

**TRANSPORT MANAGEMENT PRACTICES AND SAFETY PERFORMANCE OF PUBLIC
TRANSPORT ORGANIZATIONS IN NAIROBI**

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**A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN PROCUREMENT AND
SUPPLIES MANAGEMENT OF MOUNT KENYA UNIVERSITY**

NOVEMBER, 2024

DECLARATION AND APPROVAL

This project is my original work and has not been presented for a degree or any other award in any other University.

Signed



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Date: 14 November 2024

I confirm that this project was prepared by the candidate under my supervision.

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DEDICATION

This research is dedicated to my families and friends particularly my wife Mrs. keroy Alio Hassano and elder brother Haj Abdi Mohamed Adan for their tireless efforts, social encouragement and economical support in achieving this milestone.





ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisor Dr.kamoni for his unwavering support, guidance and humane handling throughout this research project. I also acknowledge the support of the university, particularly the post graduate department.



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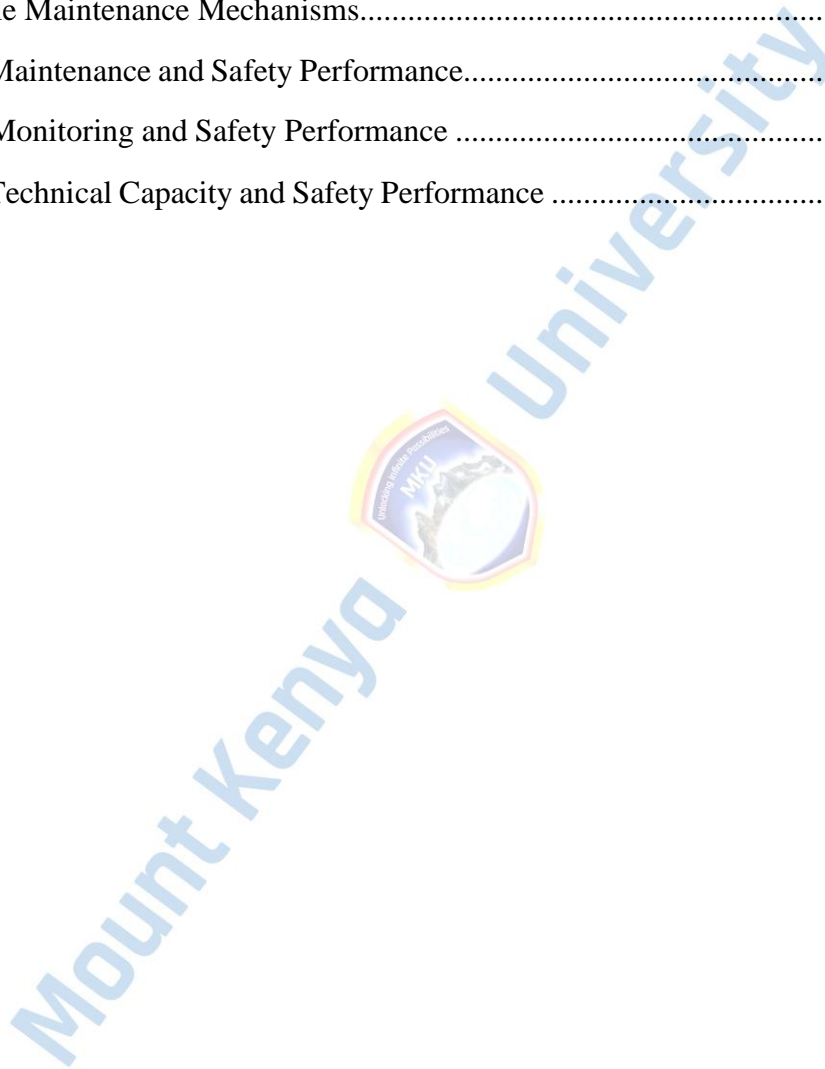
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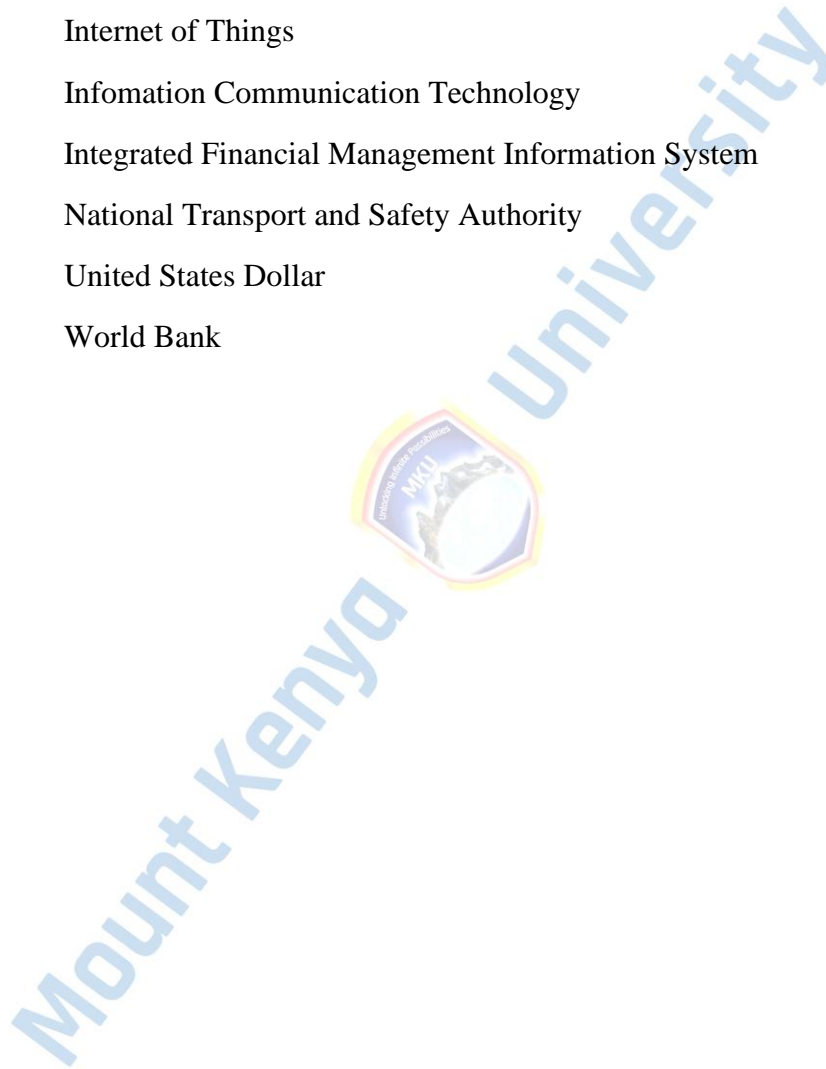
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LIST OF ABBREVIATIONS AND ACRONYMS

COSMO:	Consensus Self Organization Models Approach
FTA:	Federal Transit Administration
GPS:	Global Positioning System
GDP:	Gross Domestic Product
IOT:	Internet of Things
ICT:	Information Communication Technology
IFMIS:	Integrated Financial Management Information System
NTSA:	National Transport and Safety Authority
USD	United States Dollar
WB:	World Bank



ABSTRACT

Road accidents cost the country, as is the case in other developing jurisdictions across the world, a loss of over 4% of the GDP. In Kenya, road accidents have been on the rise unlike in some developed nations. A substantial percentage of the road accidents involve public service vehicles. The transport management practices that could influence road safety performance of public sector organizations is yet to be empirically examined. This study sought to examine the effect of e-transport, fleet maintenance, fleet monitoring, and fleet technical capacity in Kenya. The study collect data from the 64 public transport organizations in County of Nairobi. Data was analyzed by applying descriptive and inferential statistics; which was be used to test the hypothesis of the study. This study established that transport management practices have a significant and substantial effect on the safety performance of public transport organizations. The study however established that public transport organizations in the county of Nairobi have a significantly low level adoption of e-transport, fleet maintenance mechanisms, and very low crew qualification requirements. The study recommends that adoption to a higher level, of these practices, could significantly reduce the number of accidents involving public sector transport organizations in Kenya.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.0 Introduction

This chapter provides the background of the study, and provides a rationale for the study.

1.1 Public Transport and Road Safety

Transport services enable the supply chain of all items known to humanity; and is seen by the World Bank (2024) as a key enabler of essential services such as economic activity, Education and Health care. Transportation has been linked severally to output levels, income and employment in all nations of the world. In developed economies for instance; it accounts for up-to 12% of the GDP; and further accounts for up-to 25% of the cost of the GDPs in developed economies (Jean & Theo 2024). According to Hickman et al (2015) efficient transport system catalyze economic and social advancement in the society that ultimately results in improved market access, investment, improved quality of life, and reduced cost of business. Public transport is a fundamental component of transportation services worldwide. According to the International Association of Public Transport (UITP, 2024), public transport in Europe significantly impacts economic performance, contributing more than 150 billion pounds annually to the economies of European countries. This contribution represents over 1.2% of the continent's Gross Domestic Product (GDP).

Moreover, public transport stands as one of the largest employment sectors globally. In Europe alone, it directly employs over two million individuals, providing jobs that are vital for many communities. In the United States, Statista (2024) projects that public transport will generate

approximately 76 billion U.S. dollars in revenue in 2024. Additionally, it is expected to transport more than half a billion individuals by the year 2028. This trend emphasizes the growing reliance on public transport services as urban populations increase. In Africa, similar trends are visible; Statista (2024) estimates that public transport will generate around 8.39 billion U.S. dollars by the end of 2024 and facilitate the movement of about 680 million passengers by 2028. This growth is particularly crucial as urbanization accelerates, especially in African developing nations, necessitating a focus on enhancing the efficiency of public transport systems (WB, 2024).

However, the effectiveness of public transport systems faces numerous challenges. A major issue affecting these systems globally is inadequate infrastructure, a problem that is especially severe in developing countries (Boakye, 2022). This lack of proper infrastructure often leads to significant traffic congestion, increased transportation costs, and higher emissions of harmful pollutants. These factors have become pressing concerns for governments and policymakers who are striving to create sustainable and effective transport solutions (WB, 2024). Safety within public transport systems is a critical issue, particularly in developing economies where rapid urbanization is on the rise (Lars, 2023). While advanced nations such as those in Europe have seen a reduction in public transport-related accidents and fatalities, developing nations are experiencing the opposite trend. The Public-Private Infrastructure Advisory Facility (PPIAF) reported that as much as 85% of public transport fatalities occur in developing countries. Data from Kaptou (2015) highlights that the rate of public transport accidents has increased by over 300% in African developing countries.

This downward trend in safety performance can be illustrated through recent reports from Kenya. Kinyanjui (2024) analysis indicated that the number of Kenyans involved in traffic accidents surged by 1,908 from January 2024 to April 2024, in comparison to the same period in 2023. Such

accidents impose a significant economic burden and result in the loss of productive lives, with estimates suggesting that developing nations could lose over 4% of their GDP due to these incidents. The repercussions of road accidents involving public transport vehicles are profound, leading to substantial loss of life, disability, and increased dependency among the affected populations, alongside various negative socio-economic and psychological consequences. The underlying causes of these accidents often relate to failures in the areas of enforcement, evaluation, education, and engineering. Poor driving habits, speeding, driving under the influence of alcohol, overloading, slippery road conditions, inadequate road markings, fatigue among drivers, and a lack of proper driver training have been identified by the National Transport and Safety Authority (NTSA, 2024) in Kenya as primary contributors to road accidents involving public transport vehicles. Addressing these issues is crucial for improving safety and ensuring efficient public transport services (Omondi, 2024).

1.1.1 Global Perspective: Logistics management Practices and public transport safety

Performance

The Federal Transit Administration (FTA, 2024) in the United States has a significant role in ensuring public transport safety through the implementation of the National Public Transport Safety Plan. This plan serves as a key document that directs efforts to improve safety performance across various public transportation systems. According to the FTA, public transport organizations are required to create and execute an Agency Safety Plan (ASP). This plan must outline the processes and procedures necessary for establishing a Safety Management System (SMS). An SMS is a thorough and organized method focused on enhancing safety through collaboration and systematic practices. One of the critical components of the National Public Transport Safety Plan

is the involvement of transport workers. The plan emphasizes the need for training and the development of specific safety processes and procedures to ensure that all personnel are adequately equipped to handle safety-related issues. The FTA oversees public transportation safety in the U.S. by requiring public sector organizations to draft and enforce stringent safety protocols. Additionally, the American Public Transportation Association (APTA, 2024) plays a supportive role in promoting safety management practices. APTA offers its members valuable resources, including management programs, safety standards, and detailed safety audits and reviews.

In the context of public transport safety management in the United States, research by Bolobonov et al (2021) highlights the integration of digital tools and technologies. These advancements have been essential in enhancing safety measures. The Metropolitan Transit System leverages technologies such as the Internet of Things (IoT), Global Positioning Systems (GPS), and various analytical systems to provide real-time capabilities (CISCO, 2017). These technologies enable the communication of current traffic events through mobile applications, as well as the ability to assess and respond to transport safety issues and disruptions immediately. Similarly, tools like 360degree cameras and GPS tracking have become common practices to monitor routes, driving behaviors, and habits, as noted by A&S. Other countries have adopted similar initiatives to ensure the safety of public transport systems. For instance, in Russia, comparable public transportation solutions have been implemented, showcasing a commitment to improving safety standards, as reported by Tadviser (2019).

In Azerbaijan, the transport ministry has taken critical steps to address the frequent accidents caused by driver carelessness and inattention. The ministry implemented a system that allows for real-time monitoring of bus operations, including routes, driver performance, driver fatigue,

technical conditions, and various vehicle parameters. This initiative utilizes IoT technologies to enhance overall safety, as highlighted by Bakutel, (2018). Conversely, Japan has successfully cultivated a robust safety culture among its citizens. Despite having sophisticated systems and world-class transport infrastructure in place, the country relies heavily on the human element for the implementation and oversight of safety measures in public transport. This focus on people has led Japan to achieve one of the highest public transport safety records globally, as detailed by Yudhistira et al (2017). Through these various approaches, nations are continuously striving to improve the safety standards of public transportation systems, recognizing the importance of both technological integration and human involvement in achieving optimal safety outcomes.

1.1.2 Regional Perspective: Logistics Management Practices and Road Safety

Research indicates that developed nations utilize a combination of effective practices and advanced tools to enhance public safety. These include comprehensive public transport management systems, well-defined policies, and the integration of artificial intelligence, the Internet of Things (IoT), robust infrastructure, and a culture that promotes safety. Each of these elements plays a critical role in ensuring that transportation systems operate smoothly and safely for all users. In stark contrast, developing nations in Africa face significant challenges in this area. These countries often struggle with inadequate and poorly maintained infrastructure, which is further exacerbated by rapidly growing populations. This demographic surge places additional demands on infrastructure that is already insufficient to meet the needs of the populace, as highlighted by Olojede et al. (2017).

Furthermore, government transport agencies in these developing regions are tasked with overseeing the enforcement of transportation regulations and rules. However, their effectiveness

in this role is often limited, leading to a lack of proper oversight and enforcement. For instance, in Tanzania, although rigorous requirements have been established for transport organizations seeking permits to operate public transport services, the actual monitoring and enforcement of these regulations appear to be lacking. This gap in oversight allows permit holders to operate without adhering to the stringent measures intended to ensure public safety, as noted by Kimaro et al. (2016).

Public transport safety in South Africa has a history of being inadequate, a situation that mirrors the experiences of other African countries which face similar hurdles in ensuring safe transit options for their citizens. Over the last decade, however, South Africa has taken significant steps to improve the safety of its public transport system. A report published by the European Commission (2019) outlines various initiatives that have been implemented. These initiatives include the redesign of transportation infrastructure to make it more user-friendly and secure, improvements to traffic management systems that help regulate the flow of vehicles and reduce accidents, and rigorous safety audits that aim to identify weaknesses within the current system and propose necessary adjustments.

Despite these commendable efforts toward enhancing safety, the same European Commission report (2019) indicates that there are still existing shortcomings related to the efficacy of safety audits, the necessary skills of personnel involved, and the enforcement of safety regulations. Such gaps hinder the overall progress towards achieving a safer public transport environment. In parallel, Ghana has also been active in addressing safety issues within its public transport sector. Research conducted by Sam and Abane (2018) identifies various strategies that Ghana has implemented to tackle these pressing safety concerns. The authors emphasize the importance of

evaluating and assessing the effectiveness of these strategies to ensure they lead to meaningful improvements in safety outcomes. Among the measures adopted in Ghana are programs focused on proper vehicle maintenance to enhance reliability and reduce the risk of accidents, driver management programs designed to ensure that drivers adhere to safety standards and regulations, and the implementation of robust passenger safety protocols intended to protect individuals using public transport.

By concentrating on these critical areas, Ghana aims to bolster its safety records and establish a more dependable public transport system that serves the needs of its citizens efficiently and securely. The commitment of both South Africa and Ghana to enhancing public transport safety reflects a broader recognition of the significant role that safe and reliable transport plays in the development and well-being of their respective societies.

In Uganda, the Government, through the Ministry of Works and Transportation, has identified five critical action areas to enhance the safety performance of public transport. These areas include the development of safe road infrastructure, ensuring vehicle safety, promoting safe road use, and improving post-crash response systems. Each of these focus areas is designed to address specific challenges faced by public transport systems, thereby contributing to an overall reduction in road traffic accidents and enhancing passenger safety. Research by Zanule (2015) supports the notion that applying technology and effectively sharing information with stakeholders about road safety can significantly improve the safety performance of public transport. This includes using advanced technologies to monitor road conditions, implementing vehicle safety standards, and educating the public on safe transportation practices. By prioritizing these strategies, the Ugandan government seeks to foster a safer environment for all individuals who use the roads. This initiative is

significant not only for personal safety but also for the overall improvement of the public transport system, which the government aims to make more efficient and reliable.

By focusing on these goals, the government hopes to enhance the experience for all commuters, making it easier and safer for them to travel. A crucial aspect of these strategies (Zanule (2015) is the enhancement of communication among all stakeholders involved in public transport. This includes not only government authorities and transportation providers but also the general public who utilize these services. Improved communication ensures that everyone is aware of important updates, safety measures, and any changes in transportation services. Additionally, the integration of technology into transport systems is viewed as an essential factor in achieving these safety and efficiency goals. Technology can streamline operations, provide real-time information, and improve the overall management of public transport services. Ultimately, by implementing these strategies, the Ugandan government aims to create a cohesive environment where safety is prioritized, and all road users are well-informed. This approach is expected to lead to a public transport system that is not only more secure but also more dependable and user-friendly for all citizens.

1.1.3 Kenyan Perspective: Logistics Management Practice and Public Transport Safety

Performance

Public transport safety in Kenya is currently facing significant challenges that reflect issues commonly experienced in many developing nations. These challenges have largely emerged as a result of rapid population growth, swift urbanization, and the limited state of transport infrastructure. The increase in the number of people moving to cities has placed a strain on existing transport systems, and the infrastructure has not kept pace with this surge. According to a report

from the European Union (2019), the symptoms of an ineffective transport system are clearly visible in Kenya. For instance, prolonged traffic jams have become a daily reality for many commuters, with congestion sometimes lasting for several days. This situation not only leads to frustrating delays for those trying to reach their destinations but also contributes to increased stress levels among the population. The traffic problems are compounded by the fact that many roads are poorly maintained and not designed to handle the volume of vehicles currently in use (EU, 2019).

Moreover, there is a growing concern regarding the safety of road users, as the number of fatal road crashes has seen a troubling increase. The rising incidents of accidents pose a serious threat to public safety, prompting the government and relevant authorities to take action. In response to these alarming trends, various safety measures have been introduced. A notable initiative has been the crackdown on vehicles that fail to meet established safety standards. However, despite these efforts, it is important to note that such initiatives have not always been applied consistently, thus limiting their effectiveness. In addition to this crackdown, regular inspections of public transport vehicles have been mandated to ensure that they are roadworthy and safe for passengers. These inspections serve as a critical component of the overall strategy to improve transport safety. The success of these efforts is paramount to not only enhancing the safety of public transport but also improving the overall efficiency of the transportation system in Kenya. As the situation continues to evolve, the commitment to maintaining safety standards and addressing the underlying issues within the transport infrastructure will be crucial for the future of public transport in the country.

Furthermore, the installation of speed limiters in vehicles has been mandated to help regulate speed and reduce the likelihood of accidents. Public awareness campaigns, such as the Zusha initiative by the National Transport and Safety Authority (NTSA, 2024), have also been introduced to

educate the public about road safety. Despite these efforts, recent statistics reveal a troubling trend: the number of road accidents is on the rise. According to a report from the Kenya News Agency in 2023, there was a 2.4% increase in road accident fatalities in 2022 compared to the previous year. More strikingly, data compiled by Kinyanjui (2024) indicates that from January to April 2024, the number of Kenyans involved in accidents surged by 1,908 when compared to the same timeframe in 2023. Alarming, a significant number of these accidents occur within the public transport sector, highlighting the urgent need for further intervention and improvement in safety measures.

1.1.4 Public Transport Sector in Nairobi, Kenya.

As reported by the National Transport and Safety Authority (NTSA) in 2024, there exists a significant number of transport organizations in Nairobi, specifically exceeding 635 registered entities commonly referred to as Sacco's. These organizations play a crucial role in providing transportation services across various regions of the country. However, these transport organizations face multiple challenges that have serious implications for road safety. Among the most pressing issues identified are dangerous overtaking practices, a lack of lane discipline, excessive speeding, incidents of driving under the influence of alcohol, and concerns regarding the roadworthiness of vehicles.

Kinyanjui (2024) provides a detailed examination of the findings from the National Transport and Safety Authority (NTSA), which identifies several key factors that contribute significantly to road accidents in Kenya. The report highlights that public transport vehicles, which are essential for moving large numbers of people across the country, are frequently involved in these accidents.

This involvement underscores the vital role that public transportation plays in the overall landscape of road safety in Kenya. Given the importance of public transport in the national transport system, it follows that enhancing the safety performance of public transport vehicles could lead to considerable improvements in road safety on a larger scale. By focusing on the management and implementation of safety protocols within public transport organizations, stakeholders can work toward reducing the frequency and severity of accidents.

Addressing these pressing issues within public transport systems is crucial for advancing the safety and reliability of transportation throughout the country. It is essential for transportation authorities, vehicle operators, and policymakers to collaborate on strategies that enhance safety measures. Doing so will not only benefit passengers using public transport but also contribute positively to the broader community by fostering a safer travel environment for all road users in Kenya.

1.2 Statement of the Problem

Transport services enable the supply chain of all items known to humanity; and is seen by the World Bank (2024) as a key enabler of essential services such as economic activity, Education and Health care. Transportation has been linked severally to output levels, income and employment in all nations of the world. Literature shows that there exists a mix of practices and tools such as public transport management system, policies, artificial intelligence, IOT, good infrastructure and carefully crafted culture to manage public safety in developed nations (CISCO, 2017; Tadviser, 2019, & Bolobonov et al, 2021). In these countries, the rate of accidents in the public sector appear to be reversing in the last couple of years (Lars, 2023)

In Kenya however, as is generally the case in developing Nations of Africa, the number of deaths from road accidents increased 2.4% in 2022 when compared to the 2021 statistics. In Kenya, Kinyanjui reports that Kenyan's involved in accidents have risen by 1908 in the period January 2024 to April 2024 when compared to the same period of the year 2023. A substantial portion of these deaths seem to occur from the public sector transport (NTSA 2024). KNA (2023) reports that the accidents cost the county up-to 5% of the GDP; and cause devastation in the society as they mostly involve people of productive age. This is even as the government has rolled out effort to mitigate the causes of the accidents through public campaigns, installation of speed limiters in public service vehicles, and crackdown of non-roadworthy vehicles.

Extant literature examines some of the issues related to public transport safety performance. For instance, Wangari (2016) examines Gender based issues arising in public transport vehicles; while Njoroge (2019) examines quality management in transport Saccos in Nairobi. Extant literature seems not to outline the important logistics management practices that public transport organizations could adopt to improve safety performance. Therefore this study seeks to examine

public transport organizations safety performance from the perspective of transport management practices.

1.3 General Objective

The general objective of this study was to examine the effect of Transport management practices and the safety performance of public transport organizations in Nairobi

1.4 Specific Objective

The study was guided by the following specific objectives:

- i. To examine the effect of e-transport Management on the safety performance of public transport organizations in Nairobi
- ii. To assess the effect of fleet maintenance on the safety performance of public transport organizations in Nairobi
- iii. To examine the effect of Fleet monitoring on the safety performance of public transport organizations in Nairobi
- iv. To assess the effect of Fleet technical capacity management on the transport resource the safety performance of public transport organizations in Nairobi

1.5 Research Hypothesis

- i. H_0 : There is no significant effect of e-transport Management on the safety performance of public transport organizations in Nairobi
- ii. H_0 : There is no significant effect of fleet maintenance on the safety performance of public transport organizations in Nairobi
- iii. H_0 : There is no significant effect of fleet monitoring on the safety performance of public transport organizations in Nairobi
- iv. H_0 : There is no significant effect of fleet technical capacity management on the transport resource the safety performance of public transport organizations in Nairobi

1.6 Scope

This study sought to examine the effect of transport management practices that influence road safety performance of public transport organizations in Nairobi, Kenya. The scope of the study was to examine four transport management practices: e-transport, fleet maintenance, fleet monitoring, and fleet technical capacity. The study collected data from public transport organizations operating in Nairobi.

1.7 Significance of the study

The findings from this study hold significant implications for shaping policy directions that are essential for improving road safety performance. These insights will be particularly valuable for key stakeholders in the public transport sector in Kenya, including the Ministry of Transport, the National Transport and Safety Authority, and various County Governments. These entities are responsible for developing and implementing policies related to road safety. With a clear understanding of the data presented in this study, these organizations can make informed decisions aimed at enhancing overall road safety. Moreover, the use of study's findings are not limited to governmental agencies; they also offer crucial information to public transport organizations. These organizations can utilize the insights gained from this research to adopt effective strategies that will enhance their road safety practices.

By improving road safety performance, they can also boost the overall efficiency and effectiveness of their transport operations. The implementation of these strategies can lead to safer travel experiences for passengers, reduced accident rates, and improved public trust in transport services. Ultimately, the findings of this study serve as a vital resource for both policymakers and public transport providers in their ongoing efforts to create safer roads in Kenya.

1.8 Limitations of the Study

This study aimed to investigate the impact of various transport management practices on the road safety performance of public transport organizations located in Nairobi, Kenya. The research will focus specifically on four key transport management practices that are believed to play a significant role in enhancing road safety. These practices include e-transport, which involves the use of electronic systems to improve transportation efficiency; fleet maintenance, which refers to the routine upkeep and repair of vehicles to ensure they are safe and reliable; fleet monitoring, which entails the use of technology to track and analyze vehicle performance and driver behavior; and fleet technical capacity, which relates to the skills and knowledge available within the organization to manage and operate the fleet effectively.

To gather relevant data, the study will survey public transport organizations that are actively operating within Nairobi. This will ensure that the findings are directly applicable to the context of public transportation within the city. It is important to note that the study will have specific limitations in its scope. It will focus exclusively on the four identified transport management practices and will only include public transport organizations based in Nairobi. Consequently, organizations that operate outside of this area will not be considered in the research. This focused approach aims to provide a clear and comprehensive understanding of how these particular management practices influence road safety in Nairobi's public transport sector.

1.9 Operational Definition of Terms

E-Transport Management

Refers to the digitization and electronic management of the transport operations of an organization

Fleet Maintenance

Refers to the servicing and mechanisms put in place to ensure the roadworthiness of transport vehicles

Fleet Monitoring

Refers to the mechanisms placed by an organization in monitoring the operations of fleet in the various routes

Fleet Technical capacity

Refers to the general level of skill of transport operators employed by a fleet and is often enhanced through continuous training programs

Public sector Transport Organization:

Refers to transport organization, normally referred to as a transport Sacco; managing fleet of vehicles and duly registered and licensed by the NTSA



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CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Diffusion of Innovation on E-Transport Management

The Diffusion of Innovations Theory was developed and popularized by Rodgers (1962) in his book “Diffusion of Innovations”. It originates in the communication field and seeks to explain how ideas, new products or innovations permeate the populations. This permeation is what is referred to as diffusion (Rodgers, 2003). The theory observes that people adopt ideas or innovations at different paces through five stages of Learning about the innovation; forming an opinion about the innovation; deciding whether to use the innovation; analysis of its contribution; and confirmation on whether to use the innovation. The theory further distinguishes between early adopters and later adopters of innovation and further identifies the elements of adoption of innovation to include: Innovation; adopters; communication channels time; and social systems (McCullen, 2013).

Rodgers' work in 1962 and 2003 presents a comprehensive analysis of the five key characteristics of innovations that potential adopters carefully evaluate before incorporating them into their processes. The characteristics that are being discussed include compatibility, triability, relative advantage, observability, and complexity. Each of these factors is essential in understanding how new technologies and methods are accepted and utilized in various industries. In the specific context of this study, which focuses on e-transport management, these characteristics are especially significant. This study examines the adoption of Artificial Intelligence and other modern digital tools in the transport sector, as outlined by Li (2020). Compatibility refers to how well new

technologies fit with existing systems and practices. If a new digital tool can easily integrate with current transport management systems, it is more likely to be adopted. Triability involves the ability to test or experiment with a new technology on a limited basis before fully committing to it. This concept is crucial, as it allows stakeholders in the transport sector to evaluate the effectiveness of AI tools without extensive risk.

Relative advantage is about the perceived benefits of a new technology compared to current methods. If AI offers significant improvements in efficiency, cost savings, or user experience, its adoption will likely increase. Observability refers to how visible the results and benefits of a new technology are to potential users. When the advantages of using AI and digital tools are clear and can be readily observed in the transport sector, it encourages more organizations to adopt these innovations. Finally, complexity addresses how difficult or easy a new technology is to understand and use. If AI tools are seen as complicated, potential users may hesitate to adopt them, fearing a steep learning curve. In summary, these five characteristics—compatibility, triability, relative advantage, observability, and complexity—are critical factors that influence the adoption of Artificial Intelligence and digital tools in transport management. Their importance is amplified in this study as it seeks to analyze how these elements affect the willingness of transport professionals to integrate new technologies into their operations.

This examination enables the study to draw insightful comparisons between the early adopters of these technologies in developed nations (as exemplified by Bolobonov et al, 2021) and the subsequent adoption in Kenya's public sector, representing a later adopter/laggard case in the context of developing nations (Zanule, 2015). This comprehensive review not only provides a basis for comparative analysis but also paves the way for the development of a robust conceptual

framework. This framework is specifically designed to explore and propose strategies to expedite the adoption of these innovative digital solutions among public transport organizations. The proposed strategies encompass a wide array of approaches, including policy persuasion and educational initiatives aimed at highlighting the comparative advantages of these technological solutions. In summary, this study is poised to contribute significantly to the understanding of the dynamics and determinants of technology adoption within the public transport sector, offering valuable insights that can inform policy and practice in this rapidly evolving domain.

2.1.2 Maintenance Theory and Fleet Management

The maintenance Theory, fronted by (Schuyler, 2023) sits at the intersection of sustainability, social value and science, and preservation. It espouses the reality of deterioration subject to time and condition; even operant conditions. The theory by Schuyler (2023) depicts cycles of repair to preserve or slow deterioration. This theory brings to fore the need for cycles of repair as a factor of preservation. When considering the principles from the theory of maintenance in relation to fleet management, it becomes clear that these concepts apply effectively. Vehicles, influenced by their operational conditions, age, and design, naturally face deterioration over time, as observed by Kleefed and Chen in their 2015 study. This understanding is crucial in the context of vehicle maintenance, suggesting that to maintain or at least slow down the deterioration of vehicles, regular maintenance practices are essential. Consequently, these maintenance activities play a significant role in ensuring the quality and safety of the vehicles within a fleet.

This theoretical framework provides a valuable perspective for examining how fleet management practices, particularly those related to vehicle maintenance by public transport organizations, impact safety performance. The study will focus specifically on various types of maintenance

strategies, including preventive planned maintenance and corrective maintenance. Additionally, it will address maintenance audits and strategic decisions related to vehicle replacement, as highlighted by Supriatana et al (2016). The investigation will analyze not only the types of maintenance practices employed by public transport organizations but also their frequency and the resulting effects on safety performance. By exploring these elements in detail, the study aims to create a conceptual foundation that will facilitate empirical evaluation of the relationship between effective maintenance practices and enhanced safety outcomes in public transportation.

2.1.3 Theory of Change and Fleet Monitoring

According to Moore (1995), the 'Theory of Change' serves as an evaluation method that emphasizes engaging with various stakeholders involved in a program. This approach aims to clarify and articulate the expected outputs and outcomes associated with specific initiatives, particularly in the context of large-scale projects, commonly referred to as mega projects. A critical aspect of this method is the identification and examination of the underlying assumptions that inform the program's creation and ongoing development. By investigating these assumptions, evaluators gain insight into the foundational reasons for the program's establishment, the design process that shaped it, and the potential outcomes that may arise as a result. The Theory of Change methodology is viewed as beneficial because it encourages a comprehensive understanding of the motivations and objectives that led to the program's inception. Unlike other evaluation approaches that may focus on individual preferences or singular viewpoints, the Theory of Change prioritizes the collective purposes agreed upon by stakeholders. This collaborative focus ensures that a wide range of perspectives is considered, leading to a more robust evaluation process.

As highlighted by McLellan (2021), the Theory of Change framework helps to identify long-term goals and the necessary conditions required to achieve these aspirations. This framework serves as a foundation for establishing an outcome-oriented perspective. It underscores the importance of monitoring and evaluating strategic processes within organizations. These evaluations are essential for facilitating corrective actions and adaptive management in relation to the attainment of organizational objectives. Furthermore, McLellan (2021) notes that this evaluation model allows for the identification of gaps between anticipated processes and expected outcomes. Through this lens, the Theory of Change can clarify the role of monitoring within fleet management, particularly concerning the safety performance of public transport organizations. It highlights the necessity of recognizing gaps in processes that may hinder the achievement of safety objectives, such as noncompliance with established safety systems and regulations. These compliance failures have been identified as significant contributors to accidents within the public transport sector.

As a result, the application of the Theory of Change enables this study to define a conceptual framework for monitoring that aligns with the safety performance goals of public transport organizations. By establishing this framework, the study aims to address the critical issues surrounding safety compliance and ultimately improve outcomes related to public transportation safety.

2.1.4 Resource Based View and Fleet Technical Capacity Management

The resource based view brings to fore the importance of an organizations resources to its capabilities. According to Barney (1991), the resources of an organization: Physical; Human; Financial; or otherwise; provide the organization with its ability to achieve competitive advantage.

The managers of an organization decides the characteristics of the resources to exploit while considering the competitive external environment and opportunities (Jurevicius, 2013). Further, to enhance their capabilities, these resources must be natured or improved. This nurturing of the organizations resources, has a remarkable effect on improving the organizations innate capabilities in the competitive environment (Gerhart & Feng 2021). Following this line of thought, its easy to conclude then that; poorly nurtured or managed resources limit the organization's capability to compete or operate efficiently relative to its mandate.

Therefore this theory gives this study a theoretical framework for framing the empirical analysis of the fleet capacity management and its effect on safety performance of public transport organizations. According to Lindwe (2022), most accidents are directly traceable to the organizations' technical resources factors: such as drunk driving; fatigue; lack of proper skill; lane discipline; and lack of safety training. Therefore this theory brings to prominence the factors that this study needs to assess; that are related to fleet technical capacity; and strategies that could be used by organizations in the public transport to nurture the technical capacity that would improve the public transport organizations capabilities in delivering their mandate in a safe manner.

2.2 Empirical Review

2.2.1 E-Transport Management and safety performance of public transport Organizations

Research on the incorporation of digital technology into transport management is limited, with only a few significant studies available. Adebayo and Aworemi (2017) conducted a study focusing on transport management practices and their impact on the performance of firms. This research utilized purposive sampling to select participants from food and beverage processing companies

located in Lagos, Nigeria. The findings revealed that the implementation of digital tools in transport management plays a crucial role in enhancing the overall performance of these firms.

However, it is important to note that this study does not specifically address how digital tools affect the safety performance of the logistics functions within these organizations. In contrast, Singh (2023) focused on the integration of digital technologies within transport management systems. This comprehensive literature review highlighted that the adoption of Logistics 4.0 significantly influences transport operations by facilitating seamless integration and real-time communication among different stakeholders. This integration not only streamlines processes but also leads to improved operational efficiency in transport management.

Another insightful study by Heinbach et al. (2022) presented a typology of digital technologies available for road freight management. The researchers elaborated on how these digital technologies enhance visibility, optimization, and analytics in transport operations. The study highlighted several digital platforms that European road freight transport managers can utilize to improve their operations. It strongly recommended that organizations adopt these various digital tools due to their associated benefits, which include increased safety control, better tracking of shipments, and enhanced overall operational effectiveness. Akkerman et al. (2019) explored the decision support systems relevant to road transport management in the context of the digital age. Their research recognized that the progression of digital technologies has significantly increased the amount and diversity of data available to road transport managers. This abundance of data equips managers with the tools necessary to fully harness the potential of all available data sets. The study emphasized that the diverse sources of data in the digital landscape create the need for

various metrics, which can highlight different aspects of the transportation process, thereby enabling better decision-making.

Vasilenko et al. (2021) conducted an examination of the digital tools that enhance the quality and efficiency of transport management, particularly within the rail system in Russia. This study provided valuable insights into the implementation of technologies such as telematics, blockchain, and advanced documentation management systems, including ticketing management. The researchers noted that telematics plays a vital role in ensuring safety within the rail system in Russia, illustrating its importance in transport management. Similarly, Dmitriev (2019) investigated the impact of digital technologies on logistics visibility. His findings align with those of Vasilenko et al., emphasizing the significant role that digital solutions play in improving the transparency and effectiveness of logistics operations. Collectively, these studies highlight the transformative influence of digital technology on transport management, underscoring the necessity for firms to adapt to these advancements to enhance their operational performance and safety measures.

2.2.2 Fleet Maintenance and Safety Performance of Public Transport Organizations

Aflabo et al. (2020) conducted a comprehensive examination of how fleet management practices impact the competitive advantage of businesses within the transport sector in Ghana. Their research, carried out specifically in the Kumasi Metropolis, found that effective repair and maintenance of vehicles plays a significant role in enhancing a company's competitive edge. This is primarily because a well-maintained fleet minimizes downtime and reduces the costs associated with vehicle breakdowns. The findings of this study highlight the importance of adopting fleet management strategies that prioritize and improve maintenance and repair processes within the

Ghanaian transport industry. In a different approach, Killeen (2019) offered an innovative perspective on predictive maintenance. This study introduced a unique Internet of Things (IoT) architecture designed to facilitate predictive maintenance and included a semi-supervised machine learning algorithm aimed at enhancing the selection of sensors used in the Consensus selforganized models approach (COSMO). This advancement has the potential to optimize maintenance operations further by making more informed decisions based on data collected from various sensors.

Expanding on the use of technology in fleet maintenance, Lee et al. (2017) investigated an IoTbased system focused on enhancing machine maintenance. The key takeaway from their research is the ability of such systems to enable predictive maintenance, which helps prevent unexpected failures and improves overall operational efficiency. Another important contribution came from Rawat and Lad (2017), who explored maintenance planning within fleet management. Their study argued for a shift away from traditional maintenance decisions, which often rely on the Level of Repair, towards a more practical strategy that emphasizes preventive maintenance. This approach is based on the time-dependent failure rates of machine components, allowing for more effective planning and resource allocation.

Further advancing the discourse on fleet maintenance, Pastillos, Marcos, and Parlikad (2023) introduced a dynamic maintenance model specifically designed for rolling stocks. Their study emphasizes the role of predictive maintenance models in preventive maintenance, aimed at extending the useful life of rolling stock and ensuring operational reliability. Lastly, Rivera et al. (2022) focused on a maintenance management system tailored for a fleet of official vehicles used by a higher education institution. Their research resulted in the development of a preventive

maintenance database and a training program, both intended to enhance transport management and safety within the institution. By implementing such systems, the study aims to ensure that vehicles remain in optimal condition, thus supporting the institutions operational needs more effectively.

2.2.3 Fleet Monitoring and safety performance of public transport organizations

Aflabo et al. (2020) conducted an in-depth examination of how various fleet management practices influence the competitive advantage of firms operating within the transport sector of Ghana. Their research, specifically centered in the Kumasi Metropolis, revealed that the implementation of fleet monitoring systems had an adverse effect on the competitiveness of these firms. The primary reason for this negative impact was identified as the high costs associated with the installation, regular maintenance, and operational processes required for such monitoring systems. Despite these challenges, the study underscored that fleet monitoring represents an essential investment for effective fleet management in the modern business landscape of the 21st century.

In a related study, Tembe (2023) focused on the municipality of Ethekwini in South Africa, examining the outcomes of effective vehicle monitoring practices on fleet management. This research, aptly titled “Effective Monitoring of Vehicle Utilization,” highlighted the critical relationship between monitoring and the overarching goals of fleet management and control. Tembe emphasized that close oversight of vehicle usage is vital for achieving better control of fleet operations. Such control mechanisms are instrumental in optimizing performance and ensuring that resources are utilized efficiently. Mazinga (2020) investigated the contribution of fleet management practices to the competitive positioning of Biltrans Company, a notable haulage company in Zimbabwe. This study took a unique approach by remotely assessing the effect of installing vehicle monitoring devices and how such technology impacts competitiveness within

the transport industry. Although the findings were not entirely conclusive, they did establish a connection between the implementation of monitoring systems and improved fleet control. This indicates the potential for better operational practices and enhanced competitive standing within the market.

Ali (2018) conducted research titled “Intelligent Fleet Management Systems, Information Communication Technology, and Operational Performance of Transport Companies in Mombasa County, Kenya.” The primary aim of this study was to assess the impact of Intelligent Fleet Management Systems (IFMS) on the operational performance of transport companies in the region. Additionally, it sought to determine how Information Communication Technology (ICT) plays a moderating role in the relationship between IFMS and operational performance. The findings pointed to the significance of vehicle monitoring as a crucial component of comprehensive fleet management practices. Lastly, Carter (2012) explored the decisions and obstacles faced by fleet managers in the industry. This study revealed that possessing extensive fleet knowledge is critical for effective management. Furthermore, it highlighted that fleet monitoring is a vital component of awareness within fleet operations. Therefore, it can be concluded that fleet monitoring is not merely a helpful tool but is indispensable for effective operational management. These studies collectively emphasize the importance of monitoring within fleet management, pointing to both its challenges and its essential role in enhancing the competitive capabilities of transport companies across various contexts.

2.2.4 Fleet Technical capacity management and Public transport Organizations

Aflabo et al. (2020) conducted a comprehensive examination of the influence of fleet management practices on the competitive advantage of firms operating within the Ghanaian transport sector.

The research, which took place in the Kumasi region, revealed that driver training plays a crucial role in enhancing the competitive advantage profile of these firms. The study highlighted the importance for management to focus on effectively supervising and planning driver activities. Additionally, it emphasized the need for engaging in thorough hiring processes to select qualified drivers, as well as providing ongoing maintenance training to ensure that drivers are well-prepared for their responsibilities. In a related study, Sangrar (2019) performed a systematic review of existing driver training programs aimed at older drivers to assess their impact on driving experiences. The findings demonstrated that structured training programs, which incorporated both classroom instruction and practical in-vehicle training, significantly improved the driving experience for older drivers. Key benefits included increased confidence, better understanding of new technologies, enhanced knowledge of traffic laws, and a notable reduction in crash incidents.

In South Africa, Niekerk et al. (2019) investigated the effects of safety incentives, vehicle modifications, and driver training specifically on school bus driver performance. Their study concluded that the "safe to travel" school program, which integrates driver training along with other safety interventions, resulted in school transport drivers demonstrating superior performance compared to general motorists on various safety indicators. These indicators included metrics such as speeding, acceleration, braking, and cornering throughout the study period. Supporting these insights, Cassut (2014) found similar results regarding driver training. This study pointed out that simulator training for older, healthy drivers significantly improved overall on-road performance when compared to training focused solely on attention. The conclusion drawn from this research indicated that simulator training serves as a powerful tool for enhancing the safety performance of drivers, particularly for older individuals.

Pozueco et al. (2015) proposed an adaptive learning system designed for efficient driving. This innovative system allows for the evaluation of professional drivers working in urban public transport within their actual work environment. By implementing this system, organizations can pinpoint specific failure points related to driving contexts, enabling a more targeted and effective evaluation process. This method not only enhances driver performance but also contributes to the overall safety and efficiency of urban transport systems.

2.3 Summary and Gap in Literature

Numerous studies have explored and analyzed the variables relevant to this research. In the area of electronic transport management, scholars such as Adebayo and Aworemi (2017), Singh (2023), Heinbach et al. (2022), Akkerman et al. (2019), and Dmitriev (2019) have investigated the application of digital tools in managing transportation systems. Their work provides empirical evidence demonstrating the beneficial impacts of these tools on aspects such as transport visibility, operational optimization, and analytics. Furthermore, they establish a connection between the use of digital tools and improvements in safety measures. However, while these studies offer valuable insights into certain dimensions of this research, none have specifically focused on the empirical effects of electronic tools on the safety performance of public transport systems. Additionally, the majority of these investigations are based on contexts outside of Kenya, thereby neglecting the unique dynamics present in the Kenyan transport environment.

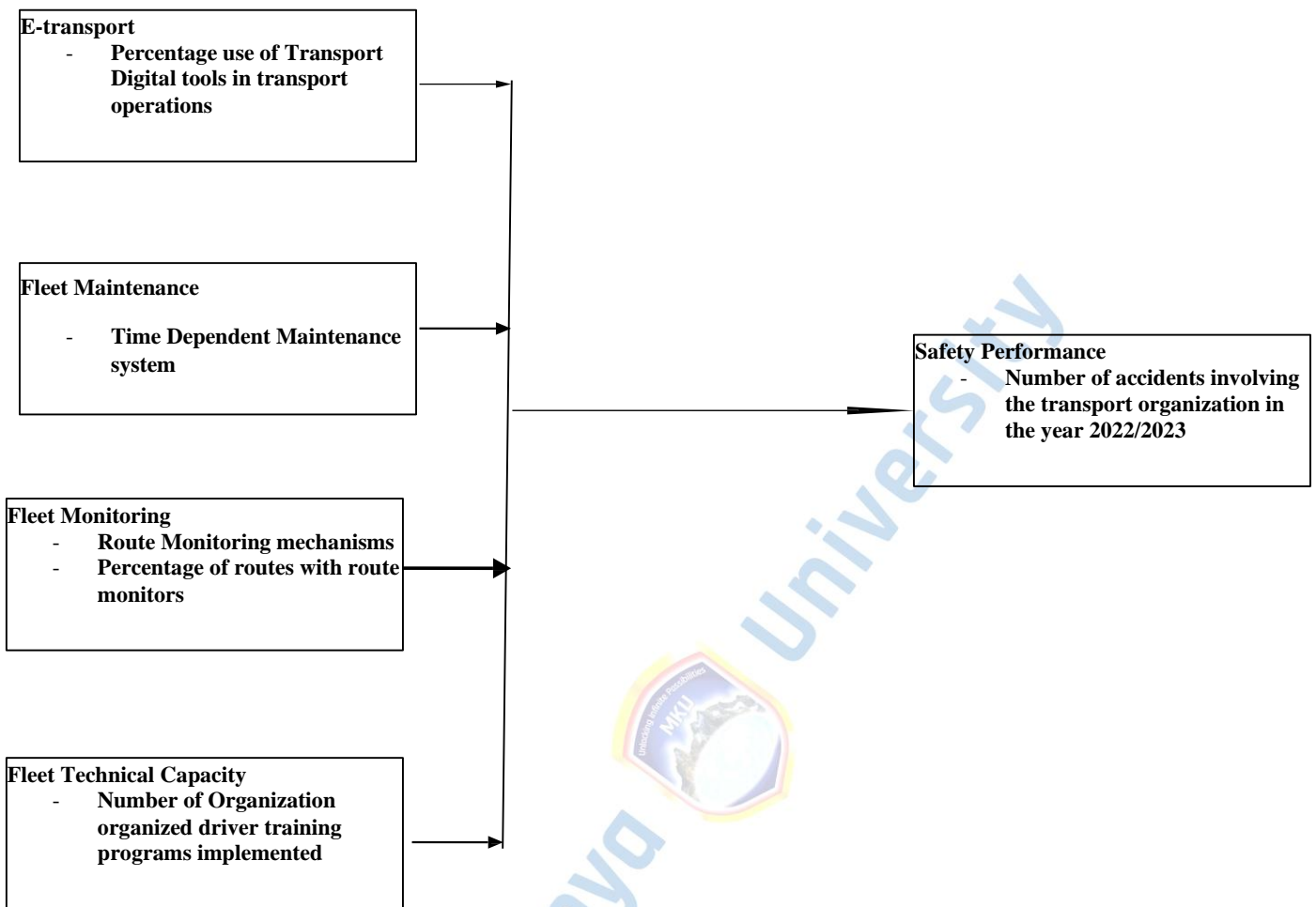
In terms of fleet maintenance, there are limited studies that specifically assess the relationship between fleet maintenance practices and safety in transportation. Researchers like Aflabo et al. (2020), Kelleen (2019), Lee et al. (2017), and Rawat and Lad (2017) present intriguing viewpoints on preventative maintenance strategies, particularly those that incorporate intelligence and

timedependent frameworks. These frameworks highlight their influence on the overall performance of transportation systems; however, they do not address the critical intersection of fleet maintenance and safety performance directly.

Similarly, research related to fleet monitoring has predominantly been conducted in international settings that are more advanced than the situation in Kenya. Studies by Aflabo et al. (2020), Tembe (2023), Mazinga (2020), Ali (2018), and Carter (2012) offer essential insights into various models, tools, and strategies for effective fleet monitoring. These findings could contribute to shaping the conceptual framework of this study. Nevertheless, they fall short of providing empirical evidence that connects fleet monitoring practices to safety performance specifically within the Kenyan context. Furthermore, there is a scarcity of research focusing on fleet technical capacity. Studies by Sangrar (2019), Niekerk et al. (2019), and Cassut (2014) provide valuable perspectives on how enhancing fleet technical capacity through driver training can influence safety outcomes. However, these studies similarly do not adequately address the concept of fleet safety performance within the Kenyan public transport sector. This gap indicates a need for further research that focuses on the local context and investigates the connections between these crucial elements in the transportation industry.

2.4 Conceptual Framework

Ngai and Wu (2022) discuss the significance of a conceptual framework in research. A conceptual framework serves as a visual representation that illustrates the anticipated relationships among various variables within a study. This framework plays a crucial role in guiding researchers by providing a clear structure for understanding how different factors interact and influence one another. Additionally, it aids in the development of operational specifications, which are essential for measuring the variables under investigation. These specifications help researchers define how each variable will be quantified and assessed throughout the study. Figure 2.1 in this context presents the specific conceptual framework for the current study, emphasizing the expected relationships between the identified variables. It also outlines the key aspects that need to be measured for each variable, ensuring a comprehensive approach to data collection and analysis. This clarity in the relationship between variables enhances the overall understanding of the research objectives and contributes to the validity of the findings.



Independent Variables

Dependent Variable

Figure 2.1 Conceptual Framework Source:

Author, 2024.

2.4.1 E-transport Management and Safety Performance

Research in the field of transport management indicates that the application of digital tools significantly influences the overall performance of firms within this sector. This study aims to conduct an empirical examination of the hypothesis that the integration of electronic transport

management strategies leads to a marked improvement in the safety performance of public transport organizations. By utilizing modern technologies, these organizations can enhance their operational visibility, allowing for better monitoring of vehicle movements and staff activities. Additionally, the use of data optimization tools enables public transport entities to allocate resources more efficiently and effectively, ultimately minimizing risks and increasing safety measures. Furthermore, advanced analytics can provide insights into safety trends, helping organizations proactively address potential hazards and improve decision-making processes. Through this study, the intention is to establish a clear link between the adoption of E-transport management practices and enhanced safety outcomes in public transport systems.

2.4.2 Fleet Maintenance and Safety Performance

The existing body of literature offers valuable insights into the relationship between preventive maintenance and its positive impact on transport costs and the reliability of transport systems. This study seeks to build on that foundation by exploring a new dimension—specifically, the influence of preventive maintenance on the safety performance of transport organizations. The focus will be on examining the fleet maintenance strategies and practices that are utilized by transport organizations operating within the public sector. The investigation will adopt a time-dependent approach to assess the effects of planned preventive maintenance on safety performance outcomes. This will involve an analysis of how timely and systematic maintenance efforts can enhance not only the operational efficiency of transport fleets but also the overall safety of their operations. By identifying and evaluating the strategies that are currently in place, this research aims to provide a clearer understanding of the significance of preventive maintenance in promoting safer transport

practices. Ultimately, the goal is to highlight the critical role that well-planned maintenance activities play in ensuring the safety and reliability of transport services in the public sector.

2.4.3 Fleet Monitoring and safety performance

This study will be guided by empirical evidence that demonstrates a strong connection between monitoring fleet utilization and improved transport performance. Specifically, it will focus on the relationship between the monitoring mechanisms employed by public transport organizations and the overall impact of these monitoring practices on transport safety. The analysis will encompass various routes operated by public transport vehicles, investigating how consistent monitoring of these vehicles contributes to the safety measures in place. By examining this relationship, the study aims to identify key factors that enhance transport safety, directly linked to the methods of monitoring utilized by public transport systems. Understanding this relationship is crucial for optimizing transport performance and ensuring the safety of passengers and the general public. Through comprehensive evaluation and analysis, the study seeks to highlight the significance of effective monitoring as an essential component of successful public transport operations.

2.4.4 Fleet Technical Capacity and Safety Performance

Research conducted in more advanced jurisdictions indicates that comprehensive training programs, which include both classroom instruction and practical in-vehicle training, significantly improve the driving experience for older drivers. These tailored programs are designed to enhance various aspects of driving, including building confidence behind the wheel, familiarizing participants with new technological advancements in vehicles, and providing a clearer understanding of driving laws and regulations. Furthermore, studies suggest that such training can

lead to a reduction in the number of crashes involving older drivers, promoting safer driving habits. Drawing on the insights and findings from existing literature, this study proposes that implementing driver training programs could have a substantial positive impact on the safety performance within public transport organizations. By focusing on the specific needs of drivers in this sector, the application of structured training could contribute to improved safety outcomes, helping organizations to operate more effectively while ensuring the well-being of both drivers and passengers.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

Aityan (2022) emphasizes that researchers have access to a variety of research designs, which play a crucial role in shaping the direction and structure of their studies. According to Aityan, the research design serves as a blueprint that outlines the strategies and methods the researcher will employ to gather and analyze data. This blueprint is often influenced and directed by the specific objectives of the study being conducted. In the case of this study, the focus will be on empirically examining the transport management practices that are implemented by public transport organizations. This study aims to analyze how these management practices impact the safety performance of these organizations. To effectively conduct this examination, the study will adopt a descriptive research design. This approach is defined by Osuagwu (2022) as one that aims to provide a clear and detailed description of the subjects being researched, capturing their characteristics in their existing state.

Utilizing a descriptive research design will be significant for this study, as it will help in accurately assessing the hypotheses and in developing the instruments required for data collection. By following this structured approach, the study intends to provide valuable insights into the relationship between transport management practices and safety performance within public transport organizations.

3.2 Population of Study

Populations in research refer to the specific group of individuals or entities that share common characteristics and are the focal point of the study. According to Aityan (2022), this group is of significant interest to the researcher conducting the investigation. In the context of this study, the goal is to analyze the transport management practices employed by major public transport organizations in Nairobi County, as well as how these practices impact safety performance within these organizations.

The common characteristic that is fundamental to this study is the classification of the organizations as "public transport organizations in the County of Nairobi." This designation establishes a clear boundary for the research, allowing for a focused exploration of the transport sector within this specific geographic area. The study will encompass a total of 64 large public transport organizations that operate within Nairobi County. In this research framework, the organizations themselves will serve as the unit of analysis, providing a comprehensive overview of their operational practices and management strategies. Meanwhile, the transport managers from these organizations will be identified as the units of observation. These managers will act as the respondents who provide firsthand insights and perspectives regarding their transport management practices and associated safety measures. Their responses will be crucial for understanding the overall safety performance linked to the transport management practices utilized by the public transport organizations in question.

3.3 Census Survey

Bell et al. (2022) suggests that when working with a relatively small population, it is appropriate to conduct a census. A census is a comprehensive method that entails studying and collecting information from every single member of the population. In the context of this specific study, the population in question is small enough to facilitate the collection of data from all public transport organizations located in Nairobi County. As a result, this research will implement a census survey that includes all 64 primary public transport organizations. This approach ensures that the data gathered is complete and representative, allowing for a thorough analysis of the public transport sector in the region. By engaging with every organization involved, the study aims to capture a full picture of the dynamics within Nairobi's public transport system.

3.4 Data Collection

This study will focus on the collection of primary data, aiming to describe data related to transport management practices within public transport organizations that have not been documented before. The emphasis will be on how these practices influence safety within the transport sector. To achieve this goal, the study will utilize meticulously crafted questionnaires that will be distributed to participants. These questionnaires will be administered using either the drop and pick method or through direct interviews. The drop and pick method involves leaving the questionnaire with respondents and collecting it later, while the interview method allows for real-time interaction and response collection. According to Frolich and Schellhammer (2022), the use of questionnaires is particularly beneficial for researchers as it enables the collection of sufficient data from respondents in a consistent and standardized manner. This approach will help ensure that the

findings of the study are reliable and can provide valuable insights into the transport management practices that impact safety in public transport organizations.

3.5 Pilot Study

The study focused on the evaluation of the data collection instrument to determine both its completeness and appropriateness for the research objectives. This will be accomplished by conducting a pilot study involving a selection of minor public transport organizations located within Nairobi. A total of ten organizations will be included in this pilot study, all situated in Nairobi County. According to Dzwigol (2020), conducting a pilot study is a critical step that helps to ensure the accuracy and reliability of the results obtained from the research instrument being tested. Specifically, this study will aim to assess two key elements related to the data collection process. These elements will be central to understanding how effectively the instrument gathers the necessary information for the research objectives.

3.5.1 Validity

Easterby et al. (2021) highlight a crucial aspect of research design, emphasizing that a research instrument must accurately measure the specific concepts it aims to evaluate. If a research instrument fails to fulfill this requirement, the overall accuracy and reliability of the analysis can be significantly compromised. This limitation is often a direct result of how research questions are structured. In light of this understanding, this study will employ a systematic approach to apply the research instrument to professionals who possess expertise in the field of transport management. The objective is to critically assess and identify any improperly constructed questions that may lead to misinterpretation or inadequate measurement of the intended concepts.

By focusing on the restructuring of these questions, the study aims to ensure that all questions accurately reflect the intended constructs and thus improve the overall quality of the research outcomes.

3.5.2 Reliability

The Chronbach's Alpha will be used to examine the reliability of the research instrument. According to Hunziker and Blankenagel (2021) Chronbach's alpha (α) (Cronbach, 1951) is a common reliable measure of validity of items in a questionnaire. The study will set cut offs at 0.7 as recommended by Cronbach (1951) Items not attaining this cut-off will be examined and corrected.

3.6 Data Analysis

The study hypothesizes that there is a significant relationship between: E-transport management, fleet monitoring, fleet maintenance, and fleet technical capacity management; on safety performance of public transport organization. Data collected on these elements will be analyzed through production of descriptive statistics; specifically generation of means and percentages. Graphs will be used to give visual presentation and; inferential statistics to test significance of the relationship between variables to test the hypothesis of the study. The model $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$; Where; Y = safety performance of the public transport organizations; β_0 = constant (coefficient of intercept); X1, X2, X3, X4, are independent variables; and $\beta_1, \beta_2, \beta_3, \beta_4$; are regression coefficient of the variables.

3.7 Ethical Consideration

The study will thoroughly examine several ethical considerations related to the processes of collecting, managing, and storing data. First and foremost, it is crucial to establish a clear understanding of the intent behind data collection and to obtain informed consent from the participants involved in the research. To achieve this, the study will provide an introductory letter from the university, which will clearly outline the objectives of the study and the specific reasons for data collection. This letter will serve as an informative resource, ensuring that all respondents are aware of how their information will be used and the significance of their participation. Alongside this letter, a formal consent form will be utilized to secure the agreement of each participant, ensuring that they willingly consent to participate in the research process.



Furthermore, the study adhered to the established ethical standards set by the university by undergoing the review process mandated for research involving human subjects. This process will result in the issuance of an Ethical Clearance Certificate (ERC), which is crucial for maintaining transparency and accountability in the research. By obtaining this clearance, the research will demonstrate its commitment to ethical practices throughout all stages of the study. In addition to the university's ethical approval, a research license will be obtained from the National Commission of Science and Technology, in accordance with the existing university policies. This step is essential to ensure that the study aligns with national guidelines and regulations regarding research practices. By following these protocols, the study aims to uphold the highest ethical standards while protecting the rights and confidentiality of all participants involved.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This section present the results of the study; provided using two approaches. Descriptive and inferential statistics are provided followed by discussion of the results for each variable.

4.2. Pilot Study Results

The study conducted a pilot study involving 5 transport organization in the county of Kiambu. These transport organizations are structurally and operatively similar to the transport organizations in the county of Nairobi. The study computed the Chronbach's Alpha for the study variables-the cut-off for reliabilities was set at 0.7. The results are as shown on table 4.1.

Table 4.1: Pilot study

Items	Chronbach's Alpha
E-Transport Management	0.798
Fleet Monitoring	0.893
Fleet Maintenance	0.786
Fleet Technical Capacity	0.769
Accident involving Transport Organization	0.868

The results indicate that the questionnaire was properly constructed to collect data on elements of the study as recommended in Hunziker and Blankenagel (2021). Thus the questionnaire could be

deemed complete and appropriate to collect data accurately and could ensure consistency of data collected.

4.3. Response Rate.

The study sought to collect data from 64 transport organization in County of Nairobi. Therefore, 64 questionnaires were issued to transport managers of the public transport organizations in the county of Nairobi. However, only 42 questionnaires were collected having been fully filled.

Therefore the response rate of this study was 66% as shown on table 4.2.

Table 4.2: Response Rate

	Questionnaires issued	Questionnaires returned	Non-responsive
Frequency	64	42	22
Percentage	100	66	34

This response rate is deemed sufficient to allow for data analysis. As per recommendations of Aityan (2022), a response rate above 60% is deemed sufficient for data analysis. Therefore, the response rate of this study was deemed sufficient for data analysis.

4.4. Accidents involving Transport organizations in the County of Nairobi

This study focused on collecting data concerning accidents that involved road transport organizations within the county of Nairobi. The findings revealed that during the period of 2022/2023, all the vehicles registered under the various transport organizations that were part of this study had been involved in accidents. On average, the transport organizations reported a mean of 79 accidents. Among these organizations, the one with the fewest accidents recorded a total of 9, while the organization with the highest number reported 178 accidents. The accidents included

both minor incidents and major collisions, demonstrating a broad spectrum of severity. This data underscores the significant involvement of public transport organizations in accidents, affirming observations made in a report by KHA in 2023. The report states that a considerable proportion of accidents in Kenya are associated with vehicles operated by public transport organizations. This evidence highlights the pressing issue of road safety related to public transport and the need for further investigation and potential interventions to improve safety measures within this sector.

4.5. Findings on E-transport Management and Safety Performance of Transport Organizations in the County of Nairobi

This study hypothesized that a significant relationship exists between Electronic transport management system and safety performance of transport organizations in the County of Nairobi. The following section presents the descriptive and inferential analysis; and discussion of the results on E-transport and safety performance of transport organizations in the County of Nairobi.

4.4.1 Descriptive statistics on E-Transport management and Safety Performance of Transport organizations in the County of Nairobi.

This study sought to establish the different digital transport management tools that have been employed by various transport organizations. The study found that transport organizations have adopted digital transport management tools to a different extent. Various organizations have adopted digital tools. For instance, 98 percent of transport organizations in this study reported having embraced digital payments; while 41% of the transport organizations have adopted mobile based booking operations. Additionally, 36% and 31% of the transport organizations have embraced use of parcel management systems and web based fleet management systems. The results of this analysis are as shown on figure 4.1.

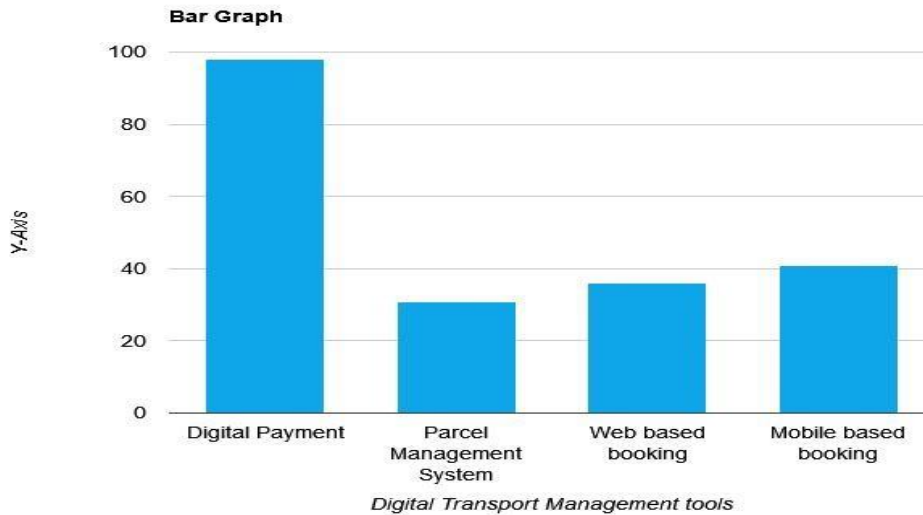


Figure 4.1: Adoption of Digital Transport Management Tools

A limited number of organizations have embraced a broad range of digital tools, while the majority have chosen to implement only digital payment systems. This supports the viewpoint of Akkerman et al. (2019), who argue that digital tools are becoming increasingly important for transport management across Africa. However, a detailed examination of how transport organizations in Nairobi are adopting these digital tools reveals that the adoption is quite superficial. Most of the tools that have been implemented primarily focus on managing customer interactions. There is a notable absence of integrative tools that would allow for the effective management of other vital areas within transport operations, such as route planning and optimization. For example, not a single organization has incorporated a fleet management system, which is crucial for efficient vehicle operation and logistics.

In addition to examining the tools being adopted, the study also sought to identify the benefits that organizations experience from implementing these digital tools. Organizations that have adopted certain digital technologies reported various positive outcomes depending on the specific tools in use. For instance, many noted enhanced revenue visibility, which enables them to track earnings more effectively. Improved customer service and customer retention were particularly highlighted by organizations that permitted online booking through websites or mobile applications. These features increase convenience for customers and often lead to more satisfied clients. Additionally, organizations that have put into place parcel management systems, complete with tracking capabilities, saw an increase in parcel customers. This development fosters greater customer confidence, facilitates retention, and ultimately boosts profitability in that segment of their transport operations. This finding aligns with the observations made by Heinbach et al. (2022), who describe how digital technology in road freight management enhances visibility of processes, allows for better optimization, and provides analytical insights.

The study also aimed to assess the overall level of digitization in transport operations. An analysis of data gathered from various public transport organizations indicated that only 31% of these organizations had achieved what can be categorized as the highest level of digitization, which is around 40%. The other organizations displayed varying levels of digitization, ranging from 10% to 30%. This data illustrates that public transport organizations have a long way before reaching high levels of digitization in their operations, indicating a significant opportunity for improvement in this area.

4.4.2 Inferential Statistics on E-Transport management and Safety Performance of Transport organizations in the County of Nairobi.

The study hypothesized that E-transport Management does not have a significant effect on safety performance of public transport organizations in the County of Nairobi. The study used the regression model; $Y = \beta_0 + \beta_1 X_1 + \epsilon$; Where; Y = safety performance of the public transport organizations; β_0 = constant (coefficient of intercept); X_1 is E-transport Management; and β_1 , is the regression coefficient of E-transport Management. The analysis revealed the following statistics as shown in Table 4.3.

Table 4.3: E-Transport Management and Safety performance

R-Squared	P-value
.859	.000
co-efficient: B, 131.951, X_1 , -2.723	

These results reveal that Digitization of transport operations has a significant effect on safety of public transport organizations. The resultant regression Model was described as: $Y = 131.951 - 2.723X_1 + \epsilon$, this implies that a percentage increase in level of digitization of transport operations results in 2.723 reduction in accidents involving public transport organizations in the county of Nairobi. These findings agree with Vasilenko et al (2021) who espoused that digital technologies creates data to empower managers to efficiently manage various aspects of transport operations; which contributes to reducing the level of accidents involving the fleet.

4.5.3 Discussion on E-Transport management and Safety Performance of Transport organizations in the County of Nairobi.

The findings of the study indicate that the uptake of digital tools within the management frameworks of transport organizations in Nairobi County is limited. This observation aligns with

the perspective presented by Akkerman et al. (2019), who suggest that while digital tools are increasingly becoming important for transport management across Africa, the rate of their adoption varies significantly from one location to another. The research highlights that different transport organizations have embraced digitization to different extents, illustrating a diverse landscape in the implementation of these technological solutions.

Moreover, the study identifies a noteworthy correlation between the digitization of transport operations and the safety performance of public transport organizations in Nairobi County. This correlation supports the arguments made by Heinbach et al. (2022), who assert that the application of digital technologies generates valuable data for transport managers, thereby facilitating more effective operational strategies. Such advancements in digital engagement can enhance safety performance, which is a critical aspect of public transport services.

It is particularly noteworthy that public transport organizations prioritize the integration of digital payment systems and enhance other areas related to customer interaction. Despite this focus, they seem to overlook essential components of transport management, such as the digitization of vehicle and crew management. This area represents a significant opportunity for growth within the transport organizations in Nairobi County. By adopting digital tools for these purposes, they could potentially unlock additional benefits that go beyond the advantages already recognized through their current digital initiatives.

Interestingly, the shallow adoption of various digital tools by many transport organizations raises questions about their overall digital strategy. The primary motivation for the adoption of digital payment systems appears to be the enhancement of revenue collection processes. Understanding

the factors that drive the adoption of digital tools in these organizations could provide valuable insights into their operational dynamics and help identify potential areas for improvement.

4.6 Fleet Maintenance and Safety Performance of Transport organizations in the County of Nairobi

This study was guided by the hypothesis that: Fleet maintenance has no significant effect on the safety performance of transport organizations in the County of Nairobi. The study collected data pertaining to mechanisms of fleet maintenance, and pre-post trip inspection, as well as the number of fleet inspections per month. The result of the analysis is presented below.

4.6.1 Descriptive Statistics on Fleet Maintenance and Safety Performance of Transport organizations in the County of Nairobi

The examination of fleet maintenance practices indicates that different organizations adopt various strategies when it comes to the upkeep of their vehicles. Out of the 42 transport organizations included in this study, only 13 have established a defined fleet management schedule as outlined by a Sacco, showcasing a significant gap in systematic maintenance planning. The remaining organizations have chosen not to implement any formal maintenance schedules. Instead, the responsibility for conducting vehicle upkeep is largely left to individual vehicle owners, which can lead to inconsistencies and potentially neglectful practices. Furthermore, only 13 out of the fleet organizations prioritize pre-trip and post-trip inspections for their vehicles. This lack of attention to regular inspections and structured maintenance reflects an overall disregard for proper vehicle care within these transport organizations. Such findings resonate with the observations made by Aflabo et al. (2020), who highlighted similar issues within the Ghanaian transport sector, indicating

a broader concern regarding vehicle maintenance oversight. The results of the analysis is provided in Table 4.4

Table 4.4: Vehicle Maintenance Mechanisms

Sacco defined Maintenance	Owner Defined Maintenance	Pre-post Trip Inspection
13 Trans. Orgs.	29 Transport Orgs.	13 Transport Orgs.

The study analysis further reveals that 29 organizations do not conduct periodical fleet inspection to ascertain the condition of vehicles of the fleet, and their appropriateness. Only 13 transport organizations conduct fleet assessment per month.

4.6.2 Inferential Statistics on Fleet Maintenance and Safety Performance of Transport organizations in the County of Nairobi

The study sought to examine the hypothesis that: Fleet Maintenance has no significant effect on safety performance of public transport organizations in the county of Nairobi. The study examined the data on accidents involving public transport organizations, and on fleet maintenance. Using the regression model: $Y = \beta_0 + \beta_1 X_1 + \epsilon$; Where; Y = safety performance of the public transport organizations; β_0 = constant (coefficient of intercept); X_1 is fleet maintenance; and β_1 , is the regression coefficient of fleet maintenance; the analysis yielded the following statistics shown on table 4.5.

Table 4.5: Fleet Maintenance and Safety Performance.

R-Squared	P-value
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.780

.000

co-efficient: B, 99.9, X1, -26.811

These results mean that Fleet maintenance, depicted by number of vehicle inspections per month significantly contributed to improved safety performance and thus the null hypothesis is rejected. These results auger well with the findings of Pastillos, Marcos and Parlikad (2023) who proposes that predictive maintenance models used in preventive maintenance extends the useful life of rolling stocks. In this scenario, strategy to examine conditions of vehicles could be a potent input into preventive maintenance strategy and thus improve fleet safety performance. The resultant regression model becomes: $Y = 99.9 - 26.8X_1 + \epsilon$; which means that an increase in number of inspection checks per month, results in reduction of accidents involving the fleet by 26.8 accidents. Therefore, fleet inspection could be viewed as a potent strategy contributing to the fleet safety performance.

4.6.3 Discussion of Findings on Fleet Maintenance and Safety Performance of Transport organizations in the County of Nairobi

The study clearly establishes that the maintenance of a fleet plays a crucial role in ensuring the safety performance of vehicles. It highlights a significant concern within transport organizations in Kenya, which reflects broader trends observed throughout Africa, as noted by Aflabo et al. (2020). Many of these organizations do not prioritize vehicle maintenance as a key factor in promoting fleet safety. This lack of priority is demonstrated by the fact that only a small number of organizations, specifically thirteen, maintain a fleet maintenance schedule that is directly managed by the transport organization itself. In contrast, the majority of fleet organizations have chosen to delegate the responsibility of vehicle maintenance to individual vehicle owners.

This delegation of responsibility can lead to a troubling situation. Vehicle owners may prioritize maintenance based primarily on their available financial resources, rather than viewing maintenance as essential for safety. This financial perspective could lead to unpredictable servicing; vehicles might be maintained only when funds permit, rather than following a disciplined, scheduled approach aligned with the needs identified through regular fleet inspections. This practice stands in stark contrast to the recommendations put forth by Rawat and Lad (2017), who advocate for a shift away from traditional fleet maintenance strategies based solely on the level of repair needed. Instead, they encourage organizations to adopt a more practical approach that emphasizes preventive maintenance based on the time-dependent failure rates of vehicle components.

Moreover, the study reveals that many organizations neglect to carry out mandatory inspections before and after trips. This lack of proactive assessment indicates that numerous fleet organizations lack sufficient visibility into the condition of their vehicles. Consequently, they may struggle to accurately determine whether a vehicle is suitable for a trip or if repairs are necessary. This oversight can prevent organizations from taking effective measures to enhance and ensure the safety of their fleets. The implications of the analysis shed light on the alarming state of disrepair prevalent among many public service vehicles. Reports from police officials indicate that a frequent cause of accidents involving public service vehicles is their un-roadworthy condition. A notable example is provided by Njeru and Marete (2022), who documented an incident in which a public service vehicle was involved in an accident resulting in over 34 fatalities. Initial investigations revealed that the bus had embarked on its journey despite having known mechanical issues. Such incidents often occur when transport organizations fail to implement proper maintenance schedules and adequate fleet inspection strategies.

4.7 Fleet Monitoring and Safety Performance of Transport organizations in the County of Nairobi

This study hypothesized that fleet monitoring has no significant effect on safety performance of transport organizations in the county of Nairobi. The study collected data mechanisms transport organizations deploy to monitor fleet. The following section presents the analysis of the data in the form of descriptive and inferential analysis.

4.7.1 Descriptive statistics on Fleet Monitoring and Safety performance of Transport Organizations in the County of Nairobi

The study aimed to gather detailed information about the mechanisms that transport organizations use in order to provide a clear description of the current state of fleet monitoring. The analysis conducted within the study indicates that a total of 13 organizations, which represents 31% of the total transport organizations surveyed, utilize a variety of mechanisms to effectively monitor their fleet operations. These mechanisms include a feedback system based on social media, GPS tracking technology, route supervisors, and toll-free numbers available in the vehicles. These 13 transport organizations harness the capabilities of social media to collect feedback from users regarding the performance of their crew and the condition of their fleet. Additionally, GPS tracking is employed for real-time monitoring of fleet vehicles, which is particularly useful in ensuring compliance with government regulations related to speeding. This capability allows the organizations to maintain high standards of safety and adherence to traffic rules.

Furthermore, the transport organizations provide toll-free numbers inside their vehicles, enabling passengers and the public to report any issues or concerns directly to the company. In addition to these technological solutions, these organizations also deploy route supervisors who play a crucial

role in overseeing the daily operations of the fleet. These supervisors are responsible for monitoring factors such as overloading of vehicles, adherence to designated routes, and compliance with government regulations regarding the behavior and appearance of drivers. The findings of this study align with the conclusions drawn by Tembe (2023), who observed that public transport organizations are increasingly implementing effective monitoring strategies for their fleets, leading to noticeable success. This suggests a growing trend within the industry toward adopting various monitoring mechanisms to enhance the overall efficiency and safety of transport services.

4.7.2 Inferential Analysis on Fleet Monitoring and Safety performance of Transport Organizations in the County of Nairobi

The study hypothesized that fleet monitoring has no significant effect on safety performance of transport organizations in the County of Nairobi. Data collected was analyzed using regression analysis guided by the following model: $Y = \beta_0 + \beta_1 X_1 + \epsilon$; Where; Y = safety performance of the public transport organizations; β_0 = constant (coefficient of intercept); X_1 is fleet monitoring; and β_1 , is the regression coefficient of fleet monitoring; the analysis yielded the following statistics shown on table 4.6.

Table 4.6: Regression Analysis of Safety Performance on Fleet Monitoring

R-Squared	P-value
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.788

.000

co-efficient: B, 105.6, X1, -68.639

These results mean that Fleet Monitoring has a significant effect on safety performance of transport organizations (P Value-0.000). Therefore the study rejects the null hypothesis and concludes that fleet monitoring has a significant effect on safety performance of transport organizations in the County of Nairobi. The resultant regression Model could be written as: $Y = 105.6 - 68.639X_1 + \epsilon$; which implies that presence of route supervisors results in reduction of number of accidents by 68.639. This means that organizations that employ route supervisors experienced reduced number of accidents than those organizations that don't employ route supervisors. These findings auger well with finding of Mazinga (2020) that links fleet monitoring to improved fleet efficiency.

4.7.3 Discussion of Analysis on Fleet Monitoring and Safety performance of Transport Organizations in the County of Nairobi

The study highlights that a limited number of transport organizations have implemented fleet monitoring systems. These systems include the utilization of social media platforms and toll-free numbers, which serve as effective tools for collecting user feedback regarding crew discipline and addressing complaints. By adopting these methods, fleet managers are better equipped to oversee their fleet operations comprehensively. For example, these organizations can closely monitor incidents of customer harassment, driver indiscipline, excessive speeding, and reckless driving behavior. Such monitoring is crucial because these factors are directly tied to the overall safety performance of the fleet, a connection that this study has thoroughly established. The findings of this research reinforce the arguments put forth by Tembe (2023), who asserts that monitoring

mechanisms are essential for transport managers to maintain control over the various operational aspects of their fleets. This control is vital for achieving fleet efficiency. In Kenya, these monitoring mechanisms have been implemented multiple times to ensure the safety and orderliness of public transport organizations.

A notable example is provided by Ndunda (2021), who reports on an incident involving a driver from a Nairobi-based transport organization. This driver was held accountable for dangerous driving practices, thanks in large part to a video that a road user posted on social media, enabling swift action to be taken against the driver. Furthermore, the presence of route supervisors plays a significant role in enhancing safety. These supervisors conduct random inspections of vehicles while they are in operation, which helps deter issues such as overloading and other hazardous behaviors that could compromise road safety. As a result, organizations that employ route supervisors often see improved compliance with regulations and, consequently, better safety performance overall. This comprehensive approach to monitoring and oversight significantly contributes to creating a safer and more efficient public transport environment.

4.8 Fleet Technical Capacity and Safety performance of Transport Organizations in the County of Nairobi

This study sought to examine the effect of fleet technical capacity on safety performance of transport organizations in the County of Nairobi. The study collected data on the recruitment requirements concerning driving class endorsement, police clearance; and other requirements such as defensive driving qualification, basic mechanics, and health and safety qualifications. The results of the analysis are presented below.

4.8.1 Descriptive Analysis on Fleet Technical Capacity and Safety performance of Transport Organizations in the County of Nairobi

The analysis of data concerning fleet technical capacity indicates that all fleet organizations identify class endorsement and police clearance as fundamental prerequisites for both employment and the issuance of public service licenses. This requirement ensures that candidates meet basic legal and safety standards before taking on significant responsibilities. Nevertheless, it is noteworthy that only 31% of the transport organizations impose any additional qualifications for their crew members as a condition of employment. In these organizations, drivers and crew are expected to obtain qualifications in several key areas, including defensive driving, health and safety protocols, and basic mechanics. This framework aims to enhance the skills and preparedness of the crew, ensuring they can perform their duties effectively and safely.

Further examination of the data reveals that a mere 31% of these transport organizations actively organize capacity-building training for their crew. Within this subset of organizations, some arranged a minimum of one training session during the study period, while others facilitated up to four training sessions within the year. The topics addressed in these training sessions encompassed a range of vital areas, such as road rules and regulations, refresher courses on driving skills, safety and first aid instruction, customer service techniques, and updates on new transport technology and infrastructure.

These insights align closely with the findings of Sangrar (2019), which also highlighted that prevalent capacity-building strategies within transport organizations typically include a combination of classroom instruction and in-vehicle training programs. Such programs are specifically designed to improve the driving experience of older drivers, focusing on enhancing

their confidence, familiarizing them with new technologies, ensuring they understand relevant laws, and ultimately reducing the likelihood of accidents. This comprehensive approach to training and development is essential for maintaining safety and efficiency within the transport sector.

4.8.2 Inferential Analysis on Fleet Technical Capacity and Safety performance of Transport Organizations in the County of Nairobi

The study sought to examine the hypothesis that fleet technical capacity has no significant effect on safety performance of transport organizations. The study regressed data on number of accidents involving transport organizations on data on number of training programs offered in the year under study. The study used the following regression model: $Y = \beta_0 + \beta_1 X_1 + \epsilon$; Where; Y = safety performance of the public transport organizations; β_0 = constant (coefficient of intercept); X_1 is fleet technical capacity; and β_1 , is the regression coefficient of fleet technical Capacity; the analysis yielded the following statistics shown on table 4.7.

Table 4.7: Regression Analysis of Safety Performance on Fleet Technical Capacity

R-Squared	P-value
.824	.000
co-efficient: B, 100.8, X1,-27.8	

These results indicate that Fleet technical Capacity (Training Programs), have a significant and substantial effect on the safety performance. These results yield the following regression model: $Y = 100.8 - 27.8X_1 + \epsilon$. This means that a unit increase in number of training programs results in reduction of accidents by 27.8 units. This translates to imply that training programs for crew result in improved safety performance. This augers well with the findings of Niekerk et al (2019) that

established that safety incentivisation, vehicle modification, and driver training results in better safety performance.

4.8.3 Discussion on Analysis on Analysis on Fleet Technical Capacity and Safety performance of Transport Organizations in the County of Nairobi

The findings from this study reveal that crew training plays a crucial role in enhancing the safety performance of transport organizations operating in Nairobi County. This aligns with previous research conducted by Niekerk et al. (2019), which established that when drivers receive thorough training, particularly focused on safety protocols and practices, it results in marked improvements in the safety performance of vehicle fleets. The current study observed that a significant number of transport organizations tend to implement only the bare minimum qualifications for their fleet drivers. Furthermore, it was noted that most organizations do not prioritize developing capacitybuilding training programs for their crew members. This lack of investment in comprehensive training may help explain the overall safety performance issues within transport organizations in Nairobi County. As highlighted by Kinyajui (2024), a notable proportion of road transport accidents in Kenya can be linked to public transportation vehicles, underscoring the critical need for improved safety measures.

One of the underlying reasons for these safety challenges could be the low qualification requirements that many transport organizations enforce. Their focus primarily appears to be on satisfying government regulations rather than improving the skill levels of their drivers. The evidence suggests that transport organizations would significantly benefit from raising their standards regarding crew qualifications. By requiring a higher level of expertise and investing in extensive training programs for their crew members, these organizations can enhance their safety

capabilities. Ultimately, this would contribute positively to the overall safety performance of public transport systems in Kenya.



CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This study sought to examine the effect of transport management practices on safety performance of public transport organizations in the county of Nairobi. This chapter presents the summary of findings, conclusion and recommendations.

5.2. Summary of Findings

The study focused on understanding how various aspects of E-Transport management impact the safety performance of public transport organizations in Nairobi County. Specifically, it analyzed the significance of Fleet Maintenance, Fleet Monitoring, and Fleet Technical Capacity. The foundation of this research rests on the Diffusion of Innovation theory, which highlights the essential elements and characteristics relevant to the adoption of e-transport management practices. This includes the integration of Artificial Intelligence and other emerging digital tools that are becoming increasingly relevant in the transportation sector, emphasizing their role and relative importance. The study incorporated the Maintenance Theory, which is crucial in explaining vehicle upkeep. This theory indicates that regular maintenance is necessary to preserve and slow down the deterioration of vehicles, thereby ensuring that their quality and safety are adequately managed. By applying this theoretical framework, the study aimed to establish a clear conceptual relationship between effective fleet management practices and improved safety performance within public transport organizations.

In addition, the Theory of Change was utilized to elucidate the role of monitoring within fleet management. This theory is particularly relevant as it addresses the gaps in processes that may hinder the achievement of safety objectives in public transport organizations. It emphasizes how effective monitoring can identify and rectify issues that could compromise safety. The Resource Based View was also an important part of the study. This perspective argues that the safety of transportation processes is closely linked to the organization's technical resources. Factors such as instances of drunk driving, driver fatigue, inadequate skills, lane discipline, and insufficient safety training were identified as critical components influencing safety outcomes.

The literature review conducted as part of this study revealed a significant gap in existing research. It became clear that while there are a limited number of studies on transport management practices, these studies rarely address fleet safety performance specifically within the Kenyan public transport sector. The review highlighted a need for more focused research in this area. The study collected data, from 42 transport organizations, and employed both descriptive and inferential statistics to analyze the relationship between fleet management practices and safety performance. The findings of this research are summarized in the following sections.

5.2.1 E-Transport and Safety Performance

The study revealed that organizations exhibit diverse degrees of digitization, indicating a lack of uniformity in how these entities approach technological integration. A notable observation is that public transport organizations prioritize digital payment systems, showcasing a strong commitment to modernizing this specific area. However, this emphasis on digital payment is not matched by a similar focus on other critical dimensions of transport operations. The adoption of electronic tools for various operational processes remains limited among these organizations.

Furthermore, the research established a significant link between the digitization of transport operations and the safety performance of public transport organizations in Nairobi County. This finding supports existing literature that suggests digital technologies provide valuable data to transport managers, thereby enabling them to enhance operational efficiency. Improved access to data and operational insights can lead to better safety outcomes within these organizations.

The results of the study indicate that many transport organizations in Nairobi have yet to fully embrace comprehensive e-transport solutions that could offer greater benefits. Specifically, areas such as vehicle and crew management have not seen substantial digitization efforts. This presents a clear opportunity for these organizations to gradually incorporate more e-transport tools into their operations. Among the various digital tools available, the study identifies the digitization of revenue processes as the most commonly adopted. Additionally, parcel management is only utilized by a small number of firms, suggesting that the drive to optimize revenue collection may be a primary motivator for the limited digital adoption.

However, the study does not provide insights into the reasons behind the low uptake of other e-transport tools. Understanding the factors that influence how these organizations adopt digital technologies could be an important area for future research. This exploration could reveal the barriers or incentives affecting the implementation of a broader range of e-transport solutions.

5.2.2 Fleet Maintenance and Safety Performance

The research highlights a critical connection between fleet maintenance and the safety performance of vehicles used in transportation. It clearly indicates that effective fleet maintenance plays a vital role in ensuring the safety of public transport systems. Despite this knowledge, the findings reveal

that a minimal number of public transport organizations in Kenya prioritize vehicle maintenance as a key component of ensuring fleet safety. In fact, it is evident that few public transport organizations actively prescribe and enforce a structured maintenance schedule for their vehicles. This lack of proactive maintenance planning can be traced back to the delegation of fleet management responsibilities to individual vehicle owners. These vehicle owners often do not approach vehicle maintenance with a focus on safety. Instead, their perspective is predominantly influenced by the availability of financial resources. This financial mindset can lead to neglect in essential maintenance activities, which may account for the frequent sight of public service vehicles in various states of disrepair.

When examining the numerous road accidents that involve public transport vehicles, Kenyan authorities, including the police, frequently cite mechanical failures as a primary factor in these incidents. This observation underscores the urgent need for public transport organizations to adopt a more rigorous approach to vehicle upkeep. The study's findings further reveal that very few organizations carry out or require pre- and post-trip inspections of their vehicles, which are crucial for informing an effective maintenance schedule. The absence of regular inspections and assessments suggests that many fleet organizations lack a comprehensive understanding of the condition of their vehicles. Consequently, they may struggle to evaluate whether a vehicle is fit for a journey or if it requires immediate repairs. This lack of awareness indicates that organizations are unlikely to implement necessary measures that would enhance and ensure fleet safety. Overall, the study emphasizes the importance of prioritizing regular maintenance and inspections to improve the safety and reliability of public transport systems in Kenya.

5.2.3 Fleet Monitoring and Safety Performance

The study revealed that fleet monitoring plays a crucial role in enhancing the safety performance of public transport organizations in Nairobi County. The findings indicate that these organizations have adopted a range of monitoring strategies to ensure safe transit for passengers. Among the methods employed are the use of social media platforms and toll-free numbers, which serve as channels for users to provide feedback regarding the behavior of the crew. These feedback systems also function as complaint mechanisms, allowing passengers to report any issues they encounter while using public transport services. Through these approaches, fleet managers can effectively oversee fleet operations. This oversight includes monitoring incidents such as customer harassment, crew indiscipline, instances of over-speeding, and reckless driving. Addressing these factors is essential in promoting road safety, as they significantly influence the overall safety conditions on the roads. For fleet organizations to manage these challenges effectively, it is vital for them to maintain a clear view of their transport operations.

These monitoring strategies have been implemented frequently to uphold order and safety standards within public transport systems in Kenya. Additionally, the engagement of route supervisors plays an important role in ensuring safe transportation. These supervisors conduct random inspections of vehicles while they are in operation, which acts as a deterrent against overloading and other hazardous behaviors that can threaten road safety. Organizations that utilize route supervisors tend to demonstrate better adherence to safety regulations, leading to improved safety performance overall. Therefore, the presence of these supervisors contributes positively to the overall functioning and safety of public transportation in the region.

5.2.4 Fleet Technical Capacity

The study conducted on public transport organizations revealed significant insights regarding the relationship between fleet technical capacity and safety performance. Specifically, it was determined that the effectiveness of crew training plays a crucial role in shaping safety outcomes within these organizations. By examining how crew training impacts safety performance, the study highlighted that organizations which actively implement comprehensive training programs covering a variety of essential topics—including safety protocols, regulatory compliance, advancements in technology, and periodic refresher courses focused on driving records—experience a notable reduction in the number of accidents. In contrast, transport organizations that do not prioritize crew training are likely to report a higher frequency of accidents. This conclusion aligns with existing literature on transport management practices in more developed regions, which supports the idea that well-structured training programs can enhance safety outcomes. The findings also reveal a concerning trend among a majority of transport organizations, which tend to enforce only the minimum qualifications required for fleet drivers.

Furthermore, many of these organizations do not invest in capacity-building training initiatives for their crew members. This lack of adequate training may help to explain the suboptimal safety performance observed in transport organizations within Nairobi, where road transport accidents are alarmingly high. A significant proportion of these accidents can be traced back to driver errors, including but not limited to speeding, overloading vehicles, improper road usage, failure to obey traffic signs, and inadequate lane discipline. One possible reason for the prevalence of these issues is the tendency of transport organizations to establish very low qualification standards for their drivers, often only meeting baseline government requirements. This minimal approach to driver

qualifications raises questions about the overall safety capacity of these organizations. To address these concerns and improve safety performance in public transport throughout Kenya, it is imperative for transport organizations to adopt more stringent qualification criteria for their drivers. Additionally, investing in robust training programs for crew members would significantly enhance their competence and ultimately lead to safer transport operations. Implementing such changes could contribute to a meaningful reduction in accidents and foster a safer transportation environment for all road users in Kenya.

5.3 Conclusions

The study therefore concludes that transport management practices: E-transport management, Fleet Maintenance; Fleet Monitoring and Fleet technical capacity have significant effect on safety performance of public transport organizations. The following section provides conclusions per variable.

5.3.1 E-transport Management and Safety Performance

The study arrived at a significant conclusion regarding the impact of electronic transport management on public road safety performance. It highlights that digitizing transport processes plays a crucial role in influencing safety outcomes on the roads. However, the research also notes a concerning trend: there is only a minimal level of adoption of e-transport tools among public transport organizations. When examining the types of e-transport tools that have seen adoption, the study identifies that the most prevalent forms involve the digitization of revenue-related processes. This includes the use of mobile money systems that enable users to pay for transport services and make bookings remotely. Such developments indicate a shift towards more convenient payment methods that align with modern consumer expectations. In contrast, the study

reveals that few organizations have extended this digitization to parcel services, indicating a gap in the broader application of technology within the transport sector. Moreover, only a limited number of other transport processes have been digitized at this time, showcasing a lack of widespread innovation in this area.

The research suggests that the growing adoption of digital payment and booking systems is closely linked to the rising popularity of mobile money services in Kenya. This trend is not only a response to consumer demand but also an essential strategy for public transport organizations to effectively manage and increase their revenue streams. Despite these advancements in payment and booking systems, it appears that public transport organizations have not prioritized the digitization of their operations to enhance the safety of transport processes. The study implies that there is minimal incentive for these organizations to adopt further digital solutions aimed at improving safety measures. Additionally, a lack of awareness about the potential benefits of digitization in enhancing safety and efficiency may contribute to this situation. Overall, the study paints a picture of a sector at a crossroads, where the opportunity for improvement exists but is not fully realized.

5.3.2 Fleet Maintenance and Safety Performance

The study found a notable connection between fleet maintenance practices and the safety performance of public transport organizations operating within Nairobi County. It was observed that many public transport entities have not effectively managed their fleet maintenance responsibilities. Instead, these organizations tend to pass this critical function to individual vehicle owners. This delegation often results in insufficient motivation among these owners to maintain vehicles, as their interests may not align with achieving high safety standards and performance.

The consequences of this are clearly visible in the poor condition of many public transport vehicles, which often show signs of neglect and deterioration. In contrast, there are some public transport organizations that have put in place structured and routine fleet maintenance schedules.

These organizations demonstrate a commitment to ensuring that their vehicles are kept in good operational condition. As a direct result of these proactive measures, they experience fewer accidents and incidents. This reinforces the idea that effective maintenance practices can significantly influence safety outcomes. Furthermore, the study highlights a concerning trend among most public transport organizations in Nairobi County: a lack of pre-trip and post-trip vehicle inspections. This absence of regular inspections means that these organizations are unable to accurately assess whether their vehicles are suitable for safe transport operations. Without proper evaluations, they cannot identify the need for necessary repairs or maintenance, which poses serious risks to both the passengers and the overall safety of the public transport system. This underscores the critical need for enhanced maintenance practices and regular vehicle assessments to improve safety in public transport operations.

4.3.3 Fleet Monitoring and Safety Performance

The study investigated the impact of fleet monitoring on the safety performance of public transport organizations in Nairobi. It was found that the presence of route supervisors plays a crucial role in enhancing safety measures within these organizations. However, the findings indicate that only a small number of transport companies have adopted effective fleet monitoring mechanisms. These mechanisms include the use of social media feedback systems, GPS tracking, toll-free numbers for reporting concerns, and the employment of route supervisors. Among the few organizations that have implemented these techniques, social media platforms are utilized to gather feedback from

passengers about both the crew and the vehicles. This feedback serves as a valuable tool for improving service quality and addressing safety issues. Additionally, GPS tracking systems allow for real-time monitoring of vehicle speed, ensuring that drivers adhere to government regulations regarding safe driving practices.

Transport companies also provide toll-free numbers in their vehicles, enabling passengers to report any safety concerns or issues they experience without facing any financial burden. Furthermore, these organizations employ route supervisors who are responsible for overseeing the operations of the fleet. The supervisors monitor various aspects, including passenger overloading, adherence to designated routes, and compliance with government regulations related to driver attire and road usage. The study concludes that public transport organizations that employ a diverse range of fleet monitoring techniques are more likely to achieve favorable safety performance outcomes. In contrast, it emphasizes that the majority of transport organizations currently lack adequate visibility and control over their fleet of vehicles. This limited oversight can hinder their ability to ensure the safety of their operations and meet regulatory standards.

4.3.4 Fleet Technical Capacity and Safety Performance.

The study concludes that the technical capacity of a fleet has a significant impact on the safety performance of public transport organizations. This finding emphasizes the crucial role that well-equipped and properly trained personnel play in ensuring safe transport operations. Despite this important connection, the research highlights that only a small number of public transport organizations actively design and implement programs aimed at enhancing the skills and capacities of their crew members. The training programs that do exist within these organizations typically

encompass a range of essential topics. These include safety protocols, regulatory compliance, advancements in technology relevant to transport, and refresher courses focused on driving skills.

Such comprehensive training is vital in preparing crew members to handle various situations they may encounter on the road. Notably, organizations that prioritize and implement these training programs tend to experience a significant reduction in the number of accidents compared to those that do not invest in crew training. This correlation underscores the importance of ongoing education and skill enhancement in promoting safer driving practices.

Furthermore, the study reveals that the majority of public transport organizations set only minimal qualifications for their fleet drivers. This approach to hiring and training may contribute to the overall safety challenges faced by transport organizations within Nairobi. It becomes evident that many road transport accidents in Kenya can be attributed to driver errors, which include common issues such as speeding, overloading of vehicles, improper use of roadways, failure to adhere to road signs, and lack of lane discipline. These factors collectively highlight the pressing need for improved training and qualifications for drivers, which could lead to enhanced safety and a reduction in the number of traffic incidents in the region.

5.4. Recommendations

The study based on findings and conclusions, makes various recommendations to improve public transport safety performance. The recommendations are discussed as follows:

5.4.1 Recommendation to Stakeholders in Public Transport

The study has successfully identified that various transport management practices, specifically Etransport Management, fleet maintenance, fleet monitoring, and fleet technical capacity, play a

crucial role in influencing the safety performance of public transport organizations. These practices are essential for ensuring that transportation services operate efficiently and remain safe for passengers. However, the findings also highlight a critical issue: public transport organizations have only minimally adopted practices that can significantly improve safety. For instance, the level of digitization within these organizations is surprisingly low, indicating that many are falling behind in modern technological advancements that can enhance safety. Furthermore, the use of mechanisms related to fleet maintenance and monitoring is virtually nonexistent, which poses a risk to the overall safety of public transport operations. This lack of attention to maintenance and monitoring can lead to mechanical failures and safety incidents that endanger passengers and drivers alike.

In addition to these challenges, the transportation organizations studied exhibit very low qualification criteria for their fleet crew. This lack of rigorous standards means that individuals responsible for operating and maintaining the vehicles may not possess the necessary skills or knowledge to ensure safe and effective transportation services. Compounding this issue is the absence of capacity-building activities designed to improve the qualifications and skills of the fleet crew. Without proper training and development opportunities, employees may not be adequately prepared to handle the complexities and challenges of their roles, further compromising safety. In light of these findings, the study strongly urges stakeholders—including government agencies, public transport managers, and organizational leaders—to develop and implement strategies aimed at enhancing the adoption of safety-improving practices within public transport organizations. By doing so, these stakeholders can significantly reduce the frequency of accidents involving public service vehicles, many of which are linked to poor compliance with safety regulations, ineffective

monitoring and control systems, inadequate vehicle maintenance, and driver errors. Taking decisive action in these areas is essential for ensuring safer public transport for all users.

5.4.2 Further Research

The research conducted aligns well with the existing body of literature on transport management practices and their effects on the performance of fleets. This study adds valuable evidence regarding fleet management techniques specifically related to public service vehicles within Kenya. Furthermore, it contributes insights that are relevant not only to Kenya but also to many other developing nations facing similar transportation challenges. As such, this research enhances the understanding of effective transport management practices and their correlation with safety performance in the public transport sector. One of the key findings of the study is the observation that there is a minimal or shallow adoption of established transport management practices among public service vehicle operators. Despite the availability of effective strategies that have been shown to improve safety and reduce the incidence of accidents, these practices are not being implemented to a significant degree. The study does not, however, explore the underlying causes of this limited adoption of transport management practices.

Consequently, this study emphasizes the need for further investigation into why these practices are not being embraced more fully. It calls upon scholars and researchers to explore this issue in greater depth, aiming to uncover the barriers that may be hindering the adoption of effective transport management practices. By doing so, the research can contribute to the accumulation of evidence that supports the implementation of these practices, which are crucial for enhancing safety and reducing accidents involving public service vehicles. Such insights could ultimately lead to

improved transport safety standards and better overall fleet performance in Kenya and similar contexts within developing nations.

REFERENCES

Adebayo, I. T., & Aworemi, J. R. (2021, August). Transport management practices and firms' performance in Nigeria. In *Proceedings of the International Conference on Industrial Engineering and Operations Management Rome, Italy* (pp. 649-657).

Aflabo, J. E., Kraa, J. J., & Agbenyo, L. (2020). Examining the effect of fleet management on competitive advantage in the transport industry. *European Journal of Logistics, Purchasing and Supply Chain Management*, 8(2), 7-23.

Aityan, S. K. (2022). *Business research methodology: Research process and methods*. Springer Nature

Akkerman, G., Buynosov, A., Dorofeev, A., & Kurganov, V. (2019, May). Decision support system for road transport management in the digital age. In *International Scientific Siberian Transport Forum* (pp. 773-781). Cham: Springer International Publishing.

A&S Adria, 2019. How Technology Is Making School Buses Safer. <https://www.asadria.com/en/how-technology-is-making-school-buses-safer/> (accessed 17 June 2020).

Bakutel, 2018. Press Release of Bakutel 2018 Exhibition. <https://bakutel.az/en/opennews/7121.33.html> (accessed 17 June 2020).

Barney (1991). "Firm Resources and Sustained Competitive Advantage". *Journal of Management*. 17 (1): 99–120. [doi:10.1177/014920639101700108](https://doi.org/10.1177/014920639101700108). [S2CID 220588334](https://doi.org/10.1177/014920639101700108).

Bell, E., Bryman, A., & Harley, B. (2022). *Business research methods*. Oxford university press.

Borken-Kleefeld, J., & Chen, Y. (2015). New emission deterioration rates for gasoline cars–

Results from long-term measurements. *Atmospheric Environment*, *101*, 58-64.

Casutt, G., Theill, N., Martin, M., Keller, M., & Jäncke, L. (2014). The drive-wise project: driving simulator training increases real driving performance in healthy older drivers. *Frontiers in aging neuroscience*, *6*, 85.

Carton, G., & Parigot, J. (2024). Toward an Ecological Resource Orchestration Model. *Organization & Environment*, 10860266241244784.

Castillo, A. C., Marcos, J. A., & Parlikad, A. K. (2023). Dynamic fleet maintenance management model applied to rolling stock. *Reliability Engineering & System Safety*, *240*, 109607.

Dmitriev A. (2019). Digital Technologies of Transportation and Logistics Systems Visibility.

Strategic decisions and risk management.10(1):20-26. [https://doi.org/10.17747/2618-](https://doi.org/10.17747/2618-947X-2019-1-20-26)

[947X-2019-1-20-26](https://doi.org/10.17747/2618-947X-2019-1-20-26)

Dźwigoł, H. (2020). Pilot study in the research procedure. *Organizacja i Zarządzanie: kwartalnik naukowy*.

Frölich, N., & Schellhammer, K. S. (2022). Questionnaire design and sampling procedures for business and economics students: a research-oriented, hands-on course. *International Journal of Mathematical Education in Science and Technology*, 1-19.

Easterby-Smith, M., Jaspersen, L. J., Thorpe, R., & Valizade, D. (2021). *Management and business research*. Sage.

European Commission (2019).

[https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=0801](https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5c2e9aa16&appId=PPGMS)

[66e5c2e9aa16&appId=PPGMS](https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5c2e9aa16&appId=PPGMS)

FTA (2024) <https://www.transit.dot.gov/regulations-and-programs/safety/national-public-transportation-safety-plan>

Gerhart, B., & Feng, J. (2021). The Resource-Based View of the Firm, Human Resources, and Human Capital: Progress and Prospects. *Journal of Management*, 47(7), 1796-1819. <https://doi.org/10.1177/0149206320978799>

Heinbach, C., Beinke, J., Kammler, F., & Thomas, O. (2022). Data-driven forwarding: a typology of digital platforms for road freight transport management. *Electronic Markets*, 32(2), 807-828.

Hickman, R., Bonilla, D., Givoni, M., & Banister, D. (2015). *International handbook on transport and development*. Edward Elgar Publishing.

Hunziker, S., & Blankenagel, M. (2021). *Research Design in Business and Management*. Wiesbaden: SpringerGabler, 1.

Kimaro, H., Mvungi, N. H., Kundaali, H. N., & Hamisi, N. Y. (2016). Challenges in the management of road safety in Tanzania: the need for an integration framework. *Huria: Journal of the Open University of Tanzania*, 22(1), 42-51.

Killeen, P., Ding, B., Kiringa, I., & Yeap, T. (2019). IoT-based predictive maintenance for fleet management. *Procedia Computer Science*, 151, 607-613.

Kinyajui, M. (2024) Leading causes of road accidents in Kenya. <https://www.the-star.co.ke/news/2024-02-14-ntsa-reveals-13-leading-causes-of-road-accidents/>

Jurevicius, O. (2013). Resource Based View. Retrieved 1 March and 9 March 2019 from <https://www.strategicmanagementinsight.com/topics/resource-based-view.html>

Lars, S (2023) <https://www.linkedin.com/pulse/advancing-bus-transport-safety-leveraging-data-sustainable-bus-e6y9f/>

Lee, K., Kim, D. H., Choi, H. R., Park, B. K., Cho, M. J., & Kang, D. Y. (2017). A study on IoT based fleet maintenance management. *International Journal of Control and Automation*, 10(4), 287-296.

Li, Jerry (2020), "[Blockchain technology adoption: Examining the Fundamental Drivers](#)", *Proceedings of the 2nd International Conference on Management Science and Industrial Engineering*, ACM Publication, April 2020, pp. 253–260. [doi:10.1145/3396743.3396750](https://doi.org/10.1145/3396743.3396750)

McLellan, T. (2021). Impact, theory of change, and the horizons of scientific practice. *Social Studies of Science*, 51(1), 100-120. <https://doi.org/10.1177/0306312720950830>

McCullen, N. J., Rucklidge, A. M., Bale, C. S., Foxon, T. J., & Gale, W. F. (2013). Multiparameter models of innovation diffusion on complex networks. *SIAM Journal on Applied Dynamical Systems*, 12(1), 515-532.

Mazinga, J. (2020). *Fleet Management Practices and its effects on competitiveness of the Zimbabwean Road Freight Sector: A case of Biltrans Haulage Company* (Doctoral dissertation, Chinhoyi University of Technology Zimbabwe).

Ngai, E. W., & Wu, Y. (2022). Machine learning in marketing: A literature review, conceptual framework, and research agenda. *Journal of Business Research*, 145, 35-48.

Njeri (2016) <https://www.geopoll.com/blog/safety-in-kenyas-public-transport-vehicles-matatu/><https://www.kenyanews.go.ke/alarm-as-road-accidents-continue-increasing-on->

Njeru, A., & Marete, G. (2022) 24 Dead After Bus Plunges into River Nithi.

<https://nation.africa/kenya/counties/tharaka-nithi-/24-dead-after-bus-plunges-into-river->

[nithi-3890630](#).

NTSA (2024) <https://www.ntsa.go.ke/downloads.php?pid=Press%20Release>

kenyan-roads/

Olojede, O., Daramola, O., & Olufemi, B. (2017). Metropolitan transport safety and security: An African experience. *Journal of Transportation Safety & Security*, 9(4), 383–402.

<https://doi.org/10.1080/19439962.2016.1230164>

Omondi 2024 <https://www.standardmedia.co.ke/sports/national/article/2001493071/recklessness-altered-speed-limiters-main-cause-of-road-accidents-ntsa>

Osuagwu, L. (2020). Research methods: Issues and research direction. *Business and Management Research*, 9(3), 46-55.

Pozueco, L., Tuero, A. G., Pañeda, X. G., Melendi, D., García, R., Pañeda, A. G., & Mitre, M.

(2015). Adaptive learning for efficient driving in urban public transport. In *2015 International Conference on Computer, Information and Telecommunication Systems (CITS)* (pp. 1-5). IEEE.

PPIAF (2023)

<https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/UrbanBusToolkit/assets/1/1b/1b10.html>

Rawat, M., & Lad, B. K. (2017). An integrated strategy for fleet maintenance planning. *Journal of Quality in Maintenance Engineering*, 23(4), 457-478.

Rogers, Everett M. (1962). *Diffusion of innovations (1st ed.)*. New York: Free Press of Glencoe.

OCLC 254636.

Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Sam, E. F., & Abane, A. M. (2017). Enhancing passenger safety and security in Ghana: Appraising public transport operators' recent interventions. *Journal of Science and Technology (Ghana)*, 37(1), 101-112.

Sam, E. F., Brijs, K., Daniels, S., Brijs, T., & Wets, G. (2018). Public bus passenger safety evaluations in Ghana: A phenomenological constructivist exploration. *Transportation research part F: traffic psychology and behaviour*, 58, 339-350.

Sangrar, R., Mun, J., Cammarata, M., Griffith, L. E., Letts, L., & Vrkljan, B. (2019). Older driver training programs: a systematic review of evidence aimed at improving behind-the-wheel performance. *Journal of safety research*, 71, 295-313.

Schuyler, D. (2023). *Maintenance Theory: Applying Care Within a Socio-Technical Framework of Preservation in the Modern Built Environment* (Doctoral dissertation, Columbia University).

Singh, A. (2023). Revolutionizing Traditional Logistics: Integrating Digital Technologies in Logistic and Transport Management. *Journal of Research Administration*, 5(2), 10482-10490.

Statista (2024). <https://www.statista.com/outlook/mmo/shared-mobility/public-transportation/americas>

Rodrigue, J.-P. (2024). *The Geography of Transport Systems* (6th ed.). Routledge. <https://doi.org/10.4324/9781003343196>

Tadviser, 2019. Skytracking Transport Security (STTS).

http://tadviser.com/index.php/Product:Skytracking_Transport_Security_%28STTS%29

(accessed 15 June 2020).

Tembe, N. P. (2023). *Effective monitoring of vehicle utilization: a case study of eThekweni Municipality FMSs* (Doctoral dissertation).

Van Niekerk, A., Govender, R., Jacobs, R., & Van As, A. B. (2017). Schoolbus driver performance can be improved with driver training, safety incentivisation, and vehicle roadworthy modifications. *South African Medical Journal*, 107(3), 188-191.

Vasilenko, M., Kuzina, E., Bessalov, V., Drozdov, N., Tagiltseva, J., Korenyakina, N., & Nadolinsky, P. (2021). Digital technologies in quality and efficiency management of transport service. In *E3S Web of Conferences* (Vol. 244, p. 11046). EDP Sciences.

WB 2024 <https://www.roadsafetyfacility.org/country/kenya>

Yudhistira, G., Firdaus, M. I., & Agushinta, L. (2015). Transportation System in Japan: A Literature Study. *Jurnal Manajemen Transportasi & Logistik (JMTranslog)*, 2(3), 333-352.

QUESTIONNAIRE

This questionnaire seeks data on transport practices in your organization. Kindly provide the data, by filling each section of the questionnaire. The data provided will be used for academic analysis only.

Section A: Demographic Information

1. Position in the organization.....
2. Period of Work.....
3. Name of Sacco.....
4. Routes
operated.....
.....
.....

Section B: E-Transport Management

This sections seeks data on elements of digitization of transport management in your organization.

1. What digital tools are in place to enhance fleet management operations?
Visibility of Parcels
Improved bookings
.....
.....
.....
2. What percentage of transport management operations is conducted electronically?
.....

.....

Section C: Fleet Maintenance

1. Describe the various mechanisms employed by the Sacco to monitor fleet maintenance.

.....

.....

.....

2. How many times is fleet and fleet maintenance record inspected in a month?

.....

.....

.....

Section D: Fleet Monitoring

1. Describe the mechanisms the Sacco uses to monitor transport operations of operators.....

.....

2. Does the Sacco employ route Supervisors?

.....

.....

Section E: Fleet Technical capacity

1. Driver qualification requirement
 - a) Class endorsement and police clearance
 - b) Health and safety competence
 - c) Basic mechanics

d) Defensive driving

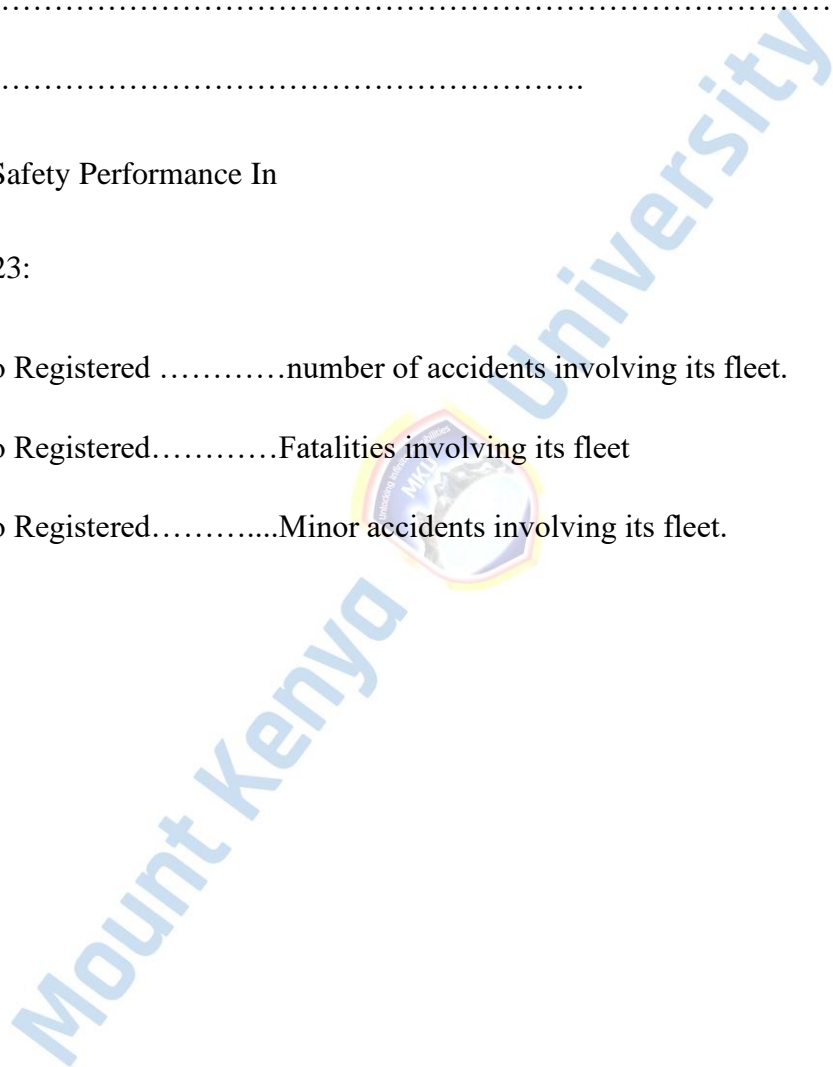
2. Describe the different training programs the Sacco has organized for its crew in the year 2022/2023.

.....
.....
.....

Section F: Road Safety Performance In

the year 2022/2023:

1. The Sacco Registerednumber of accidents involving its fleet.
2. The Sacco Registered.....Fatalities involving its fleet
3. The Sacco Registered.....Minor accidents involving its fleet.



APPENDIX I: CONSENT FORM

Dear Respondent,

This study seeks data for a study titled “TRANSPORT MANAGEMENT PRACTICES AND SAFETY PERFORMANCE OF PUBLIC TRANSPORT ORGANIZATIONS IN NAIROBI”

The study will there require you to respond to questions relating to the transport management practices employed in your organization; as well as the safety information concerning your organization.

The data collected will be treated with utmost confidentiality and will only be used for academic purpose only.

This is to therefore seek your consent for data collection; by signing the in the space provided below.

Respondent:Signature..... Date.....

APPENDIX II: NACOSTI LICENCE



REPUBLIC OF KENYA



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 363998

Date of Issue: 23/October/2024

RESEARCH LICENSE



This is to Certify that Mr. BISHAR MOHAMED ADAN of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: TRANSPORT MANAGEMENT PRACTICES AND SAFETY PERFORMANCE OF PUBLIC TRANSPORT ORGANIZATIONS IN NAIROBI for the period ending : 23/October/2025.

License No: NACOSTI/P/24/41374

363998

Applicant Identification Number

Walter Mb

Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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See overleaf for conditions

APPENDIX III: ETHICAL CERTIFICATE CLEARANCE



REF: MKU/ISERC/4441

Date: 25 September 2024

TO: BISHAR MOHAMED ADAN

REG: MPSM/2023/55583

Dear Sir/Madam,

RE: TRANSPORT MANAGEMENT PRACTICES AND SAFETY PERFORMANCE OF PUBLIC TRANSPORT ORGANIZATIONS IN NAIROBI

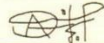
This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **3163**. The approval period is **25/09/2024 - 25/09/2025**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including informed consents, study instruments, MTA will be used
- ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
- vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,



Dr. Alfred Owino, PhD
Chairman, Mount Kenya University ISERC





APPENDIX IV: PLAGIARISM REPORT



Mohamed Bishar

Bishar Project.docx

- Thesis
- Master
- Mount Kenya University

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