MONITORING AND EVALUATION PRACTICES AND ROAD SAFETY DATA QUALITY IN AFRICA: A CASE OF SELECTED AFRICAN COUNTRIES

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DECLARATION

I declare that this thesis is my original work and that it has not been presented in any other university for any academic award.

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APPROVAL

This research was conducted under my supervision and is submitted with my approval as the university supervisor.

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ABSTRACT

Monitoring and Evaluation (M&E) in the context of road safety is a critical component of an overarching strategy aimed at reducing traffic incidents and improving road user safety. The problem of poor road safety data persists in Africa. Reliable data are indispensable for understanding the dynamics of road traffic crashes, formulating appropriate interventions, and evaluating the effectiveness of policies and programs. This study aimed to assess the influence of M&E practices on road safety data quality in Africa, focusing on seven selected African countries (Cameroon, Kenya, Lesotho, Burkina Faso, Uganda, Ghana, and Burundi). This study was guided by three specific research objectives: determining the influence of data collection on road safety data quality in Africa, establishing the influence of resource allocation on road safety data quality in Africa, and assessing the influence of M&E staff expertise on road safety data quality in Africa. To achieve the stated objectives, this study adopted a mixed-method descriptive research design using quantitative and qualitative approaches. The target population in this study comprised road safety agencies and ministries in the selected countries, such as the road safety lead agency, Police, Health, Transport, and road safety NGO. The study adopted a stratified purposive and convenience sampling technique through which the respondents were selected. A sample size of 129 individuals was derived from the target population (180) using stratified purposive and convenience sampling. A questionnaire survey with Likert-scale questions for quantitative data and open-ended questions for qualitative data was used for data collection from respondents. Quantitative data were analyzed through descriptive and inferential statistics using Excel and SmartPLS4, and the results are presented in tables and figures. Qualitative reports were analyzed thematically in line with the study objectives, and the results were presented in summary essay forms. The major findings based on the three objectives of this study were a statistically significant positive influence of data collection ($\beta = 0.462$, $p < 0.05$, $f^2 = 0.341$), resource allocation ($\beta = 0.258$, $p < 0.05$, $f^2 = 0.111$) and M&E staff expertise ($\beta = 0.224$, $p < 0.05$, $f^2 = 0.093$) on road safety data quality. This is supported by key qualitative results that point to underreporting, inconsistent data collection, outdated technology, limited resources, lack of standardization, and inadequate training and capacity building for M&E staff. As this study has shown a statistically significant positive relationship between M&E practices and road safety data quality in the selected African countries, a key recommendation is that future studies should investigate and develop a detailed M&E framework to guide African countries in improving road safety data quality. The framework should aim to guide road safety stakeholders not only in tailoring global road safety indicators to their country contexts, but also in practically monitoring and evaluating their road safety progress towards achieving set targets. Other recommendations have been made to improve the M&E practices (data collection, resource allocation, and M&E staff expertise) to boost the quality of road safety data in Africa.

DEDICATION

I would like to honor the Almighty God, who gave me knowledge, good health, and the strength to carry out this work successfully. I would also like to thank my loving family for their love, understanding, support, and encouragement to aim higher while conducting this study, and throughout my academic life.

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To my family, thank you for your endless love, prayer, and patience. Your belief in me has always been a source of inspiration and strength.

DEFINITION OF TERMS

Road safety data quality: This refers to the extent to which road safety data is accurate, reliable, and suitable for making informed decisions regarding road safety policies, practices, and interventions.

Monitoring and evaluation practices: In this study, M&E practices refer to the systematic process of tracking progress underpinned by data collection, resource allocation, and M&E staff expertise for quality improvement.

Data collection: In this study, data collection refers to the systematic process of gathering information relevant to all aspects of road safety, including traffic crashes, casualties, vehicle types, road conditions, driver behaviours, and road safety interventions. It includes validation, where data accuracy and reliability are confirmed, analysis to interpret the data, and derive actionable insights and report findings to relevant stakeholders for policy making and safety improvements.

Resource allocation: This refers to the process of strategically distributing available financial, human, and technical resources aimed at improving monitoring and evaluation to maximize efficiency.

M&E staff expertise: This includes qualifications, experience, and ongoing capacity-building essential for conducting M&E activities properly. Qualifications include formal education in relevant fields such as statistics, public administration, or program evaluation. Experience refers to practical involvement in various M&E roles, enhancing understanding and proficiency in real-world settings. Capacity building involves continuous professional development to keep pace with evolving M&E methodologies.

ABBREVIATIONS/ACRONYMS

AFDB	African Development Bank
AU	African Union
DC	Data Collection
DQ	Data Quality
ITF	International Transport Federation
M&E	Monitoring and Evaluation
MSE	M&E Staff Expertise
NGO	Non-Governmental Organization
NTSA	National Transport Safety Authority
PLS-SEM	Partial Least Squares Structural Equation Modeling
RA	Resource Allocation
SSATP	Sub Saharan Africa Transport Policy Program
ToC	Theory of Change
TQM	Total Quality Management
UNDP	United Nations Development Program
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This study examined the influence of monitoring and evaluation practices on the quality of road safety data in selected African countries, with a particular focus on data collection, resource allocation, and M&E staff expertise. This chapter provides the background, problem statement, research objectives and hypotheses, significance and scope of the study, and the limitations and conceptual framework of the study.

1.2 Background of the Study

Monitoring and Evaluation (M&E) in the context of road safety plays a crucial role in comprehensive approaches to decrease road traffic accidents (RTAs) and improve the safety of road users (WHO, 2023). These practices include efficient procedures to collect, analyze, and use data to assess the effectiveness of road safety initiatives and inform ongoing and planned road safety initiatives. These are crucial to ensuring that road safety interventions are effective, efficient, and adaptive to changing landscapes and emerging challenges. These practices provide the necessary feedback and insights to continuously improve road safety efforts, ultimately aiming to improve road safety outcomes. The objective of this research was to explore the effects of monitoring and evaluation practices on road safety data quality in Africa, a case of selected African countries. The countries were selected to include at least four of the five regions of Africa: Central, Eastern, Western, and Southern regions of Africa (Cameroon, Kenya, Burkina Faso, Ghana, Lesotho, Uganda, and Burundi). Three independent variables were central to this study: data collection, resource allocation, and M&E staff expertise.

1.2.1 Road Safety Data Quality in Africa

Road safety data quality is determined by its accuracy, reliability, and suitability for making critical decisions pertaining to road safety policies, practices, and interventions. Reliable data are indispensable for understanding the dynamics of road traffic accidents, formulating appropriate interventions, and evaluating the effectiveness of policies and programs (Martensen et al., 2021). All efforts to analyze accident trends, identify risk factors, and evaluate the effectiveness of implemented safety measures are underpinned by road safety data (WHO, 2023). The quality of road safety data can be assessed using a set of indicators, such as accuracy, completeness, timeliness, reliability, and validity.

Good quality road safety data are essential for effective road safety management. This is because it enables informed and timely decision making. Correct road safety decisions are made in the presence of high-quality road safety data. Data completeness captures all relevant incidents, providing a comprehensive understanding of safety issues. Data timeliness allows rapid response to emerging problems. Reliable data garner trust, which is crucial for sustaining support for safety initiatives, and validity ensures that interventions are appropriate for the road safety issues they aim to address. These data qualities are fundamental to the development, implementation, and evaluation of effective road safety policies and interventions to reduce road accidents and ensure road safety (ITF/OECD, 2022).

In many African countries, road safety data systems are either underdeveloped or poorly maintained, creating huge gaps in data quality (AfDB, 2013). Poor road safety data quality is a crucial issue that has hampered road safety improvements in Africa. It is widely acknowledged that monitoring and evaluation play a crucial role in enhancing the quality of road safety data, which in turn improves road safety outcomes (Bliss & Breen, 2009). Instituting systematic methods for data collection and analysis through rigorous M&E, road

safety data could be consistent and reliable across different regions. A structured approach allows for the identification and timely correction of data gaps, inaccuracies, and inconsistencies (Kusek & Rist, 2004). Additionally, the incorporation of feedback mechanisms within the M&E processes enables real-time improvements in data collection tools and methodologies, ensuring that the data are both relevant and of good quality. M&E practices facilitate a cycle of continuous improvement in road safety data management to ensure the quality of road safety data by ensuring that the data are collected systematically, analyzed accurately, and used effectively.

In Africa, the high rates of road traffic fatalities (19 fatalities per 100 thousand population) underscore the urgent need for road safety improvements (WHO, 2023). The World Health Organization (WHO) reports that despite having only 2% of the world's vehicles, Africa accounts for approximately 20% of global road traffic deaths, accentuating a critical public health issue (WHO, 2018). Effective M&E practices are essential for addressing these challenges, owing to their potential to generate quality road safety data that will inform road safety policies and guide safety interventions.

1.2.2 Monitoring and Evaluation (M&E) Practices

This study sought to determine the influence of monitoring and evaluation practices on road safety data quality in Africa, focusing on seven African countries. Monitoring and evaluation practices are at the core of efforts to enhance the quality of road safety data (Kelly & Reid, 2021). Through regular monitoring, stakeholders would identify discrepancies, gaps, or errors in data emanating from data collection processes. This often includes data inaccuracies, incomplete information, and delays in data entry (Thomas et al., 2018; Usami et al., 2020). By promptly addressing these issues, countries can ensure that road safety data are accurate and reflective of the current situation, thereby enhancing the quality and utility of the

information generated. M&E practices include several key aspects that collectively enhance data quality and by extension the effectiveness of road safety programs and interventions (El Khalai et al., 2023; Girma, 2021; Okello, 2021). These aspects include the systematic collection of data to continuously observe the progress of initiatives, use of specific indicators to measure performance against predefined objectives, and regular analysis and reporting of data to relevant stakeholders.

1.2.2.1 Data Collection

Data collection is a fundamental M&E practice that involves gathering accurate and timely information to assess whether projects or program objectives are being met. Therefore, monitoring and evaluation rely heavily on robust data collection to ensure that interventions effectively meet set targets (Okello, 2021). This practice includes several critical steps such as data validation, analysis, and reporting. The quality of the collected data in terms of accuracy, timeliness, and relevance is influenced by the quality of monitoring and evaluation. As noted by Thomas et al. (2018), robust data collection systems are essential for generating valid information for an effective program evaluation. Therefore, maintaining the quality of data through validation is a crucial M&E step. Validation ensures that the data accurately reflects reality, thus supporting the credibility of M&E. After validation, data is analyzed to elucidate insights on program performance. Subsequently, reporting is necessary for accountability and informed decision making. The integration of data collection, validation, analysis, and reporting in M&E not only bolsters the credibility and utility of evaluations but also ensures the efficient use of resources to achieve desired outcomes and inform future improvements (Biwott et al., 2017; El Khalai et al., 2023; Okello, 2021).

1.2.2.2 Resource Allocation

Resource allocation in M&E is an important aspect that influences the effectiveness and success of projects and programs (Mohan et al., 2020; Mwale et al., 2024; World Bank, 2020). Without financial, human, and technical resources, efficient M&E can hardly be achieved, as they are the backbone of any M&E system. Understanding how these resources impact M&E can help organizations optimize their interventions and achieve desired outcomes. The level of funding directly affects the scope and depth of M&E activities; the capabilities of M&E human resources influence the quality of M&E processes, while the availability of appropriate technology can greatly enhance the efficiency and accuracy of M&E activities (Mitullah et al., 2022; WHO, 2023). The World Bank (2020) emphasizes that sustainable funding structures are essential for maintaining effective M&E systems.

1.2.2.3 M&E Staff Expertise

The expertise of staff in M&E is a critical determinant of the quality of information generated through M&E practices within departments and agencies involved in road safety. The Police, health, and transport sectors generate significant road safety data, the quality of which is influenced by the expertise of M&E staff in these agencies (Okeowo, 2018; Segui-Gomez et al., 2021; SSATP, 2023). The qualifications, experience, and ongoing capacity building of M&E personnel determine how well they discharge their duties. M&E staff qualifications pertain to the formal education and training that they have received in the domain, which prepares them to perform M&E functions effectively. Experience in M&E adds practical knowledge and skills that complement formal qualifications. M&E staff capacity building ensures continuous professional development to keep pace with evolving M&E methodologies, technologies, and best practices. UNDP (2018) advocates regular training programs to enhance staff skills and keep them updated with the latest M&E methods and

technologies. Skillful M&E staff are indispensable in designing efficient data collection tools, conducting reliable data analysis, and interpreting results to inform strategic decision-making. However, a common challenge in Africa is the shortage of well-trained M&E personnel in the multi-sectoral domain of road safety. This is among the root causes of the poor road safety data quality in African countries.

1.3 Statement of the Problem

The quality of road safety data in Africa poses a great challenge to traffic management and road safety improvement initiatives (ITF/OECD, 2022; SSATP, 2021; WHO, 2010). This is because effective road safety management and intervention strategies critically hinge on the quality of road safety data. Quality road safety data are required to inform interventions to address the huge road safety burden in Africa, which is among the highest in the world (ITF/OECD, 2022; Mavromatis et al., 2018). Reliable data are the backbone of strategic planning, enabling policymakers and road safety officials to identify high-risk areas, understand the underlying causes of accidents, and design targeted interventions that can substantially reduce road traffic casualties (Segui-Gomez et al., 2021). Without accurate and comprehensive road safety data, efforts to improve road safety are often based on guesswork, rather than evidence, which can lead to ineffective or misdirected policies that fail to address the issues at hand. The Africa Status Report on Road Safety 2020 (2021) provides a comprehensive overview of the road safety situation in 26 African countries, emphasizing the problem of poor data quality and the need for improvement.

By implementing robust M&E practices, road safety stakeholders can ensure that the data collected are both accurate and relevant, improving data quality by addressing the challenges of underreporting prevalent in Africa (African Union, 2021). Systematic

enhancement of data quality is vital for creating reliable databases that stakeholders can use to make informed decisions. Ultimately, effective M&E practices are indispensable for overcoming the challenges of poor data quality and laying the groundwork for sustained road safety improvements in Africa. Despite ongoing efforts to enhance road safety, the problem of poor road safety data quality persists in Africa, significantly hindering effective policymaking and intervention strategies (Bhalla et al., 2014; Mitullah et al., 2022; SSATP, 2023). Studies have indicated that discrepancies in data collection methodologies and lack of standardization across different regions are major contributors to the unreliability of road safety data in Africa (Adeloye et al., 2016; Okeowo, 2018; Thomas et al., 2018). However, no study has assessed the influence of M&E practices on road safety data quality in Africa in terms of data collection, resource allocation, and M&E staff expertise. This gap in the literature was filled by this study, which aimed to establish the influence of M&E practices on road safety data quality in Africa, with a focus on seven African countries.

1.4 Objectives of the Study

1.4.1 General Objective of the Study

The general objective of this study was to determine the influence of monitoring and evaluation practices on road safety data quality in Africa, focusing on selected African countries.

1.4.2 Specific Objectives of the Study

The specific objectives of this study are as follows:

i) To determine the influence of data collection on road safety data quality in selected African countries.

ii) To assess the effect of resource allocation on road safety data quality in selected African countries.

ii) To examine the role of M&E staff expertise on road safety data quality in selected African countries.

1.5 Research Hypothesis

This study sought to test the following hypotheses.

i) **H_{01}**: There is no significant relationship between data collection and road safety data quality in the selected African countries

H_1: There is a significant relationship between data collection and road safety data quality in the selected African countries

ii) **H_{02}**: There is no significant relationship between resource allocation and road safety data quality in the selected African countries

H_2: There is a significant relationship between resource allocation and road safety data quality in the selected African countries

iii) **H_{03}**: There is no significant relationship between M&E staff expertise and road safety data quality in the selected African countries

H_{03}: There is a significant relationship between M&E staff expertise and road safety data quality in the selected African countries

1.6 Significance of the Study

The results of this study contribute as an eye-opener for African countries to re-examine the effectiveness of their M&E practices in data collection, resource allocation, and M&E staff expertise. This provides evidence to galvanize the political will to invest in strengthening existing M&E practices and systems, leading to improvements in road safety data quality. This

is a significant contribution, as improved data quality is fundamental to evidence-based interventions for road safety improvements in Africa. This research makes a substantial contribution by demonstrating with statistical evidence the influence of M&E practices (resource allocation, data collection, and M&E staff expertise) on the quality of road safety data in Africa, an area underrepresented in the literature. It also highlights the need for capacity building, advocating for enhanced training, and skill development among M&E personnel involved in road safety data management.

Additionally, this study provides a rationale for the standardization of data collection and reporting across African countries, which is vital for ensuring data consistency and enhancing international cooperation on road safety initiatives. Furthermore, this study has enriched the body of knowledge on road safety performance monitoring by offering insights and lessons applicable to most African countries with similar challenges.

1.7 Scope of the Study

This study focused on M&E practices that influence road safety data quality in Africa, specifically in the selected countries. The study was conducted in January, February, and March of 2025.

1.8. Delimitation of the Study

The study was delimited to seven selected countries (Cameroon, Kenya, Burkina Faso, Ghana, Lesotho, Uganda, and Burundi) with a sample size of approximately 124 respondents. The choice of these countries was rooted in their significant road safety challenges and M&E framework. They face high rates of RTCs, making accurate and reliable data critical for policy formulation and intervention. Some countries such as Burkina Faso, Ghana, and Kenya have standalone road safety lead agencies, namely the National Office of Road Safety, the National

Road Safety Authority, and the National Transport and Safety Authority, respectively, while the other countries' road safety lead agencies are embedded in the Ministry of Transport. Characterized by diverse road safety contexts and common challenges of data inaccuracies, incompleteness, and timeliness, these countries are emblematic of issues faced by many African countries, making them an ideal microcosm for understanding broader African road safety issues. Several M&E practices can be adopted by road safety data management agencies. However, this study focused on three practices: data collection, resource allocation, and M&E staff expertise.

1.9 Limitation of the study

A limitation of this study was that of uncooperative respondents at sensitive agencies, such as the police in some countries, such as Burkina Faso. This was mitigated by a high police response rate in one of the countries (Uganda) in which their support was solicited, coupled with their interest in the research findings, given its significance in resolving a problem that constitutes a public outcry. They were also informed that their responses were confidential and that they would be analyzed anonymously. Although a North African country was not included in the study, as initially planned, the perspectives from the four regions still provide valuable insights for the improvement of road safety data quality in Africa.

1.10 Assumptions of the study

The study assumed that the respondents would be honest and trustworthy in their response to the research instruments and would be available to respond to the research instruments in time. This study also assumed that M&E practices influence the quality of road safety data.

1.11 Theoretical review

The following theories anchored this study.

1.11.1 Theory of Change

The Theory of Change (ToC) was initially broadly disseminated by Weiss (1995), a proponent who emphasized the significance of making explicit the assumptions and causal pathways of programs, thereby laying the foundation for what is now widely known as the Theory of Change. This theory was propounded in the mid-1990s with substantial input from Carol Weiss, who discussed it extensively in her 1995 publication. The ToC is a comprehensive methodology used to plan, implement, and evaluate the effectiveness of intervention initiatives. It clearly lays out the outcomes that interventions aim to achieve and maps the pathways by which these results will be achieved (Stein & Valters, 2012; Vogel, 2012).

The ToC is rooted in several key assumptions. It assumes clear causal linkages between intervention activities and desired outcomes, ensuring that each step logically leads to the next one. It recognizes the critical role of contextual relevance, considering the social, economic, political, and cultural environments in which interventions are implemented. Active participation and support from all relevant stakeholders through engagement is indispensable. This theory also considers external factors, assuming that they will remain favorable and consistent. Additionally, it relies on the competency and capacity of the implementation staff to ensure that they possess necessary skills and knowledge.

In relation to the current study, the theory of change was used to articulate the expected linkages between improved M&E practices (inputs) and enhancements in data quality (outputs). This theory helps road safety researchers and practitioners visualize the interventions necessary to achieve desired outcomes (Dale et al., 2023). By mapping the constituent

elements, ToC facilitates a clear understanding of how specific M&E enhancements would lead to better data quality and, ultimately, more effective road safety measures. This theoretical approach is particularly useful for planning M&E activities and communicating to stakeholders how specific changes in practices are expected to improve road safety data quality in Africa. Despite its relevance to the study, the ToC has some critiques, who argue that it can oversimplify complex social processes and may be resource-intensive, requiring significant time and stakeholder engagement (James, 2011; Vogel, 2012). It also relies heavily on the assumption that, if flawed, it can undermine its effectiveness (Rogers, 2014).

1.11.2. Total Quality Management (TQM)

In the mid-20th century, Deming, Juran, Crosby, and Ishikawa developed the Total Quality Management (TQM) theory (Crosby, 1980; Deming, 2018; Ishikawa, 1985; Juran, 1989). These proponents contributed to the development of this theory, as Deming (2018) introduced statistical process control and the Plan-Do-Check-Act (PDCA) cycle. This emphasizes commitment to continuous improvement and management. Through the Juran Trilogy, Juran (1989) focused on the managerial aspects of quality which comprise quality planning, quality control, and quality improvement. Crosby (1980), through his famous phrase "quality is free" promoted the notion of "zero defects, " and posited that quality improvement is cost effective. Ishikawa (1985) developed practical tools such as the cause-and-effect diagram and promoted the involvement of all employees in quality circles. These proponents collectively shaped TQM theory, emphasizing continuous improvement, customer satisfaction, and the involvement of all organizational levels in quality enhancement.

The TQM theory assumes that quality is everyone's responsibility and requires the involvement of all stakeholders (Deming, 2018; Juran, 1989). Continuous improvement, is

central to TQM, emphasizing ongoing evaluation and enhancement of processes, products, and services (Ishikawa, 1985). It assumes that data-driven decision-making is fundamental, and that involving employees in decision-making processes leads to better quality improvements (Deming, 2018; Ishikawa, 1985). Despite its relevance to this study, critics have raised concerns about TQM theory. Vinni (2007) argued that TQM can be overly complex and bureaucratic, making it difficult to implement, particularly in resource-constrained environments. Aquilani et al (2017) argue that a comprehensive general model for a successful implementation of TQM theory does not yet exist.

In relation to this study, TQM's principles of continuous improvement and employee involvement can be applied to enhance the effectiveness of M&E practices. By focusing on continuous improvement, TQM encourages the iterative refinement of data collection methods, ensuring that road safety data become increasingly accurate and reliable over time (Deming, 2018). The customer focus principle aligns with the need to meet stakeholder expectations, such as those of policymakers and the public, who rely on high-quality data to make informed decisions (Kujala et al., 2022). Applying TQM in this study of M&E practices and road safety data quality involves ensuring that every step of data handling, from collection and storage to analysis and reporting, is subjected to rigorous quality checks and continuous enhancement. TQM fosters a culture of quality and systematic evaluation of processes, which can help identify inefficiencies and inaccuracies in data management workflows (Álvarez-Santos et al., 2018). This approach has been applied to road safety initiatives in Morroco, encouraging a proactive approach to problem-solving and innovation. Such an approach is crucial for responding to evolving road safety challenges (Ennajih et al., 2018).

1.12 Conceptual Framework

A conceptual framework functions as an analytical tool for organizing and structuring knowledge in research. This serves as a guide that delineates key variables and their connecting relationships, providing a logical perspective on how the variables interact within the scope of the research. Conceptual frameworks help researchers not only showcase their findings, but also systematically address their research objectives. The conceptual framework in this study depicts the relationship between dependent and independent variables. It portrays the relationships between variables in line with the research objectives.

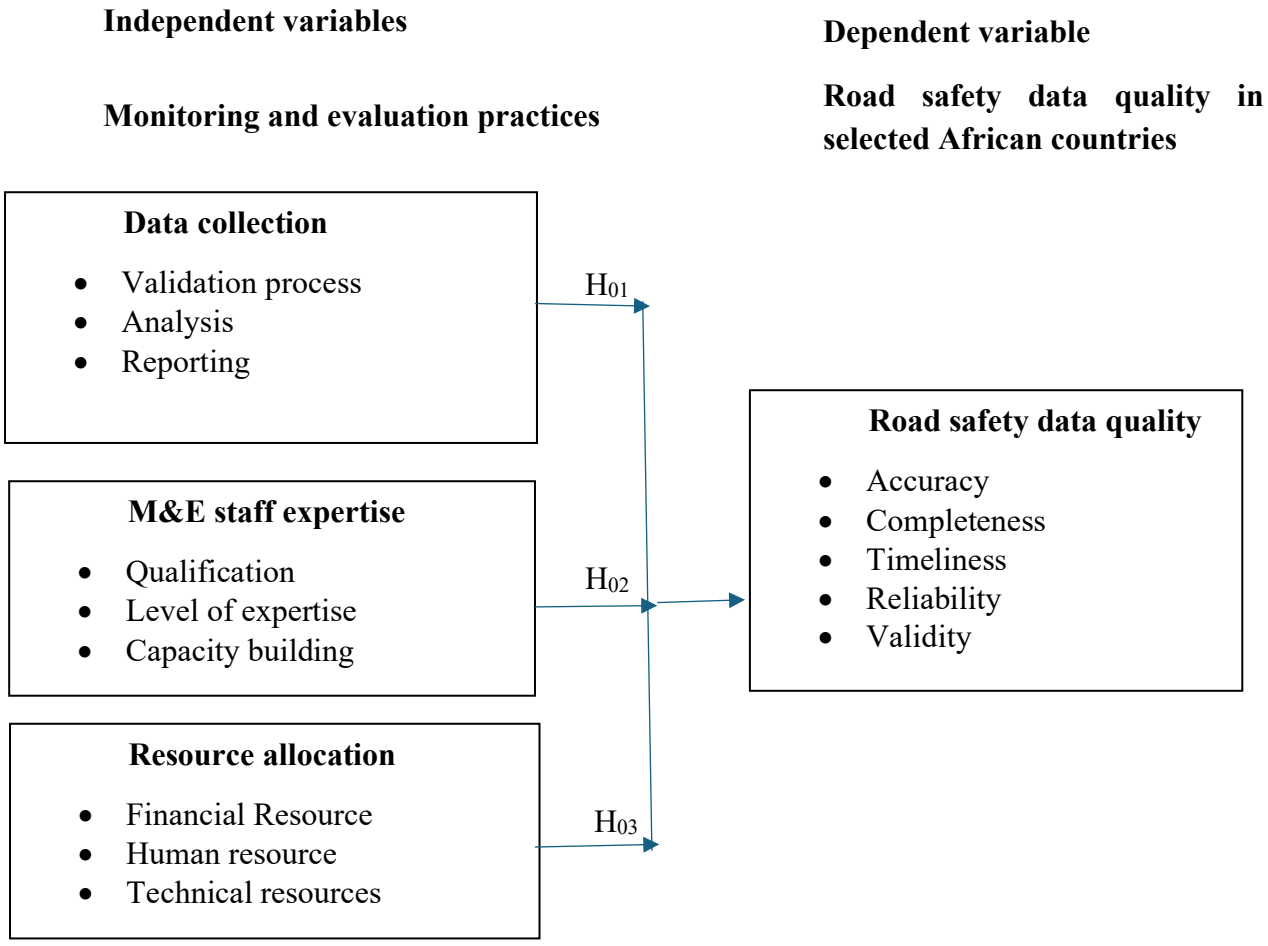

Figure1.1: Conceptual framework showing the independent and dependent variables

Source: (Researcher, 2025)

Figure1.1 shows a diagrammatic representation of the relationship between the independent and dependent variables. The arrows indicate the direction of influence and thus show the independent variables. The independent variables, including data collection, resource allocation, and M&E staff expertise, influence the dependent variable. The dependent variable was the road safety data quality in terms of accuracy, completeness, timeliness, reliability, and validity.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The quality of road safety data in Africa is crucial for the implementation of effective interventions and policies aimed at reducing traffic-related injuries and fatalities (Segui-Gomez et al., 2021). This chapter provides an examination of literature pertaining to monitoring and evaluation practices, and the quality of road safety data in Africa. It presents a comprehensive review of the relevant literature, with a focus on the objectives of the study, and identifies a gap in knowledge.

2.2 Empirical Review

This section summarizes and discusses recent studies and publications that focus on the strengths and limitations of M&E practices.

2.2.1 Road Safety Data Quality

The WHO Global Status Report on Road Safety (2023) shows that road safety data quality is a key factor influencing the effectiveness of road safety interventions and policies. This is because accurate identification of high-risk areas, understanding the causes of accidents, and evaluating the impact of safety measures cannot be achieved without good quality data. A study by the World Bank (2020) on road safety opportunities and challenges in low- and middle-income countries revealed that many African countries face significant challenges in maintaining reliable and comprehensive road-safety databases. The study also found that data collection often suffers from underreporting, inconsistencies, and a lack of standardization, which hamper efforts to improve road safety.

A scoping review by Sadeghi-Bazargani et al. (2022) on the assessment of data quality in road traffic injury (RTI) registries revealed four main themes and 14 sub-themes related to data quality in registry systems. The key topics included aspects of quality assessment (both individual and system-wide approaches), strategies to ensure data quality (through assurance and control measures), obstacles and remedies related to data quality attributes (including physical and human resources, guidelines, protocols, and training), and factors that hinder or improve data quality (including equipment, technology, workforce, organizational structure, management, support systems, infrastructure, and personal elements). These themes offer valuable perspectives for evaluating the quality of the information in road traffic injury databases. However, road safety data span injury data, fatality data, and safety performance indicator data that are derived from different databases whose quality is of great importance to road safety improvements.

Chokotho et al. (2013) evaluated the quality of RTI data in Western Cape Province, South Africa. They compared 2008 data from the South African Police Services (SAPS) with information from 18 provincial mortuaries and revealed significant issues in data quality. These issues include incomplete records, duplicate entries, and substantial underreporting of deaths caused by traffic accidents in police records. The police dataset showed inconsistent levels of incomplete data regarding variables related to demographics and identification. Notably, information on age was missing in approximately 50% of records. They concluded by emphasizing the need to improve data quality to inform road safety interventions. Similarly, Okeowo (2018) investigated the quality of data and the need for restructuring the accident report form at the Stellenbosch Traffic Department in South Africa. His methodology was guided by research questions focused on the simplicity and comprehensibility of the accident report form for users and the practicality of the information provided for understanding and

preventing road accidents. The study identified a high proportion of errors in accident report forms, primarily due to human inaccuracies caused by negligence in data processing. These errors were attributed to poorly executed training and validation processes and delays in information processing, leading to compromised data quality.

Bonnet et al. (2020) conducted a study on better data for better action in francophone West Africa and presented key findings on some road safety realities such as data collection and reliability issues, fragmented data sources, ministerial allegiances and lack of authority by road safety agencies over police forces who are responsible for initial data collection limiting their ability to ensure data quality and integration with health data. However, a description of their methodological approach for ascertaining their findings is lacking. Imprialou and Quddus (2019) conducted a comprehensive examination of the existing research on crash data quality in road safety studies. Their analysis revealed several significant issues, including errors in the reported location and timing of crashes, difficulties in linking data due to inconsistencies across databases, misclassification of crash severity, incomplete demographic information of victims, and inaccuracies in identifying the factors contributing to crashes. It is important to note that their study specifically focused on crash data, which are only a subset of road safety data.

Mwale et al. (2023) conducted a study on the completeness of road traffic mortality data in Zambia using a three-source capture recapture method. They analyzed data from the police, hospitals, and civil registration and vital statistics (CRVS) databases and estimated the completeness of data in these databases to be 19%, 11%, and 14%, respectively. Other indicators of data quality such as timeliness, accuracy, consistency, reliability, and validity were not assessed in this study. Poor data quality was also highlighted by Sohail et al. (2023), who conducted a systematic review of the literature from online databases on the topic "data-driven approaches for road safety." They characterized the data sources, collection equipment,

and analysis methodologies. The aspects of resource allocation and expertise of M&E staff were not the subjects of their study. Usami et al (2020) conducted a study on improving road safety knowledge in Africa through crowdsourcing. The study identified a significant demand for reliable road safety data and knowledge for decision making.

2.2.2 Data Collection and Road Safety Data Quality

A World Bank report on guidelines for conducting road safety data reviews indicates that effective data collection is crucial for improving road safety globally through the generation of good quality data to inform road safety interventions (Martensen et al., 2021). These guidelines address various aspects of the data collection process, such as accident investigations, reporting and registration, verifying thoroughness and coherence, archiving, and data accessibility. However, challenges persist in ensuring data quality owing to underreporting, data duplication, and missing information, which impedes accurate assessment and intervention (Ali et al., 2024; Nankunda & Evdorides, 2025). A study conducted by Taber et al. (2020) examined the effectiveness of traditional paper-based and modern digital methods for collecting road safety data in Mumbai, India. An observational study was conducted to compare the reliability, productivity, and efficiency of these two data collection approaches when monitoring various road user behaviors, including the use of helmets and seatbelts as well as instances of speeding. They found that, while paper-based data collection was initially more productive, the productivity gap narrowed over time, with significant improvements in the correlation between the methods. Digital data collection proved to be more time- and cost-effective overall, with datasets available nine days sooner and 7.73% cheaper owing to lower variable costs without compromising reliability or comparability.

Mehmood et al. (2019) conducted research comparing paper-based and digital methods for gathering data on road safety risk factors. Their investigation involved observing motorcycle passengers' helmet usage, 4-wheeler passengers' seat belt compliance, and instances of speeding in Ghana, Vietnam, and Indonesia through roadside monitoring. The findings revealed that the reported prevalence of road safety risk factors was similar across both data collection methods, indicating that digital data collection is a reliable alternative to traditional paper methods, although productivity may vary based on familiarity with the tools. Rabbani et al. (2022) reviewed road accident data collection systems in developing and developed countries in a comparative manner. They found that developing countries relied heavily on manual data collection methods, which are prone to inaccuracies and under-reporting owing to human error and lack of training. Developed countries use advanced digital systems that incorporate tools, such as GIS, CCTVs, and GPS, resulting in more accurate and comprehensive data.

Mavromatis et al. (2018) conducted a study on road safety data collection systems and definitions in Africa as part of the European Union funded SaferAfrica project. The study surveyed 29 road safety stakeholders from 21 African countries to assess the current road safety data collection systems and definitions. They found significant disparities in data collection practices despite the existence of formal systems for recording road accidents. They also found the existence of resource constraints that prevent the effective collection, management, and analysis of road-safety data. The stakeholders in the study expressed a high demand for data and knowledge to support road safety decision-making. Mwale et al. (2024) examined the methods and protocols for collecting road traffic fatality data in Zambia. Their investigation revealed several major obstacles, including underreporting, reliance on paper records, insufficient staff training, limited resources, inconsistent case definitions, and low death

registration rates. They recommended actions such as forming a multidisciplinary data analysis team, leveraging technology for data collection, enhancing training and capacity building, raising public awareness, and fostering collaboration among the police, hospitals, Civil Registration and Vital Statistics to improve the accuracy and completeness of RTC mortality data. The data collection processes and procedures reviewed were limited to crash mortality data collection and did not include road safety performance data.

Joseph et al (2023) examined the impact of M&E information on project success in teachers' colleges in Tanzania using Structural Equation Modeling (SEM) to test their hypotheses. The study's findings established that M&E information positively influences project success. Key factors contributing to this success include the availability of a clear data collection system, regular stakeholder meetings, community involvement in M&E, and the effective communication of information to team members. Their focus was on measuring the effect of M&E information on project success, in which they assessed the availability of a clear data collection system. Thambura et al. (2023) conducted a study on M&E data collection practices and performance of livelihood program at Caritas Meru, Kenya. They targeted smallholder farmer group leaders, project staff, and senior managers of Caritas Meru. Questionnaires, key informant interviews, and focus group discussions were used to collect data. The study found a positive correlation between M&E data collection and program performance.

2.2.3 Resource allocation and road safety data quality

Globally, resource allocation for road safety monitoring is recommended to generate good-quality data that will inform evidence-based road safety interventions. Abdolmanafi and Karamad (2019) researched a new approach to resource allocation for black spot treatment in

Iran. The study addressed the issue of resource allocation for road safety in Iran, which was based on expert opinions rather than network priorities. The researchers proposed a new methodology that optimizes the annual budget allocation by considering economic and social factors to prioritize accident-prone points. When applied to Iran's road network, the proposed method led to 15% higher benefits compared to the conventional method and resulted in 17% more safe points compared to existing methods. Road safety challenges in sub-Saharan Africa were investigated by Odonkor et al. (2020) in the case of Ghana. They emphasized the critical role of road safety in the socioeconomic development of Ghana and investigated the challenges impeding it. Through qualitative interviews with 97 road safety leaders, six key thematic challenges were identified: institutional, executional, managerial, operational, attitudinal, behavioural, research, and financial and investment challenges. They recommend that the challenges be addressed in a collaborative manner by the government and stakeholders.

In a study on traffic, training, and turnover, Lakshmi et al. (2021) examined the challenges faced by research staff in collecting road safety data. The researchers employed both quantitative and qualitative approaches to obtain primary and secondary data, while assessing the impact of road safety initiatives under the Bloomberg Philanthropies Global Road Safety Program in Hyderabad, India. Their findings revealed environmental, administrative, and operational difficulties as well as facilitators at individual, systemic, and technical levels that influenced road safety research. To improve the safety of data collectors, the authors suggest developing strong collaborations with various stakeholders, including research partners, administrators, and local communities. They also recommend enhancing data quality and optimizing systems, particularly in similar geopolitical contexts.

A research study by Abdi (2020) examined the impact of resource management practices on the performance of road infrastructure projects in Wajir County, Kenya. The researcher employed a descriptive survey approach to investigate how planning, scheduling, allocating, and monitoring resources influence the success of road projects in the region. The target population of this study comprised project stakeholders, including county Transport and Infrastructure Department officials, project managers, and members of project management committees involved in major county government road initiatives in Wajir. Using stratified random sampling, the researcher selected participants and gathered primary data through semi-structured questionnaires. The results indicate that resource planning, scheduling, allocation, and monitoring have a significant positive influence on project performance. Effective resource planning enables organizations to meet task specifications efficiently, whereas successful resource scheduling resolves issues related to resource availability and job efficiency. Efficient resource allocation allows project managers to effectively prepare and manage resources. Osuret et al. (2019) explored the state of pedestrian road safety in Uganda through a qualitative study of pedestrian safety interventions and the existing challenges in their design, implementation, monitoring, and evaluation. The findings revealed that while the National Road Safety Council and the Uganda Police are responsible for coordinating and enforcing pedestrian safety, the implementation of policies such as the Non-Motorized Transport policy is hindered by weak institutional capacity and limited resources.

The Role of M&E in the sustainability of road construction projects was investigated by Selestin (2018) in Bagamoyo District, Coast Region. A sample of 100 respondents was drawn from district officials from the Bagamoyo Works Department, village government members' road users, and project beneficiaries from whom data were collected. They assessed compliance with the procedures and guidelines, resource management, and time management.

The findings revealed that adherence to guidelines and procedures is crucial in M&E, and that there is a statistically significant positive relationship between resource requirements and resources used, as well as between time management and the sustainability of road construction projects. Chepng'eno and Kimutai (2021) conducted a study on integrated planning and resource allocation as project management skills on sustainability of road projects. They found that project planning plays a significant role in ensuring project sustainability. This was because budgetary estimates, inventory systems, and planning processes reduced waste, mismanagement, and corruption. Resource allocation (human, physical, and financial) has a significant positive influence on project sustainability. This situation does not differ in the domain of road safety data management, in which resource allocation as an M&E practice is alleged to have a positive effect on data quality. A study on the M&E process for road construction project performance in Somalia by Mohamed (2023) identified the factors that affect the M&E of road projects in Somalia National Highway Authority (SNHA). The population of roads with ongoing construction work was targeted, and simple random sampling was used to derive a sample of roads with ongoing construction work. Those involved in construction work on the sampled roads were respondents from whom data was collected through questionnaires. The study found that adequate resources ensure timely completion of construction projects together with competent project staff.

2.2.4 M&E staff expertise and road safety data quality

Globally, the effectiveness of road safety data systems depends not only on the tools and resources available but also on the expertise of the personnel managing these systems. The WHO Global Status Report on Road Safety (2018) points out that training personnel in data analysis and interpretation is essential for translating raw data into actionable insights that can guide policy and intervention strategies. Similarly, a study by the World Bank on guidelines

for conducting road safety data reviews raises the question of teams' capacity to conduct M&E for road safety indicators (Martensen et al., 2021). The knowledge and skills of M&E personnel are pivotal for ensuring that data collection, analysis, and use are conducted effectively (Segui-Gomez et al., 2021).

Mpofu et al. (2014) conducted a study on strengthening M&E and building sustainable health information systems in resource limited countries such as Botswana. The study aimed to improve M&E of health programs in Botswana by recruiting and training 51 recent university graduates as district M&E officers. Three years after recruitment and training, a qualitative assessment was conducted using in-depth interviews with national officers and focus group discussions with district M&E officers, district managers, and program coordinators. The assessment revealed improved data quality and management and increased use of health data for various purposes owing to the enhanced capacity of health workers to monitor and evaluate programs. This allowed nurses and health workers to focus on their clinical duties. As key lessons, they emphasized the need for clear role definitions, proper alignment of resources, stakeholder collaboration, and retention of new cadres. The study concluded by highlighting that creating a dedicated M&E cadre significantly improved the health information systems in Botswana.

Hailemichael (2021) studied the M&E practice in Ethiopian road projects, specifically federal road projects. The study assesses the M&E practices of the Ethiopian Roads Authority (ERA), noting that many of its projects suffer from significant time and cost overruns, as well as quality issues. Using questionnaires, key informant interviews, and authority records, data were collected from 150 participants involved in the project planning, implementation, monitoring, and evaluation. The study found that the M&E unit of the ERA operates with specific guidelines and manuals, but without a consistently applied M&E approach. It was also

found that M&E results are primarily used for decision-making, but communication gaps between key staff, management, and stakeholders hinder the effective dissemination of findings. The study identified challenges such as a lack of training and skilled personnel, communication issues, difficulties in using M&E tools, capability gaps, and poor ICT support. Based on the findings, the study recommended staffing the M&E unit with knowledgeable and skilled personnel, centralizing decentralized M&E roles, structuring mechanisms for data consistency, and implementing a clear M&E approach and communication plan to enhance the effectiveness of ERA's M&E practices.

Rubia and Kimaru (2022) studied the influence of M&E practices on the implementation of road construction projects in Kiambu County. Specifically, it investigated the impact of leadership in M&E on the implementation of road construction projects using a descriptive survey design. The findings indicate that various M&E practices are integral to the successful implementation of road projects in the county, emphasizing the critical role of leadership in planning, setting objectives, organizing projects, staffing, and controlling and monitoring activities. Khalaı et al. (2023) studied road safety performance monitoring practices through a review of the literature. Their research questions aimed to explore various aspects of road safety performance monitoring. That is, to identify the interest shown by journals and countries, recognize the frameworks or flagship projects implemented, identify commonly used data sources and the organizations providing them, identify the typical types of measures used in the field of road safety monitoring, and identify the road safety components that have generated the most interest among researchers. They conducted a prior analysis of the selected papers based on their geographical distribution, and it is interesting to note from their findings that studies were dispersed across 24 countries contributing to the field of road safety monitoring

research, and Africa was not among them. This indicates a scarcity of research in the field of road safety monitoring in Africa.

2.3 Literature Review Summary and Knowledge Gap

Based on the empirical studies examined, various researchers have proposed diverse factors that influence the quality of road safety data in Africa (Bonnet et al., 2020; Segui-Gomez et al., 2021; Thomas et al., 2018). They highlighted several factors affecting road safety data quality, such as under-reporting, weak coordination mechanisms, financial constraints, lack of standardized protocols, and poor data integration. An extensive review of the relevant literature revealed knowledge gaps regarding the impact of monitoring and evaluation practices. such as data collection, resource allocation, and M&E staff expertise on road safety data quality, which this study seeks to investigate.

There is a paucity of research on road safety monitoring and evaluation. This is depicted by Khalaı et al. (2023), who conducted a comprehensive review of the literature on road safety performance monitoring practices and obtained published studies on the topic conducted in 24 countries, with none in Africa. This shows a huge research gap regarding road safety monitoring and evaluation in Africa. Previous research has assessed the influence of M&E practices, such as planning, leadership in M&E processes, M&E systems, and frameworks, without delving into the M&E practices considered in this study (Chepng'eno & Kimutai, 2021; Mpofu et al., 2014; Rubia & Kimaru, 2022).

In addition, the influence of M&E practices has been researched elaborately on the performance of projects and programs in Kenya (Njiru & Thoronjo, 2023; Wairimu & Doreen, 2022; Wambua, 2019). Very few studies have examined the influence of M&E practices on the performance of road safety variables, such as the performance of road construction projects in

Kenya, Somalia, and Tanzania (Mohamed, 2023; Rubia & Kimaru, 2022; Selestin, 2018). No study has assessed the influence of M&E practices on road safety data quality, which was the focus of this study. This is a significant contribution of this study in filling this gap. By addressing these gaps, this research has contributed to enhancing the knowledge on road safety data quality in Africa, providing actionable insights and recommendations to improve M&E practices for improving road safety data quality. This will ultimately aid in the development of more effective road safety policies and interventions, leading to a decrease in road traffic injuries and fatalities in Africa.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section outlines the methodology used in this study. This includes the study design, target population, sampling technique, sample size, data collection instruments, and data analysis methods.

3.2 Research Design

A research design serves as a comprehensive blueprint that delineates the methods for collecting and analyzing data in a research study. This structured approach ensures the methodological integrity of the research and guarantees that the results obtained are both reliable and valid (Swarooprani, 2022). This study employed a descriptive design that combined quantitative and qualitative methods to thoroughly evaluate the influence of monitoring and evaluation practices on the quality of road safety data in selected African countries. The selection of this approach was guided by the study's research objectives and type of data required to address the research problem. Opoku et al. (2016) argued that integrating aspects of qualitative and quantitative research methodologies can maximize the advantages of each approach while reducing their respective limitations. It provides a more comprehensive understanding of research problems by converging numerical data with narrative data. A questionnaire with structured Likert scale questions was developed and used for the survey, alongside open-ended questions for qualitative data collection from respondents to prop deeper into the issues of M&E practices and road safety data quality in the selected countries. RSLAs bear the responsibility of road safety M&E in their respective countries. Therefore, respondents for the open-ended questions were purposively drawn from there.

3.3 Research Site

The research was intended to be carried out in five selected African countries, involving a country from all five regions of Africa. These included Cameroon (Central Africa), Kenya (East Africa), South Africa (Southern Africa), Burkina Faso (West Africa), and Tunisia (North Africa). Owing to logistical and administrative constraints, data collection from South Africa and Tunisia was not possible. Consequently, South Africa was substituted with Lesotho, another country in southern Africa, while Tunisia was not replaced by a North African country. Consequently, Uganda, Burundi, and Ghana were incorporated into this study to achieve an optimal sample size. These countries with similar road safety contexts and data quality challenges were conveniently selected owing to the presence of road safety stakeholders across various strata who were willing to participate and provided responses to the questionnaire. As a result, seven African countries (Cameroon, Kenya, Lesotho, Burkina Faso, Uganda, Ghana, and Burundi) were included in the study.

3.4 Target Population

The study's target population was drawn from several key groups within road safety data management and road safety monitoring and evaluation sectors across the seven selected African countries. Each group plays a critical role in the collection, management, and use of road safety data, and their insights were crucial for understanding the influence of existing M&E practices on the road safety data quality in these countries. The specific target population groups included road safety authorities and agencies such as Police, Health, Transport, road safety lead agencies, and road safety non-governmental organizations (NGOs).

Road safety authorities and agencies are directly involved in the execution of road safety programs, data collection, and evaluation processes. Road safety NGOs include

organizations advocating road safety improvements and supporting victims of road traffic crashes. They often conduct independent monitoring and evaluations and can offer alternative insights into road safety data quality issues as well as M&E practices of data collection, resource allocation, and M&E staff expertise. Transport professionals involved in road design, traffic management systems, and safety audits provided information on data quality issues through their data application practices, which was vital for understanding how M&E practices influence road safety data quality. These target population groups, as characterized by Cooper and Schindler (2013), constitute people with the desired information capable of responding to the measurement questions. Initially 140 persons were targeted from five countries, but with an addition of two other African countries making a total of seven countries, 180 people were targeted as the researcher consolidated representatives from the target population groups as illustrated in Table 3.1. The target population provided a reliable framework in which the validity of the study was anchored.

Table 3.1:Target Population Distribution Table

Population category	**Target population**	**Percentage**
RSLA Kenya	7	3.89%
RSLA Ghana	7	3.89%
RSLA Burkina Faso	7	3.89%
Police Kenya	8	4.45%
Police Burundi	8	4.45%
Police Uganda	8	4.45%
Police Cameroon	8	4.45%
Health Cameroon (EMS)	7	3.89%
Health Uganda (EMS)	7	3.89%
Health Burundi (EMS)	7	3.89%
Health Kenya (EMS)	7	3.89%
Transport Kenya	9	5%
Transport Cameroon	9	5%
Transport Lesotho	9	5%
Transport Uganda	9	5%
Transport Ghana	9	5%
Transport Burkina Faso	9	5%
Transport Burundi	9	5%
Road safety NGO Cameroon	9	5%
Road safety NGO Burkina Faso	9	5%
Road safety NGO Uganda	9	5%
Road safety NGO Burundi	9	5%
	180	**100%**

Source: Researcher, 2025

3.5 Study Sample

3.5.1 Sampling Procedure

Mujere (2016) defined a sample as a group of people, objects, or items drawn from a larger population. Sampling is the technique used to select a sample from a target population to be studied (Bhardwaj, 2019). In this study, a combination of stratified purposive and convenience sampling was used. Stratified sampling enhances the efficiency and accuracy of sampling by dividing the population into homogeneous subgroups (strata), as shown in Table 3.1. This ensured the inclusion of relevant subgroups in the sample, which would otherwise have been omitted by other sampling methods because of their small population size.

According to Campbell et al. (2020), purposive sampling improves methodological rigour and trustworthiness in qualitative studies by aligning with aims and objectives and fostering credibility, transferability, dependability, and confirmability. Convenience sampling is also used to supplement purposive sampling by including readily accessible respondents from each population group (strata). Respondents were selected from the road transport sector in all seven countries using stratified, purposive, and convenience sampling, because of the sector's strategic importance for road safety. The RSLA in four of the selected countries (Cameroon, Lesotho, Uganda, and Burundi) were part of the Ministry of Transport. In countries with standalone RSLAs, such as Kenya, Burkina Faso, and Ghana, respondents were also chosen from the RSLAs. Additionally, study participants were selected from the health sector (EMS) in four countries, police departments in four countries, and road safety NGOs in four countries, as outlined in Table 3.1.

3.5.2 Study Sample Size

The sample size refers to the number of participants or observations included in the study. Yamane's formula was used to determine the sample size of the respondents. This formula is used to determine the optimal sample sizes for both continuous and categorical variables at all confidence levels in survey research (Adam, 2020). It is applicable in situations in which the target population is either small or large. To determine the sample size (n), we used the population size (N) and margin of error as the input variables.

In a road safety study in Africa, Adeloye et al. (2016) applied a confidence level of 95% and 5% margin of error. Given a target population of 180 individuals, the sample size was calculated as follows.

$$n = \frac{N}{1 + Ne^2}$$

n = Samples size

N = Target population size

e = Margin of error (5%)

$$n = \frac{180}{1 + (180 * 0.05^2)}$$

$$n = 124$$

The sample size in this study was 124.

Table 3.2: Sample Population

Population category	Target population	Sample population	Percentage
RSLA Kenya	7	5	4.03%
RSLA Ghana	7	5	4.03%
RSLA Burkina Faso	7	5	4.03%
Police Kenya	8	5	4.03%
Police Burundi	8	5	4.03%
Police Uganda	8	5	4.03%
Police Cameroon	8	5	4.03%
Health Cameroon (EMS)	7	5	4.03%
Health Uganda (EMS)	7	5	4.03%
Health Burundi (EMS)	7	5	4.03%
Health Kenya (EMS)	7	5	4.03%
Transport Kenya	9	7	5.65%
Transport Cameroon	9	7	5.65%
Transport Lesotho	9	7	5.65%
Transport Uganda	9	7	5.65%
Transport Ghana	9	7	5.65%
Transport Burkina Faso	9	7	5.65%
Transport Burundi	9	7	5.65%
Road safety NGO Cameroon	9	5	5.65%
Road safety NGO Burkina Faso	9	5	5.65%
Road safety NGO Uganda	9	5	5.65%
Road safety NGO Burundi	9	5	5.65%
Total	**180**	**124**	**100%**

Source: Researcher, 2025

3.6 Data Collection

3.6.1 Data Collection Instruments

Data was collected using structured questionnaires with Likert scale questions for each study variable. Structured questionnaires are characterized by questions accompanied by predefined response options that respondents choose to best describe their situation (Kumar, 2018). Likert-scale questions were used in which statements reflecting the variables were formulated and respondents were asked to indicate their degree of agreement with the statements. Likert scales are often used in surveys to capture a more balanced view of the respondents' opinions. Westland (2022) indicated that information loss is characteristic of similar survey responses. This aspect was mitigated in this research, as qualitative data were collected through open-ended questions with purposively selected respondents who were sufficiently knowledgeable to provide the required information on the subject.

3.6.2 Pilot Testing of Research Instrument

To evaluate the clarity and content of the structured questionnaire, a pilot study was conducted. It tested how respondents understood the questions. Participants for the pilot study were purposively selected from Cameroon and Kenya from all the strata (RSLA, Police, Transport, health, and NGO) considered within the countries, approximately 10 respondents, five from each country. This aligns with Cooper and Schindler's (2013) rule of thumb, which suggests that 5% of the sample size should participate in the pilot study. They were contacted via email for a virtual pilot test on the research instrument. The findings from the pilot study were used to refine the questionnaire, eliminating all ambiguities, to ensure a coherent understanding of the questions from the respondents.

3.6.3 Instrument Reliability

Instrument reliability refers to the extent to which a research instrument yields consistent results after repeated trials (Creswell & Creswell, 2018). This indicates the consistency of the instrument. Internal consistency reliability analysis was performed using Cronbach's alpha. This was performed to assess the internal consistency and reliability of the questionnaire items. The items consistently measured the same construct. A Cronbach's alpha value of 0.70 is often considered the minimum threshold for demonstrating satisfactory reliability (Gliem & Gliem, 2003). In this study, Cronbach's alpha values were above 0.70 (see Table 4.1) and considered good, indicating that the scale reliably measured the construct it was supposed to measure.

Table 4.1: Cronbach's alpha for research variables

Variables	Cronbach's alpha	No of Items
Data Collection	0.873	9
Road Safety Data Quality	0.898	10
Resource Allocation	0.864	9
M&E Staff Expertise	0.91	8

3.6.4. Instrument validity

Instrument validity refers to an instrument's efficiency in measuring what it was intended to measure (Creswell & Creswell, 2018). In other words, it is related to the accuracy. The content validity of the research instrument was assessed during a virtual pilot study with road safety experts, who were potential study respondents in a panel discussion. They reviewed the data collection instrument to determine if it fully represented the concepts being measured and provided valuable feedback that was used to fine-tune the research instrument. This established the validity of the data-collection instrument (Souza et al., 2017). Specifically,

content validity, which was crucial for this study, assesses whether the items on the instrument reflect all facets of the construct in question (Alexandre & Coluci, 2011). A direct correspondence between the objectives of the study and the survey questions was established during the pilot. The expertise of the participants in the pilot test was used to fine-tune the questionnaire, as there were some issues of inconsistency that were flagged and addressed.

3.6.5 Data Collection Procedures

After the research proposal was approved by the Africa Nazarene University, to collect data, the researcher sought a license from NACOSTI that was granted. Using the university's authorization letter and permission from NACOSTI, the researcher commenced data collection after seeking permission from the road safety authorities and agencies in the selected African countries. An online survey was designed using Google Forms and distributed to study participants identified through key road safety contacts in the road safety sectors of the seven countries. The data collection instrument consisted of structured Likert scale questions for quantitative data and open-ended questions for qualitative data. The questionnaire was designed, translated into French, and administered in both English and French for ease of comprehension of the identified respondents via email and WhatsApp.

3.7 Data Processing and Analysis

Quantitative data was analyzed using descriptive and inferential statistics in Excel and Smart PLS 4 software. SmartPLS is a software tool used for Partial Least Squares Structural Equation Modeling (PLS-SEM), which enables the analysis of relationships between observed and latent variables in datasets (Ringle et al., 2023). The characteristic countries and road safety sectors of the respondents were summarized in Excel and presented using tables and figures. Inferential statistics were conducted using SmartPLS 4 in line with the research objectives to

test the research hypotheses. A confidence level of 95% and a 5% margin of error were used. Therefore, associations and relationships (p-value $\leq$ 0.05) were considered statistically significant, but relationships with a p-value > 0.05 were considered statistically insignificant. A simple linear regression model in the following format was used to test the hypotheses:

$Y = \beta_0 + \beta_x X_c + e$

Where:

Y = road safety data quality in selected African countries

β_0 = Constant and e = error value

β_x = Coefficient for data collection, resource allocation and M&E staff expertise

X_c = data collection, resource allocation and M&E staff expertise.

Model: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$

where: Y is road safety data quality, X_1 is data collection, X_2 is resource allocation, X_3 is M&E staff expertise, β_0 is Constant, β_1, β_2, and β_3, are beta coefficients for X_1, X_2, and X_3 respectively and e is error value

3.8 Legal and Ethical Considerations

This research followed the guidelines set by Africa Nazarene University (ANU). All rules related to conducting research were strictly adhered to. Informed consent was obtained from all the participants prior to data collection. Respecting confidentiality and privacy was crucial, and respondents' rights to both were maintained. The researcher conducted the study with honesty and integrity.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1. Introduction

This section provides an analysis of the data using descriptive and inferential statistics. The findings of this study are summarized and presented in tables and figures, and their implications are discussed.

4.2. Response Rate

This study targeted a population of 180 individuals with an anticipated sample size of 124. To mitigate bureaucratic challenges and enhance the response rate, questionnaires were distributed via email and WhatsApp to 200 road safety stakeholders in seven countries. This approach yielded 129 responses, surpassing the initial estimate of 124 outlined in Chapter 3, resulting in a response rate of 64.5 %. An increased sample size of 129 was beneficial for this study.

4.3. Demographic Characteristics

This section presents the demographic characteristics of the participants. The distribution of respondents was organized and presented by country and sector. A description of the professional level and experience of the respondents was also presented.

4.3.1 Distribution of Respondents by Country and Sector

Of the total number of respondents in the study, the highest percentage was from Uganda (22.5%), while the lowest percentage (3.1%) was from Ghana (see Table 4.2). The respondents were all included in the study because the analysis was not country-specific.

Table 4.2: Respondents by country

Country	Respondents	Percentage
Uganda	29	22.5
Cameroon	28	21.7
Burundi	24	18.6
Kenya	22	17.1
Burkina Faso	16	12.4
Lesotho	6	4.7
Ghana	4	3.1
	129	100

Source: Researcher, 2025

In terms of respondents per sector per country, the Police in Uganda responded the most (9.3%) compared to the other sectors in all the selected countries, as shown in Table 4.3.

Table 4.3: Respondents per sector per country

Countries	Sectors	Respondents	Percentage
Uganda		29	22.5%
	Police	12	9.3%
	Transport	6	4.7%
	NGO	6	4.7%
	EMS	5	3.9%
Cameroon		28	21.7%
	NGO	10	7.8%
	EMS	8	6.2%
	Transport	7	5.4%
	Police	3	2.3%
Burundi		24	18.6%
	NGO	7	5.4%
	Transport	6	4.7%
	Police	6	4.7%
	EMS	5	3.9%
Kenya		22	17.1%
	Transport	8	6.2%
	RSLA	6	4.7%
	Police	6	4.7%
	EMS	2	1.6%
Burkina Faso		16	12.4%
	NGO	8	6.2%
	Transport	5	3.9%
	RSLA	3	2.3%
Lesotho		6	4.7%
	Transport	6	4.7%
Ghana		4	3.1%
	Transport	2	1.6%
	RSLA	2	1.6%
Grand Total		129	100.0%

Source: Researcher, 2025

4.3.2. Description of Professional Level and Experience of Respondents

The respondents from the Emergency Medical Services Department of the Ministry of Health comprised a diverse group of professionals, including EMS researchers, data managers, road safety focal officers, commissioners of emergency medical services, M&E specialists, principal medical officers, and general hospital directors. Emergency medical doctors, marketing specialists in first-aid training, epidemiologists, emergency nurses, and senior deputy directors of medical services were also involved. Respondents from the Ministry of Transport included various key personnel such as road safety officers, research officers, chief engineers, directors of road transport, principal accident investigators, urban transport planners, deputy directors for environmental and social safeguards, deputy directors for highway safety, chef of service for urban transport, occupational safety experts, environmental health and safety specialists, senior inspectors of vehicles, senior road safety officers, general directors of studies and sectoral statistics, and directors of urban transport planning.

The respondents from road safety lead agencies included managers, strategy and planning officers, deputy directors of corporate research strategy and planning, road safety lead agency directors, heads of statistics departments, heads of public investment and business development, senior research managers, monitoring and evaluation officers, and program officers for safety programs within the directorate of road safety and road safety officers. Police respondents included administrators, deputy traffic commanders, regional traffic officers, traffic police officers, traffic controllers, chief aviation security officers, road traffic regulation agents, supervisors, traffic wardens, police inspectors, directors of national urgent operation centers, public relations officers, community liaison officers, traffic data collectors, and heads of service in charge of prevention. Respondents from the NGO sector across the selected African countries included executive presidents, occupational health and safety officers,

executive directors, general secretaries, sensitization agents, NGO treasurers, communication specialists, operation managers, statisticians, independent consultants, NGO journalists, and country coordinators. This shows that respondents from all the road safety sectors of the selected countries had the required professional level and experience to adequately respond to the questionnaire.

4.4. Data Analysis and Presentation of Results (Descriptive Statistics)

The objective of this study was to assess the influence of M&E practices (data collection, resource allocation and M&E staff expertise) on road safety data quality in Africa: case of selected African countries. Statements reflecting the variables were presented and the study participants were required to rate the extent to which they agreed or disagreed with the statements regarding the independent and dependent variables of the study on a scale of [1] Strongly Disagree, [2] disagree, [3] neutral, [4] agree, and [5] Strongly Agree. Data was collected from 129 respondents, cleaned in excel and questionnaire responses were summarized using Excel and Smart PLS 4 and the results are presented.

Table 4.4: Descriptive analysis

Items	Missing	Mean	Median	Scale min	Scale max	Standard deviation
DC1	0	3.256	3	1	5	1.259
DC2	0	3.000	3	1	5	1.264
DC3	0	3.202	3	1	5	1.241
DC4	0	2.86	3	1	5	1.244
DC5	0	3.078	3	1	5	1.23
DC6	0	2.822	3	1	5	1.349
DC7	0	3.426	4	1	5	1.262
DC8	0	3.101	3	1	5	1.287
DC9	0	3.55	4	1	5	1.239
RA1	0	2.279	2	1	5	1.161
RA2	0	2.264	2	1	5	1.089
RA3	0	2.318	2	1	5	1.056
RA4	0	3.000	3	1	5	1.294
RA5	0	2.636	3	1	5	1.276
RA6	0	2.302	2	1	5	1.104
RA7	0	2.488	2	1	5	1.162
RA8	0	2.419	2	1	5	1.054
RA9	0	2.628	3	1	5	1.148
MSE1	0	3.279	3	1	5	1.201
MSE2	0	3.031	3	1	5	1.226
MSE3	0	3.078	3	1	5	1.145
MSE4	0	3.109	3	1	5	1.156
MSE5	0	3.070	3	1	5	1.149
MSE6	0	2.884	3	1	5	1.139
MSE7	0	3.155	3	1	5	1.314
MSE8	0	2.682	3	1	5	1.168
DQ1	0	3.271	3	1	5	1.173
DQ2	0	3.682	4	1	5	1.056
DQ3	0	2.752	3	1	5	1.148
DQ4	0	3.093	3	1	5	1.103
DQ5	0	2.736	3	1	5	1.267
DQ6	0	2.403	2	1	5	1.089
DQ7	0	3.062	3	1	5	1.166
DQ8	0	3.093	3	1	5	1.151
DQ9	0	2.667	3	1	5	1.074
DQ10	0	2.977	3	1	5	1.236

As shown in Table 4.3, the four variables (data collection (DC), resource allocation (RA), M&E staff expertise (MSE), and road safety data quality (DQ)) were measured by nine, nine, eight, and ten statements (indicators), respectively. A higher percentage of agreement (agree and strongly agree) with the statements would indicate a better measure/performance of the construct (variable) measured, while a lower percentage of agreement (agree and strongly agree) with the statements would indicate a weak measure/performance of the variable. The initial data description showed that all constructs had zero missing values, mean values ranged from 2.264 to 3.682, medians ranged from 2 to 4, minimum values were 1, maximum values were 5, and standard deviations ranged from 1.054 to 1.349. The summary descriptive statistics illustrate the extent to which the respondents agreed or disagreed with the statements on road safety "data collection," "resource allocation," "M&E staff expertise" and "road safety data quality" respectively in their countries. This provides clues on how the independent variables (data collection, resource allocation, and M&E staff expertise) affect the dependent variable (road safety data quality) in these countries.

4.4.1 Results of the Influence of Data Collection on Road Safety Data Quality in the Selected African Countries

Examining questionnaire responses on "data collection," two statements that received the highest agreement (strongly agree and agree) with 60% and 57% agreement (agree and strongly agree) were "Data analysis findings are regularly communicated to policymakers" and "interagency collaboration on road safety data analysis exist." In contrast, key data collection practices such as "systematically resolving data inconsistencies", "consistently applying data cleaning procedures", and "existence of rigorous data check procedures" received the least agreement (strongly agree and agree) of 34%, 35%, and 39%, respectively, from respondents,

as shown in Figure 4.1. This result reveals the weaknesses of road safety data collection in these countries, as there was less than 40% agreement from the respondents on the three key statements mentioned. Correspondingly, this influences the quality of road safety data in these countries.

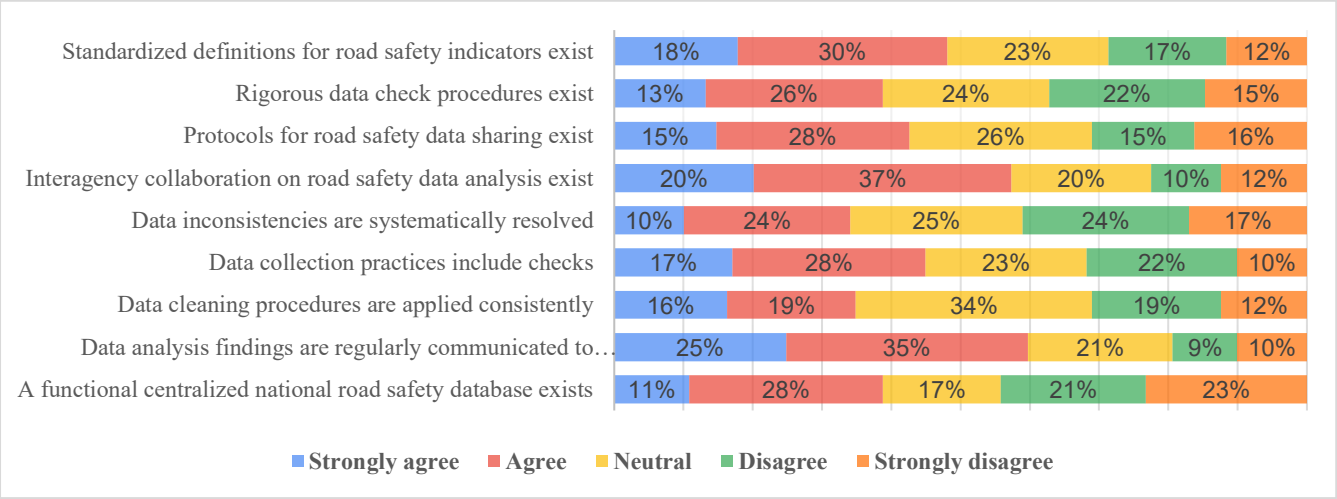

Figure 4.1: Questionnaire Responses on "Data Collection"

Only 44% agreement (strongly agree and agree) was recorded for all statements for data collection in all countries (see Figure 4.5). This reveals the underperformance of the countries in this aspect, as reported by the respondents, and its consequential influence on the road safety data quality in the countries.

Table 4. 5: Percentage of agreements for data collection statements

Statements (Data Collection)	**SA/A (%)**	**N (%)**	**SD/D (%)**
DC1. Standardized definitions for road safety indicators exist	48	23	29
DC2. Rigorous data check procedures exist	39	24	37
DC3. Data collection practices include checks	45	23	32
DC4. Data inconsistencies are systematically resolved	34	25	41
DC5. Data cleaning procedures are applied consistently	35	34	31
DC6. A functional centralized national road safety database exists	39	17	44
DC7. Interagency collaboration on road safety data analysis exists	57	20	22
DC8. Protocols for road safety data sharing exist	43	26	31
DC9.Data analysis findings are regularly communicated to policymakers.	60	21	19
Average	**44**	**24**	**32**

4.4.2 Results of the Influence of Resource Allocation on Road Safety Data Quality in the Selected African Countries

Regarding resource allocation for road safety, a very low proportion of respondents agreed (strongly agree and agree) with most of the statements. Only 13% of respondents agreed (strongly agree and agree) that "adequate financial resources are allocated," 15% agreed (strongly agree and agree) that "funding sources for road safety M&E are sustainable," and 13% agreed (strongly agree and agree) that "funding resource arrangements are flexible." The results revealed the challenging nature of road safety resource allocation in these countries, pointing to its influence on the quality of road safety data.

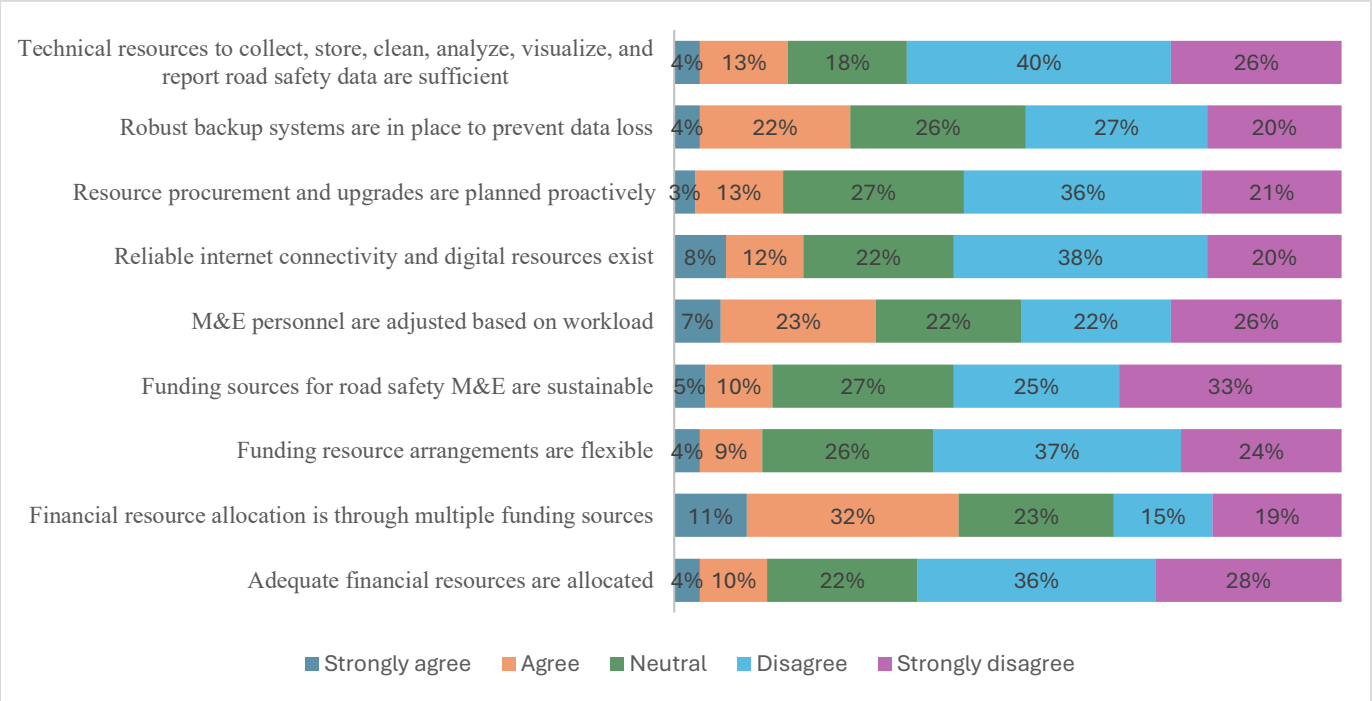

Figure 4.2: Questionnaire Responses on Resource Allocation

For all countries, only 22% agreement (agree and strongly agree) was made on average for statements on resource allocation (see Table 4.6). This low percentage confirms the challenges of resource allocation, which hampers the road safety data quality in these countries.

Table 4.6: Percentage of agreements for resource allocation statements

Statements (Resource Allocation)	SA/A (%)	N (%)	SD/D (%)
RA1. Funding sources for road safety M&E are sustainable	15	27	58
RA2. Adequate financial resources are allocated	14	22	64
RA3. Funding resource arrangements are flexible	13	26	61
RA4. Financial resource allocation is through multiple funding sources	43	23	34
RA5. M&E personnel are adjusted based on workload	30	22	48
RA6. Technical resources to collect, store, clean, analyze, visualize, and report road safety data are sufficient.	17	18	65
RA7. Reliable internet connectivity and digital resources exist	19	22	58
RA8. Resource procurement and upgrades are planned proactively.	16	27	57
RA9. Robust backup systems are in place to prevent data loss	26	26	47
Average	**22**	**24**	**55**

4.4.3 Results of the Influence of M&E Staff Expertise on Road Safety Data Quality in the Selected African Countries

Regarding M&E staff expertise, less than 50% of the respondents agreed (strongly agree and agree) to the statements. The highest proportion of agreement (strongly agree and agree) was 48% agreement (strongly agree and agree) that "M&E staff have the necessary academic qualifications relevant to the field". Meanwhile only 28% agreement (strongly agree and agree) was exhibited for the statement that "capacity building programs for continuous professional development is available for M&E staff". Less than 50% agreement (strongly agree and agree) was made for all statements on M&E staff expertise, showing the weakness of M&E staff expertise in the countries and its influence on the quality of road safety data generated.

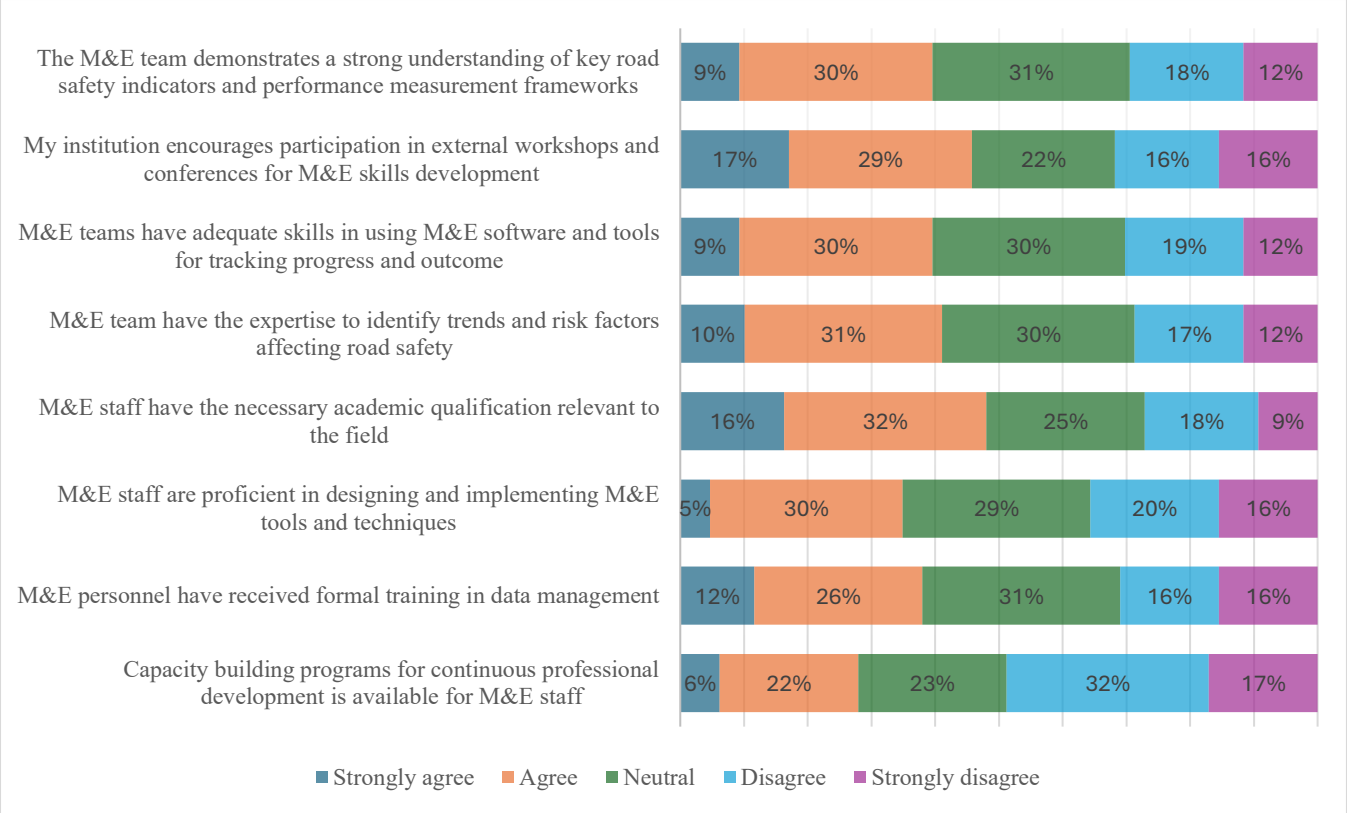

Figure 4.3: Questionnaire Responses on M&E Staff Expertise

Only 39% agreement (agree and strongly agree) was recorded for statements on M&E staff expertise (Table 4. 7). This low percentage is an indication of weak M&E staff expertise in these countries that have a toll on the quality of road safety data.

Table 4. 7: Percentage of agreements for M&E staff expertise statements

Statements (M&E Staff Expertise)	SA/A (%)	N (%)	SD/D (%)
MSE1. M&E staff have the necessary academic qualification relevant to the field	48	25	27
MSE2. M&E personnel have received formal training in data management.	38	31	31
MSE3. The M&E team demonstrates a strong understanding of key road safety indicators and performance measurement frameworks	40	31	29
MSE4. M&E team have the expertise to identify trends and risk factors affecting road safety.	41	30	29
MSE5. M&E teams have adequate skills in using M&E software and tools for tracking progress and outcome	40	30	30
MSE6. M&E staff are proficient in designing and implementing M&E tools and techniques	35	29	36
MSE7. My institution encourages participation in external workshops and conferences for M&E skills development	46	22	32
MSE8. Capacity building programs for continuous professional development is available for M&E staff.	28	23	49
Average	**39**	**28**	**33**

The road safety data quality was assessed using 10 statements and a very low proportion of respondents agreed (strongly agree and agree) with the statements. Specifically, only one statement “data on road safety occurrences and interventions is useful for decision making” had more than 50% agreement (strongly agree and agree) from the respondents. In addition, only 17% agreement (strongly agree and agree) was accorded for the statement that “road safety data is promptly uploaded to a centralized road safety database” and only 21% agreement (strongly agree and agree) was made for the statement that “road safety data does not contain missing fields” (see Figure 4.4).

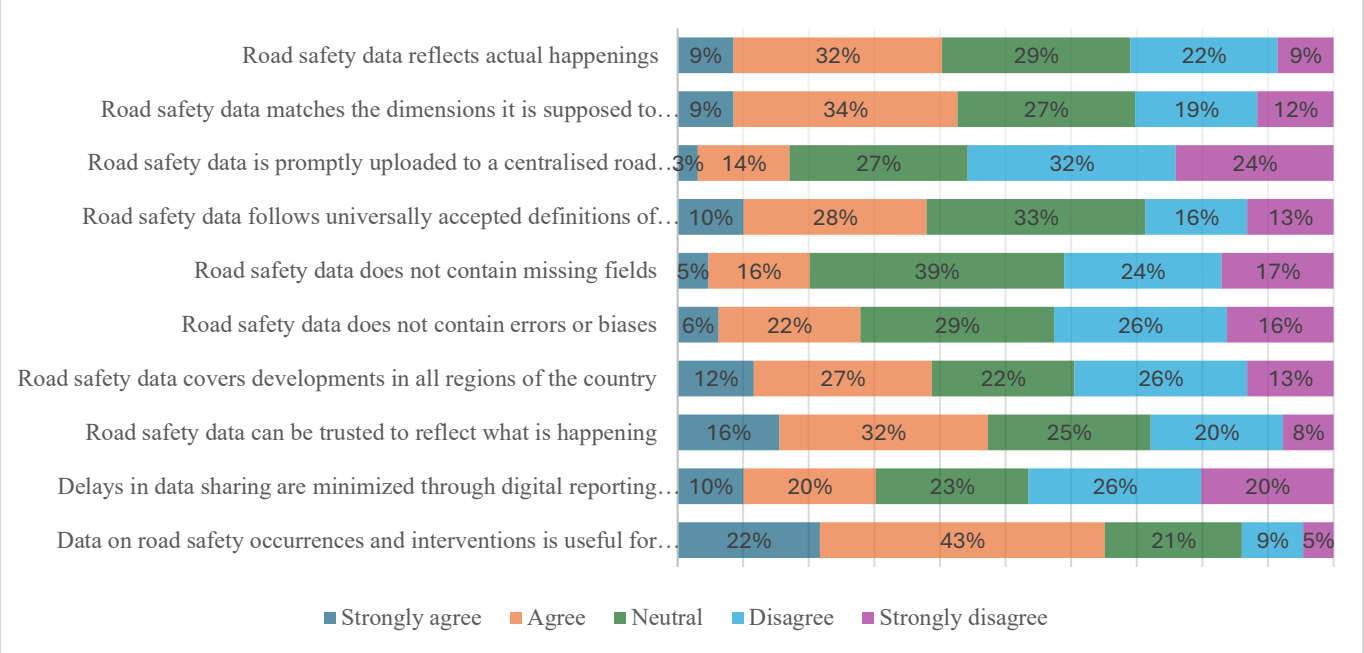

Figure 4.4: Questionnaire responses on road safety data quality

Table 4.8: Percentage of agreements for road safety data quality statements

Statements (Road Safety Data Quality)	**SA/A (%)**	**N (%)**	**SD/D (%)**
DQ1. Road safety data can be trusted to reflect what is happening.	47	25	28
DQ2. Data on road safety occurrences and interventions is useful for decision-making	65	21	14
DQ3. Road safety data does not contain errors or biases	28	29	43
DQ4. Road safety data reflects actual happenings	40	29	31
DQ5. Delays in data sharing are minimized through digital reporting systems and automated processes	30	23	47
DQ6. Road safety data is promptly uploaded to a centralised road safety database	17	27	56
DQ7. Road safety data follows universally accepted definitions of concepts and protocols	38	33	29
DQ8. Road safety data matches the dimensions it is supposed to measure or describe	43	27	30
DQ9. Road safety data does not contain missing fields	20	39	41
DQ10. Road safety data covers developments in all regions of the country	39	22	40
Average	**37**	**28**	**36**

The low percentage of 37% of agreements (agree and strongly agree) with the statements on road safety data quality is a reflection of the poor quality of road safety data in the countries (see Table 4.8). This result affirms the problem of poor-quality road safety data in the African countries and with similar trends of low percentages of agreements for the independent variables (DC 44%, RA 22%, and MSE 39%), the problem of poor data quality for road safety can be traced to weak data collection, poor resource allocation, and weak expertise of M&E staff.

The demographic variable (country) did not affect the study in any specific manner because the percentage of agreements (agree and strongly agree) from all seven countries standardized by the number of respondents per country showed a similar contribution from all countries (see Figure 4.5).

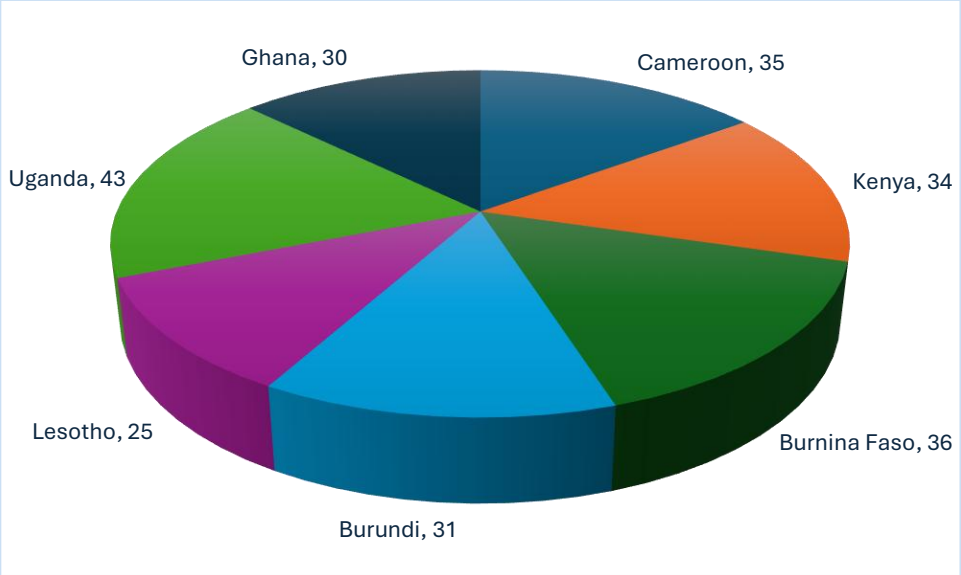

Figure 4.5: Percentage of agreements (strongly agree and agree) to all statements of all variables standardized by no. of respondents per country

The percentage of agreement (agree and strongly agree) for all statements of all variables standardized by the number of respondents per country indicates that the issues of

road safety data quality, data collection, resource allocation, and M&E staff expertise are crosscutting, affecting the selected African countries in a manner similar to that shown in Figure 4.5.

4.5. Data Analysis and Presentation of Results (Inferential Statistics)

4.5.1 Results of the Influence of M&E Practices on Road Safety Data Quality in the Selected African Countries (Inferential Statistics)

The main objective of this study was to assess the influence of M&E practices (data collection, resource allocation and M&E staff expertise) on road safety data quality in the selected African countries. In accordance with their country road safety context, the participants were required to rate their responses on the items of the four variables (latent constructs) following a Likert scale: [1] Strongly Disagree, [2] disagree, [3] neutral, [4] agree, and [5] Strongly Agree. Further analysis was conducted using SmartPLS 4 to assess the influence of monitoring and evaluation practices on road safety data quality, in accordance with the study objective to test the research hypotheses. Through this quantitative analysis, the influence of independent variables (data collection, resource allocation, and M&E staff expertise) on the dependent variable (road safety data quality) was assessed, and the results are presented.

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used for data analysis because of its effectiveness with both scale-independent and scale-dependent variables and its suitability for various sample sizes. It also does not require assumptions about data distribution (Nallaluthan et al., 2024). To asses the measurement model, three main aspects were examined, the internal consistency reliability, the convergent validity, and the discriminant validity (Aburumman et al., 2023). Internal consistency reliability was assessed

using Cronbach's alpha, whose values for all variables were greater than 0.7, indicating internal consistency reliability (Table 4.1).

Convergent validity was assessed through factor loading and Average Variance Extracted (AVE). According to Aburumman (2023), indicators should be accepted and retained if they have factor loadings ≥ 0.7, whereas they should be dropped or deleted if they have a loading of less than 0.4. For loading between 0.4 and 0.7, the indicators should be retained if the values of Cronbach's alpha and composite reliability are above the threshold value of o.7. In this study, most indicators had factor loadings above 0.7 and no indicator had a factor loading of less than 0.4, as shown in Table 4.9. The convergent validity of the constructs was established based on the factor loadings.

Table 4.9: Factor Loadings

	Data Collection	Resource Allocation	M&E Staff Expertise	Road Safety Data Quality
DC1	0.592			
DC2	0.811			
DC3	0.826			
DC4	0.647			
DC5	0.789			
DC6	0.559			
DC7	0.693			
DC8	0.728			
DC9	0.679			
RA1		0.736		
RA2		0.777		
RA3		0.71		
RA4		0.571		
RA5		0.606		
RA6		0.709		
RA7		0.635		
RA8		0.782		
RA9		0.693		
MSE1			0.773	
MSE2			0.756	
MSE3			0.826	
MSE4			0.807	
MSE5			0.807	
MSE6			0.821	
MSE7			0.765	
MSE8			0.715	
DQ1				0.766
DQ2				0.647
DQ3				0.717
DQ4				0.75
DQ5				0.654
DQ6				0.765
DQ7				0.722
DQ8				0.821
DQ9				0.682
DQ10				0.688

Regarding the average variance extracted (AVE), values more than 0.5 are widely accepted (Hair, 2017). In this study, all the constructs had AVE values more than 0.5 except for resource allocation, which had a value of 0.482. The AVE for road safety data quality, data collection, and M&E staff expertise were 0.523, 0.502, and 0.616, respectively. However, the discriminant validity of the constructs was further confirmed through the heterotrait–monotrait (HTMT) ratio (Hair et al., 2021). Generally, values less than 0.85 for the HTMT ratio are widely accepted. In this study, all constructs achieved values ranging between 0.578 and 0.82 for discriminative validity based on the HTMT criterion, as shown in Table 4.10. Discriminant validity was established for the research variables.

Table 4.10: Discriminant validity - Heterotrait-Monotrait (HTMT) ratio

Variables	Data Collection	M&E Staff Expertise	Resource Allocation	Road Safety Data Quality
Data Collection				
M&E Staff Expertise	0.596			
Resource Allocation	0.685	0.578		
Road Safety Data Quality	0.82	0.664	0.726	

Collinearity issues were examined using the Variance Inflation Factor (VIF). According to Hair et al. (2021), VIF values of < 3 indicate the absence of collinearity, which is the case for almost all indicators, as shown in Table 4.11. Values between 3 and 5 indicate slight collinearity, whereas values > 5 indicate serious collinearity. The VIF values for the indicators in the study were all < 3, except for two items on M&E staff expertise (MSE3 and MSE4) that had values slightly > 3 but much less than 5. Consequently, no serious collinearity issues were observed in this study.

Table 4.11: Collinearity statistics (VIF) for indicators

ITEMS	VIF
DC1	1.482
DC2	2.688
DC3	2.961
DC4	1.707
DC5	2.401
DC6	1.542
DC7	1.743
DC8	2.126
DC9	1.733
RA1	2.124
RA2	2.628
RA3	1.78
RA4	1.391
RA5	1.412
RA6	1.898
RA7	1.69
RA8	2.003
RA9	1.927
MSE1	2.529
MSE2	2.245
MSE3	3.043
MSE4	3.279
MSE5	2.562
MSE6	2.72
MSE7	2.444
MSE8	2.475
DQ1	2.234
DQ2	1.867
DQ3	2.156
DQ4	1.983
DQ5	1.679
DQ6	2.139
DQ7	1.781
DQ8	2.826
DQ9	2.035
DQ10	1.93

After the measurement model was assessed and found to be okay, the structural model was assessed to examine the relationships between constructs and determine the influence of

the independent variables on the dependent variable. The coefficient of determination (R^2), effect size (f^2), and path coefficients were assessed. Generally, values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak for R^2, respectively (Hair, 2017). R^2 is a measure of the amount of variance in the dependent variable that is explained by the independent variables. The R square value (0.644) for "road safety data quality" was moderate which indicates that 64.4% of the variance in road safety data quality was explained by the independent variables (data collection, resource allocation and M&E staff expertise). This was supported by R^2_{adj} (0.635). Path coefficients (beta coefficients) were evaluated using a bootstrapping procedure. A two-sided test with a significance level of 5% was used. All path coefficients from DC to DQ, RA to DQ, and MSE to DQ were statistically significant with p-values of 0.000, 0.000, and 0.001, respectively, as shown in Table 4.12. Additionally, the effect size (f^2) of the independent variables was assessed. Regarding effect sizes (f^2), values of 0.35, 0.15, and 0.02 are considered large, medium, and small for f^2 (Nallaluthan et al., 2024). DC→DQ showed a medium effect (0.341), whereas RA→DQ and MSE→DQ showed small effects of 0.111 and 0.093, respectively.

Table 4.12: Structural model assessment

Paths	**Path Coefficient**	**T values**	**P values**	**f^2**	**CI**	
					BC CI (L)	**BC CI (U)**
DC->DQ	0.462	5.447	0.000**	0.341	0.305	0.627
RA->DQ	0.258	4.049	0.000**	0.111	0.125	0.368
MSE->DQ	0.224	3.24	0.001**	0.093	0.101	0.359
R- Square	0.644					
R- Square$_{adj}$	0.635					

Note: DC (data collection), DQ (data quality), RA (resource allocation), MSE (M&E staff expertise)
Note: **: $p \leq 0.001$.

4.5.2. Hypotheses testing

The first specific objective of this study was to determine the influence of data collection on road safety data quality in selected African countries. The hypothesis testing the relationship between data collection and road safety data quality was tested at a significance level of 0.05, which stated that H_{01}: there is no statistically significant relationship between data collection and road safety data quality in the selected African countries. The PLS SEM analysis shows that data collection significantly influences road safety data quality ($\beta = 0.462$, $p < 0.05$, $f^2 = 0.341$). Therefore, the null hypothesis, which stated that: H_{01}: There is no statistically significant relationship between data collection and road safety data quality in the selected African countries, was rejected and the alternative hypothesis was accepted with the conclusion that H_1: There is a statistically significant relationship between data collection and road safety data quality in the selected African countries.

Second, this study sought to assess the effect of resource allocation on road safety data quality in selected African countries. The hypothesis testing the relationship between resource allocation and road safety data quality was tested at 0.05 level of significance which stated that H_{02}: There is no statistically significant relationship between resource allocation and road safety data quality in selected African countries. The PLS SEM analysis shows that resource allocation significantly affects road safety data quality ($\beta = 0.258$, $p < 0.05$, $f^2 = 0.111$). This implies that the null hypothesis, which stated that: H_{02}: There is no statistically significant relationship between resource allocation and road safety data quality in the selected African countries, was rejected, and the conclusion was that H_2: There is a statistically significant effect of resource allocation on road safety data quality in the selected African countries, which was the alternative hypothesis.

The third specific objective of the study was to examine the role of M&E staff expertise on road safety data quality in selected African countries. The hypothesis testing the relationship between M&E staff expertise and road safety data quality was tested at a significance level of 0.05, which stated that H_{03}: there is no statistically significant relationship between M&E staff expertise and road safety data quality in the selected African countries. The PLS SEM analysis shows that M&E staff expertise significantly affects road safety data quality ($\beta = 0.224$, $p < 0.05$, $f^2 = 0.093$). This implies that the null hypothesis, which stated that H_{03}: There is no statistically significant relationship between M&E staff expertise and road safety data quality in the selected African countries, was rejected and the conclusion made that H_3: There is a statistically significant relationship between M&E staff expertise and road safety data quality in the selected African countries, which was the alternative hypothesis.

4.6. Results of Qualitative Data Analysis

The respondents were asked two open-ended questions for each of the four research variables (road safety data quality, data collection, resource allocation, and M&E staff expertise). They were asked about current challenges and improvement mechanisms for these challenges. Their responses to the challenges and improvement mechanisms of the four variables are summarized in this section.

4.6.1 Road Safety Data Quality Challenges

Respondents highlighted some challenges of road safety data quality that span underreporting, inconsistent data collection, outdated technology, limited resources, and lack of standardization. One of the primary challenges is underreporting and incomplete data coverage. Many respondents pointed out that minor accidents, especially those involving motorcycles or those occurring in remote areas, often go unreported. As one respondent noted,

"Most cases, including motorcycle accidents, are not reported," which indicates a significant gap in capturing all relevant data.

A respondent stated, "the data is collected, but at some points are not precise," showing that even when data is collected, it is often insufficient to provide a full picture of road safety. Data fragmentation and lack of coordination was reported as another challenge. Road safety data is often collected by multiple agencies, such as traffic police, hospitals, and insurance companies, without a centralized system for coordination.

One respondent emphasized, "Road accident data is often collected by multiple agencies leading to inconsistencies," indicating that this lack of coordination results in data that is not integrated or comparable.

This fragmentation makes it difficult to form a comprehensive view of road safety conditions and to implement effective policies based on reliable data.

Technological limitations also play a critical role in poor data quality. Many respondents noted that outdated manual systems are still in use, which slows data collection and increases the likelihood of errors.

As one participant mentioned, "Poor data quality due to analogue systems still in use," and another respondent highlighted the lack of automation, stating, "data is not reported instantly in the database."

These technological constraints lead to significant delays in data validation and hinder timely decision-making. In addition, insufficient resources and funding are significant barriers to improving data quality. The lack of financial support affects every aspect of data collection and analysis, ranging from inadequate equipment to insufficient personnel.

One respondent pointed out, "Resources are inadequate, and most actions for improving data quality are not adequately funded," underscoring the need for better investment in road safety data systems.

The shortage of trained personnel further exacerbates this issue, as many officers lack the necessary skills to collect, analyze, and interpret data effectively. Finally, the lack of standardization and data quality assurance is a persistent problem. Different agencies often use different reporting formats and methods, making it challenging to ensure consistency across datasets.

As one respondent explained, "The challenges are exacerbated by the lack of prioritization of data in an already not well-prioritized sector." Without standardized data collection procedures, it is difficult to compare and aggregate data across regions or agencies.

4.6.2. Road Safety Data Quality Improvement Mechanisms

The respondents highlighted the following strategies to improve road safety data quality in their countries:

Standardization and centralization of data collection

One respondent suggested that "having a standardized system that allows all stakeholders to input and access processed information" would ensure consistency across the various agencies involved in data collection. Additionally, the creation of a "centralized data repository" and the implementation of "standardized templates and indicators" for data collection across institutions would help unify data and reduce inconsistencies.

Adoption of digital tools and automation:

Respondents emphasized the importance of "automation of crash data collection and management," noting that this would streamline the process and reduce the risk of human error. The development of digital tools, such as mobile data collection apps and GPS-enabled devices, would facilitate real-time reporting and improve the accuracy of collected data.

Capacity building and training

"Training of data collectors" and "capacity building" were identified as key strategies for ensuring that personnel are equipped with the necessary skills and knowledge to accurately collect and analyze road safety data. "Enhancing organizational capabilities" through continuous training is essential to keep staff updated on the latest data collection techniques and technologies. As highlighted, "training and automation" should go together to ensure that staff are not only familiar with modern tools, but also able to use them effectively.

Improved collaboration and data sharing

"Establishing data sharing agreements" and "creating a centralised data repository" are strategies that can facilitate better coordination. One respondent emphasized, "harmonization and collaboration with all key stakeholders" to ensure that data is consistently collected and shared across agencies. Effective collaboration will minimize data fragmentation and enhance the comprehensiveness of the data collected.

Public engagement and awareness

As one respondent suggested, public awareness and "Public awareness" and "community reporting mechanisms" would help gather additional data from citizens, particularly in rural areas where accidents may be underreported.

Regular monitoring, auditing, and feedback

"Conducting regular data audits" and implementing "data validation techniques" can help identify gaps, inconsistencies, or inaccuracies in the collected data. Establishing a "system for feedback and continuous improvement" would also allow for timely corrections and improvements in the data collection process. A respondent noted that "Monitoring non-fatal incidents" and ensuring timely reporting and verification are essential for maintaining accurate and up-to-date road safety data.

4.6.3. Road Safety Data Collection Challenges

Respondents highlighted some challenges in road safety data collection, including **inadequate infrastructure and limited resources**.

As one respondent noted, "lack of dedicated resources (personnel and finances)" significantly impacts data collection efforts. A shortage of trained personnel, with some regions relying on only "two officers" for all data-related tasks, leads to data gaps and errors. Furthermore, there is "a lack of scientific gadgets" necessary for accurate data collection, and in some cases, "manual data collection is prone to human error and manipulation."

Fragmented data collection and poor coordination

"Road Safety Data is scattered in different agencies," one respondent shared, pointing to the difficulty in creating a unified view of road safety data. This fragmentation is further compounded by "Lack of a crash database system" and "Lack of coordination between agencies."

Underreporting and inconsistent data

A respondent noted that "Some crashes go without being noticed" due to challenges such as "inadequate police officers" and "geographical disparities." Additionally, incidents like "hit-and-run" accidents are often unreported, leading to incomplete data. This lack of reporting compromises the accuracy of road safety data.

Technological challenges and manual data collection

"Manual data collection" was frequently cited as a major issue, with one respondent noting that "data is collected manually leaving gaps in un-investigated crashes." Furthermore, the absence of "automation to link spot-time reporting" makes it difficult to capture real-time

data. Reliance on manual processes increases the likelihood of errors and delays in updating road-safety data.

Lack of standardization and data quality assurance

"Inconsistent data collection methods" and "lack of standardization" were frequently mentioned as major obstacles. Different agencies use different methodologies, making it difficult to compare data across regions or institutions. For example, "data not georeferenced" and "data is collected by multiple agencies without a unified system" are data collection concerns. Moreover, respondents noted that "the quality of data is compromised due to manual data entry" and that there is a "lack of a framework for sharing data with the Police and other stakeholders."

4.6.4. Road Safety Data Collection Improvement Mechanisms

The respondents provided the following suggestions for improving data collection practices in their countries:

Centralized and standardized data collection

Some respondents suggested, "establish a centralized data management system" that can integrate data from all relevant agencies. Another respondent stressed the need for "standardized data collection protocols" to ensure consistency across regions and agencies. Additionally, it was noted that "data collection tools should be standardized" to ensure uniformity in reporting and analysis.

Automation and integration of technology

Several respondents highlighted the importance of transitioning from manual systems to automated *systems.*

"Automation of data collected" and "digitization of the data collection process" are essential for improving timeliness and accuracy. Using mobile applications for real-time reporting and automated systems like "GPS, sensors, and traffic cameras" would help collect data more efficiently and reduce human error.

A respondent noted the need for "automated crash data collection and management" and the "operationalization of the national crash database system," which has already been developed but is not fully used by the police.

Training and capacity building

"Training of data collectors" and "capacity building" for both personnel and stakeholders involved in road safety data management are essential to ensure high-quality data collection. As one respondent emphasized, "continuous professional development and training for staff

in modern data collection methods" would ensure that they are equipped with the necessary skills and knowledge.

Enhanced collaboration and data sharing

"Enhancing inter-agency collaboration" and "establishing data-sharing agreements" will help ensure that relevant information is shared across all stakeholders. Respondents noted that "having a unified crash database system" and "improving coordination between institutions, such as the police, hospitals, and the transport ministry, would facilitate seamless data exchange. One respondent suggested creating "a national framework for road safety data sharing" to standardize the process and enhance its efficiency.

Improved resource allocation

*Respondents emphasized the need for "dedicated budgets for data collection" and better funding for technological tools and training. As one participant stated, "There should be more resources to employ personnel and ensure they have the proper tools for data collection," including "gadgets for crash scene management." Adequate funding and resources are needed to implement and maintain these improvements effectively***.**

4.6.5. Resource Allocation Challenges

According to respondents, several key issues hamper effective road safety resource allocation, including the following:

Insufficient and inadequate funding

One respondent pointed out, "insufficient financing" and "the function is not adequately funded to handle the workload," highlighting that road safety projects often do not receive the necessary financial backing. Inadequate funding is a consistent concern, with many respondents noting that "budget cuts and low releases" hinder efforts to improve road safety infrastructure and services. Additionally, a lack of dedicated funding for road safety projects, such as "lack of dedicated and ringfenced road safety budget," means that essential treatments and infrastructure improvements are often treated peripherally, lumped with broader civil works.

Limited budgetary allocation and resources.

Respondents frequently mentioned "limited budget allocation" and "Inadequate funding," pointing to the insufficient amount of money allocated to essential areas such as data management, emergency services, and road safety infrastructure. For example, "we have a challenge in financing the following activities: training of first responders, post-crash care kits, data management, M&E" illustrates how various critical sectors are underfunded, affecting the overall effectiveness of road safety programs. Some respondents also noted that,

even when funds are allocated, they are often delayed or insufficient, as seen in statements such as delayed financial release/allocation.

Shortage of skilled personnel and training resources

"Inadequate human resources in terms of skills and capabilities" was a recurrent theme, with respondents highlighting the shortage of skilled persons to handle critical tasks such as data collection, crash investigation, and emergency services. "There is insufficient human resources and funding for procurement of the necessary technological tools" also emphasizes the resource gap, which prevents the effective implementation of technology-driven safety solutions.

Inadequate technological tools and equipment

"Inadequate modern data collection tools" and "Insufficient tools to use during enforcement" reflect the technological deficits that hinder data accuracy and response time. A lack of basic infrastructure, such as "Speed machines" and "limited equipment," compromises the ability to effectively monitor and enforce road safety measures.

Competing priorities and poor prioritization.

"Competing priorities" and "poor prioritization of funding for road safety" were cited as major challenges. "The government purse is narrow for road safety resource allocation" points to a lack of prioritization of road safety within national budgets, leaving it vulnerable to cuts or limited funding despite its importance.

Inefficiencies and delays in resource allocation

"Resources are not enough or sometimes not available at all," and "the allocation of resources is often tardy." Delays in financial releases and misallocation contribute to the inability to carry out road safety projects on time. "Inadequate allocation of resources" and "delayed disbursement of funds" exacerbate this situation, making it difficult to meet road safety targets and respond to emerging challenges.

4.6.6. Resource Allocation Improvement Mechanisms

The key mechanisms for better resource allocation suggested by the respondents were as follows:

Increased funding and dedicated budget: A recurring theme was the need for increased funding to support road safety programs.

Respondents emphasized the importance of allocating sufficient funds specifically for road safety, stating that road safety should be treated as a priority. Another key suggestion was to "deliberate full implementation of existing policies on dedicated/ringfenced road safety budgets," with a strong emphasis on creating stand-alone road safety intervention projects that are solely focused on road safety initiatives.

Priority Allocation for Road Safety: There was a clear call for prioritizing road safety in national budgets.

It was suggested that "road safety activities be given priority" and that a "percentage of the transportation budget specifically for road safety" be set aside.

One respondent proposed that "10% of the cost of road infrastructure" should be allocated for road safety elements such as road safety infrastructure.

Another pointed out the importance of "prioritizing road safety as the main tool in any country's development." This aligns with the idea of allocating "funds for critical interventions, such as post-crash care and infrastructure maintenance."

Improved financial management and transparency

Respondents recommended "better budget processes" and the "establishment of clear funding models" to avoid inefficiencies in resource allocation. One participant suggested the creation of a "road safety fund," which would be a dedicated source of funding for road safety initiatives, drawing on revenue from "fuel levies" or other sources. Furthermore, "increased transparency" and "regular financial audits" were recommended to ensure that resources are allocated efficiently and that funds are not misappropriated.

Diversification of funding sources: To reduce dependency on government allocations, respondents suggested

"Exploring alternative funding sources," including "public-private partnerships" and "engaging with international donors." One participant emphasized the need for "lobbying cooperation with development partners" to secure funding for road safety projects. Others proposed "creating a road safety fund with contributions from insurance companies" and other stakeholders.

This approach would help ensure that road safety initiatives are not solely reliant on government funding, thereby making them more sustainable.

Legislative and policy support

Respondents called for "legal reforms to entrench the mandate" of road safety agencies, ensuring that "funding and resource allocation for road safety are protected by law." By

making road safety a legal priority, countries can ensure that "funding is not cut haphazardly" and that it is consistently allocated to key road safety initiatives.

4.6.7. M&E Staff Expertise Challenges

In many cases, there were significant challenges related to the knowledge and skills of the personnel involved in road safety M&E. These challenges included a lack of training, insufficient staff, and poor coordination between relevant agencies. Several key issues identified by the respondents were grouped as follows.

Inadequate training and capacity building: One of the most common challenges faced by road safety M&E staff is insufficient training.

As one respondent highlighted, "many staff lack the specialized skills required to perform effective M&E in road safety. The training of M&E officers is insufficient," which points to the broader issue of lack of expertise in data management and road safety M&E. Furthermore, there is no continuous training in many cases, and staff are often not equipped with the latest skills required for modern data collection and analysis methods. For example, "modern data collection methods, inadequate training and exposure" were noted as key barriers to improving M&E staff expertise.

Limited knowledge of road safety indicators: Another significant challenge is the lack of knowledge regarding road safety indicators. M&E staff often do not have the necessary understanding of key metrics such as crash severity, fatality rates, and vehicle occupancy factors, which are crucial for evaluating road safety initiatives.

Respondents mentioned that M&E staff have "limited knowledge of road safety indicators," which makes it difficult to measure the success of interventions and policies effectively. This knowledge gap hinders the ability to accurately assess programs and adjust strategies accordingly.

Lack of technological proficiency: The absence of proficiency in modern technologies is a major hindrance to effective road safety M&E. Many M&E staff still rely on paper-based methods, which increase the chances of errors and delays in data processing.

As a respondent pointed out, "inadequate tools for use" and "no M&E staff in my institution" suggest the broader issue of technological limitations.

Furthermore, a lack of familiarity with advanced technologies such as Geographic Information Systems (GIS), data analytics software, and mobile data collection apps hampers the ability of M&E staff to collect and analyze data in real time.

Understaffing and workload

Understaffing is another critical issue that affects road safety M&E. "There is a shortage of staff to cover the workload available" was a common complaint. Many institutions have very few M&E personnel, which contributes to a high workload for the existing staff. As one respondent mentioned, "more staff required to reduce workload," highlighting the need for better human resource allocation in the M&E sector to ensure that the growing demands of road safety monitoring are met.

Poor coordination between stakeholders: Effective road safety M&E also requires strong coordination among various stakeholders, including law enforcement, health services, and transportation agencies. However, respondents noted that "there was no formal M&E department" in many institutions, leading to fragmented efforts in data collection and reporting.

The lack of "coordination between actors" and "limited stakeholder engagement" makes it difficult to consolidate data, share insights, and implement effective policies.

Insufficient funding for M&E operations: M&E operations often suffer from insufficient funding and limited resources.

A recurrent theme in the responses was the lack of a dedicated budget for M&E activities. This is compounded by poor funding, which limits the ability to hire qualified staff, procure necessary tools, and conduct essential training.

4.6.8. M&E Staff Expertise Improvement Mechanisms

Respondents suggested several strategies to improve M&E staff expertise, based on the challenges they highlighted. They are:

Recruitment of qualified staff: A primary solution to this expertise gap is the recruitment of qualified M&E personnel.

Multiple respondents emphasized the need to hire additional qualified staff and ensure they are properly trained. As one respondent suggested, "hiring more personnel and offering more training " could address the shortage of skilled M&E professionals.

Continuous capacity building and specialized training: Continuous training is essential for improving M&E staff expertise.

Several responses suggested that ongoing professional development is needed to keep staff up to date with the latest data collection tools and road safety principles. For example, "more training needs to be conducted" and "continuous capacity building" were commonly mentioned as key strategies.

Incentivizing M&E staff and providing adequate resources: Finally, providing financial incentives and adequate resources for M&E staff was highlighted to improve their motivation and performance.

As one respondent stated, "improved funding and motivated personnel" would go a long way to enhance the quality of road safety M&E. A clear budget dedicated to M&E activities, such as "more funds into the department" and "adequate staffing", would ensure that M&E staff have the resources needed to carry out their duties effectively.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the research findings, conclusions, limitations of the study, and recommendations for future studies. Before summarizing these aspects, it is imperative to revisit how the study was conducted and whether it met the research objectives. Descriptive quantitative and qualitative analyses were conducted, and the results are presented in tables, figures, and essay formats.

5.2 Summary of Main Research Findings

A summary of the main research findings is provided, in line with the research objectives in this section.

The first research objective was to determine the influence of data collection on road safety data quality in selected African countries. This study found a statistically significant positive relationship between data collection and road safety data quality ($\beta = 0.462$, $p < 0.05$, $f^2 = 0.341$). On average, only 44% agreement (strongly agree and agree) was recorded for all statements regarding data collection in all countries. In addition, there was an average of 37% agreement (strongly agree and agree) for road safety data quality statements. This similar trend of low percentages reflects the influence of data collection on road safety data quality in these countries.

Second, this study sought to assess the effect of resource allocation on road safety data quality in selected African countries. Resource allocation also had a statistically significant

positive relationship with road safety data quality ($\beta = 0.258$, $p < 0.05$, $f^2 = 0.111$). On average, only 22% agreement (strongly agree and agree) was recorded for all statements regarding resource allocation in all countries. The low 37% agreement (strongly agree and agree) on average for road safety data quality statements such as that for resource allocation reflects the influence of resource allocation on road safety data quality in the countries.

The third objective was to examine the role of M&E staff expertise on road safety data quality in the selected African countries. Like "data collection" and "resource allocation," the study found that "M&E staff expertise" had a statistically significant positive relationship with "road safety data quality" ($\beta = 0.224$, $p < 0.05$, $f^2 = 0.093$). On average, only 39% of agreement (strongly agree and agree) was recorded for all statements regarding M&E staff expertise in all countries. With 37% agreement (strongly agree and agree) on average for road safety data quality statements, there is an indication of the influence of M&E staff expertise on road safety data quality in these countries.

Summary qualitative results pointed to underreporting, inconsistent data collection, outdated technology, limited resources, lack of standardization, and inadequate training and capacity building for M&E staff. The general objective of the study to determine the influence of monitoring and evaluation practices (data collection, resource allocation and M&E staff expertise on road safety data quality in Africa, through selected African countries was attained.

5.3 Discussion

This study revealed some interesting outcomes regarding the M&E practices of data collection, resource allocation, and M&E staff expertise on the quality of road safety data in Africa. This study found that improving the currently poor M&E practices of data collection, resource allocation, and M&E staff expertise will improve the quality of road safety data in

Africa. This finding corroborates that of Kelly and Reid (2021), who found that monitoring is a key mechanism for enabling learning, decision-making, and improvement. Similarly, it also aligns with the findings of Okeowo (2018), who found that road safety data quality is compromised owing to errors emanating from poor validation processes and delays in processing information. In line with the findings of this study, Thomas et al. (2017) assessed the state of road safety data, data collection systems, and definitions across various African countries and identified a strong need for improved data collection practices.

The effect of data collection on road safety data quality found in this study aligns with that of Mavromatis et al. (2018), who found an indirect effect of data collection on road safety data quality, mediated by resource constraints. Similarly, the beneficial effects of digital data collection have been documented by previous studies showing that digital data collection is more time- and cost-efficient than paper-based data collection (Mehmood et al., 2019; Taber et al., 2020). This was also confirmed by a study (Mwale et al., 2024) that reviewed the processes of road accident mortality data collection in Zambia and found underreporting and reliance on paper-based records as significant data collection challenges similar to the qualitative results reported by respondents in this study. Rabbani et al. (2022) also revealed that developing countries rely heavily on manual data collection methods, that are prone to inaccuracies and under-reporting due to human error as indicated by the qualitative results of this study. In support of this study's results, Thambura et al. (2023) found a positive correlation between M&E data collection and livelihood program performance in their study. This implies the influence of data collection not only on road safety data quality but also on broader program and project performance improvements (Joseph et al., 2023).

The effect of resource allocation on road safety data quality found in this study is similar to the results of previous studies that found resource allocation in terms of human,

physical and financial resources to be positively associated with project sustainability and performance (Abdi, 2020; Chepng'eno & Kimutai, 2021). The budget-driven resource allocation recommended by respondents in the qualitative findings aligns with that of Selestin (2018), who found a statistically significant positive relationship between resource requirements and resources used. In addition, the significance of resource allocation in the field of road safety was supported by Osuret et al. (2019), who found that limited resources affected the implementation of road safety policies in Uganda. The prevailing financial challenges highlighted by the results of this study is affirmed by the findings of Odonkor et al. (2020), who identified limited resources as one of the key road safety challenges in Sub Sahan Africa. In line with the findings of this study, Mohamed (2023) put forth the value of adequate resources,(2023) finding that timely completion of projects relied on adequate resources.

The influence of M&E staff expertise on road safety data quality found in this study was found by Mpofu et al. (2014). They evaluated the impact of establishing a new cadre of district M&E officers in Botswana to improve health information systems and found that improved data quality and management hinges on M&E officers. The qualitative results of this study on M&E staff expertise challenges corroborate the findings of Hailemichael (2021), who found that the Ethiopian Roads Authority lacks a consistent M&E approach and faces significant communication gaps among staff, management, and stakeholders, although it has an M&E unit and uses specific guidelines and manuals. They also found other similar challenges, such as insufficient training, difficulties using M&E tools, and gaps in implementing effective ICT-supported M&E programs. The positive effects of M&E practices found in this study are in line with Rubia and Kimaru (2022), who found that various M&E practices are integral to the successful implementation of road projects in Kiambu County, Kenya.

5.4 Conclusion

This study aimed to investigate the influence of monitoring and evaluation practices on road safety data quality in Africa, focusing on selected African countries. A mixed research approach (quantitative and qualitative) was used to achieve this study's aim. The study concludes that improvements in monitoring and evaluation practices of data collection, resource allocation, and M&E staff expertise will significantly improve the quality of road safety data in Africa.

5.5 Recommendations

This study revealed a statistically significant positive influence of M&E practices on the quality of road safety data. It also reveals the current poor M&E practices and road safety data quality in the selected African countries. There is an overwhelming consensus among road safety stakeholders regarding the need to improve road safety data collection, resource allocation, and M&E staff expertise to improve road safety data quality in Africa. The recommendations for improvement suggested by the respondents of this study in Section 4.6, who are qualified road safety experts, hold true for this section. Though the African countries have M&E systems, their sophistication and effectiveness greatly vary. It is recommended that African countries establish or strengthen their M&E systems through formal legislative processes, such as passing a bill or law to provide a legal framework that defines the mandate, scope, and functions of the M&E system, and ensuring that it has the authority and resources needed to operate effectively. African countries should embrace M&E systems as a governance tool to foster the realization of the collective vision of Agenda 2063. Moreover, countries should institutionalize standardized M&E frameworks across all road safety agencies. This should include the mandatory adoption of a nationally standardized M&E framework that

integrates key performance indicators, data validation protocols, and reporting timelines. Furthermore, road safety authorities should prioritize capacity building for data collectors and M&E officers by investing in regular training programs that focus on data collection tools, evaluation techniques, and digital reporting systems.

5.6. Areas of Further Research

Haven established a statistically significant positive relationship between M&E practices and the quality of road safety data, and given the growing need for M&E in the domain of road safety, future studies should focus on investigating and developing a detailed M&E framework to guide African countries in improving their road safety M&E to improve road safety data quality. The framework should aim to guide road safety stakeholders not only in tailoring global road safety indicators to their country contexts, but also in practically monitoring and evaluating their road safety progress towards achieving set targets.

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APPENDICES

APPENDIX I: Letter to the Respondent

Dear Respondent,

RE: RESEARCH PROJECT

I am a postgraduate student of Africa Nazarene University pursuing Master of Arts in Monitoring and Evaluation. As a requirement of my study, I am carrying out a survey on the influence of monitoring and evaluation practices on road safety data quality in Africa: case of selected African countries. The success of this study will substantially depend on your cooperation to provide the information required. I kindly request you to complete this questionnaire for data collection. The attached questionnaire is specifically designed for the purpose of this study and all responses will be treated with absolute confidentiality and anonymity.

Thank you for your cooperation.

Yours Faithfully,

Noella Kunsoan

APPENDIX II: Questionnaire

The researcher aims to examine the influence of monitoring and evaluation practices on the quality of road safety data in selected African countries (Cameroon, Kenya, Lesotho, Burkina Faso, Uganda, Ghana, and Burundi). To collect information that will help in achieving the objectives of this study, a questionnaire has been developed. I kindly request your participation in this study by answering all the questions posed. Please be assured that your responses will remain anonymous and will never be linked to you personally. Your honest and cooperative responses to the questions will be greatly appreciated.

SECTION 1: Quantitative data collection tool (Likert scale questions)

A: Country, Agency/department/ministry/sector, and Job title

A1. Please specify your country

Country	**Tick (✓)**
1. Cameroon	
2. Kenya	
3. Lesotho	
4. Burkina Faso	
5. Ghana	
6. Uganda	
7. Burundi	

A2. In which road safety agency/department/ministry/sector of your Country do you work? Please respond with a tick in the space provided. Also, specify your current job title or position of responsibility within your institution.

Road safety agency/department/ministry/sector	**Tick (✓)**	**Job title**
1. Road safety lead agency		
2. Police		
3. Transport		
4. Health		
5. NGO		

B: Road safety data collection (DC) in your country

Please indicate the extent to which you agree with the following statements on road safety data collection in your country. Use a scale of 1-5, where: [1] Strongly Disagree; [2] Disagree; [3] Neutral; [4] Agree; and [5] strongly Agree.

Statements	**1 SD**	**2 D**	**3 N**	**4 A**	**5 SA**
DC1. Standardized definitions for road safety indicators exist					
DC2. Rigorous data check procedures exist					
DC3. Data collection practices include checks					
DC4. Data inconsistencies are systematically resolved					
DC5. Data cleaning procedures are applied consistently					
DC6. A functional centralized national road safety database exists					
DC7. Interagency collaboration on road safety data analysis exist					
DC8. Protocols for road safety data sharing exist					
DC9. Data analysis findings are regularly communicated to policymakers.					

C: Resource allocation (RA) for road safety data in your country

Please indicate the extent to which you agree with the following statements on resource allocation for road safety data in your country. Use a scale of 1-5, where: [1] Strongly Disagree; [2] Disagree; [3] Neutral; [4] Agree; and [5] strongly Agree.

Statements	**1 SD**	**2 D**	**3 N**	**4 A**	**5 SA**
RA1. Funding sources for road safety M&E are sustainable					
RA2. Adequate financial resources are allocated					
RA3. Funding resource arrangements are flexible					
RA4. Financial resource allocation is through multiple funding sources					
RA5. M&E personnel are adjusted based on workload					
RA6. Technical resources to collect, store, clean, analyze, visualize, and report road safety data are sufficient.					
RA7. Reliable internet connectivity and digital resources exist					
RA8. Resource procurement and upgrades are planned proactively.					
RA9. Robust backup systems are in place to prevent data loss					

D: Road safety monitoring and evaluation staff expertise (MSE) in your country

Please indicate the extent to which you agree with the following statements on road safety M&E staff expertise in your country. Use a scale of 1-5, where: [1] Strongly Disagree; [2] Disagree; [3] Neutral; [4] Agree; and [5] strongly Agree.

Statements	**1 SD**	**2 D**	**3 N**	**4 A**	**5 SA**
MSE1. M&E staff have the necessary academic qualification relevant to the field					
MSE2. M&E personnel have received formal training in data management.					
MSE3. The M&E team demonstrates a strong understanding of key road safety indicators and performance measurement frameworks					
MSE4. M&E team have the expertise to identify trends and risk factors affecting road safety.					
MSE5. M&E teams have adequate skills in using M&E software and tools for tracking progress and outcome					
MSE6. M&E staff are proficient in designing and implementing M&E tools and techniques					
MSE7. My institution encourages participation in external workshops and conferences for M&E skills development					
MSE8. Capacity building programs for continuous professional development is available for M&E staff.					

E: Road safety data quality (DQ) in your Country

Please indicate the extent to which you agree with the following statements on road safety data quality in your country. Use a scale of 1-5, where: [1] Strongly Disagree; [2] Disagree; [3] Neutral; [4] Agree; and [5] strongly Agree.

Statements	1 SD	2 D	3 N	4 A	5 SA
DQ1. Road safety data can be trusted to reflect what is happening.					
DQ2. Data on road safety occurrences and interventions is useful for decision-making					
DQ3. Road safety data does not contain errors or biases					
DQ4. Road safety data reflects actual happenings					
DQ5. Delays in data sharing are minimized through digital reporting systems and automated processes					
DQ6. Road safety data is promptly uploaded to a centralised road safety database					
DQ7. Road safety data follows universally accepted definitions of concepts and protocols					
DQ8. Road safety data matches the dimensions it is supposed to measure or describe					
DQ9. Road safety data does not contain missing fields					
DQ10. Road safety data covers developments in all regions of the country					

SECTION 2: Qualitative data collection tool (open ended questions)

Road safety data quality

1. What are the challenges of road safety data quality in your country?
2. Please suggest strategies that can improve road safety data quality in your country.

Data collection

3. What are the challenges of road safety data collection in your country.
4. Please describe any improvements needed in the current road safety data collection practices.

Resource allocation

5. What are the current road safety resource allocation challenges in your country?
6. What improvements would you suggest for better resource allocation for road safety?

M&E staff expertise

7. What are the major challenges of road safety monitoring and evaluation pertaining to the M&E staff expertise?
8. How can these challenges be resolved?

APPENDIX III: Research Variables

Name	No.	Type	Missings	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness	Cramér-von Mises p value
Country	1	CAT	0	3.806	4	1	7	1	7	2.161	-1.362	0.095	0
Agency	2	CAT	0	3.256	3	1	5	1	5	1.265	-1.043	-0.03	0
DC1	3	ORD	0	3.256	3	1	5	1	5	1.259	-0.93	-0.307	0
DC2	4	ORD	0	3	3	1	5	1	5	1.264	-1.055	-0.047	0
DC3	5	ORD	0	3.202	3	1	5	1	5	1.241	-1.005	-0.169	0
DC4	6	ORD	0	2.86	3	1	5	1	5	1.244	-1.031	0.048	0
DC5	7	ORD	0	3.078	3	1	5	1	5	1.23	-0.838	-0.023	0
DC6	8	ORD	0	2.822	3	1	5	1	5	1.349	-1.303	0.024	0
DC7	9	ORD	0	3.426	4	1	5	1	5	1.262	-0.615	-0.616	0
DC8	10	ORD	0	3.101	3	1	5	1	5	1.287	-0.993	-0.234	0
DC9	11	ORD	0	3.55	4	1	5	1	5	1.239	-0.452	-0.674	0
RA1	12	ORD	0	2.279	2	1	5	1	5	1.161	-0.555	0.549	0
RA2	13	ORD	0	2.264	2	1	5	1	5	1.089	-0.213	0.659	0
RA3	14	ORD	0	2.318	2	1	5	1	5	1.056	-0.12	0.609	0
RA4	15	ORD	0	3	3	1	5	1	5	1.294	-1.105	-0.239	0
RA5	16	ORD	0	2.636	3	1	5	1	5	1.276	-1.163	0.169	0
RA6	17	ORD	0	2.302	2	1	5	1	5	1.104	-0.321	0.67	0
RA7	18	ORD	0	2.488	2	1	5	1	5	1.162	-0.382	0.613	0
RA8	19	ORD	0	2.419	2	1	5	1	5	1.054	-0.471	0.418	0
RA9	20	ORD	0	2.628	3	1	5	1	5	1.148	-0.987	0.117	0
MSE1	21	ORD	0	3.279	3	1	5	1	5	1.201	-0.819	-0.31	0
MSE2	22	ORD	0	3.031	3	1	5	1	5	1.226	-0.865	-0.187	0
MSE3	23	ORD	0	3.078	3	1	5	1	5	1.145	-0.717	-0.248	0
MSE4	24	ORD	0	3.109	3	1	5	1	5	1.156	-0.721	-0.276	0
MSE5	25	ORD	0	3.07	3	1	5	1	5	1.149	-0.749	-0.231	0
MSE6	26	ORD	0	2.884	3	1	5	1	5	1.139	-0.921	-0.215	0
MSE7	27	ORD	0	3.155	3	1	5	1	5	1.314	-1.067	-0.249	0
MSE8	28	ORD	0	2.682	3	1	5	1	5	1.168	-0.903	0.231	0
DQ1	29	ORD	0	3.271	3	1	5	1	5	1.173	-0.839	-0.253	0
DQ2	30	ORD	0	3.682	4	1	5	1	5	1.056	0.148	-0.769	0
DQ3	31	ORD	0	2.752	3	1	5	1	5	1.148	-0.84	0.096	0
DQ4	32	ORD	0	3.093	3	1	5	1	5	1.103	-0.751	-0.186	0
DQ5	33	ORD	0	2.736	3	1	5	1	5	1.267	-1.025	0.209	0
DQ6	34	ORD	0	2.403	2	1	5	1	5	1.089	-0.639	0.379	0
DQ7	35	ORD	0	3.062	3	1	5	1	5	1.166	-0.702	-0.241	0
DQ8	36	ORD	0	3.093	3	1	5	1	5	1.151	-0.787	-0.308	0
DQ9	37	ORD	0	2.667	3	1	5	1	5	1.074	-0.537	0.092	0
DQ10	38	ORD	0	2.977	3	1	5	1	5	1.236	-1.065	-0.005	0

APPENDIX IV: Nacosti Authorization Letter

Date: 27/01/2025

E-mail: researchwriting.mba.anu@gmail.com/ monitoringandevaluation@anu.ac.ke
NACOSTI: registry@nacosti.go.ke Tel. 0202711213

Our Ref: (Admin No. 21DMME019)
The Director,
National Commission for Science,
Technology and Innovation (NACOSTI),
P. O. Box 30623, 00100
Nairobi. Kenya

Dear Sir/Madam:
RE: RESEARCH AUTHORIZATION FOR: KUNSOAN NOELLA BAJIA Adm: .No. 21DMME019

KUNSOAN NOELLA BAJIA is a postgraduate student at Africa Nazarene University in the Master ARTS IN MONITORING AND EVALUATION (MME) program.

To complete her program, NOELLA is conducting research entitled: "MONITORING AND EVALUATION PRACTICES AND ROAD SAFETY DATA QUALITY IN AFRICA: A CASE OF SELECTED AFRICAN COUNTRIES"

Any assistance offered to her will be highly appreciated.

Yours Faithfully,

Dr. Wanjiru Nderitu

MME, Coordinator,

School of Business,

Africa Nazarene University.