

Challenges to effective road user education in reducing road traffic accidents in Nigeria

Adedotun Joseph Adenigbo 

Department of Transport and Supply Chain Management, University of Johannesburg,
Auckland Park, Johannesburg 2006, South Africa
ajadenigbo@uj.ac.za



Article history:

Received: July 16, 2024
1st Revision: August 11, 2024
Accepted: November 12, 2024

DOI:

[10.14254/jsdtl.2024.9-2.1](https://doi.org/10.14254/jsdtl.2024.9-2.1)

Abstract: The increasing trend in road traffic accidents (RTAs) has remained a concern that seems to defy solutions over the years. A major strategy for reducing RTAs is road user education, which uses campaigns and enlightenment programmes. However, the effectiveness of road user education in curtailing the trend of RTAs is faced with several challenges. This study examines the challenges to the effectiveness of road user education in reducing the trend of RTAs in Nigeria. The data for the study were collected with a well-designed questionnaire administered randomly to respondents. The questionnaire presented twelve (12) statements in a 5-point Likert scale for the respondents to rank in order of significance to identify the most significant challenges to road user education. The data collected were subjected to exploratory factor analysis to reduce the items to the most significant challenges facing effective road user education. The study identified institutional, participatory and funding as the most significant challenges confronting effective road user education in Nigeria. The study provides insight into the approach that can enhance the effectiveness of road user education by improving institutional policies, road user behaviour and external sources of funding.

Keywords: road user education, road traffic accidents, institutional challenges, funding challenges

Sustainable Development Goals (SDGs): **SDG 3:** Good Health and Well-being; **SDG 11:** Sustainable Cities and Communities

1. Introduction

The efficient management of road transportation brings substantial advantages regarding the seamless flow of traffic and the delivery of goods. The poor management of road transportation results in certain externalities that depict the underdevelopment of urban cities (Kaiser & Barstow, 2022; Řřha et al., 2022; Zhang & Cheng, 2023). In the same manner, poor road transportation management leads to costs for a society, which emphasises the importance of efficient traffic flow. Consequently, governments worldwide are increasingly concerned about educating road users about the hazards of

poor road traffic (Antoine et al., 2023; Tavakkoli et al., 2022). The need to provide traffic education to road users has led to the development and implementation of strategies to mitigate road traffic accidents (RTAs) in most developing countries (Bouagna et al., 2022; Fisa et al., 2022; Razzaghi et al., 2021). This is because most RTAs occur due to road users' inadequate traffic education.

It is noted that RTAs stand out as the sole non-disease-related factor among the top 10 causes of global fatalities (Boateng, 2021). Hence, RTA can be said to constitute a major source of global health issues (Jamal et al., 2019; Rahman et al., 2022). More than half of all road traffic deaths and injuries involve vulnerable road users, such as pedestrians, cyclists, and motorcyclists and their passengers (Holländer et al., 2021). More broadly, road traffic injuries have a serious impact on national economies, costing countries 3% of their annual gross domestic product (Antoine et al., 2023; Fisa et al., 2022; Mohammed et al., 2023). Most developing countries that are heavily reliant on road transportation face an alarming rate of road traffic accidents, necessitating urgent and comprehensive efforts to tackle this problem (Tavakkoli et al., 2022; WHO, 2018). To address the problem, various governments have initiated programmes for road users' education. An example of such an initiated programme in Nigeria is the establishment of the Federal Road Safety Commission (FRSC) saddled with a mandate to provide public road and traffic education to reduce RTAs (FRSC, 2022). Despite the importance of the FRSC education programme to reduce RTAs, the trend of RTAs has been increasing due to different challenges that have made the FRSC education programme ineffective. The study by Awoniyi et al., (2022) found an increasing trend in RTAs with a 74.7% increase in injuries, a 61.2% increase in causalities, and a 9.6% increase in fatalities in Nigeria. The study also found that the three (3) major causes of RTA include speed violation, loss of control, and dangerous driving. The findings imply that despite the implementation of road user education, the trend of RTA is increasing and that the major causes of RTAs are those that need to be addressed with effective road user education.

Scholars have undertaken to examine the challenges to effective road user education in various countries. For example, Bouagna et al. (2022) employed a cost quantification perspective to identify the challenges to the effectiveness of road traffic education (RTE) on RTA reduction in developing countries. The study showed that underreporting, segregation, inconsistency, and inadequacy in RTA data systems not only water down the efficacy of these strategies but disrupt the adoption of a universal evaluation method. In the landlocked republic of Nepal, Banstola et al. (2020) undertook a similar study and noted the rapid increase in vehicle population, giving a backdrop to the rate of RTAs. Antoine et al. (2023) noted that an overwhelming majority of RTAs happen in Low- and Medium-Income Countries (LMICs). Fisa et al. (2022) stated that many intervention strategies have been put in place by different countries to prevent RTA-related deaths and injuries. The strategies range from the Netherlands sustainable safety vision of 1992 to the United Nations (UN) resolution for a decade of action for road safety till 2030. Gbadamosi and Adenigbo (2017) found that strategic vehicle inspection for roadworthiness does not significantly contribute to accident reduction. It is no news that these strategies are plagued with certain challenges that have made them hitherto ineffective or undereffective. So, this study provides the answer to the question of what challenges significantly affect the effectiveness of road user education in Nigeria. Hence, this study aims to identify the most significant challenge(s) to the effectiveness of road user education to improve policy approaches and strategies towards RTA reduction.

The paper is structured such that after this introduction section, section 2 presents the review of literature, section 3 details the methodology employed to conduct the research, section 4 presents the results of the study, section 5 focuses on the discussion of the results, and section 6 concludes the study.

2. Literature review

Road safety is a complex issue that cannot be solely addressed through technological advancements in road infrastructure, urban planning, and vehicle safety, nor can it be solely regulated by the state. It requires a multisectoral institutional capacity involving various disciplines and stakeholders. This recognition has led to the emphasis on the role of road users in road safety and has encouraged the view of traffic accidents as not just technical or legal matters but as moral problems. Hence, the advocacy for traffic education is a suitable approach to address the problem of RTA (Nowak, 2016). Education of road users, combined with other factors has been identified as a link

between driver behaviour and road safety (Okafor et al., 2014). So, this section focussed on discussing RTA and education, and the challenges facing effective road users' education.

2.1. Road traffic accidents and user education

Studies have focused on the economic and social costs of RTAs by unveiling an important challenge to the effectiveness of implementation strategies. For instance, Bougna et al. (2022) quantified the social cost of RTA and adduced the ceaseless bedevilment of RTA improvement strategies by enormous challenges. The study stressed that the problem of underreporting makes it difficult to quantify the costs of RTAs which invariably undermines the level of effectiveness of the implemented strategies. Tan et al. (2020) examined the economic cost of RTA in China by using property damage, productivity loss, medical cost, time delay cost, legal cost, and insurance cost as indicators. The study found approximately 72.6 billion USD as the total economic loss from all the indicators with the cost of productivity lost and time delay accounting for the significant share of the losses. In the same way, Banstola et al. (2020) estimated the economic costs of road traffic injuries (RTI) in Nepal including the costs to society in terms of direct and productivity costs and the valuation of pain, grief, and suffering.

Antoine et al. (2023) forecasted the RTA rate and stated that LMICs in East Africa often adopted measures to reduce the rate of RTAs premised on driver adjustment strategies such as speed limits and imposing cameras on the roads. Mohammed et al. (2023) investigated the spatio-temporal variability of RTAs and found that cultural and institutional contexts of education may shape RTA interventions. Similarly, Jamal et al., (2019) examined the spatiotemporal trend of RTA and found that driver attributes (such as sleep, distraction, over-speeding), crash characteristics (such as sudden deviation from the lane, or collisions with other moving vehicles, road fences, pedestrians, or motorcyclists), weather conditions, road, and vehicle infrastructural characteristics are significant variables in measuring the effectiveness of RTA education strategies.

Fisa et al. (2022) systematically reviewed literature across several databases to measure the effectiveness of RTA intervention strategies and found that education enlightenment programmes offered a joint reduction in RTAs by 19%. This indicates the existence of challenges against the effective road user's education to significantly reduce RTA. Ehsani et al., (2023) applied a logic model to find that public awareness, enforcement strategies, and legislative impetus as the three most significant strategies to reduce RTA-related injuries and deaths. The finding indicates the importance of road users' education through enlightenment and awareness programmes to reduce RTA. Public awareness strategies included targeted campaigns for all classes of road users, in the form of safety education and mass media campaigns. Ehsani et al., (2023) finding also showed that mass media campaigns had the strongest impact on RTA reduction and indicated the informative and supportive role road user education plays in aiding other intervention strategies toward RTA reduction.

A crucial strategy for achieving the desired transformation in road safety, skills, and attitudes, as highlighted by Mirzaei et al. (2014) and Fowode et al. (2023), is the implementation of educational and psychological interventions for road users. Education serves as a fundamental and essential platform that underpins all road safety programs. The primary objective of Road Safety Education is to cultivate risk-averse drivers and road users by equipping them with the necessary knowledge and skills (Aghdam et al., 2020) since traffic education aims at conditioning road users to use the roadways within the regulatory contexts available (Alonso et al., 2018; Nowak, 2016). Through this education, road users can develop the ability to regulate their behaviour in response to the inherent risks present in the road and traffic environments (Obregón-Biosca et al., 2018).

The studies have examined the trends in RTAs, their social and economic impacts, and the role of education as a strategy to reduce RTAs. The importance of adhering to traffic rules and regulations, public enlightenment campaigns play a pivotal role in imparting safety norms and highlighting the consequences of violating these rules (Afolabi & Gbadamosi, 2017; Lee & Al-Mansour, 2020). Despite implementing road user education strategies through public enlightenment and awareness campaigns, studies on the challenges to effective road user education remain limited. This study, therefore, examines the challenges to effective road user education to fill the existing gap in the literature.

2.2. Challenges facing effective road traffic education

Studies such as Odonkor et al. (2020) and Smethurst (2022) highlighted some challenges confronting the effectiveness of road traffic education including, institutional challenges, execution challenges, operational challenges, attitudinal challenges, data challenges, and financial challenges. An examination of the challenges can aid in sustainable and effective road user education applications in the country of interest. Razzaghi et al. (2021) agreed that road user education enforcement agencies face many challenges that can make the educative processes of road users ineffective. The authors suggested the need for place-based educational approaches as what is obtainable in one country or state might necessitate a tweaked approach when dealing with another. Smethurst (2022) on the other hand enlisted the topographical challenges that hamper the effectiveness of road traffic education, stating that the presence of certain topographical constraints limits compliance. Uzundu et al. (2022) also highlighted several challenges to road safety education in Nigeria including, road engineering and infrastructural problems, organisational and implementation problems, behavioural problems, funding, and operational problems. Although they found driver education as a very effective strategy, its ease of implementation was ranked low, with a dogmatic overture centred on driver attitude. This agrees with Akbari et al. (2021) who found driver education as an ineffective strategy in Iran due to ineffective teaching methods or contents.

Boateng (2021) boycotts traditional road safety studies and argues that there is an interplay and overlap between road safety challenges and socio-econo-political processes. Hence, understanding the challenges of effective road user education must cover a broad perspective rather than carry a single-player perspective. Effective road user education becomes difficult with factors such as ineffective public transportation systems, unimodal transportation, rickety and superannuated vehicle importation, overdependence on privately run public transport services, liberalised commercial passenger transport that is structurally framed to exploit drivers, cut-throat competition, corruption consumed enforcement agencies, traffic congestion, the rising unemployment rate driving a corresponding surge of youth involvement in motorcycling, all working together to encourage safety-adverse driving behaviour (Boateng, 2020). Hence, rather than intensifying driver punishment, the author acclaims the resolution of the structural deficiencies extant in Africa. Similarly, Ehsani et al. (2023) emphasised the Safe System approach which encompasses a broad array of strategies unified by the shared principle of proactive prevention rather than reactive measures in reducing RTAs. This shift moves the focus from "How can people use the transportation system more safely?" to "How can the system be designed to be safe for people?" thus providing a holistic approach to the issue of road safety. Notwithstanding, road users still need to understand and be familiar with system design. Hence, there is still a need for education.

The literature has shown that researchers have examined the trend of RTAs and noted an increasing trend over the years. Studies have also examined the social and economic costs of RTA. It also shows that road user education as a strategy for reducing RTAs faces challenges to its effectiveness. Despite the studies on RTA, there is a need for research attention to be given to identifying the significant challenges facing road user education towards reducing RTAs in specific study areas. This is important because the factors that influence road users' behaviour in a cultural environment differ in different countries.

3. Data and methods

This study adopted the survey research design which used a structured questionnaire to examine the challenges facing FRSC road users' education in Nigeria. The study employed the positivist research philosophy that enables data collection with a paradigm relying on data measurement and quantification. The population for the study comprises different categories of road users, which include, commercial drivers, private drivers (vehicle owners), corporate drivers, passengers, and staff of the FRSC. The study population for the study was assumed as infinite because of the unavailability of data specifying the number of each population category. So, the study employs the method of sample size determination with an infinite population using Cochran's (1977) formulae to determine the sample size for the study.

The Cochran formulae generated a sample size of 384 for the study. There are three parameters for calculating sample size: population size, specific margin of error, and desired confidence levels.

$$n = \frac{Z^2}{4e^2} = \frac{1.96^2}{4(0.05)^2} = 384.16 = 384$$

Where;

n = sample size

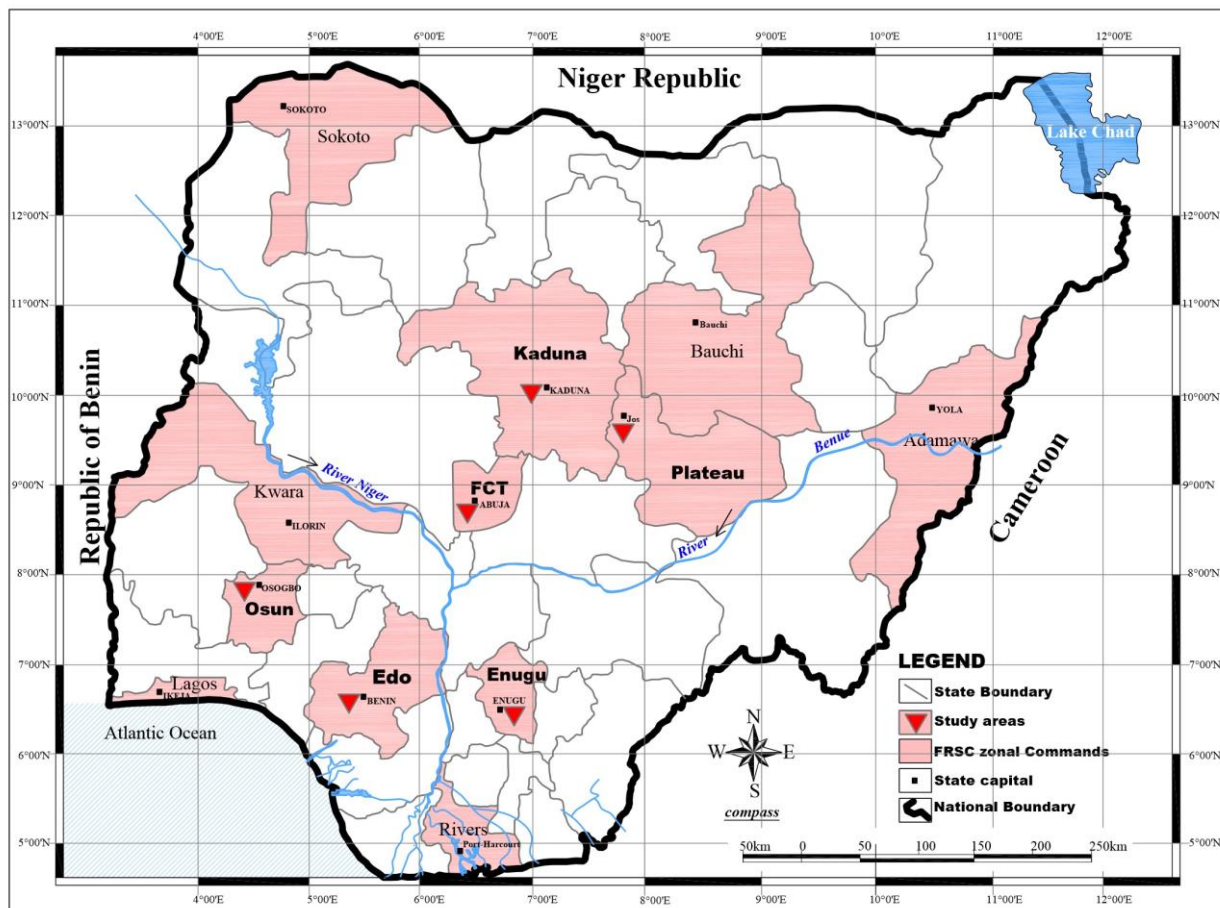
Z = statistical power for a particular population based on confidence level.

1.96 is the derived statistical power for two-sided comparison at a 5% confidence level.

e = is the error term

The data for the study were collected by designing a questionnaire that was administered randomly to respondents. The technique provides the respondents equal chance of being included in the survey. The questionnaire was distributed to the respondents at six (6) purposively selected zonal headquarters cities of FRSC. The selected zonal headquarters are in Kaduna State (Kaduna), Plateau State (Jos), Edo State (Benin City), Federal Capital Territory (Abuja), Osun State (Osogbo), and Enugu State (Enugu). The cities were deemed to be representative of the geographical zones in Nigeria. Kaduna, Jos, and Abuja (FCT) represent the Northern part and Edo, Osun, and Enugu represent the Southern part of the country.

Figure 1: Map of Nigeria showing the study areas



Source: Adapted from Google Earth Map

The questionnaire was presented in close-ended questions to permit each respondent to answer the questions by choosing from the 5-point Likert scale of SA=Strongly Agree, A=Agree, Fairly Agree, D=Disagree, and SD= Strongly Disagree. The questionnaire was prepared in two sections A and B. Section A was devoted to obtaining data on the demographic characteristics of the respondents, while section B focused on the challenges confronting the effective road users' education by FRSC in Nigeria. Section B of the questionnaire contains twelve (12) statements presented in the 5-point Likert scale

for the respondents to rank. At the end of the survey, 287 copies of the questionnaire were completed and returned for analysis. The statements were extracted from the initial information gathered from the reconnaissance survey conducted before the development of the questionnaire for administration. The twelve (12) statements are presented in Table 1.

Table 1: Statement for questionnaire administration

S/N	Questionnaire Statements	Code
1	Willingness to adopt technology innovations and applications	CRTE1
2	Inadequate funding from a single source	CRTE2
3	Inadequate provision of road infrastructure	CRTE3
4	Poor willingness for road users to participate in public campaigns and enlightenment	CRTE4
5	The unwillingness of road users to change attitudes	CRTE5
6	High level of corrupt practices	CRTE6
7	Inadequacy of manpower to provide road user education	CRTE7
8	Inappropriate behaviour of road users	CRTE8
9	Inability to meet global requirements for road education standards	CRTE9
10	Inadequacy of resources for sustenance	CRTE10
11	Challenges of sustaining road user education programmes across the country	CRTE11
12	Poor performance reward systems to motivate educators	CRTE12

The data was analysed using Exploratory Factor Analysis (EFA). The purpose of the technique is to reduce the factors to a few orthogonal ones that will serve as the most significant challenges facing effective FRSC road users' education in Nigeria. EFA is one of several multivariate statistical methods relevant to the dimension reduction of variables. It can be conceptualised as a multivariate multiple regression method where the factor serves as a predictor and the measured variables serve as criteria. EFA is often used for theory and instrument development, as it helps in understanding the underlying structure of a set of variables and how they relate to each other. It can reveal whether the variables are measuring distinct constructs or if there is overlap between them. The output of EFA is valuable for refining measurement instruments and ensuring the validity and reliability of assessments (Watkins, 2021). EFA is a data reduction technique that aims to uncover the underlying structure or factors within a set of observed variables. In EFA, the observed variables are analysed to determine the latent or unobserved factors that are believed to be responsible for the correlations among the variables. These latent factors represent the common variance shared by the observed variables. The goal is to identify a smaller number of factors that explain the majority of the variance in the data. This makes it a valuable technique in multivariate data analysis (Watkins, 2021).

In EFA, Bartlett's test of sphericity is employed to determine the suitability of the data for the analysis. The test is a null hypothesis that the correlation matrix is an identity matrix assuming that the p-value must be <0.001 to be statistically significant. The Kaiser-Meyer-Olkin (KMO) test is also used to ensure the adequacy of the data. The closer the KMO test is to 1, the more perfectly it shows that the data is adequate for the EFA. KMO value is recommended to be at least 0.60 for acceptability (Watkins, 2021).

To assess the challenges confronting effective road users' education by the FRSC, exploratory factor analysis was performed with varimax rotation using the principal axis factoring to extract the factors. An important step involved weighing the overall significance of the correlation matrix through Bartlett's Test of Sphericity, which provides a measure of the statistical probability that the correlation matrix has significant correlations among some of its components.

4. Results

The output of Bartlett's test shows $\chi^2 (n = 201) = 1144.704$ ($p < 0.005$), which indicates that the data is suitable for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy, which indicates the adequacy of the data for factor analysis, was 0.830. As a result, the data for this study is adequate for conducting exploratory factor analysis for having a KMO value above 0.80 (Li et al., 2020). The detail of the result is presented in Table 2.

Table 2: KMO and Bartlett's test of sample suitability and adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. Chi-Square	1144.704
	Df	66
	Sig.	.000

The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation (See Table 3). The model's communalities represent the sum of the squared loadings of the initial and extracted values of the variance of each variable. The extracted values show that all the variables have an acceptable variance to explain the variability in the common factors that serve as the challenges to effective road user education in Nigeria. The variables with values less than 0.40 after extraction are considered to have little contribution to the overall output of the analysis (Adenigbo et al., 2023). However, the results in Table 3 show that all communalities were over 0.40, which is within the acceptable range (Costello & Osborne, 2005).

Table 3: Communalities of challenges to effective road user education

Codes	Statements	Initial	Extraction
CRTE1	Willingness to adopt technology innovations and applications	.657	.723
CRTE2	Inadequate funding from a single source	.474	.680
CRTE3	Inadequate provision of road infrastructure	.604	.658
CRTE4	Poor willingness for road users to participate in public campaigns and enlightenment	.558	.612
CRTE5	The unwillingness of road users to change attitudes	.549	.553
CRTE6	High level of corrupt practices	.531	.551
CRTE7	Inadequacy of manpower to provide road user education	.591	.539
CRTE8	Inappropriate behaviour of road users	.359	.529
CRTE9	Inability to meet global requirements for road education standards	.516	.522
CRTE10	Inadequacy of resources for sustenance	.562	.520
CRTE11	Challenges of sustaining road user education programmes across the country	.446	.496
CRTE12	Poor performance reward systems to motivate educators	.500	.439

The study went further to present the values that determine the contributions of each of the variables to the common extracted factors using the varimax rotation under principal axis factoring. The model presented a maximum of three common factors that represent the challenges affecting the effectiveness of road user education in Nigeria. Table 4 presents the total variance that explains the contribution of the common factors serving as significant challenges to effective road user education in Nigeria. The information in Table 4 indicates that there are three (3) significant challenges facing effective road user education in Nigeria. The three (3) challenges are indicated by the number of factors that have eigenvalues greater than 1. The three (3) factors with an eigenvalue greater than 1 have an initial cumulative percentage of 67.25 at extraction and 56.8 per cent after rotation. The percentage cumulative contribution of the three (3) factors is high to represent a very high proportion of the cumulative percentage.

Table 5 presents the outcome of the analysis showing the three (3) major challenges facing effective road user education in Nigeria. The exploratory analysis reduced the twelve (12) statements to three (3), which are representative to serve as major significant challenges facing effective road user education in Nigeria. The analysis undertakes factor rotation using the varimax technique according to size and suppressed factor coefficients that are less than 0.50. The twelve factors were highly loaded above 0.600 and distributed under the three (3) identified factors.

Table 4: Total variance explained for the challenges facing effective road user education

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.092	42.432	42.432	4.667	38.889	38.889	3.153	26.275	26.275
2	1.889	15.744	58.176	1.457	12.144	51.033	2.336	19.469	45.744
3	1.089	9.075	67.250	.697	5.810	56.843	1.332	11.099	56.843
4	.745	6.206	73.457						
5	.612	5.102	78.559						
6	.578	4.820	83.379						
7	.513	4.276	87.655						
8	.389	3.243	90.898						
9	.345	2.872	93.770						
10	.290	2.420	96.190						
11	.259	2.155	98.345						
12	.199	1.655	100.000						

Extraction Method: Principal Axis Factoring.

The three (3) identified factors were named institutional challenge, participation challenge, and financial challenge. Factor 1 named institutional challenge comprises statements with codes CRTE1, CRTE7, CRTE12, CRTE10, and CRTE6. Factor 2 named participatory challenge comprises statements with codes CRTE4, CRTE11, CRTE5, CTRE8 and CRTE9. Factor 3 named financial challenges comprises statements with codes CRTE2 and CRTE3.

Table 5: Challenges to effective road user education in Nigeria

Codes	Statements	Factor		
		1	2	3
CRTE1	Willingness to adopt technology innovations and applications	.864		
CRTE7	Inadequate manpower to provide road user education	.648		
CRTE12	Poor performance reward systems to motivate educators	.646		
CRTE10	Inadequacy of resources for sustenance	.628		
CRTE6	High level of corrupt practices	.607		
CRTE4	Poor willingness for road users to participate in public campaigns and enlightenment		.680	
CRTE11	Challenges of sustaining road user education programmes across the country		.675	
CRTE5	The unwillingness of road users to change attitudes		.644	
CRTE8	Inappropriate behaviour of road users		.627	
CRTE9	Inability to meet global requirements for road education standards		.611	
CRTE2	Inadequate funding from a single source			.747
CRET3	Inadequate provision of road infrastructure			.707
	Factor Name	Institutional Challenges	Participatory Challenges	Funding Challenges

A further examination of Table 5 looks at the highest loading item on each extracted factor. CRTE1 with $r = 0.864$ has the highest loading on Factor 1. Factor 2 has CRTE4 with $r = 0.680$ and Factor 3 has CRTE2 with $r = 0.747$. The result implies that the items can be considered significant factors affecting the effectiveness of road user education in reducing accident rates in Nigeria. The factors can be extracted from the statements as unwillingness to adopt technological innovations, low participation in road education campaigns and enlightenment, and inadequate funding.

5. Discussion of the results

Road user education has a major goal of moderating the activities of road users to reduce road traffic accidents. The effectiveness of road user education in terms of enlightenment and campaign programmes is expected to produce a reduction in the trend of RTA, otherwise, with the increasing trend in RTA, road user education is considered ineffective. So, this study examines the challenges facing the effectiveness of road user education in Nigeria.

The study produced two categories of results. Firstly, based on the renaming of the items that load on each factor, the significant challenges to effective road user education are institution challenge, participatory challenge, and financial challenge. Secondly, the challenges to effective road user education were identified by the highest loading item on each of the grouped factors including an unwillingness to adopt technological innovations, low participation in road education campaigns and enlightenment, and inadequate funding.

The institutional challenges reflect the underlying factors that pose obstacles, but if adequately tackled, it could facilitate the effectiveness of the FRSC's initiatives in promoting road education and enlightenment for accident reduction on Nigerian roads. Institutional challenges relate to the manner a society, system, institution, or organisation develops and implements policy decisions that govern its operations. They are long-term challenges that affect the development of a corporate organisation.

The low level of the adoption of advanced technologies for implementing traffic education strategies in real-time is significantly affecting road traffic education in Nigeria (Adewoye et al., 2013; Ajiboye et al., 2022). Unlike in developed countries where the application of intelligent transportation systems (ITS) enhances road safety education and enforcement, Nigeria's reliance on outdated and inadequate technology limits the reach of traffic education efforts (Ajayi et al., 2021; Diderot et al., 2023). Additionally, limited manpower provision challenges effective road user education by FRSC. The organisation is considered understaffed for the massive need for road user education in Nigeria. Furthermore, training and retraining programmes are either insufficient or poorly executed, leaving many officers ill-equipped to educate the public effectively on road safety practices (Foo, 2021; Lamidi, 2024). In the same vein, an effective performance reward system is crucial for motivating personnel and road users alike. This lack of incentive structures leads to low morale and motivation among officers, which in turn affects their performance in conducting effective educational programmes and enforcing road safety regulations (Akindele et al., 2023). Similarly, resources allocated for the continuous operation and success of road safety education programmes such as patrol vehicles and adequate databases, are inefficient and as such, unsustainable. Corruption on the other hand is a pervasive issue in Nigeria that affects all levels of governance, including road safety management (Yagboyaju, 2023). Corruption within the corps undermines the implementation of road safety programs as funds meant for these initiatives are often diverted (Ojiya et al., 2023). Additionally, corrupt practices among traffic officers, such as accepting bribes, diminish the credibility and effectiveness of road safety campaigns (Oluseye, 2024).

The second group was named participatory challenges. This name captures the underlying dimensions that play a role in the engagement and long-term sustainability of road user education programme. The statements that make the factors presented in Table 5 represent key factors that impact the success and continuation of road user education and enlightenment programme. Sustaining road safety education programmes is a major challenge for the FRSC since the continuity and effectiveness of the enlightenment strategies are dependent on inadequate resources (Uzondu et al., 2022). Many RTA reduction schemes start with enthusiasm but fade out due to inconsistent support and logistical difficulties. This lack of sustained efforts leads to diminishing returns over time, as initial gains in road user awareness and behaviour are not maintained. Thus, the unsustainability of the programme can make full implementation impossible and ineffective. In the same way, the behaviour of road users in Nigeria presents a significant hurdle to effective road safety education. Many drivers and pedestrians ignore basic knowledge of road safety rules, contributing to high rates of traffic violations and accidents. Cultural attitudes towards road safety, characterised by a general disregard for traffic laws and an acceptance of risky behaviours cannot be over-emphasised. This further complicates efforts to change these behaviours and makes road user education ineffective (Uhegbu & Tight, 2021). Engaging road users in safety education programme is challenging due to a widespread lack of unwillingness to participate in the campaign programmes. Many road users do not see the

immediate benefits of such programmes and are often reluctant to take part (Uhegbu & Tight, 2021). This apathy is exacerbated by a mistrust of government initiatives, rooted in historical inefficiencies and corruption. Without active participation, the effectiveness of educational programmes is severely limited (Uzundu et al., 2022).

Even when road users participate in education programmes, their willingness to change long-established behaviours is often low. Habitual non-compliance with traffic rules, driven by a culture of impunity and weak law enforcement, makes it difficult for the FRSC to instill lasting behavioural changes. Efforts to promote safer driving and pedestrian practices are frequently met with resistance or quickly forgotten once the immediate influence of the programme fades (Uhegbu & Tight, 2021).

In essence, the willingness of users to participate and change driving behaviour would be necessary even after structural factors are put in place. This is because the presence of structural factors alone cannot change driving behaviour (Uzundu, 2019). If this were the case, no country would have driver behaviour issues as revealed by extant literature (Alonso et al., 2018). This therefore depicts the undeniable role of education and enlightenment in reducing RTA. However, this can and should only come after the primary factors (institutional and infrastructural factors) are addressed. In other words, implementation and participatory challenges can only be adequately dealt with when the institutional and infrastructural challenges have been dealt with, in which case these challenges can be viewed as factors to be addressed for RTA reduction strategies to be effective.

Aligning Nigeria's road safety education with global standards poses additional challenges. International best practices and guidelines set by organisations such as the World Health Organisation (WHO) and the United Nations (UN) require robust data collection, advanced technological tools, and comprehensive training for enforcement officers. However, Nigeria's current infrastructure and resource limitations make it difficult to meet these global requirements, hindering the FRSC's ability to implement globally recognised road safety measures effectively (Ajiboye et al., 2020). Moreso, implementation becomes ineffective if it does not align with global practices (Ishola et al., 2021).

The third significant challenge with two items (inadequate funding and infrastructure) was named financial challenges to effective road user education towards accident rate reduction. The limited availability of funds constraints infrastructure provision for effective implementation of road user education strategies. The challenges to effective road user education in Nigeria are significant due to insufficient funds to provide infrastructure and equipment for implementing strategies, and too weighty to be sidelined (Uzundu et al., 2022). The FRSC often faces significant budgetary constraints in ensuring the continuous operation and success of road safety education programmes, limiting its ability to sustain long-term educational initiatives. This financial insufficiency is further compounded by the misallocation of available resources, often due to bureaucratic inefficiencies and corruption (Okereke et al., 2022). Road safety education requires substantial investment in materials, training, public awareness campaigns, and technological tools. However, the budget allocated to the FRSC is often inadequate to cover these expenses comprehensively (Omidiji, 2021). This funding shortfall limits the scope and reach of educational programmes, making it difficult to achieve a nationwide impact. Essential resources such as educational materials, training facilities, and outreach tools are often lacking. Without adequate resources, the FRSC struggles to deliver high-quality education programmes consistently, which diminishes the overall effectiveness of its initiatives.

In the same vein, implementing modern technology for road safety education and enforcement is quite expensive. Technologies such as automated traffic enforcement systems, advanced training simulators, and real-time data collection tools require significant funding. Given the financial constraints, the FRSC often cannot afford these technologies, limiting its ability to enhance road user education effectively with modern tools (Adewoye et al., 2013; Ajiboye et al., 2022). Sustaining road safety education programmes involves ongoing maintenance and operational costs. These include costs associated with updating educational materials, maintaining training facilities, and conducting regular outreach campaigns. Financial constraints make it difficult for the FRSC to cover these recurring expenses, leading to a decline in programme quality and sustainability over time.

6. Conclusion and policy recommendations

As RTA continues to increase despite the implementation of various road user education programmes and strategies, this study attempts to identify the most significant challenges facing

effective road user education. The goal is to provide insights for decisions to improve education programmes towards RTA reduction. The study employed exploratory factor analysis to reduce twelve items to three (3) most significant factors that serve as challenges to effective road user education in Nigeria from two interpretative perspectives of the statistical analysis. First, by renaming a group of items, the study identified institutional, participatory and financial challenges as significant challenges to effective road user education. Second, the result was interpreted based on the highest loading value of the items under each factor, and technology adoption, road user behaviour, and funding were identified as the three most significant challenges facing effective road user education in Nigeria. The outcome of both interpretations goes in the same direction. The findings of the study have implications for both developed and developing countries.

This study is consistent with Boateng's assertion (2020; 2021) that behavioural challenges are not the main issues affecting the effectiveness of RTA reduction strategies. The empirical evidence further gives voice to the primary role of institutional challenges in impeding the effectiveness of the FRSC road user education for the reduction in RTA. Akindele et al. (2023) stated that the effective performance of Nigeria's public services is dependent on the effectiveness of the available public institutions. This study affirms the significance of participatory challenges due to human behaviour as universal. The medium-income countries, such as Nigeria experience different road user behaviour that renders road user education less effective in reducing RTA. The effectiveness of road user education in reducing RTA will always be forestalled when the necessary funds are unavailable.

Therefore, this study recommends efforts towards sourcing funds from external donors. This can be approached through partnerships with international organisations. Importantly, the three (3) identified challenges require a systematic approach by addressing the challenges one after another from institutional to participatory and then funding.

Addressing the challenges in Nigeria requires a holistic approach that includes improving infrastructure, investing in technology, ensuring adequate and continuous training for FRSC personnel, establishing effective performance reward systems, and combating corruption. This must precede attempts at enforcement and participation. In other words, road user education initiatives must be complemented by adequate infrastructure and institutions as well as the transparency and accountability of the FRSC. This will increase the willingness of road users to participate and change their behaviour to the initiative and promote a collective commitment to road safety. Moreover, establishing sustainable funding mechanisms, such as public-private partnerships and dedicated road safety funds, can provide more reliable financial support. Investing in cost-effective technologies and leveraging digital platforms for education and outreach can also help maximise the impact of limited resources. The goal of adopting the recommendations is to reduce the trend of RTA in Nigeria.

This study is limited to road user education using Nigeria as a case study. The implications of the findings are relevant to both developing and developed countries towards reducing the trend of RTAs. Future studies may examine the institutional constraints to road safety education.

Acknowledgment

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Citation information

Adenigbo, A. J. (2024). Challenges to road user education in reducing road traffic crashes in Nigeria. *Journal of Sustainable Development of Transport and Logistics*, 9(2), 6-20. doi:10.14254/jsdtl.2024.9-2.1.

References

- Adenigbo, A. J., Mageto, J., & Luke, R. (2023). Adopting technological innovations in the air cargo logistics industry in South Africa. *Logistics*, 7(4), 84. <https://doi.org/10.3390/logistics7040084>
- Adewoye, J. O., Jonathan, O. A., & Hasimiyu, A. A. (2013). Strategic Influence of Information Technology on the Performance of Nigeria Federal Road Safety Commission. *International Journal of Business and Commerce*. <https://www.ijbcnet.com/2-11/IJBC-13-21108.pdf>
- Afolabi, O. J., & Gbadamosi, T. (2017). Road Traffic Accidents In Nigeria: Causes And Consequences. *The International Journal of Transport and Logistics*, 17(42), 40–49.
- Aghdam, F. B., Sadeghi-Bazargani, H., Azami-Aghdash, S., Esmaeili, A., Panahi, H., Khazaei-Pool, M., & Golestani, M. (2020). Developing a national road traffic safety education program in Iran. *BMC Public Health*, 20(1). <https://doi.org/10.1186/s12889-020-09142-1>
- Ajayi, O. O., Bagula, A. B., Maluleke, H. C., & Odun-Ayo, I. A. (2021). Transport inequalities and the adoption of intelligent Transportation Systems in Africa: A research landscape. *Sustainability*, 13(22), 12891. <https://doi.org/10.3390/su132212891>
- Ajiboye, A. O., Folagbade, A. M., Ohida, M. E., & Kolawole, O. J. (2022). Appraisal of the Federal Road Safety Commission (FRSC) Performance in Road Accidents Reduction in Kaduna State, Nigeria. *Port Harcourt Journal of Disaster Risk Management & Development Studies (PJDRMDS)*, 4(3 & 4), 124–144.
- Ajiboye, A. O., Kolawole O.J., & Adebajo, A. A. (2020). Assessment of Statutory Duties of Federal Road Safety Corps at Reducing Accidents and Carnages in Ibadan, South-western Nigeria. *Journal of Art, Architecture and Built Environment*, 3(2), 1–17. <https://doi.org/10.32350/jaabe>
- Akbari, M., Lankarani, K. B., Heydari, S. T., Motevalian, S. A., Tabrizi, R., & Sullman, M. J. M. (2021). Is driver education contributing towards road safety? a systematic review of systematic reviews. *Journal of Injury and Violence Research*, 13(1). <https://doi.org/10.5249/jivr.v13i1.1592>
- Akindele, I. T., Okanlawon, D., & Olusesi, D. (2023). Public infrastructural decay as an impediment to effective performance. *Journal of Governance*, 8(2). <https://doi.org/10.31506/jog.v8i2.19178>
- Alonso, F., Estéban, C., Useche, S. A., & Colomer, N. (2018). Effect of Road Safety Education on Road Risky Behaviors of Spanish Children and Adolescents: Findings from a National Study. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 15(12), 2828. <https://doi.org/10.3390/ijerph15122828>
- Antoine, G., Kuradusenge, M., Bajpai, G., Mikeka, C., & Shrivastava, S. (2023). Comparison of random forest and support vector machine regression models for forecasting road accidents. *Scientific African*, 21, e01739. <https://doi.org/10.1016/j.sciaf.2023.e01739>
- Awoniyi O., Hart A., Argote-Aramendiz K., Voskanyan A., Sarin R., Molloy M. S., Ciottone G. R. (2022) Trend analysis on road traffic collision occurrence in Nigeria. *Disaster Med Public Health Prep* 16: 1517–1523. doi: <https://doi.org/10.1017/dmp.2021.166>.
- Banstola, A., Kigozi, J., Barton, P., & Mytton, J. (2020). Economic burden of road traffic injuries in Nepal. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 17(12), 4571. <https://doi.org/10.3390/ijerph17124571>
- Benlagha, N., & Charfeddine, L. (2020). Risk factors of road accident severity and the development of a new system for prevention: New insights from China. *Accident Analysis and Prevention*, 136, 105411. <https://doi.org/10.1016/j.aap.2019.105411>

- Boateng, F. G. (2020). "Indiscipline" in context: a political-economic grounding for dangerous driving behaviours among Tro-Tro drivers in Ghana. *Humanities & Social Sciences Communications*, 7(1). <https://doi.org/10.1057/s41599-020-0502-8>
- Boateng, F. G. (2021). Why Africa cannot prosecute (or even educate) its way out of road accidents: insights from Ghana. *Humanities & Social Sciences Communications*, 8(1). <https://doi.org/10.1057/s41599-020-00695-5>
- Bougna, T., Hundal, G., & Taniform, P. N. (2022). Quantitative Analysis of the Social Costs of Road Traffic Accidents Literature. *Accident Analysis and Prevention*, 165, 106282. <https://doi.org/10.1016/j.aap.2021.106282>
- Cochran, W. G. (1977). *Sampling Techniques* (3rd ed.). New York: John Wiley & Sons.
- Costello, A. M., & Osborne, J. A. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation*, 10(1), 1–9. <https://doi.org/10.7275/jyj1-4868>
- Diderot, C. D., Bernice, N. W. A., Tchappi, I., Mualla, Y., Najjar, A., & Galland, S. (2023). Intelligent transportation systems in developing countries: challenges and prospects. *Procedia Computer Science*, 224, 215–222. <https://doi.org/10.1016/j.procs.2023.09.030>
- Ehsani, J. P., Michael, J. P., & MacKenzie, E. J. (2023). The future of road Safety: challenges and opportunities. *The Milbank Quarterly*, 101(S1), 613–636. <https://doi.org/10.1111/1468-0009.12644>
- Fisa, R., Musukuma, M., Sampa, M., Musonda, P., & Young, T. (2022). Effects of interventions for preventing road traffic accidents: an overview of systematic reviews. *BMC Public Health*, 22(1). <https://doi.org/10.1186/s12889-021-12253-y>
- Foo, K. (2021). Regenerative green infrastructure governance in weak, rebounding, and wealthy land markets. *Frontiers in Sustainable Cities*, 3. <https://doi.org/10.3389/frsc.2021.734440>
- Fowode, K. V., Nwaogazie, I. L., & Anyanwu, B. O. (2023). Effect of Safety Education Intervention on Knowledge of Road Accident Prevention among Drivers in Lagos State, Nigeria. *Open Journal of Safety Science and Technology*, 13(03), 89–100. <https://doi.org/10.4236/ojsst.2023.133005>
- FRSC (2021). 2020 FRSC Annual Report. In *Federal Road Safety Corps*. Federal Road Safety Corps.
- FRSC (2022). 2021 Annual Report. In *Federal Road Safety Corps*. Federal Road Safety Corps.
- Gbadamosi, K. T. & Adenigbo, A. J. (2017). Contributions of vehicle inspection operations to traffic system in Abuja, Nigeria. *Ethiopian Journal of Environmental Studies and Management*, 10(4), 451 – 260. [10.4314/ejesm.v10i4.3](https://doi.org/10.4314/ejesm.v10i4.3)
- Holländer, K., Colley, M., Rukzio, E., & Butz, A. (2021). A Taxonomy of Vulnerable Road Users for HCI Based On A Systematic Literature Review. *CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. <https://doi.org/10.1145/3411764.3445480>
- Ishola, A., Abdulkareem, A., & Bello, M. (2021, February 25). *Transforming Public Service Delivery from the line to online in Nigeria* | *Acta Universitatis Danubius. Administration*. <https://dj.univ-danubius.ro/index.php/AUDA/article/view/718>
- Jamal, A., Rahman, M. T., Al-Ahmadi, H. M., & Mansoor, U. (2019). The dilemma of road safety in the eastern province of Saudi Arabia: Consequences and prevention strategies. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 17(1), 157. <https://doi.org/10.3390/ijerph17010157>
- Kaiser, N., & Barstow, C. (2022). Rural Transportation Infrastructure in Low- and Middle-Income Countries: A Review of Impacts, Implications, and Interventions. *Sustainability*, 14(4), 2149. <https://doi.org/10.3390/su14042149>

- Lamidi, K. O. (2024). Nigerian State and the War Against Armed Banditry. In *Armed Banditry in Nigeria* (pp. 221–250). https://doi.org/10.1007/978-3-031-45445-5_10
- Lee, S. M., & Al-Mansour, A. I. (2020). Development of a new traffic safety education material for the future drivers in the Kingdom of Saudi Arabia. *Journal of King Saud University. Engineering Sciences/Mağallaġ Ġāmi'aġ Al-malik Sa'ūd. al-'Ulūm Al-handsiyyaġ*, 32(1), 19–26. <https://doi.org/10.1016/j.jksues.2018.11.003>
- Li, N., Huang, J., & Feng, Y. (2020). Construction and confirmatory factor analysis of the core cognitive ability index system of ship C2 system operators. *PLOS ONE*, 15(8), e0237339. <https://doi.org/10.1371/journal.pone.0237339>
- Mirzaei, R., Hafezi-Nejad, N., Sabagh, M. R., Moghaddam, A., Eslami, V., Rakhshani, F., & Rahimi-Movaghar, V. (2014). Dominant role of drivers' attitude in prevention of road traffic accidents: A study on knowledge, attitude, and practice of drivers in Iran. *Accident Analysis & Prevention*, 66, 36–42. <https://doi.org/10.1016/j.aap.2014.01.013>
- Mohammed, S., Alkhereibi, A. H., Abulibdeh, A., Jawarneh, R. N., & Balakrishnan, P. (2023). GIS-based spatiotemporal analysis for road traffic accidents; in support of sustainable transportation Planning. *Transportation Research Interdisciplinary Perspectives*, 20, 100836. <https://doi.org/10.1016/j.trip.2023.100836>
- Nowak, K. (2016). Teaching self-control: road safety and traffic education in postwar Germany. *Historical Social Research*, 41(1), 135–153. <https://doi.org/10.12759/hsr.41.2016.1.135-153>
- Obregón-Biosca, S. A., Betanzo-Quezada, E., Romero-Navarrete, J. A., & Ríos-Nuñez, M. (2018). Rating road traffic education. *Transportation Research Part F-traffic Psychology and Behaviour*, 56, 33–45. <https://doi.org/10.1016/j.trf.2018.03.033>
- Odonkor, S. T., Mitsotsou-Makanga, H., & Dei, E. N. (2020). Road safety challenges in Sub-Saharan Africa: The case of Ghana. *Journal of Advanced Transportation*, 2020, 1–9. <https://doi.org/10.1155/2020/7047189>
- Ojiya, E. A., Asom, S. T., Gbaka, S., Mohammed, S. A., Salihu, M. B., & Shiek, J. M. (2023). Corruption, Institutional Effectiveness and Economic Growth in Nigeria. *Research Journal of Humanities Legal Studies and International Development*, 13(2). <https://doi.org/10.48028/iiprds>
- Okafor, I. P., Odeyemi, K. A., Dolapo, D. C., Ilika, A. L., & Omosun, A. O. (2014). Effectiveness of road safety education in Nigeria using a quasi-experimental trial: Findings from the Road Safety Intervention Project. *African Safety Promotion*, 12(1), 1–17. https://www.unisa.ac.za/cgs/news/wp-content/uploads/2014/11/ASJP_vol12_No_1_2014_Okafor-et-al.pdf
- Okereke, I. C., Zahoor, U., & Ramadan, O. (2022). Trauma care in Nigeria: Time for an integrated trauma system. *Curēus*. <https://doi.org/10.7759/cureus.20880>
- Oluseye, O. (2024). Exploring potential political corruption in large-scale infrastructure projects in Nigeria. *Project Leadership and Society*, 5, 100108. <https://doi.org/10.1016/j.plas.2023.100108>
- Omidiji, A. (2021). Road Transport Accidents and Socio-Economic Indicators: A Case of Nigeria. *Journal of Construction Project Management and Innovation*, 11(1), 101–113. <https://doi.org/10.36615/jcpmi.v11i1.562>
- Rahman, M. M., Islam, M. K., Al-Shayeb, A., & Arifuzzaman, M. (2022). Towards Sustainable Road Safety in Saudi Arabia: Exploring Traffic Accident Causes Associated with Driving Behavior Using a Bayesian Belief Network. *Sustainability*, 14(10), 6315. <https://doi.org/10.3390/su14106315>
- Razzaghi, A., Saadati, M., & Najafi, M. (2021). Challenges of education in prevention of road traffic accidents. *International Journal of Epidemiologic Research*, 8(2), 54–55. <https://doi.org/10.34172/ijer.2021.09>

- Říha, Z., Dockalikova, I., Tichý, J., & Košťál, D. (2022). Solving transportation externalities, economic approaches, and their risks. *Open Engineering*, 12(1), 1–10. <https://doi.org/10.1515/eng-2022-0001>
- Smethurst, S. (2022, January 21). 10 road safety challenges facing low-income countries. *Brightmile*. <https://www.brightmile.io/blog/10-road-safety-challenges-facing-low-income-countries>
- Tan, H., Zhao, F., Hao, H., & Liu, Z. (2020). Cost analysis of road traffic accidents in China. *International Journal of Injury Control and Safety Promotion*, 27(3), 385–391. <https://doi.org/10.1080/17457300.2020.1785507>
- Tavakkoli, M., Torkashvand-Khah, Z., Fink, G., Takian, A., Küenzli, N., De Savigny, D., & Muñoz, D. C. (2022). Evidence from the Decade of Action for Road Safety: A Systematic Review of the Effectiveness of Interventions in Low and Middle-Income Countries. *Public Health Reviews*, 43. <https://doi.org/10.3389/phrs.2022.1604499>
- Uhegbu, U. N., & Tight, M. R. (2021). Road user attitudes and their reported behaviours in Abuja, Nigeria. *Sustainability*, 13(8), 4222. <https://doi.org/10.3390/su13084222>
- Uzundu, C. C. (2019). *The influence of road safety culture on driver behaviour: a study of Nigerian drivers*. <https://theses.whiterose.ac.uk/25329/>
- Uzundu, C., Jamson, S., & Marsden, G. (2022). Road safety in Nigeria: unravelling the challenges, measures, and strategies for improvement. *International Journal of Injury Control and Safety Promotion*, 29(4), 522–532. <https://doi.org/10.1080/17457300.2022.2087230>
- Watkins, M. W. (2021). A Step-by-Step Guide to Exploratory Factor Analysis with SPSS. In *Routledge eBooks*. <https://doi.org/10.4324/9781003149347>
- WHO. (2018). Global Status Report on Road Safety 2018: Summary. In *World Health Organization (WHO/NMH/NVI/18.20)*. World Health Organization. Retrieved June 7, 2023, from <http://apps.who.int/iris>
- Yagboyaju, D. A. (2023). The Implication of Corruption to Nigeria's Internal Security: Insights from Selected Security Agencies. *Scientia Militaria*, 51(1). <https://doi.org/10.5787/51-1-1408>
- Zhang, Y., & Cheng, L. (2023). The role of transport infrastructure in economic growth: Empirical evidence in the UK. *Transport Policy*, 133, 223–233. <https://doi.org/10.1016/j.tranpol.2023.01.017>



© 2016-2024, Journal of Sustainable Development of Transport and Logistics. All rights reserved.

This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share – copy and redistribute the material in any medium or format Adapt – remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution – You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Journal of Sustainable Development of Transport and Logistics (ISSN: 2520-2979) is published by Scientific Publishing House "CSR", Poland, EU and Scientific Publishing House "SciView", Poland, EU

Publishing with JSDTL ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the JSDTL website
- Rapid publication
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a JSDTL at <https://jsdtl.sciview.net/> or submit.jsdtl@sciview.net

