



Road Traffic Accidents Prevention Efforts in Oyo State - Vehicle Inspection Operations Perspective

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Abstract:

This review article examines the role of vehicle inspection operations in Preventing Road Traffic Accidents (RTAs) in Oyo State, Nigeria, with a focus on their economic, social, and safety impacts. Despite their potential, vehicle inspections remain underutilized, hindered by systemic challenges such as outdated technology, limited public engagement, and institutional constraints. By addressing mechanical faults, promoting preventive maintenance, and enhancing safety awareness, vehicle inspection operations form a crucial part of Oyo State's road safety framework. This article emphasizes the need for systemic reforms, technological advancements, and greater public participation to unlock the full potential of these operations. Further, it explores how innovative approaches—driven by data, collaboration, and technological integration—can transform the inspection system into a model of efficiency, effectiveness, and sustainability. The future of vehicle inspection in Oyo State hinges on leveraging these innovations to strengthen institutional frameworks and engage diverse stakeholders, positioning the state as a leader in proactive traffic management. The article also discusses the far-reaching economic and social benefits of effective vehicle inspections. These operations reduce the financial burden of RTAs, foster safer communities, and promote economic resilience through job creation and local industry growth. By integrating behavioural changes and promoting a maintenance-oriented mind-set, vehicle inspections can cultivate a culture of accountability and safety. Ultimately, this review argues that enhancing vehicle inspection operations in Oyo State not only improves road safety but also contributes to broader development goals, serving as a model for other regions seeking to balance road safety with social and economic progress.

Keywords: Road Traffic Accidents, Vehicle Inspection, road Safety

Introduction

Road Traffic Accidents (RTAs) pose a significant challenge to public health and safety, particularly in low- and middle-income countries such as Nigeria. Between 2020 and 2022, Nigeria experienced over 18,000 crashes attributed primarily to speed violations, with mechanical failures also playing a crucial role in many incidents (Muguro et al., 2020). According to the National Bureau of Statistics (2024) reported road traffic crashes in the second quarter of 2024 was 2,404, indicating a decrease of 9.69% from the previous quarter which recorded 2,662 and an 18.98% fall from 2,967 in Q2 2023. This high toll of RTAs highlights systemic issues such as poor infrastructure, inadequate enforcement of traffic regulations, and insufficient emergency services that exacerbate the consequences of these accidents (Onyemaechi and Ofoma, 2016; Hossain, et al., 2024). According to Adebiyi et. al., 2007, the first main trunk of road in Nigeria,

was constructed in Ibadan northwest to Oyo in 1905, and since then, rapid urban growth and upsurge in traffic has resulted to a high increase in RTA, which is caused on many occasions, by mechanical faults. In spite of Vehicle Inspection Office (VIO) activities, these underlying factors of obsolete methods, minimal adherence, and unmonitored informal transport affect efficiency.

This is compounded by economic factors and technology constraints. In order to boost efficiency of regulatory oversight, improve vehicle conditions and lower RTAs, a strong and localised technology-based inspection capacity is necessary (Bun, 2012; Onyemaechi and Ofoma, 2016; Odukoya et al., 2024). In order to promote road safety in Oyo state, there must be an approach that looks at every angle. This involves the use of modern automated systems to improve vehicle inspection services, mechanisms of enforcement, as well as information campaigns on vehicle maintenance (Duggai et al., 2021). Oyo State has the capacity



to redesign its vehicle inspection services as part of its road safety measures from the experiences and internationally accepted practices that deal with local problems. This change could help not only improve the efficiency of inspections but also make Oyo State one of the foremost subjects of the innovative approaches to road safety in Nigeria. Currently in Oyo, the vehicle inspection system is marred with challenges ranging from archaic procedures to a complete absence of technology integration.

In this field, vehicle owners are more concerned about saving costs than they are in ensuring safety, thus making compliance with the inspection requirements more difficult. Moreover, informal means of transport usually fall under no checks, so revamping inspection procedures and empowering the public of the need for regular vehicle maintenance in the state will make all stakeholders more responsive in ensuring road safety (Adenigbo, 2024). However, currently, systemic issues like ancient practices, low technology utilization, and public non-compliance still plague road safety (Bonneton, 2020). The surging number of Road Traffic Accidents (RTAs) in recent years has resulted in an urgent need for the implementation of practical and sustainable solutions to control their prevalence, which warrants an extensive inspection of the vehicle inspection frameworks presently in place as they relate to their reasonable evolution, unique challenges, and actionable restructuring. The demand for this review arises from the pivotal role vehicle inspection operations perform in reducing RTAs, fostering public confidence, and establishing a safety-driven culture and, therefore, synthesizing current knowledge, spotting holes, and formulating actionable strategies, this article aims to provide a roadmap for policymakers, practitioners, and researchers committed to improving road safety outcomes in Oyo State.

The objective of this review is to analyze the evolution, challenges, innovations, and socioeconomic impacts of vehicle inspection systems in Oyo State, offering evidence-based recommendations for sustainable reforms to enhance road safety and reduce RTAs.

2.0 Overview of Road Traffic Accidents (RTAs) In Oyo State

RTAs are emerging as a new public health challenge for many low- and middle-income countries, and Oyo State in Nigeria is no exception. According to Balogun et al. (2021), the state records more than 3,000 accidents each year, nearly 30 percent of which are due to mechanical failures. The largest share of the accidents take place in Ibadan, the city's urban core, where traffic volume, poor road maintenance, and reckless driving combine to generate the shocking figures. Accidents in rural areas frequently go underreported because the roads are unpaved and inadequate lighting, further complicating the road safety landscape (Balogun et al., 2021; Odukoya et al., 2024). The contributors to this crisis are diverse—including lack of training on how to drive, poor driving behaviour, and lack of compliance with the law. The increased risks are compounded by the deteriorating road infrastructure (road condition) and lack of control and

regulation of traffic (traffic congestion). Aging vehicles and neglect of maintenance—often driven by economic constraints and the availability of substandard spare parts—further heighten the danger (Korter et al., 2020). The consequences of RTAs are felt beyond acute injury or death, also generating substantial economic and social costs to families and communities as road traffic crashes account for 1.35 million deaths annually and cost over 65 us\$ billion (Bouagna et al., 2022). Technological embedding and improved public understanding of vehicle maintenance are essential for modernizing vehicle inspection procedures (Korter et al., 2020; Eke and Nwankwo 2023). This paradigm shift has the potential to greatly enhance road safety and incidence of RTAs in that state.

3.0 Revolutionizing Vehicle Inspections for Safer Roads in Oyo State

Vehicle inspections can play an important role in reducing RTAs, when properly performed, by uncovering defects before autos travel on the road, helping to create a culture of ongoing maintenance, and protecting the environment via emissions control. Global data indicate that strict inspection processes can alleviate the mechanical accident, up to 30%, which is a powerful message for Oyo State (Oyo State Government 2017; Kortner et al., 2020; Adebayo and Ojo, 2024). Modernizing inspection equipment, strengthening enforcement to prevent violations, and increasing the number of inspection centers and building public trust through transparency and education are all part of a complex strategy that is required today. By tackling these issues, vehicle inspection can be used as an integral part of the road safety strategy of Oyo State leading to loss of lives and facilitating sustainable transportation.

4.0 Contributions of Vehicle Inspection Operations to Road Traffic Accident Prevention in Oyo State

Vehicle inspection activities play a critical role in decreasing road traffic accidents (RTAs) by mitigating mechanical defects, which are closely linked to the occurrence of RTAs (Zahidy et al, 2024). In Oyo State, such checks aim at vehicle roadworthiness by detecting and repairing defects in such important systems as brakes, tires, lights, and steering, inspections have a crucial role to play in preventing mechanical breakdowns by demanding mechanical repairs as a condition for roadworthiness certification, and consequently improving road safety as a whole. Evidence from areas with strong inspection regimes identifies a significant reduction in RTAs due to mechanical reasons, and highlights the possible role of a systematic inspection checklist (Korter et al., 2020; Oyo State Government, 2017). Vehicle inspections, not only reducing mechanical risk, also affect drivers through the generation of a culture of compliance and preventive maintenance. Regular checks and resulting fines for non-compliance represent punishments against vehicular abuse, especially among commercial drivers.

Though safety awareness programme is not specially integrated into the conditions of the inspection in Oyo State, it would augment the protective effects anticipated from the activities of the inspection in Oyo state. Measurable effects show that properly executed inspections significantly contribute to the decrease of mechanically-induced RTAs—case studies reveal a maximum decrease of up to 30%—as well as reducing environmental risks by controlling emissions from damaged mainly-engines (Eke and Nwankwo, 2023; Adetunji and Fagbohun, 2024). However, challenges such as inconsistent enforcement, limited infrastructure, and insufficient data collection hinder the effectiveness of these operations. Supporting these systemic challenges by uniform protocols and public education campaigns will be of vital importance to use vehicle inspections adequately to stop RTAs and establish effective transportation systems (Federal Road Safety Corps, 2024; Planning Malaysia, 2024).

Table 1 provides a comprehensive overview of the evolution of vehicle inspection operations in Oyo State, comparing historical context, current challenges, and potential innovations. It highlights key areas such as legislative frameworks, institutional setup, technological adoption, public awareness, and inter-agency collaboration, illustrating the need for transformative reforms in the system. Likewise, Figure 1 provides comprehensive and forward-thinking approach to improving vehicle inspection operations. It seamlessly links past paradigms to future solutions, and in the process, provides both a model of how change can be brought about and a framework for implementation. On the one hand, the diagram recur entity highlights the idea of continuous (re)adaptation and (re)organisation, which is consistent with the focus on future innovation, sustainability and also, transformative and flexible strategies.

5.0 Challenges Facing Vehicle Inspection Operations in Oyo State

Vehicle inspection activities in Oyo State are severely constrained by a heavy load of systemic, institutional and societal obstacles such that vehicle inspection contributes little to road traffic accident (RTC) prevention. These challenges are caused by a wide range of factors, such as dimensional, capacity, functional, structural, economic, legal, infrastructural and data limits. Institutional constraints are highly restricting to the Vehicle Inspection Office (VIO)'s capacity to cope with the rising number of vehicles on the

street. Insufficient infrastructure, obsolete equipment and a small workforce constrain detailed inspection, especially in rural areas where facilities for inspection are unavailable. Additionally, many centres still rely on manual processes, which diminishes both efficiency and accuracy in assessing vehicle safety (Akinwumi and Ojo, 2023; Oladipo et al., 2023).

Irregularities within the inspection process further compromise its integrity. Be it the irregularities which enable unroadworthy vehicles to slip off scrutiny, and the feeble enforcement allowing for non-compliance which are prevalent for example, among Commercial drivers, tailing these topics to ensure effective action requires modeling data using advanced sensor technologies and firmly integrating them in vehicle designs to connect theory to actuality. Public perception plays a critical role in this dynamic; many vehicle owners view inspections as bureaucratic hurdles rather than essential safety measures. This lack of trust is frequently exacerbated by perceived lack of efficacy and misuse within the system (Abubakar and Abdulazeez, 2023). Economic factors also play a role, as vehicle repairs are expensive and they discourage vehicle owners from carrying out necessary maintenance. In the case of commercial drivers on very limited budgets, getting paid as immediately as possible is a conscious over ride of safety in the long run. In addition, obsolete laws and inconsistent enforcement increase the problems by not adequately addressing modern traffic problems (Ogunyemi and Olufemi, 2024).

6.0 The Future of Vehicle Inspection Operations in Oyo State: Innovations and Sustainability

To effectively tackle the growing complexity of road traffic management and the high rates of road traffic accidents (RTAs) in Oyo State, a transformative approach to vehicle inspection operations is essential. Integrating advanced technologies, systemic reforms, and collaborative strategies can pave the way for innovation and sustainability. The adoption of digitalized inspection technology and artificial intelligence (AI) is essential for modernizing these processes. Automated diagnostic devices can be used to improve inspection procedures, both in terms of accuracy and speed. AI-based systems are able to process historical data and detect high-risk vehicles and therefore targeted interventions may be implemented. In addition, the

Table 1: Evolution and Transformation of Vehicle Inspection Operations in Oyo State: Key Areas of Legislative, Technological, and Institutional Development

| Key Areas | Historical Context | Challenges | Innovations and Reforms | References |
|-----------------------|--|--|--|---------------|
| Legislative Framework | Initial vehicle inspection laws established during the colonial era, primarily focused on roadworthiness of commercial vehicles. | Outdated regulations that fail to address modern traffic complexities and technological advancements | Enactment of updated laws incorporating digital standards, emissions checks, and modern enforcement mechanisms | (Lawal, 2021) |

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|-----------------------------------|--|--|---|---|
| Institutional Setup | Inspection centres established in urban areas; limited institutional capacity and resources during early operations. | Insufficient inspection centres, especially in rural areas, leading to accessibility issues and operational delays | Decentralization of inspection services with mobile units and community-based inspection centres | (Oladipo and Adebayo, 2022); Eke and Nwankwo 2023 |
| Technological Adoption | Manual inspection techniques dominated until the late 20th century, with minimal technological interventions | Reliance on outdated and inefficient manual tools; lack of investment in diagnostic technologies | Integration of automated diagnostic systems, AI-powered fault detection, and blockchain-based certification processes | (Olufemi and Ogunyemi 2022; Adetunji and Fagbohun 2024) |
| Public Awareness and Compliance | Public awareness campaigns were sporadic and lacked focus, with low community involvement | Low compliance due to inadequate awareness, economic constraints, and perceived irregularities in inspection processes | Comprehensive public engagement programmes, including incentives for compliance and targeted awareness campaigns | (Banjoko, 2023; Adetunji and Fagbohun 2024) |
| Irregularities and Accountability | Early systems were plagued by unchecked irregularities | Persistent irregularities undermine public trust in inspection outcomes and leads to unsafe vehicles on the roads. | Adoption of blockchain for transparent record-keeping and implementation of anti-irregularities frameworks. | (Okah 2019; Olufemi and Ogunyemi 2022) |
| Environmental Considerations | Little to no emphasis on environmental sustainability in early inspection protocols | Lack of emissions testing contributes to environmental pollution and public health risks | Inclusion of emissions testing in inspection protocols, coupled with incentives for hybrid and electric vehicle adoption | (Olufemi and Ogunyemi 2022; Eke and Nwankwo, 2023) |
| Inter-Agency Collaboration | Minimal collaboration between the Vehicle Inspection Office (VIO), Federal Road Safety Corps (FRSC), and other relevant agencies | Fragmentation of roles, poor communication, and resource duplication among road safety agencies | Policy harmonization and the establishment of a centralized road safety coordination body for unified operations | (Okah 2019; Adetunji and Fagbohun, (2024) |
| Capacity and Training | Initial workforce was undertrained, with no structured capacity-building programmes | Limited technical skills among inspection officers to handle modern diagnostic equipment and processes | Regular training programmes and certifications for inspection officers on emerging technologies and global best practices | (Olufemi and Ogunyemi 2022; Adebayo and Oladipo, 2023; Federal Road Safety Corps. 2024) |
| Data and Reporting Systems | Early systems relied on manual record-keeping, leading to inefficiencies and poor data utilization | Lack of centralized data systems hinders analytics and decision-making processes | Establishment of a centralized digital database for real-time data collection, sharing, and analysis | (Olufemi and Ogunyemi, 2022); SGS Nigeria, 2024) |

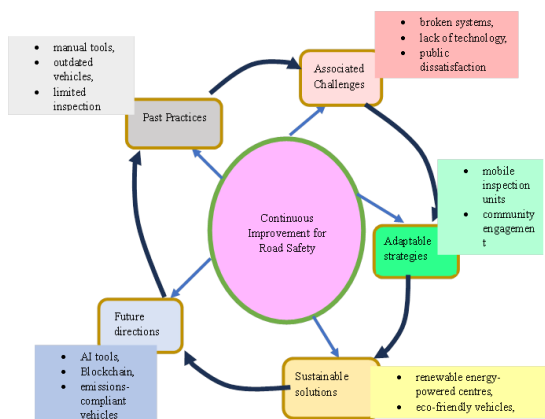


Figure 1: A Continuous Improvement Framework of Vehicle Inspection Operations for Road Safety in Oyo State

blockchain technology can offer a verifiable platform for recording inspection outcomes that will aid accountability and public confidence, while facilitating the reduction of errors (Osoteku, 2022; Agboluaje, 2022). It is highly important to build institutional frameworks for the effective implementation of these projects.

Expanding the network of inspection centres, particularly in rural areas, will help alleviate congestion in urban locations. Introduction of mobile inspection units can facilitate outreach, and continuous training of inspectors will maintain their competency to apply new technologies. Harmonizing policies of Vehicle Inspection Office (VIO), Federal Road Safety Corps (FRSC) and other applicable organizations will enable consistent enforcement activities. Furthermore, public-private partnerships (PPPs) have been used to provide resource adequacy by working with private technology vendors to rehabilitate facilities and financially support vehicle maintenance with loans through financial institutions (Oyo State Government, 2017; Akinwumi and Ojo, 2023). Public engagement by means of awareness campaigns focusing on the need for inspections for reducing RTAs can influence attitudes and encourage adherence.

7.0 Integrating Multi-Stakeholder Approaches for Sustainable Road Traffic Accident (RTA) Prevention in Oyo State

Road traffic accident prevention in Oyo State requires collaborative action, comprising a wide range of stakeholders. By promoting collaboration between government agencies, private sector entities, civil society organizations, and the general public, the state can effectively tackle the multifaceted challenges associated with road safety while enhancing the efficiency and inclusivity of vehicle inspection operations. Major government agencies, including Vehicle Inspection Office (VIO) and Federal Road Safety Corps (FRSC), play an important role in the creation of responsible legal and regulatory environment for road safety. Their activities in policy innovation, inter-agency data sharing, and infrastructure

build-out are likely to help with achieving both consistency and effectiveness of vehicle inspections (Menendez et al., 2023; World Bank, 2022). The private sector has a significant role to play as an engine of innovation for inspection processes concerning motor vehicles. Partnerships with technology companies offer the means for the procurement, installation and operation of automated inspection systems as well as AI-powered fault detection solutions, and blockchain technology, in order to increase transparency and improve efficiency. Further, collaborations with automobile producers and insurance providers can motivate adherence to inspection laws by providing lower insurance premiums as part of compensation, thereby promoting safety culture among vehicle owners (Akinwumi and Ojo, 2023; Olufemi et al., 2023).

In the meantime, civil society organisations and community based organisations can play an extremely important role in hollowing out policy gaps and achieving public accountability. Using public awareness drives and community mobilization activities, these groups can help enhance public awareness of the good reasons for vehicle inspections and encourage stakeholder openness. Public engagement is a key ingredient to implementing sustainable road safety efforts. Educational programs and interactive tools can well call attention to the benefits of routine maintenance of motor vehicles, and feedback loops promote active involvement on the part of the community. In addition, the local governments have an important capacity to make sure that testing services are accessible to marginalized communities by transferring inspection centers to rural locations and merging local enforcement strategies (Oyo State Government, 2017; Abubakar and Abdulazeez, 2023). With the creation of a collaborative platform that incentivizes all stakeholders to share responsibility, the vehicle inspection regime in Oyo State can be developed into a more efficient system with the potential to decrease road traffic accidents. The financial constraint, which has been a major issue in the application of right tools in mitigating road accident can be reduced if relevant applications of road traffic models and road safety accident reduction tools are used as recommended by Adebisi (2002) and Adebisi and Charles-Owaba (2006)

8.0 The Economic and Social Impacts of Effective Vehicle Inspection in Oyo State

Effective introduction of vehicle inspection structures in Oyo State is paramount in reducing the economic and social consequences of road traffic accidents (RTAs). These frameworks are directly in the realm of mechanical failures, an important cause of RTAs, and, ultimately, decrease the cost of vehicle repair and medical cost and increase the total productivity and the community well-being. The tangible costs of RTAs are not limited to repair bills of vehicles, but also medical costs, as well as the amount of lost production and the increment of workload to the public health system. In Oyo State, where road transport is a key element in the livelihood of various people, strong vehicle checks can help reduce the effects of this disruption by checking that it is safe for vehicles

to be on the road. In low-income families, accident prevention can help alleviate the catastrophic direct economic costs of medical care as well as lost work income and help create greater socioeconomic stability (Ogunyemi et al., 2023; Abubakar and Abdulazeez, 2023). Application of The social implications of vehicle inspections are equally significant. Through identifying broad mechanical problems like brake failures, these examinations can be directly credited to saving lives and injuries on the road. This improvement in safety promotes healthier and more unified societies. If inspection systems are able to ensure vehicle safety, public trust in transport grows which in turn leads to more extensive use of modes of public transport. This change not only relieves traffic jams but also environmental pollution caused by traffic on roads. Additionally, by minimizing social tensions that can arise from accidents—such as legal disputes and emotional distress—vehicle inspections help strengthen communal bonds (Raji et al., 2024; Eke and Nwankwo, 2023). Behavioral changes resulting from regular vehicle inspections further amplify their effectiveness. Through encouraging preventive maintenance activities, these systems facilitate a system of ownership responsibility among car owners.

Open and transparent screening procedures foster self-participation and thus promote ad hoc compliance and the gradual formation of a safety-conscious attitude within the community. In addition, the increase in inspection activities leads to new economic opportunities in that it creates jobs in the inspection centers, a requirement of trained personnel for performing diagnoses and data management tasks. The automotive repair business is also taking advantage of higher demand for servicing and this can lead to entrepreneurship and local economic development (Adebayo and Oladipo, 2024; Olufemi et al., 2023). Public-private collaboration is a key factor in maximizing the benefits of vehicle inspection schemes. The partnering of inspection processes with private technology companies may result in the adoption of new solutions that enhance efficiency of inspection processes. Furthermore, community-based projects can guarantee inclusivity and ensure public acceptability of the above systems. Through the construction of synergies on stakeholder shared accountability, Oyo State can realize sustainable road safety enhancements and foster economic development through better logistics and infrastructural development (Oyo State Government, 2017; Menendez et al., 2023).

9.0 Conclusion

Vehicle inspection activities in Oyo State are of importance to avoid road traffic accidents (RTAs) through mechanical defect rectifications, preventive maintenance, and information fraternity. Out of all challenges, the following operations are marked by the challenges arising from, outdated technology and lack of public communication, which all contribute to the failure of the operations. For optimal utilization of vehicle inspections, the Oyo State government has to finance reform, technology upgrade and also promote more involvement of the public. Doing so, the state can make roads safer and contribute to general wellbeing of the communities. The fate of vehicle

inspections in Oyo State depends on innovation and synergy amongst different actors. Using data-driven approaches and improving institutional arrangements would contribute to a more efficient and transparent inspection system. Reaching out to the diverse group of stakeholders can change the present set of provisions into a system that goes beyond road safety and contributes to economic, environmental, and social service goals.

Therefore, for sustainable implementation, Oyo State could take a significant step forward in proactive traffic management, while also making a valuable contribution in its potency to reduce the economic hardship caused by RTAs through improved repair and medical expenses while creating safer communities. Through economic inducements, social value, and facilitating behavioral changes in the drivers of vehicles, Oyo State can show the way road safety interventions may be integrated into wider societal objectives. This method not only fosters accountability but also creates public confidence in the transportation industry. Public-private partnerships can still drive the results of vehicle inspection activities, by acting upon technical developments and promoting inclusion. Collaborative efforts between government agencies and private entities can lead to improved inspection processes and community acceptance. A sustainable framework for vehicle inspection has to be developed to provide continuous funding models which could finance the ongoing upgrades and the strengthening of the inspectors' capacity, so that the system is robust against future problems.

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