastructural barriers, and competition with more advantaged commuters. For instance, the disabled and elderly are frequently crowded out of public buses or face difficulty navigating poorly designed stations and walkways (Mackett, 2017).
Globally recognized mobility support services such as travel training programs, volunteer transport schemes, or

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transport voucher systems remain absent in Nigerian cities. This contrasts sharply with practices in developed contexts where such schemes are integrated into social welfare programs. The absence of these services worsens the disadvantage of vulnerable groups, especially the disabled and unemployed, whose access to transport is not prioritized in practice despite existing policy frameworks.

Several policy documents highlight Nigeria's recognition of inclusive mobility needs, including the National Disability Act (2018), Lagos State Transport Sector Reform Law (2018), and the Nigerian National Transport Policy (2019). These policies stress the need for affordability, safety, and accessibility in public transport for vulnerable groups. However, the lack of enforcement and operationalization of these policies has led to persistent gaps in service delivery, resulting in a mobility crisis for vulnerable populations.

2.4 Access to Public Transport Services

Accessibility, a central concept in transport planning, is defined as the ease with which individuals can reach spatially distributed opportunities (Conway et al., 2018). It is both a measure of mobility potential and a determinant of social equity. Accessibility challenges often manifest in increased travel time, traffic congestion, high fare structures, or inadequate service coverage (Blanchard & Waddell, 2017). These challenges disproportionately affect vulnerable populations, particularly in Nigerian cities, where transport-land use dynamics are poorly coordinated. Accessibility measures are classified into infrastructure-based, person-based, utility-based, and place-based categories (Conway & Stewart, 2019). In practice, place-based measures dominate regional planning (Boisjoly & El-Geneidy, 2017). However, accessibility in Nigerian cities remains weak due to infrastructural deficiencies, poor enforcement of inclusive policies, and limited modal alternatives.

To ensure accessibility, it is important that barriers to access of urban public transport by the vulnerable population be addressed. Empirical information on the significance of the barriers identified factors is currently inadequate and lacking. This study therefore seeks to address this existing knowledge gap in seeking to identified the most significant factors that constitute determinant barriers to access to urban public transport services by components of the vulnerable population.

3.0 Methodology

The study used survey research design method in which structured questionnaire was used as survey instrument to obtain primary data used in the study. Studies by Blumenberg and Pierce (2014) and LINKs (2021) are already in agreement that the following identified factors constitute barriers to access and use of public transport services by the vulnerable populations in urban cities

(i) Lack of and inadequate investment in necessary transport infrastructure.
(ii) Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads
(iii) Safety concerns.
(iv) Unemployment related Poverty and Low income.
(v) Extent and level of disability. Disability in itself is a barrier to access to transport participation in society. The extent and level to which an individual is affected by or suffers disability can limit their access to and use of public transport and thus constitute barrier.
(vi) Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled.
(vii) Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system.
(viii) Increase travel time and the associated delay,
(ix) Institutional barriers**:** this includes the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities.
(x) Others.

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Structured questionnaire was used to elicit responses from the sampled respondent on the extent to which each of the identified factors constitute barriers to their access to urban public transport use.

3.1 Population and sampling techniques

The study population consists of the vulnerable population in Lagos and Abuja metropolis, consisting of poor-unemployed population, the physically disabled and medical disabled, the vision impaired, the elderly and aging (those 70 years and above who are already retired from work), school children and other children with disability. These form the population of the study from which sample was drawn.

The study adopted purposive random (non-probability) sampling method. This is most appropriate for the research due to need to get responses only from the components of the vulnerable population. Each component of the vulnerable population identified above was deliberated/purposively sampled randomly and included in the study in order that responses on extent to which each factor constitute barrier to their urban public transport access. Thus, the research questionnaire was purposively administered to randomly selected members of the vulnerable populations in Lagos and Abuja facing challenges in overcoming their barriers to accessing mobility. To determine the appropriate sample size for large (infinite) population and uncertain number of individuals to administer the survey instruments to, the study used the z-score for unknown population. This is because the number of the vulnerable population having mobility difficulties in the two frontline cities is uncertain or unknown, even though the populations of the cities are known. The equation below was applied. The sample size for population of the study will be determined by using:

$n = Z^2/4E^2$

where; n = Sample size; Z = Z score at 95 percent level of confidence = 1.96

E = Maximum acceptable error = 0.05

Thus, we have:

$N = 1.96^2/4(0.05)^2$

n = 364 disabled/vulnerable population.

Thus, the number of questionnaires and checklist will be administered and responses collected from 364 randomly selected vulnerable people in the cities. This will consist of about 182 questionnaires to each of Abuja and Lagos. Similarly, each of the ten components of the vulnerable population will get at least 35 survey instruments (questionnaires) randomly

3.2 Testing Reliability of the Instrument

To measure the reliability and internal consistency of the survey instrument, we used the slit-half reliability correlation index. It was determined after administering the survey instrument once to overcome the problems associated with testing over multiple time periods. Reliability is will thus be determined using the slit-half reliability index. The split half estimate will be done by dividing up the test into two parts first half of the items/second half of the items), administering the two forms to the same group of individuals in the population and correlating the responses. The coefficient alpha is the mean (average) of all possible split half estimates while the existence of differences between the two would be used to assess reliability.

To estimate coefficient alpha (a), we use:

$$a = \frac{n}{(n-1)[1-SumVar(Y)/Var(X)]} \ldots.$$

Where n = Number of items

Sum Var(Y) = Sum of item variances

Var(X) = Composite variance.

Since many respondents, about 364 raters will be indicating their mobility needs; correlating the responses of the respondents for each criteria of response, enables us to measure the reliability of the responses. A correlation coefficient of 0.77 was obtained which indicates about 77% high reliability.

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3.3 Method of Data Analysis: Principal Component Analysis (PCA)

The objective of the study is to determine the significant barriers hindering access to urban public transport services by components of the vulnerable population (disabled, the elderly, the poor-unemployed, and children) in Nigerian frontline cities. The study actualized this objective by the use of the Principal Component Factor Analysis (PCA). The barriers to accessing urban mobility by the vulnerable population as aforementioned in the empirical review (LINKs 2021) as identified below:

Table1. Factors that constitute Barriers to ease of Access to and use of Urban Public Transport in Cities

Barriers
Lack of and inadequate investment in necessary transport infrastructure for vulnerability types(LITI)
Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU)
Safety concerns. The high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability. (STAC)
Extent and level of disability. Disability in itself is a barrier to access to transport participation in society. (ELD)
Unemployment related Poverty and Low income (ERPI)
Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled. (DRAD)
Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system. (IFMND)
Increase travel time and the associated delay, (ITTD)
Institutional barriers: this includes the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities. (IB)
Others: Please specify:

Sources: Field survey and review of literature. 2025

Table1 above shows the data on the identified barriers to limiting the components of the vulnerable population from accessing urban public transport services satisfactorily to the extent of their needs from use of urban public transport services in the Lagos and Abuja frontline states in Nigeria. Primary data obtained on each of the factors above were analyzed using Principal Component factor Analysis (PCA).

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4.0 Results and Discussion of Findings

Table2: Determinant Barriers to Access to Urban Public Transport Needs of the Aged and Elderly component of the vulnerable population in Nigerian frontline cities.

	Mean	Std. Deviation	Analysis N
LITI	16.8750	4.70929	32
LPSU	14.0625	4.98991	32
STAC	12.8125	4.56803	32
ELD	13.1250	4.70929	32
DRAD	13.7500	4.91869	32
ERPI	15.0000	5.08001	32
ITTD	14.3750	5.04016	32
IFMND	13.4375	5.45325	32
IB	15.6250	5.04016	32

Communalities

	Initial	Extraction
LITI	1.000	.521
LPSU	1.000	.913
STAC	1.000	.654
ELD	1.000	.792
DRAD	1.000	.491
ERPI	1.000	.520
ITTD	1.000	.728
IFMND	1.000	.715
IB	1.000	.759

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.009	22.317	22.317	2.009	22.317	22.317
2	1.556	17.294	39.611	1.556	17.294	39.611
3	1.441	16.006	55.616	1.441	16.006	55.616
4	1.088	12.083	67.700	1.088	12.083	67.700
5	.953	10.584	78.284			
6	.861	9.565	87.849			
7	.684	7.595	95.445			
8	.410	4.555	100.000			
9	3.394E-017	3.771E-016	100.000			

a. 4 components extracted. Source: Author. 2025.

Table2 above is the result of the Principal Component Factor Analysis (PCA) conducted to determine the determinant barriers to access to urban public transport services in frontline Nigerian cities by the aged and elderly. This becomes necessary since some of the barrier factors may be positively correlated such that they increase or decrease in the same direction. As a result, the PCA will reduce the number barriers to only significant barriers in order that the urban public transport planning authorities can prioritize the elimination of the barriers to accessibility of UPTS by the aged and elderly starting with the determinant barriers.

The mean values of the barrier factors range from 12.81 (STAC) to 16.87 (LITI), indicating that some variables have higher central tendencies. The standard deviations are relatively close across variables, suggesting moderate dispersion around the means. The result indicates that while Lack of and inadequate investment in necessary

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transport infrastructure for vulnerability types (LITI) has a mean score of 16.87 with standard deviation of 4.709, Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) has a mean score of 14.062 with standard deviation of 4.99.

Similarly, Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barrier to accessing UPTS has mean score of 12.81 with standard deviation of 4.57 while the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 13.13 with standard deviation of 4.71.

Identified barriers such Unemployment related Poverty and Low income (ERPI), Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD), Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 15.00, 13.75, 14.38, 13.44, and 15.63 with standard deviations of 5.08, 4.92, 5.04, 5.45 and 5.0 respectively.

The correlation matrix reveals the relationships between the variables while the communalities which represent the proportion of variance in each variable that is accounted for by the extracted factors. Indicate that the highest communalities are for LPSU (0.93), ELD (0.792), IB (0.759), and ITTD (0.728). These high communalities suggest that these variables contribute significantly to the extracted principal components. The lowest communalities are DRAD (0.491), ERPI (0.520), LITTI (0.521) and STAC (0.654). These lower values indicate that these factors have no strong or significant contributions.

The Eigen values indicate that only four principal components with Eigen values that are each greater than one (Eigen >1) are extracted as the determinant factors. That is, principal components PC1 to PC4 with the Eigen values 2.01, 1.56, 1.44 and 1.09 are extracted. The table4.35 below shows the factor factors loadings of the variables (individual barriers to access to UPTS by components of the vulnerable population.

Table3: factor Loading/Component Matrix of the individual barrier Types.

Factors	Component			
	1	2	3	4
LITI	.637	-.061	.323	-.084
LPSU	.117	.313	-.613	-.653
STAC	-.374	.496	-.113	.505
ELD	-.323	-.624	-.501	.215
DRAD	.601	.219	.284	-.032
ERPI	-.537	.414	.207	.132
ITTD	-.115	-.750	.389	-.037
IFMND	.668	.105	-.059	.504
IB	-.486	.162	.646	-.282

. 4 components extracted., Source: author calculation. 2025.

Table3 shows the factor loadings for each barrier factor (variable) across the four extracted principal components. Variables with higher absolute values (≥ 0.5|) are more strongly associated with a given component. For principal component 1 which relates to infrastructural availability, the strongest influences is from LITI with factor loading of 0.64, while for principal component2 which has to do with service structure and availability, the strongest influences are from ITTD with factor loading of 0.75, ELD with factor loading of 0.62, and STAC with a loading of approximately 0.50. For principal component3 which has to do with service affordability, the strongest influence is from IB with factor loading of 0.65, LPSU with factor loading of 0.613, and ELD with factor loading of 0.501.

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Lastly for principal component 4 which relates to safety policy effectiveness the strongest influences are from LPSU with factor loading of 0.65, STAC with factor loading of 0.51and IFMND with factor loading of 0.50.

The PCA result identified 4 principal component factors considered by the aged and elderly as hindering their access to UPTS to include factor related infrastructural availability, service structure and availability, factors related to service affordability and safety policy effectiveness . The first four components are responsible for 67.7% of the variances. The figure-8 below shows the screen plot of the extracted principal components based on Eigen values.

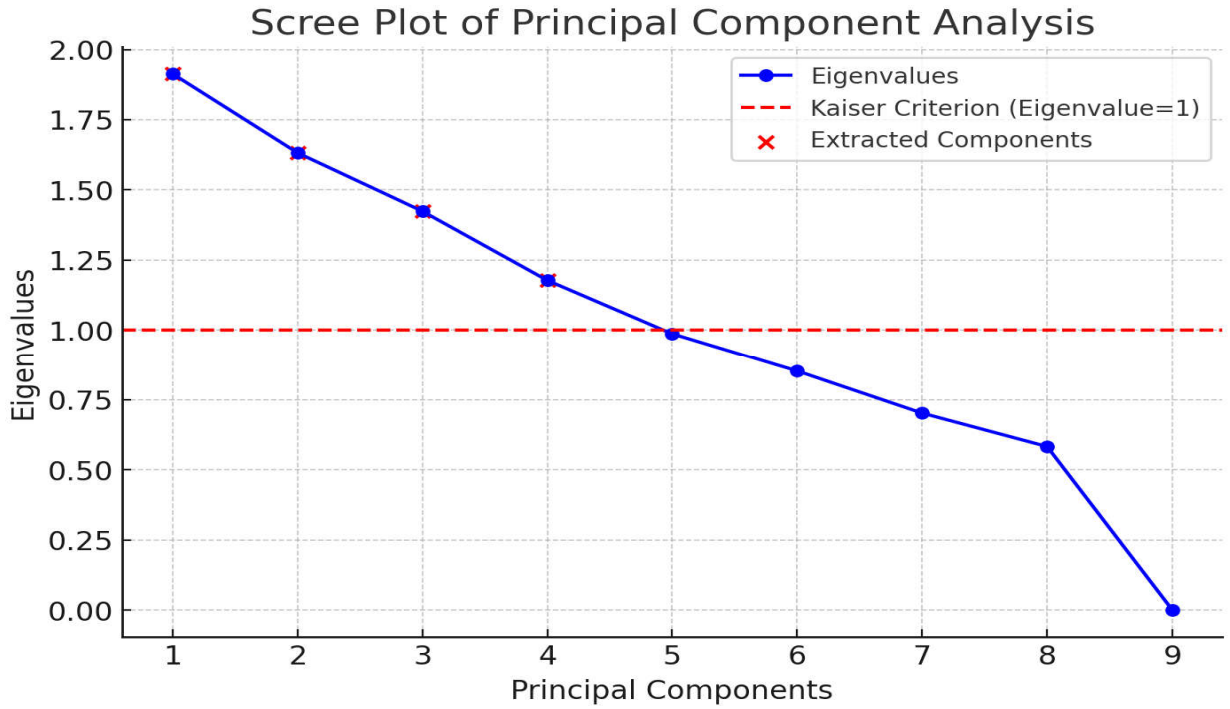

Figure-1: screen plot of the extracted principal components based on Eigen values. Source: Prepared by the author. 2025.

However, from the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute barriers to the aged and elderly in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a strong or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are:

(i) Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI)

(ii) Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU)

(iii) Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC)

(iv) Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD)

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(v) Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND), and

(vi) Increased travel time and the associated delay (ITTD)

The implication is that in order to improve access to UPTS for the aged and elderly component of the vulnerable population, urban transport planning authorities should focus on improving the four principal component barrier factor which include factors related infrastructural availability (PC1), service structure and availability (PC2), factors related to service affordability (PC3) and safety policy effectiveness (PC4). This they will achieve by prioritizing the elimination of the determinant significant barriers such as Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU), Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD), Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND), and Increased travel time and the associated delay (ITTD)that strongly limit the aged and elderly from accessing UPTS in manner and to the extent they need.

Table-4: The Significant Barriers to UPTS Access by the HDC Component of the Vulnerable Population in Nigerian Cities

	Mean	Std. Deviation	Analysis N
LITI	16.2857	4.90241	35
LPSU	12.8571	4.58349	35
STAC	13.4286	4.81594	35
ELD	12.2857	4.26043	35
DRAD	14.8571	5.17093	35
ERPI	15.1429	5.07093	35
ITTD	15.5429	4.71093	35
IFMND	10.8571	4.10984	35
IB	13.1429	5.15719	35

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.098	23.314	23.314	2.098	23.314	23.314
2	1.614	17.929	41.243	1.614	17.929	41.243
3	1.458	16.204	57.447	1.458	16.204	57.447
4	1.113	12.371	69.817	1.113	12.371	69.817
5	.999	11.097	80.915			
6	.716	7.956	88.870			
7	.623	6.926	95.797			
8	.378	4.203	100.000			
9	-1.143E-016	-1.270E-015	100.000			

Component Matrix[a]

	Component			
	1	2	3	4
LITI	.756	.328	.313	.047

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LPSU	.228	.465	-.626	-.443
STAC	-.744	.162	.140	-.074
ELD	.093	-.732	-.432	-.163
DRAD	-.327	.140	-.428	.089
ERPI	-.535	.148	.544	-.345
ITTD	.554	-.564	.377	.117
IFMND	.419	.593	.142	.213
IB	-.193	-.125	.348	.286

Source: prepared by the author. 2025.

Table-4 shows the result of the PCA implemented to identify the significant barriers to UPTS accessibly by the HDC Component of the Vulnerable Population in Nigeria **Cities.** This becomes necessary since some of the barrier factors may be positively correlated such that they increase or decrease in the same direction. As a result, the PCA will reduce the number barriers to only significant barriers in order that the urban public transport planning authorities can prioritize the elimination of the barriers to accessibility of UPTS by the HDC starting with the determinant barriers.

The mean values of the barrier factors range from 10.86 (IFMND) to 16.29 (LITTI), indicating that some variables have higher central tendencies. The result indicates that while Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 16.29 with standard deviation of 4.90, Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND), 10.86 with standard deviation of 4.11. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 12.86 and 13.43 with standard deviations of 4..58 and 4.82 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 12.29 with standard deviation of 4.21 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 14.86 with standard deviation of 5.07.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 15.14, 15.54 and 13.14 with standard deviations of 5.07, 4.71 and 5.16 respectively.

The result also indicates that four 4 principal components with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the first principal component which relates to infrastructure availability explains about 23.31% of the variances while the second principal component which relates to service UPTS quality explains about 17.93% variances in the barrier factors. The third principal component which relates to proximity and affordability explain about 16.20% of the variances while the fourth principal component related to safety of UPTS use by the HDC component of the vulnerable population explains about 12.37% of the variances with each of the first component, second principal component, third and fourth principal components having respective Eigen values of 2.1, 1.61, 1.46 and 1.11. Jointly, the four principal components explained about 70% total variances in the identified barrier factors. The screen plot of the extracted components based on the Eigen values is shown in figure-9 below.

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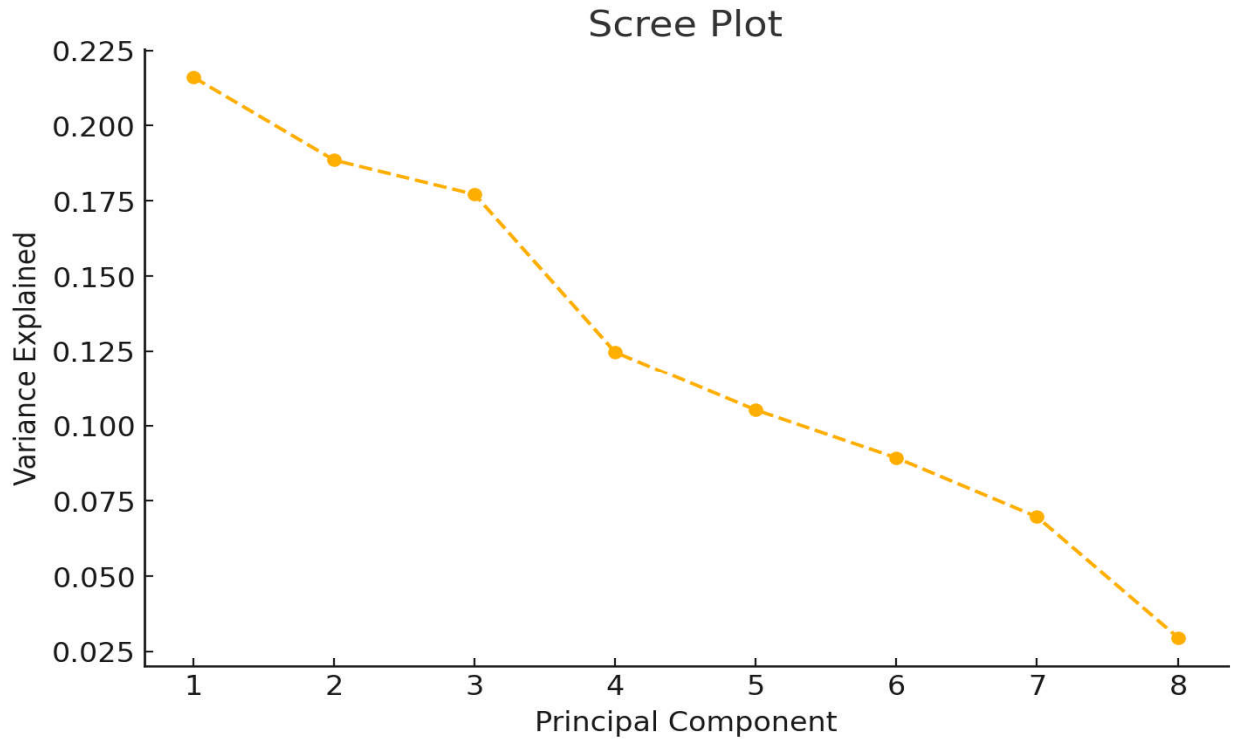

Figure 9: Screen Plot of the extracted components based on the Eigen values.
Source: prepared by the author. 2025.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the HDC component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LITI (0.756>0.5); LPSU (0.626>0.5); STAC (0.744>0.5); ELD (0.732>0.5); ERPI (0.535>0.5) ITTD (0.554>0.5) and IFMND (0.593>0.5). These constitute the significant barrier factor to accessing UPTS by the HDC component of the vulnerable population with Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI), Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) and the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) being the among the most significant barriers, meaning that infrastructure, UPTS safety concerns and extent of disability are among the most significant barriers facing the HDC component of the vulnerable population from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system in Nigerian cities must address these identified significant barrier factors.

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Table-5: The Significant Barriers to the Urban Mobility by School Children without Physical Disability(CSA) in Nigerian cities.

	Mean	Std. Deviation	Analysis N
LITTI	14.5714	5.05433	35
LPSU	13.2857	4.99159	35
STAC	15.4286	5.05433	35
ELD	12.8571	4.58349	35
DRAD	13.4286	4.81594	35
ERPI	15.1429	5.07093	35
ITTD	16.0000	4.97050	35
IFMND	13.1429	4.71008	35
IB	13.4286	4.81594	35

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.800	31.111	31.111	2.800	31.111	31.111
2	2.503	27.812	58.923	2.503	27.812	58.923
3	1.270	14.111	73.033	1.270	14.111	73.033
4	1.070	11.886	84.919	1.070	11.886	84.919
5	.676	7.514	92.433			
6	.531	5.901	98.334			
7	.128	1.426	99.760			
8	.022	.240	100.000			
9	9.565E-018	1.063E-016	100.000			

	Component			
	1	2	3	4
LITI	-.250	.034	.688	-.543
LPSU	.419	-.432	-.207	-.323
STAC	-.084	.856	.228	.247
ELD	-.066	-.054	.179	.425
DRAD	.878	-.126	.243	.353
ERPI	-.207	.462	-.666	.145
ITTD	-.157	.890	.277	.123
IFMND	-.077	-.052	.175	.378
IB	.078	-.126	.243	.353

a. 4 components extracted. Prepared by author 2025.

Table-5 shows the result of the PCA implemented to identify the significant barriers to UPTS accessibly by the CSA Component of the Vulnerable Population (in Nigerian Frontline Cities. The PCA will reduce the number barriers to only significant barriers in order that the urban public transports planning authorities can prioritize the elimination of the barriers to accessibility of UPTS children of school age without physical disability, starting with the determinant barriers.

The mean values of the barrier factors range from 12.86 (ELD) to 16.00 (ITTD), indicating that some variables have higher central tendencies. The result indicate that while Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 14.57 with standard deviation of 5.054, Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND), has a mean score of 13.1 with standard deviation of 4.71, Lack of and inadequacy of pedestrian support

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infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have respective mean scores of13.29 and 15.43 with standard deviations of 4.99 and 5.05 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 12.86 with standard deviation of 4.58 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 13.43 with standard deviation of 4.81.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 16.00, 15.14 and 13.43 respectively.

The result also indicates that four 4 principal components with each having Eigen values greater than 1 were extracted. The explained variance ratio indicate that the first principal component which relates to fare affordability explains about 31.11% of the variances while the second principal component which relates to safety effectiveness of UPTS explains about 27.81% variances in the barrier factors. The third principal component which relates to proximity explain about 14.11% of the variances while the fourth principal component related to infrastructure availability of UPTS use by the CSA component of the vulnerable population explains about 11.88% of the variances with each Eigen values greater than 1. They four extracted principal components jointly explained about 85% total variances in the identified barrier factors. The screen plot of the extracted components based on the Eigen values is shown in figure-10 below.

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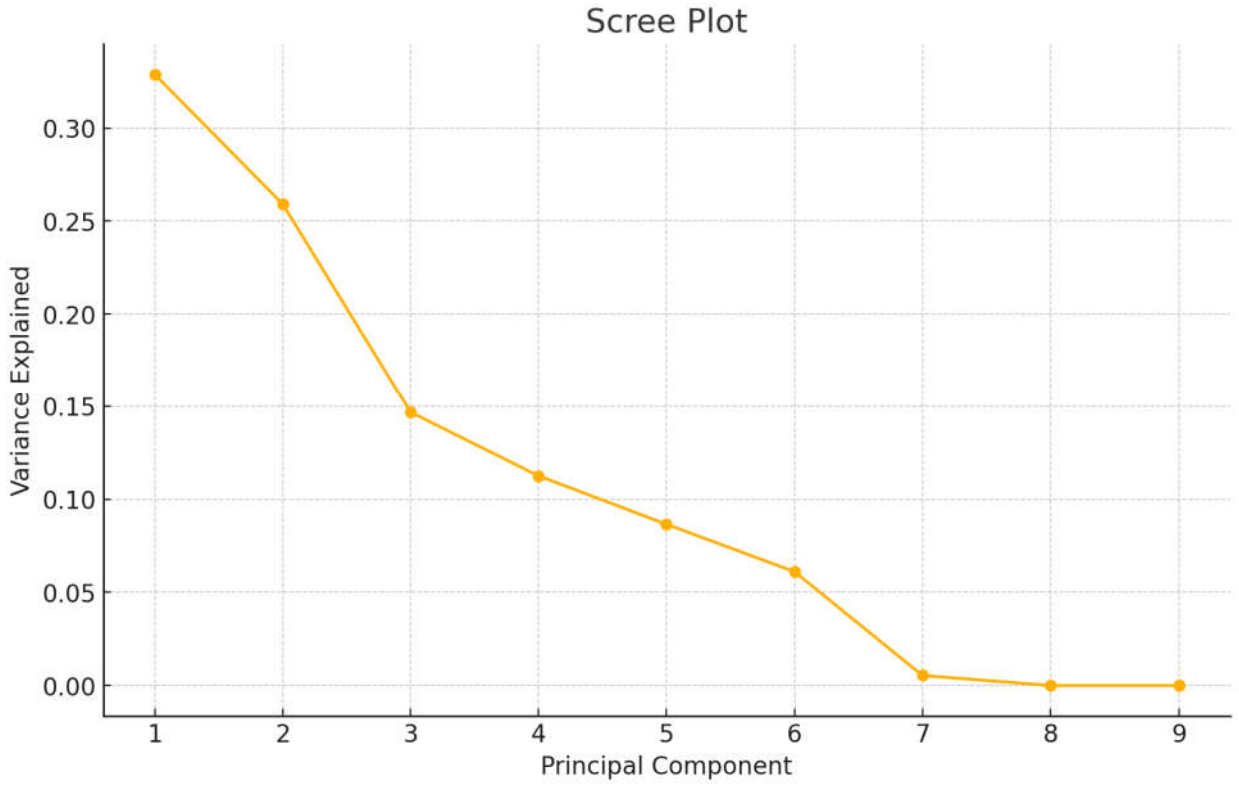

Figure 2: Screen Plot of the extracted components based on the Eigen values.
Source: prepared by the author. 2025.

Being that the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, it is determined which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the CSA component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant (significant) barriers that to accessibility of UPTS by children of age without physical disability with absolute values ≥ 0.5) for the various principal component are:

Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI) (0.69>0.5); Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) (0.86>0.5); Discrimination and discriminatory remarks and attitude against the vulnerable and the children or disabled (DRAD) (0.88>0.5), Identified barriers such Unemployment related Poverty and Low income (ERPI) (0.67>0.5) and Increased travel time and the associated delay (ITTD) (0.89>0.5).

These constitute the significant barrier factors to accessing UPTS by the CSA component of the vulnerable population with Increased travel time and the associated delay (ITTD) (0.89>0.5), Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) (0.86>0.5); and Discrimination and discriminatory remarks and attitude against the vulnerable and the children or disabled (DRAD) (0.88>0.5), being

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the among the most significant barriers facing the CSA component of the vulnerable population from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system in Nigerian cities that must carter for the urban mobility needs of school children as vulnerable component of the population must address these identified significant barrier factors.

Table-6: The Significant Barriers to the Accessibility of Urban Public Transport Services by School Children with Physical Disability (SCPD) in Nigerian frontline cities.

	Mean	Std. Deviation	Analysis N
LITI	13.2353	4.74858	34
LPSU	13.5294	4.85071	34
STAC	15.0000	5.07510	34
ELD	14.4118	5.09095	34
DRAD	13.3824	5.03331	34
ERPI	15.5882	5.03995	34
ITTD	15.0000	5.07519	34
IFMND	11.0000	3.49025	34
IB	15.2941	5.06640	34

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.265	25.170	25.170	2.265	25.170	25.170
2	1.791	19.899	45.069	1.791	19.899	45.069
3	1.213	13.474	58.543	1.213	13.474	58.543
4	1.054	11.716	70.259	1.054	11.716	70.259
5	.869	9.654	79.912			
6	.805	8.939	88.852			
7	.437	4.853	93.705			
8	.329	3.652	97.357			
9	.238	2.643	100.000			

	Component			
	1	2	3	4
LITI	-.094	-.868	-.061	.058
LPSU	-.336	.616	.083	-.437
STAC	.601	.075	-.508	-.071
ELD	.069	-.189	.819	-.054
DRAD	-.513	.234	-.258	-.392
ERPI	.776	.179	.184	.110
ITTD	.789	.256	-.151	.041
IFMND	-.014	.041	-.298	.648
IB	-.157	.080	.245	.114

Source: Prepared by the author. 2025.

Table-6 shows the result of the study aimed at determining the significant barriers factors to the accessibility of urban public transport services by School Children with Physical Disability (SCPD) in Nigerian frontline cities. The result indicates that the mean scores of Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 13.23 with standard deviation of 4.74 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of, 11.00 with standard deviation of 3.35. Lack of and inadequacy of pedestrian support infrastructure

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such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 13.52 and 15.00with standard deviations of 4..85 and 5.07 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of14.41 with standard deviation of 5.09 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 13.38 with standard deviation of 5.03.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 15.59, 15.00 and 15.29with standard deviations of 5.01, 5.07 and 5.06 respectively.

The result also indicates that four 4 principal components Pc-1 to PC-4 with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 70.3% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the SCPD component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LITI (0.87>0.5); LPSU (0.62>0.5); STAC (0.60>0.5); ELD (0.82>0.5); DRAD (0.51≥0.5): ERPI (0.78>0.5); and ITTD (0.79>0.5).

The implication is that Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Extent and level of disability. Disability in itself is a barrier to access to transport participation in society (ELD), Unemployment related Poverty and Low income (ERPI), Discrimination and discriminatory remarks and attitude against the vulnerable children and the disabled. (DRAD) and Increase travel time and the associated delay (ITTD) constitute the significant barrier factors to accessing UPTS by the school children with physical disability as a component of the vulnerable population. However, LITI (0.87>0.5), ELD (0.82>0.5); ERPI (0.78>0.5) and ITTD (0.79>0.5) constitute the most significant barriers facing the school children with physical disability (SCPD) from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for disabled school children in Nigerian cities must address these identified significant barrier factors.

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Table-7: The Significant Barriers to Accessibility of Urban Public Transport Services by Income Challenged Unemployed (INC) Components of the Vulnerable Population in Nigerian

	Mean	Std. Deviation	Analysis N
LITI	15.2857	5.27799	35
LPSU	15.4286	5.05433	35
STAC	15.0000	5.28594	35
ELD	12.0000	4.05840	35
DRAD	13.1429	4.71008	35
ERPI	12.8571	4.58349	35
ITTD	15.7143	5.02096	35
IFMND	14.3714	5.36922	35
IB	13.7143	5.33342	35

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	2.471	27.456	27.456	2.471	27.456	27.456
2	1.757	19.524	46.980	1.757	19.524	46.980
3	1.481	16.453	63.433	1.481	16.453	63.433
4	.985	10.941	74.374			
5	.872	9.684	84.058			
6	.602	6.690	90.748			
7	.508	5.646	96.395			
8	.171	1.903	98.297			
9	.153	1.703	100.000			

	Component		
	1	2	3
LITI	-.414	.086	.317
LPSU	.777	.181	.331
STAC	.491	-.694	.327
ELD	-.052	-.694	-.624
DRAD	-.367	.114	.476
ERPI	.154	.813	-.584
ITTD	.647	.407	.177
IFMND	.660	-.008	.044
IB	-.358	.257	-.079

Source: Prepared by author. 2025.

Table-7 shows the result of the PCA implemented to determine the significant barriers to accessibility of urban Public transport services by the income challenged unemployed (INC) components of the vulnerable population in Nigerian frontline cities. The result indicates that the mean scores of Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 15.28 with standard deviation of 5.28 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of 14.37 with standard deviation of 5.37. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from

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frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have respective mean scores of 15.43 and 15.00 with standard deviations of 5..05 and 5.28 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 12.00 with standard deviation of 4.06 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 13.14 with standard deviation of 4.71.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 12.85, 15.71 and 13.71 with standard deviations of 4.58, 5.02 and 5.33 respectively.

The result also indicates that three (3) principal components Pc-1 to PC-4 with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 63.4% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the INC component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LPSU (0.78>0.5); STAC (0.69>0.5); ELD (0.69>0.5); ERPI (0.82>0.5); ITTD (0.65>0.5) and IFMND (0.66).

The implication is that Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Extent and level of disability. Disability in itself is a barrier to access to transport participation in society (ELD), Unemployment related Poverty and Low income (ERPI), Increase travel time and the associated delay (ITTD) and Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system. (IFMND)constitute the significant barrier factors to accessing UPTS by the income challenged and unemployed people as a component of the vulnerable population. However, ERPI (0.82>0.5) and LPSU (0.78>0.5) constitute the most significant barriers facing the income challenged and unemployed (INC) from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for the poor, income challenged and unemployed people in Nigerian cities must address these identified significant barrier factors.

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Table-8: The Significant Barriers to the Accessibility of UPTS by Vision Impaired Disability (VID) component of the vulnerable population in Nigerian Frontline Cities.

	Mean	Std. Deviation	Analysis N
LITI	12.7273	4.52267	33
LPSU	13.9394	4.96198	33
STAC	13.3333	4.78714	33
ELD	12.4242	4.35194	33
DRAD	14.2424	5.01890	33
ERPI	14.8485	5.07519	33
ITTD	15.0112	3.02511	33
IFMND	15.1515	5.07519	33
IB	14.9012	4.07519	33

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.999	22.210	22.210	1.999	22.210	22.210
2	1.509	16.762	38.972	1.509	16.762	38.972
3	1.173	13.036	52.007	1.173	13.036	52.007
4	1.145	12.721	64.728	1.145	12.721	64.728
5	.890	9.886	74.614			
6	.789	8.767	83.381			
7	.697	7.742	91.124			
8	.545	6.052	97.176			
9	.254	2.824	100.000			

	Component			
	1	2	3	4
LITI	-.108	.365	.358	.660
LPSU	-.245	-.648	-.447	-.118
STAC	-.550	.336	-.173	.301
ELD	.200	.236	-.453	-.141
DRAD	.403	-.199	.231	.469
ERPI	-.188	.182	.274	-.133
ITTD	.662	.393	-.093	-.118
IFMND	.316	.033	.658	-.495
IB	.640	.085	-.197	.298

Source: Author's calculation. 2025.

Table-8 shows the result of the study aimed at determining the significant barriers factors to the accessibility of urban public transport services by Vision Impaired Disability (VID) component of the vulnerable population in Nigerian Frontline Cities. The result indicates that the mean scores of Lacks of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 12.73 and standard deviation of 4.52 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of 15.15 and standard deviation of 5.08. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety

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concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 13.93 and 13.33 with standard deviations of 4.96 and 4.79 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 12.4242 with standard deviation of 4.31 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of14.24 with standard deviation of 5.02.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 15.01 and 14.90 with standard deviations of 3.025 and 4.08 respectively.

The result also indicates that four 4 principal components Pc-1 to PC-4 with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 65% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the VID component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LITI (0.66>0.5); LPSU (0.65>0.5); STAC (0.55>0.5); ITTD (0.66≥0.5): IFMND (0.66>0.5) and IB (0.64>0.5).

The implication is that Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Increase travel time and the associated delay (ITTD), Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB)constitute the significant barrier factors to accessing UPTS by the vision impaired (VID) component of the vulnerable population. However, LITI (0.66>0.5) and IFMND (0.66>0.5) constitute the most significant barriers facing the VID component of the vulnerable population from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for vision impaired disabled people in Nigerian cities must address these identified significant barrier factors.

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Table-9: The significant barriers to the mobility needs of the hearing disability (HID) component of the vulnerable population Nigerian frontline cities.

	Mean	Std. Deviation	Analysis N
LITI	13.2258	4.75191	31
LPSU	11.3211	2.50191	31
STAC	13.5484	4.86373	31
ELD	15.1613	5.08001	31
DRAD	14.8387	5.08121	31
ERPI	16.1290	4.95138	31
ITTD	12.5806	4.44803	31
IFMND	13.8710	4.95138	31
IB	10.4085	5.06372	31

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.766	19.622	19.622	1.766	19.622	19.622
2	1.520	16.893	36.515	1.520	16.893	36.515
3	1.430	15.884	52.398	1.430	15.884	52.398
4	1.021	11.341	63.739	1.021	11.341	63.739
5	.928	10.310	74.049			
6	.911	10.122	84.171			
7	.668	7.426	91.597			
8	.491	5.452	97.049			
9	.266	2.951	100.000			

	Component			
	1	2	3	4
LITI	.702	.186	-.229	.030
LPSU	-.500	.581	.136	.556
STAC	.094	-.762	-.345	.290
ELD	.455	.444	-.128	-.286
DRAD	-.352	-.161	.786	-.218
ERPI	.378	.207	.243	.235
ITTD	.487	.080	.078	-.075
IFMND	-.150	.528	-.324	-.216
IB	.430	-.125	.327	-.078

Source: Prepared by the Author. 2025.

Table-9 shows the result of the study aimed at determining the significant barriers factors to the accessibility of urban public transport services by the hearing-impaired disability (HID) component of the vulnerable population in Nigerian frontline cities. The result indicates that the mean scores of Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) is 13.2 with standard deviation of 4.75 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of 13.87 with standard deviation of 4.95. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of

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public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 11.32 and 13.55 with standard deviations of 2.50 and respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 15.16with standard deviation of 5.08 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 14.83 with standard deviation of 5.08.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 12.58, 15.00 and 10.40 with standard deviations of 4.45 and 5.06 respectively.

The result also indicates that four 4 principal components Pc-1 to PC-4 with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 64% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the HID component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LITI ($0.70>0.5$); LPSU ($0.58>0.5$); STAC ($0.76>0.5$); DRAD ($0.79>0.5$) and IFMND ($0.53\geq0.5$).

The implication is that Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Discrimination and discriminatory remarks and attitude against the vulnerable children and the disabled. (DRAD) and Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND)constitute the significant barrier factors to accessing UPTS by the HID component of the vulnerable population. However, DRAD ($0.79>0.5$) and STAC ($0.76>0.5$) constitute the most significant barriers facing the hearing impaired (HID) component of the vulnerable population from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for hearing impaired people in Nigerian cities must address these identified significant barrier factors.

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Table-10: The Significant Barriers to the Accessibility of UPTS by the Physical Disabled Component (PDC) of the Vulnerable Population in Nigerian Frontline Cities.

	Mean	Std. Deviation	Analysis N
LITI	13.1429	4.71008	35
LPSU	10.0342	2.00233	35
STAC	12.8571	4.58349	35
ELD	14.5714	5.05433	35
DRAD	14.0000	4.97050	35
ERPI	14.8571	5.07093	35
ITTD	15.4286	5.05433	35
IFM	11.6704	3.03422	35
IB	12.8571	4.58349	35

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.936	21.507	21.507	1.936	21.507	21.507
2	1.819	20.208	41.716	1.819	20.208	41.716
3	1.513	16.813	58.529	1.513	16.813	58.529
4	1.203	13.370	71.899	1.203	13.370	71.899
5	.899	9.985	81.884			
6	.613	6.814	88.698			
7	.445	4.943	93.641			
8	.386	4.293	97.934			
9	.186	2.066	100.000			

	Component			
	1	2	3	4
LITI	.092	.678	.091	.493
LPSU	-.083	-.563	.543	.299
STAC	-.204	.135	-.792	-.414
ELD	-.440	.253	-.069	.449
DRAD	.555	-.501	.159	-.239
ERPI	-.382	.132	.221	-.303
ITTD	.426	-.165	-.502	.574
IFMND	.803	.273	.146	-.075
IB	-.036	-.270	-.084	.117

Source: Author's calculation. 2025.

Table-10 shows the result of the study aimed at determining the significant barriers factors to the accessibility of urban public transport services by Physical Disabled Component (PDC) in Nigerian frontline cities. The result indicates that the mean scores of Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 13.14 with standard deviation of 4.71 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of 11.67 with standard deviation of 3.03. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport

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systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 10.03 and 12.86 with standard deviations of 2.00 and 4.58 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 14.57with standard deviation of 5.05 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 14.00 with standard deviation of 4.97.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 14.85, 15.42 and 11.85 with standard deviations of 5.07, 5.05 and 4.58 respectively.

The result also indicates that four 4 principal components Pc-1 to PC-4 with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 72% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the PCD component of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is ≥ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values ≥ 0.5) for the various principal component are LITI (0.68>0.5); LPSU (0.56>0.5); STAC (0.79>0.5); DRAD (0.55>0.5); ITTD (0.57>0.5) and IFMND (0.80>0.5).

The implication is that Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Discrimination and discriminatory remarks and attitude against the vulnerable children and the disabled. (DRAD), Increase travel time and the associated delay (ITTD) and Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system. (IFMND)constitute the significant barrier factors to accessing UPTS by the school Physically challenged component of the vulnerable population. However, IFMND (0.80>0.5) and STAC (0.79>0.5) constitute the most significant barriers facing the school physically challenged component of the vulnerable population (PDC) from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for physically disabled people in Nigerian cities must address these identified significant barrier factors.

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Table11: The Significant Barriers to UPTS Accessibility by the Cognitive Disability Component (CDC) of the Vulnerable Population in Nigerian Frontline Cities.

	Mean	Std. Deviation	Analysis N
LITI	12.0000	4.05840	35
LPSU	16.8571	4.71008	35
STAC	14.8571	5.07093	35
ELD	13.4286	4.81594	35
DRAD	12.8571	4.58349	35
ERPI	13.7143	4.90241	35
ITTD	17.4286	4.43440	35
IFMND	12.1122	3.03212	35
IB	11.2071	4.06013	35

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.096	23.289	23.289	2.096	23.289	23.289
2	1.613	17.923	41.212	1.613	17.923	41.212
3	1.439	15.992	57.204	1.439	15.992	57.204
4	1.150	12.780	69.984	1.150	12.780	69.984
5	.707	7.850	77.834			
6	.641	7.125	84.959			
7	.584	6.484	91.444			
8	.397	4.415	95.858			
9	.373	4.142	100.000			

	Component			
	1	2	3	4
LITI	.779	.065	-.212	.007
LPSU	.460	-.154	.215	.698
STAC	-.741	.391	.102	.175
ELD	.136	-.361	.323	-.416
DRAD	.428	.537	-.339	.210
ERPI	-.434	-.292	-.335	.151
ITTD	.138	.256	-.439	-.217
IFMND	.449	.203	.581	-.180
IB	-.342	.746	.302	-.003

Source: Author's calculation. 2025.

Table-11 shows the result of the study aimed at determining the significant barriers factors to the accessibility of urban public transport services by the Cognitive Disability Component **(CDC)** component of the vulnerable population in Nigerian frontline cities. The result indicates that the mean scores of Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITI) has a mean score of 12.00 with standard deviation of 4.06 while Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system (IFMND) has mean score of 12.11. with standard deviation of 3.03. Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads (LPSU) and Safety concerns related to the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled

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population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC) as barriers to accessing UPTS have mean scores of 14.85 and 13.42 with standard deviations of 5.070 and 4.91 respectively.

Similarly, the Extent and level of disability since disability in itself is a barrier to access to transport participation in society (ELD) has mean score of 13.42 with standard deviation of 5.09 while Discrimination and discriminatory remarks and attitude against the vulnerable and the disabled (DRAD) has a mean score of 12.85 with standard deviation of 4.03.

Identified barriers such Unemployment Related Poverty and Low income (ERPI), Increased travel time and the associated delay (ITTD) and Institutional barriers which include the existence of many discriminatory laws, policies, rules, regulations, strategies or practices against people with disabilities (IB) have respective mean scores of 13.7, 17.43 and 11.21 with standard deviations of 4.90, 4.43 and 4.06 respectively.

The result also indicates that four 4 principal components with each having Eigen values greater than 1 were extracted. The explained variance ratio indicates that the each of the four principal components having respective Eigen values greater than 1 jointly explained about 70% of the total variances in the identified barrier factors.

However, the objective is identifying the determinant barrier factors that form the significant variables in the identified principal components. From the factor loadings table, we can determine which variables contribute most to each principal component (PC) and that form the determinant factors that constitute significant barriers to the cognitive disability component (CDC) of the vulnerable population in accessing UPTS in the frontline cities sampled. A variable or barrier factor is considered a significant or determinant contributor if its absolute loading is $\geq$ 0.5.

Based on the factor loadings, the extracted significant/determinant variables (significant barriers) with absolute values $\geq$ 0.5) for the various principal component are LITI (0.78>0.5); LPSU (0.80>0.5); STAC (0.74>0.5); DRAD (0.53$\geq$0.5) and IFMBD (0.58>0.5).

The implication is that Lack of and inadequate investment in necessary transport infrastructure for vulnerability types (LITTI), Lack of and inadequacy of pedestrian support infrastructure such as pedestrian walk ways, zebra crossing, pedestrian bridges, among other traffic systems that the vulnerable population need for effective and safe use of the roads. (LPSU), Safety concerns cum the high trend of occurrence and frequency of traffic accidents involving public transport operators, pedestrians and other road users in urban cities in Nigeria discourages the disabled population from frequent access to and use of public transport systems in Nigeria because of their vulnerability (STAC), Discrimination and discriminatory remarks and attitude against the vulnerable children and the disabled. (DRAD) and Inability to factor the special mobility needs of the vulnerable population into the design of city public transport system. (IFMND) constitute the significant barrier factors to accessing UPTS by the cognitive disability component (CDC) of the vulnerable population. However, LITI (0.78>0.5) and LPSU (0.80>0.5) constitute the most significant barriers facing the CDC component of the vulnerable population from accessing UPTS in frontline Nigerian cities. Therefore, the development of inclusive urban mobility system for people having cognitive disability challenges in Nigerian cities must address these identified significant barrier factors.

4.3 Discussion of Result and Policy Implications

The findings of the study provide significant insights into the mobility challenges faced by vulnerable populations in Nigerian frontline cities, underscoring the need for the development of an inclusive urban mobility system that addresses the needs of the vulnerable population in Nigeria. These insights carry important policy implications for urban transport planning, social inclusion, and accessibility reforms. For example, in prioritizing inclusive transport infrastructure development, the study shows that school children with physical disabilities (SCPD), physically disabled persons (PDC), and vision-impaired individuals (VID) experience the greatest immobility challenges. Thus, the policy action demands that Government agencies and urban planners should prioritize the development of inclusive transport infrastructure, including wheelchair-accessible buses, designated priority seating, ramps at bus stops, and audible announcements for visually impaired users. This also requires that transport policies should enforce accessibility standards, ensuring that both public and private transit providers comply with universal design

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principles that will guarantee components of the vulnerable population adequate access to urban public services in Nigerian frontline states.

The findings of the study highlight that the income-challenged and unemployed (INC) group and other low-income vulnerable populations have limited access to urban transport services due to financial constraints. The policy action requires that the government should implement transport subsidies or discounted fare schemes for vulnerable groups to improve affordability and reduce mobility-related financial burdens. The study reveals that vulnerable populations require access to urban transport services for an average of 2.99 days per week, while the actual accessibility remains much lower. Policy action therefore demands that urban transport agencies should increase the frequency and spatial coverage of public transport, especially in areas with a high concentration of vulnerable populations. Special transport services such as on-demand transit, shuttle services, or community-based transport initiatives should be introduced for people with disabilities, the elderly, and school children with disabilities. The study identifies significant accessibility gaps for different vulnerable groups, demonstrating a need for stronger legal frameworks. As a result, a necessary policy action should be for National and state governments to enact and enforce laws that mandate transport inclusivity, such as the Nigerian Disability Act, ensuring strict compliance by transport operators. Policies to enhance stakeholder's collaboration in UPTS provision should also be encouraged. For example, government agencies should collaborate with advocacy groups, transport unions, and disability organizations to develop policies that address urban transport challenges for vulnerable populations.

The research findings indicate disparities in access between different vulnerable groups, suggesting the need for innovative solutions. The policy implication is that government should invest in smart mobility solutions such as mobile apps that provide real-time information on accessible routes, available seating, and transport assistance services. Technology Integration into UPTS such as the Ride-hailing services can be integrated with public transport to provide flexible, accessible mobility options for persons with disabilities. The study also underscores the importance of measuring mobility needs and accessibility levels among different vulnerable groups. This can be actualized through regular transport accessibility audits and data collection exercises should be institutionalized to assess progress and effectiveness of inclusive mobility policies.

The findings further indicate that 12% of the vulnerable population identified inadequate investment in necessary transport infrastructure as a major barrier to UPTS accessibility. This underscores the need for policymakers to prioritize substantial investments in transport infrastructure tailored to the mobility needs of vulnerable populations. The government should allocate resources for the development of pedestrian walkways, ramps, designated lanes for public transit, and adaptive transport facilities to enhance inclusivity. In this regards, policies that enhance improvement in pedestrian support infrastructure are important. With 9% of respondents citing the lack of pedestrian support infrastructure as a barrier, urban planning policies must integrate pedestrian-friendly elements into city transport systems. Policies should mandate the construction of zebra crossings, pedestrian bridges, and well-maintained sidewalks, particularly in high-traffic urban areas like Abuja and Lagos. Legislative measures should enforce compliance with universal design principles to ensure safe and convenient movement for all. The 11% identification of safety concerns due to frequent traffic accidents highlights the necessity for stringent transport safety regulations. Policy interventions should include mandatory driver training programs, improved road signage, speed limit enforcement, and enhanced surveillance on public transport systems to reduce accidents. Government agencies should also enforce regular vehicle inspections to ensure compliance with safety standards. The 8% recognition of disability itself as a barrier to mobility necessitates the formulation of transport policies that prioritize accessible transit for persons with disabilities (PWDs). This includes retrofitting existing public transport with ramps, priority seating, and audio-visual announcements. Transport operators should be mandated to provide disability-friendly services, and incentives should be offered to companies that comply with accessibility regulations. The study findings also observed the need to addressing economic barriers to Public Transport Access. Given that 9% of respondents identified unemployment-related poverty and low income as barriers, transport policies should incorporate subsidized transport programs for low-income individuals. Government agencies could implement voucher programs, fare reductions, or free transit passes for vulnerable populations to improve affordability and accessibility.

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The 14% who identified the failure to incorporate special mobility needs in urban transport design highlight the need for inclusive transport planning. Future urban mobility policies should require transport systems to be designed with the specific needs of vulnerable groups in mind. This includes introducing low-floor buses, designated spaces for wheelchairs, and user-friendly transport applications for persons with disabilities. The study findings also reveal the need to reduce long travel time and delays affecting disabled groups in the use of UPTS. With 14% of respondents emphasizing increased travel time and delays as a barrier, urban transport planning should focus on reducing congestion and improving the efficiency of transit systems. Implementing intelligent transport systems, optimizing traffic signal timings, and expanding high-speed transit options can enhance mobility for all users. Institutional barriers were also observed to constitute significant barrier and the need to reform institutional barriers were highlighted. The 14% recognition of institutional barriers highlights the need for regulatory reforms. Policymakers should review and amend discriminatory laws, policies, and regulations that hinder access to public transport for vulnerable populations. Establishing oversight bodies to ensure compliance with transport accessibility laws is crucial for fostering an inclusive transit system.

5.0 conclusion and recommendations

5.1 Conclusion

The determinant barriers to the accessibility of urban public transport services by components of the variable population vary, relative to the vulnerability type or disability type. The study findings reveal that each disability group have significant barriers that limit their accessibility of urban public transport services in Nigerian frontline states.

5.2 Recommendations

In line with the findings of the study, it is recommended that:

(i) The Federal and State Ministries of transportation should prioritize the development of inclusive mobility options for all components of the vulnerable population by investment in infrastructure that support the preferred urban transport systems of each group of the vulnerable population.

(ii) Nigerian authorities, ministries and Departments of transportation should prioritize the development of policies and provision of urban public transport services that address each of the significant barriers to UPTS transport accessibility identified by the individual vulnerable groups.

(iii) transport policies should enforce accessibility standards, ensuring that both public and private transit providers comply with universal design principles that will guarantee components of the vulnerable population adequate access to urban public services in Nigerian frontline states. This is to reduce the extent of lack of access to urban public transport services by components of the vulnerable population by addressing the bariers to accessibility faced by each vulnerable population component.

References

Ababio-D., Adams A., ad Anum C. (2022) Gender Disparities in the Access and Use of Urban Public Transport in Abuja, Nigeria. *Sustainability Vol. 14 (2022): 2-24*. https://doi.org/10.3390/ su14095219

AJMC Reports (2006), Vulnerable Populations: Who Are They. *The American Journal Of Managed Care VOL. 12, NO. (13,) 348-352*

Adeyinka, A.M. Assessment of the quality of urban transport services.*Nigeria. Acad. J. Interdiscip. Stud. Vlol. 2013,(2), 49-57*

IJO -INTERNATIONAL JOURNAL OF BUSINESS MANAGEMENT

(E:ISSN 2811-2504) (P.ISSN: 2384-5961)

https://ijojournals.com/ Volume 08 || Issue 10 || October, 2025 ||

Badiora, A.I.; Odufuwa, B.O. Fear dynamics in public places: A case study of urban shopping centers. *J. Place Manag. Dev. 2019,(12), 248–270.*

Bokolo, A.J. (2023) Inclusive and Safe Mobility Needs of Senior Citizens: Implications for Age-Friendly Cities and Communities. *Urban Sci. Vol 7 (**2023**), 1-25.* https://doi.org/10.3390/ *urbansci7040103*

Burton W. N., Pransky G, Conti D. J., Chen C. Y., Edington D. W. (2004). The association of medical conditions and presenteeism. *J Occup Environ Med. Vol.46(6): S38-S45*

Blanchard, S. D., & Waddell, P. (2017). Urban access: Generalized methodology for measuring regional accessibility with an integrated pedestrian and transit network. *Transportation Research Record, 2653(1), 35–44.*

Boisjoly, G., & El-Geneidy, A. M. (2017). How to get there? A critical assessment of accessibility objectives and indicators in metropolitan transportation plans. *Transport Policy, 55, 38–50.*

Conway, M. W., & Stewart, A. F. (2019). Getting Charlie off the MTA: A multi-objective optimization method to account for cost constraints in public transit accessibility metrics. *International Journal of Geographical Information Science, 33(9), 1759–1787.*

Conway, M. W., Burd, A., & van der Linden, M. (2018). Evidence-based transit and land use sketch planning using interactive accessibility methods on combined schedule and headway-based networks. *Transportation Research Record, 2653(1), 45–53.*

Gaunt, R. Breadwinning moms, caregiving dads: Double standard in social judgments of gender norm violators. *J. Fam. Issues2013, 34, 3–24.*

Loukaitou-Sideris, A.; Ceccato, V. Sexual violence in transit environments: Aims, scope, and context. In Transit Crime and Sexual Violence in Cities, 1st ed.; Routledge: Oxfordshire, UK, 2020; pp. 3–11.

Lambros M., Karolemeas C., Tsigdinos S., Vassi A., and Bakogiannis E. (2023) A composite index for assessing accessibility in urban areas: A case study in Central Athens, Greece. *Journal of Transport Geography 108 (2023) 103566*. Available at :http//www.elsevier.com/locate/jtrangeo

LINKS (2021) Disability Inclusion: Emerging Lessons and Future Direction for LINKS Nigeria. Available at: http//www.linksnigeria.org. Retrieved on April 23, 2024

Maikarfi P. (2019). Understanding Disability and Promoting Inclusion in Agriculture and Entrepreneurship in Northern Nigeria. October 2019.

Miller E. J. 2018) Accessibility: measurement and application in transportation planning, *Transport Reviews, 38:5, 551-555,* DOI: 10.1080/01441647.2018.1492778

Mercado, R.; Páez, A.; Scott, D.M.; Newbold, K.B.; Kanaroglou, P. (2007) Transport policy in aging societies: An international comparison and implications for Canada. *Open Transp. J. Vol., 1(2007), 1–13.*

Mackett H., (2021). Management and Organizational Behaviour (10th Edition ed.). UK: Pearson.

IJO -INTERNATIONAL JOURNAL OF BUSINESS MANAGEMENT

(E:ISSN 2811-2504) (P.ISSN: 2384-5961)

https://ijojournals.com/ Volume 08 || Issue 10 || October, 2025 ||

Nwokedi T.C., , Ndikom O.B., Okoroji L.I, and Okonko I..(2020) Estimates of Economic Cost of Congestion Travel Time Delay Between Onne-Seaport and Eleme-Junction Traffic Corridor. *LOGI – Scientific Journal on Transport and Logistics Vol. 11 (2)Pp:33-43 2021. DOI: 10.2478/logi-2020-0013*

Nwokedi T. C., Nwachukwu J.O., Eru J.U., Ogwo N.E. (2022) Elongated Cargo Dwell Time in Nigeria Ports, the Root-Source and Economic Implications. *European Journal of Maritime Research Vol. 1(1) 11- 18.* DOI : 10.24018/ejmaritime.20221.1.2

Noland R, B., Smart M.J., Guo Z. (2016) Bikeshare trip generation in New York city. *Transport. Res. Part A Policy Pract. 94, 164–181*. doi: 10.1016/j.tra.2016.08.030

Ojekere, S..1, Mkpandiok D. and Inclan-Valadez C. (2024) Inclusive Mobility among School Children with Disabilities in Benin City Nigeria. *CHSM Journal, Volume 3 (1) pp: 129-152.*

Reuscher R. and Wilson B. (2016).A systematic review of disability's treatment in the activeschool travel and children's independent mobility literatures. *Transport Rev. 38 (3),349–371*.

Scheiner, J.; Holz-Rau, C. Gendered travel mode choice: A focus on car deficient households. *J. Transp. Geogr. 2012, 24, 250–261.*

Solanke, M.O. (2013) Challenges of urban transportation in Nigeria. *Int. J. Dev. Sustain. 2013, 2, 891–901.*

UK Department of Transport (UKDOT, 2021) Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure. Available at: http//www.gov.uk/government/organisations/department-for-transport Retrieved on 23 March, 2024.

United Nations Human Development programme (UNDP, 2019). Preventing violent extremism through promoting inclusive development, tolerance and respect for diversity. Available at: https://www.undp.org/fr/publications/preventing-violent-extremism-through-promoting-inclusive-development-tolerance-and-respect-diversity. Retrived: 23/03/2025.