



Project No. 101069500—AfroSAFE

AfroSAFE: Safe System for radical improvement of road safety in low- and middle-income African countries

HORIZON EUROPE—European Union’s funding programme for research and innovation

Deliverable 2.1

State of road safety management in selected African countries—review and recommendations

Deliverable due date: 2024-08-31

Project start: 2022-09-01
Duration: 48 months

Lead contractor for this deliverable:
Institute of Transport Economics, Norway

Version 1.0 (2025-08-31)

Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Document information

Authors: Tor-Olav Nævestad^a, Enoch F. Sam^b, Haneen Farah^c, Daniel Mwamba^d, Jaqueline Masaki^e, Aliaksei Laureshyn^f, Matilda Magnusson^f, Andras Varhelyi^f, Rune Elvik^a, Jenny Blom^a, Thomas Miyoba^d, Laxman Singh Bisht^c

a Institute of Transport Economics, Oslo Norway

b University of Education, Winneba, Ghana

c Delft University of Technology, Delft, Netherlands

d Zambia Road Safety Trust, Lusaka Zambia

e University of Dar es Salaam, Tanzania

f Lund University, Lund, Sweden

Quality check: Hanna Wennberg (Lund University, Sweden)

Project Coordinator

Aliaksei Laureshyn
Department of Technology and Society
Faculty of Engineering, LTH
Lund University

Box 118
221 00 Lund, Sweden

Phone: +46 46 222 91 31
Email: aliaksei.laureshyn@tft.lth.se

web: www.ictct.net/afrosafe/project

Coordinator of WP2

Tor-Olav Nævestad
Institute of Transport Economics

Address
Gaustadalleen 21, 0349 Oslo
Norway

Phone: +47 95 14 73 26
Email: ton@toi.no

Project funding

Horizon Europe
Grant Agreement 101069500

Revision and History Chart

Version	Date	Comment
1	2022-10-12	Template draft
2	2023-23-04	Revised template draft
3	2023-28-08	Revision
4	2024-01-02	Revision
5	2024-08-31	Final version

This project has received funding from the Horizon Europe, the European Union’s funding programme for research and innovation under grant agreement No 101069500.

This publication reflects only the authors’ view. Responsibility for the information and views expressed therein lies entirely with the authors. The European Commission is not responsible for any use that may be made of the information it contains.

Table of Contents

Summary	2
1 Introduction	5
1.1 Background	5
1.2 Aims	6
1.3 The AfroSAFE project	6
2 Theoretical approach and conceptual clarification.....	8
2.1 The Safe System approach	8
2.2 What is the road safety management system?.....	9
2.2.1 Formal aspects of road safety management.....	9
2.2.2 Informal aspects of road safety management	9
2.3 Operationalization of Safe System RSMS	10
2.4 What may hinder implementation of RSMS in low- and middle-income countries?	11
2.4.1 Lack of reliable crash data.	12
2.4.2 Lack of traffic-institutional influence	12
2.4.3 Lack of supporting infrastructure / larger societal factors.....	13
3 Methods.....	15
3.1 Approach to data collection and analysis.....	15
3.2 Document analysis	17
3.2.1 Information sources	17
3.2.2 Analysis	18
3.3 Focus group interviews	18
3.3.1 Recruitment and composition of the sample.....	18
3.3.2 Themes in the interview guide.....	19
3.2.3 Analysis of focus group interview data.....	20
4 Results	22
4.1 Road safety management in the countries.....	22
4.1.1 Definition of the burden and nature of road casualties.....	22
4.1.2 Commitment for road safety and support from decision makers	23
4.1.3 Road Safety Policies and Visions	24
4.1.4 Definition of Institutional Roles and Responsibilities.....	24
4.1.5 Identification of Road Safety Problems.....	25
4.1.6 Setting road Safety Targets.....	26
4.1.7 Formulate strategy and action plans	26
4.1.8 Allocate Responsibility for Measures.....	27
4.1.9 Ensure funding.....	27

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations	
4.1.10 Implement measures with Known Effectiveness	28
4.1.11 Monitor Performance	28
4.1.12 Stimulate research and capacity building.....	29
4.2 Factors influencing road safety management.....	29
5 Concluding discussion.....	31
5.1 Comparison of the European and the African countries	31
5.1.1 Insufficient systematic approach in the African countries.....	31
5.1.2 Lower level of implementation of existing plans	31
5.2 How can we explain the differences between European and African countries?	32
5.2.1 Inadequate data collection and analysis.....	32
5.2.2 Insufficient institutional capacity.....	32
5.2.3 Limited financial and human resources	33
5.2.4 Commitment to road safety	34
5.2.5 Culture and understanding of road safety	34
5.3 Recommendations to the African countries	36
5.3.1 General recommendations based on the analysis	36
5.3.2 Recommendations taking impeding factors into account.....	36
5.4 Methodological weaknesses and possible bias	37
5.5 Issues for future research	38
5.5.1 How important is culture among stakeholders?.....	38
5.5.2 How can lead agencies be strengthened?.....	38
5.5.3 How can a sense of urgency be created?	38
6 Acknowledgements	40
References.....	41
Appendix 1: Interview guide.....	45
Appendix 2: Road safety management in the countries.....	47
1) The burden and nature of road casualties	47
2) Commitment and support from decision makers	48
3) Road safety policies and visions	50
4) Defining institutional roles and responsibilities	51
5) Identification of road safety problems	55
6) Setting road safety targets.....	56
7) Formulate strategy and action plans	61
8) Allocate responsibility for measures.....	65
9) Ensure funding.....	66
10) Implement measures with known effects.....	68
11) Monitor performance	69

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

12) Stimulate research and capacity building 70

Summary

The success of certain Northern European countries when it comes to road safety records can be attributed to a road safety management system (RSMS), which is based on the Safe System approach. There is reason to believe that low-and-middle-income countries can learn from these principles. This is especially relevant in African countries, as this region has the worst fatality rate (per population) among all world regions.

In the present study, we therefore compare road safety management in three European countries (Norway, Sweden, Netherlands) which have had the best safety records in the world for several years, with three African countries (Ghana, Tanzania, Zambia), with poorer road safety records. Comparing WHO (2024) estimated numbers of road fatalities per million capita in 2021, the numbers in Norway, Sweden and the Netherlands were 15, 21 and 34 killed per million inhabitants, while the numbers in Ghana, Zambia and Tanzania were 259, 171 and 158 killed per million inhabitants.

The road safety management in the European and African countries are evaluated according to a Safe System “checklist” for road safety management systems, developed by Varhelyi (2016). The European countries’ RSMS are mainly in line with the Safe Systems principles for road safety management, as described by Varhelyi (2016). This is not surprising, as the description of RSMS following Safe System principles largely is based on what these countries do, including principles from occupational safety management (e.g. the Haddon matrix, cf. Haddon 1990).

The African countries do not have visions and road safety policies like Vision Zero or Sustainable safety, e.g. with the principles of Safe System when it comes to system owner responsibility, forgiving and anticipating road system etc. However, Safe System implementation is not just about vision, it concerns the continuous improvement process: “Plan-Do-Check-Adjust”. What the European Safe System countries have in common is an ongoing continuous improvement process; with alignment between formal (official plans/strategies) and informal (actual implementation) aspects of RSM.

They have:

- 1) Adequate statistics and data on accidents, injuries exposure and risk for different groups,
- 2) Comprehensive safety performance indicators (SPIs) measuring all Safe System pillars,
- 3) Quantified targets related to SPIs,
- 4) Strategies and action plans to improve the SPIs to reach the targets,
- 5) Relatively clearly defined responsibilities for implementation of the measures in the action plans and
- 6) Annually monitored and reported status of all SPIs.

The African countries do not have this continuous improvement process to the same extent. For example, the most recent road safety policy from Tanzania is from 2009. In Ghana and Zambia, there is a gap between formal plans and actual implementation, as described in step 1-6.

In the European countries, the RSM systems comprise stable and comprehensive institutional systems, networks, cultures, and routines, encompassing the continuous improvement logic described in step 1-6. In the focus group interviews, e.g. in Norway it was stated that this institutional system is robust enough to limit the choices of politicians who wants to make changes. This is partly because of the Vision Zero ethics, which is commonly accepted, the strong scientific foundation and the established continuous improvement approach and cooperation model in the action plan for road safety. This is different from the situation in the African countries.

A basic factor contributing to the insufficient systematic approach in the African countries is insufficient data on road accidents and indicators. The accident data in the African countries are incomplete, as indicated by the discrepancies between official numbers for annual road fatalities and

the numbers estimated by the WHO (WHO 2024). Good data on accidents and SPIs is a precondition for Safe System RSMS, as noted in step 1 and 2 of the continuous improvement process listed above.

Previous research indicates that the weakest components of RSM systems in Europe are policy implementation and funding, and the lack of knowledge-based road safety policy making. This applies to an even greater extent in the studied African countries. Ghana and Zambia have formal road safety strategies and plans in place, with SPIs related to different Safe System pillars, but the status for these SPIs is not sufficiently followed up, neither are the effects of different measures evaluated.

Thus, when it comes to the question of whether the road safety action plans and strategies are living systems that are used in practice, and whether the measures in the action plan are implemented in line with the plans, there seems to be an important difference between the European and the African countries. The African data indicates challenges related to implementation of the plans, while the action plans seem to be far more “alive”, i.e. implemented in the European countries. Thus, there seems to be a larger discrepancy between formal and informal aspects of road safety management in the African countries; between plans and implementation. Focus group interview results indicate that the discrepancy between formal and informal aspects of road safety management is the main difference between the European and African countries. In the African countries, the formal elements of the RSM system (plans, strategies) may be there, but there is not the same progress in the continuous improvement process, described above in step 1-6, as in the European countries. Thus, it is relevant to ask why there is a larger discrepancy between plans and implementation in the studied African countries.

The first factor to explain the discrepancy between plans and implementation in the African countries, as highlighted in the focus group interviews was a lack of funding of road safety measures. National economy is of course also a relevant factor here, as the European countries in our study are high income countries, while the African countries are low income countries.

It could be relevant to relate the lacking financing of road safety to insufficient commitment and support for road safety among decision makers. This was mentioned in the interviews but this is not necessarily a sufficient explanation. What was clear from the interviews, is that in a situation with scarce resources, road safety must be prioritized, in competition with other concerns.

Another important factor highlighted in the data from the African countries was that the institutional capacity of road safety agencies and stakeholders is too weak. Tanzania lacks a leading agency to coordinate the work on road safety, and it is unclear who has the main responsibility for road safety. Focus group participants also mentioned a need for better coordination among organisations working with road safety in Zambia.

A key factor that was mentioned in the focus group interviews was inadequate data collection and analysis, related to road accidents and SPIs. Good data on accidents and SPIs is a precondition for Safe System RSMS.

Based on our study, we develop general recommendations as to how the African countries can learn from the Safe System countries in their road safety management. These are:

- 1) Establish a lead agency with coordinating responsibility for road safety, and a monitoring and coordination forum, consisting of the parties involved in road safety work.
- 2) Base the general road safety strategy on Safe System and Vision Zero, and work systematically with the Safe System pillars, as described in the following points:
- 3) Improve the collection of road accident statistics and data, as this is a basic premise of an effective road safety management system.
- 4) Establish comprehensive safety performance indicators (SPIs) measuring all Safe System pillars, and monitor and report the status of these at least annually.

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

- 5) Set quantified targets related to accidents and SPIs measuring all Safe System pillars.
- 6) Develop strategies and action plans to improve the SPIs to reach the targets. Choose the most effective and relevant measures based on scientific research.
- 7) Provide a clear definition of responsibilities for implementation of the measures in the action plan.
- 8) Monitor and report annually the status of the measures and their effectiveness when it comes to fulfilling the targets.

We also provide recommendations taking impeding factors into account. Given the factors impeding road safety management system implementation in the studied African countries, e.g. economical conditions, insufficient institutional robustness etc., it might be more realistic to start off in a smaller scale than suggested above. At least a smaller scale approach seems to be more realistic as an immediate approach, while building institutional robustness and a systematic continuous improvement approach is a more long term project. The same applies to e.g. improving national economy, as we have seen that poor economy is an important constraining factor. Thus, the point of departure for the recommendations taking impeding factors into account is e.g. resource scarcity, which requires prioritizations.

With this in mind, we recommend to choose one main road safety challenge and have a primary effort on this (e.g. pedestrian fatalities). It is probably also necessary to focus on certain routes, areas or destinations (e.g. schools). This means to have a living continuous improvement process related to one main challenge in one limited area; to implement Safe System elements related to one specific issue in a given area, instead of a “total makeover”. If resources only allow a full continuous improvement process in one geographical region, that might also be possible. We presuppose that this is possible, with limited resources. Thus, this means to follow the continuous improvement steps we have described with respect to one road safety challenge in one specific area. It might also be possible to implement the steps within one organisation. We suggest an approach for doing this.

1 Introduction

1.1 Background

According to WHO estimates, 1.19 million deaths occur in traffic each year (WHO, 2023). The low- and middle-income countries are the main location of road safety problems globally, standing for 93% of traffic fatalities, a share which is completely out of proportion if accounted for their populations and vehicle fleets (Academic Expert Group, 2020). Traffic fatality rate (per population) in Africa is the worst among all world regions and is 3 times as much as in Europe (4 times in comparison to EU-countries). There has been a constant growth in African traffic fatalities and the number is expected to increase by another 68% over the next decade if nothing is done. The experience of many countries shows that the trend can be broken, and positive dynamics achieved within relatively short time if road safety gets proper attention and is treated in a systematic way.

The expertise and experiences of the countries that are best performers in road safety are highly relevant for African countries. During the 1990s, a real ‘revolution’ took place in the world of road safety. Countries like Sweden, Norway and the Netherlands were pioneers in formulating and then implementing what was later called the Safe System approach to road safety. The approach emerged as a response to a slowdown in traffic fatalities and injuries reduction and realisation that ‘doing more of the same’ would not bring the ultimate solution to the road safety problem (Green et al., 2022). Partly as a consequence of the adoption of the Safe System approach, Norway, Sweden and the Netherlands experienced strong reduction in traffic fatalities. Norway experienced a 73% reduction in traffic fatalities from 2000 to 2020; Sweden experienced a 63% reduction; Netherlands a 50% reduction. The two former countries have been world leaders in road safety in recent years.

By now, Safe System has become the state-of-the-art in road safety management, and it is recommended to countries worldwide (WHO & UN, 2021; ITF 2022a). Based on a systematic review of Safe System research, Khan and Das (2024) conclude that the Safe System approach holds great promise in reducing road traffic injuries and fatalities, and that the emphasis on shared responsibility, forgiving infrastructure, safe vehicle design, and speed management has shown positive effects in numerous case studies and real-world implementations.

The focus of the study is on the first pillar in the Safe System approach, which is road safety management. According to Muhlrad et al. (2011, 2014), a road safety management system (RSMS) can be defined as a complex institutional structure that involves cooperating and interacting bodies which support the tasks and processes necessary for the prevention and reduction of road traffic injuries. RSMS involves several elements, actors and processes, e.g. national public roads authorities with sector responsibility for road safety, road safety visions, safety performance indicators, targets, effective measures etc. (Varhelyi, 2016; Elvik and Nævestad, 2023; Elvik, 2023). In a recent study, Elvik and Nævestad (2023) conclude that the annual percentage decline in the number of killed or seriously injured road users in Norway has been considerably greater after Vision Zero was adopted in 2001 than it was before, indicating the importance of the Safe System to road safety management for road safety records.

We see that the success of certain Northern European countries when it comes to road safety records can be attributed to a road safety management system, which is based on the Safe System approach (Elvik and Nævestad, 2023). There is reason to believe that low-and-middle-income countries can learn from these principles (ITF, 2022).

This is especially relevant in African countries, as this region has the worst fatality rate (per population) among all world regions. In the present study, we therefore compare road safety management in three European countries (Norway, Sweden, Netherlands) which have had the best safety records in the world for several years, with three African countries (Ghana, Tanzania, Zambia), with poorer road safety records. Comparing WHO (2024) estimated numbers of road fatalities per million capita in 2021, the numbers in Norway, Sweden and the Netherlands were 15, 21 and 34

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

killed per million inhabitants, while the numbers in Ghana, Zambia and Tanzania were 259, 171 and 158 killed per million inhabitants.¹ Thus, the fatal road accident rate per capita is on average 8.4 times higher in the three African countries than in the three European countries. Additionally, the three European countries are pioneers in the field of Vision Zero and Safe System implementation in road transport.

It is, however, important to note that the implementation of the Safe System principles to road safety management may be constrained by factors related to economy, institutional robustness, and national road safety culture etc., and that implementation must be adapted to the national contexts. It is also important to note that some policy elements that are suitable in the European context may be less suitable or effective in an African context.

1.2 Aims

This deliverable provides a case comparison of African countries (Tanzania, Ghana and Zambia) with three EU countries with record of excellence in road safety and practicing Safe Systems principles (Netherlands, Norway and Sweden).

The aims of this deliverable are to:

- 1) Describe for each case country, the existing (formal and informal) system for road safety management.
- 2) Examine the alignment with safe system principles in the road safety management systems in the European countries compared to the African countries.
- 3) Discuss factors influencing Safe System implementation in the African countries
- 4) Develop recommendations as to how the African countries can learn from the Safe System countries in their road safety management.

1.3 The AfroSAFE project

The primary objective of the AfroSAFE project is to make a significant progress in propagation of the Safe System modus operandi within the road safety work context in African countries. This is reached by exposing the local practitioners and decision makers to the state-of-the-art knowledge and practices within road safety management based on Safe System principles, as well as supporting them by sharing necessary knowledge, tools and methods for road safety improvement—adjusted to the African conditions and in tight cooperation with the local actors.

While the AfroSAFE project activities cover all aspects of road safety in Africa, two areas get particular attention and are emphasised in all work packages:

1. Vulnerable road users. VRUs are the largest but most underprivileged road user group in Africa, disproportionately impacted by traffic accidents. Creating safe environments for VRUs has a direct positive impact on several of the Sustainable Development Goals (UN, 2017), such as related to health and well-being (Nr.3), gender equality (Nr.5), sustainable and liveable cities (Nr.11) and climate action (Nr.13).

2. Local expertise building. To achieve Safe System in Africa, it is necessary to reach a critical mass of both road safety professionals and road users with the right knowledge and attitudes. It is a long-term process, and the local educators play the key role in it. The AfroSAFE project thus adopts ‘train-the-trainer’ approach, creating the initial momentum and concentration of local expertise that will continue to spread after the project end.

¹ The numbers are based on estimates from WHO (2024). The estimates from WHO are different from the official numbers of fatal accidents reported by national authorities, especially in the African countries. In Tanzania, the WHO estimated number of road fatalities is seven times higher than the official number reported by national authorities.

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

This deliverable is part of Work Package (WP2) in the AfroSAFE project, and the objectives of WP2 are to:

- Identify constraints and opportunities for improved road safety management in African countries.
- Perform comparative analysis of formal and informal constraints on the road safety management.
- Review sources, ways of collecting and types of data relevant for road safety work and propose a comprehensive system for road safety data collection and management at national level.
- Make a participative review and provide recommendations for revision of existing national road safety programs.

The outputs of the objectives in WP2 are presented in two deliverables. This deliverable: “D2.1 State of road safety management in selected African countries—review and recommendations” presents results of the first objective. Results of the two second objectives are presented in “D2.2 Road safety data and national road safety strategies—review and recommendations.”

2 Theoretical approach and conceptual clarification

2.1 The Safe System approach

The Safe System approach emerged in the 1990s in Sweden and the Netherlands as a response to a slow-down in traffic fatalities and injuries reduction and realisation that ‘doing more of the same’ will not bring the ultimate solution to the road safety problem (Green et al 2022). By now, Safe System has become the state-of-the-art in road safety management, and it is recommended to countries worldwide (WHO & UN 2021, ITF 2022a).

The novelty of the Safe System is the ethical standpoint that road fatalities cannot be accepted, i.e. there is no ‘optimisation problem’ to solve and we must improve road safety until no one is killed or severely injured. Hence Vision Zero, which is another name for Safe System adopted in Norway and Sweden (referring to the systematic management approach to fulfil Vision Zero). The goal of Vision Zero may look unrealistic at the first sight, yet Safe System makes it achievable by clearly limiting the scope of the problem. While minor accidents are likely to continue to happen, all efforts and resources must be focused on prevention of the most severe ones with people injured and killed.

In practical terms, Safe System has its grounds in four fundamental principles (ITF, 2016; Green et al 2022):

- 1) It is human to make mistakes; the traffic system must be designed to tolerate (unintended) errors made by the road users
- 2) The traffic system must be designed so that the external forces in accidents do not exceed the human bodies’ tolerance for biomechanical impacts
- 3) The responsibility for road safety must be shared by those who design, build, manage, and use roads and vehicles, as well as the providers of the post-crash care and emergency response
- 4) All system components must be strengthened to multiply the protection effect; if one component fails, road users should still be protected.

The Safe System approach involves a cultural change (“paradigm shift”) in the sense that the “blame the victim” culture is superseded by “blaming the traffic system”, which throws the spotlight on authorities’ accountability (Green 2022). The Safe System approach is generally summed up in six pillars, describing how road safety work should be organized (WHO & UN, 2021; ITF 2022):

- i) Road safety management:* Multi-sectoral partnerships and lead agencies to develop and lead national road safety strategies, plans and targets; research-based monitoring of implementation and effectiveness.
- ii) Safe infrastructure:* Inherently safe and protective road networks, especially for the most vulnerable (e.g. pedestrians, bicyclists and motorcyclists) road users.
- iii) Safe vehicles:* Standards, consumer information and incentives to accelerate the uptake of active and passive vehicle safety technologies.
- iv) Safe speed:* Speeds within the boundaries of biomechanical tolerance.
- v) Safe road users:* Enforcement and supplementary measures (e.g. public awareness/education) targeting high-risk behaviors.
- vi) Post-crash response:* Appropriate emergency response, treatment, and rehabilitation for crash victims.

2.2 What is the road safety management system?

2.2.1 Formal aspects of road safety management

Describing the road safety management system (RSMS), we draw on a theoretical model that was developed in the DaCoTA project funded by the European Commission (Muhlrad et al 2011). The project developed a theoretical model of RSM and a survey or checklist to measure all aspects of RSM in European countries. We have concretized the model using the Varhely's (2016) description of 12 key elements of road safety programs.

Muhlrad et al (2011) refers to road safety management as a government area geared at reducing the number of road crashes and victims on the territory and in the population governed. Additionally, Muhlrad et al (2011) define policymaking as a cyclical series of tasks. Policy making begins in the 1) agenda setting stage with recognition and definition of a significant public problem and an organized call to government action. In response, the legislative and bureaucratic machinery of government and associated non-governmental stakeholders may 2) formulate policy to address the problem, 3) adopt policy in the form of legislation or rules, 4) implement the policy to address the problem (writing procedures, guidance, grants). The final stage is the 5) Policy evaluation, to determine whether the policy addresses the problem and whether implementation is proceeding well. A result of the evaluation may be revisions of point 1-4 (Dunn 1981).

To accomplish all the tasks of policymaking, four management processes are required (Muhlrad et al 2011): A) inter-sectoral coordination, B) consultation of non-governmental stakeholders, C) knowledge production and use (e.g. road safety analyses and measures) and D) capacity building (e.g. resources, knowledge, funding). According to Muhlrad et al (2011), a road safety management system (RSMS) is required to support these four essential processes and the policy-making tasks. RSMS can be defined as a complex institutional structure that involves cooperating and interacting bodies which support the tasks and processes necessary for the prevention and reduction of road traffic injuries (Muhlrad et al 2011).

Road safety management is complex. It involves several different actors, e.g. national authorities (e.g. road, health, justice, police), regional and local authorities, NGOs, private organisations (e.g. insurance, car manufacturers), and several different activities.

Another key feature of the RSM system is that it involves systematic work to ensure continuous improvement in road safety (Gitelman & Dovich 2016). This is often referred to as "Plan, Do, Study, Adjust", or PDCA. The PDCA process of continuous improvement consists of four elements:

- 1) Plan. Define policy, implementation plan, required resources, identify criteria /indicators of safety level.
- 2) Do. Carry out the implementation plan to achieve policy and objectives.
- 3) Check. Review indicators.
- 4) Adjust. Adjust measures if necessary, to achieve the goals.

This process implies that the organization has control over key figures, sets a goal to improve these, establishes a plan for how it should be done, follows up on key figures to examine effects and adjusts the measures if necessary, to reach the goals. The PDCA process of continuous improvement is a model of how to facilitate systematic learning in organisational settings, i.e. creating, maintaining and transferring knowledge (Crossan 1999). These PDCA elements are common in most processes of continuous improvement and RSM systems, including the implementation of Safe System.

2.2.2 Informal aspects of road safety management

In the foregoing, we have mainly focused on the formal aspects of RSM, i.e. the formal plans and strategies. We should however not take for granted that formal plans and strategies always are

implemented in line with intentions. Analysing the RSM system, it is therefore important to discern between the formal and informal aspects of road safety management. Research on safety indicates that there often may be a considerable gap between the two (Antonsen 2009). In accordance with this, analyses of road safety policies indicate that the weakest components of RSM systems in Europe are policy implementation and funding and the lack of knowledge-based road safety policy making (Alfonsi et al 2016).

The formal aspects of road safety management ("how things should be done") are the above mentioned formal routines and measures that enable systematic work with RS, e.g. by establishing formal safety policies and objectives, establishing important roles and responsibilities, systematically gathering information about accidents and road safety indicators, developing countermeasures, monitoring their effect, and adjusting measures if necessary. The informal aspects of road safety management generally refer to safety culture ("how things are actually done"), which can be defined as shared and safety-relevant ways of thinking or actions that are (re)created through joint negotiation by people in social settings (Nævestad 2010). Analysing the quality of national road safety management systems, safety culture thus refers to how the processes of continuous improvement in road safety management actually are conducted and implemented by the actors involved in national road safety work. Muhrad et al (2011) underlines the importance of informal aspects of RSM, or safety culture for the actual implementation of road safety plans and strategies.

2.3 Operationalization of Safe System RSMS

It may be challenging to find an operationalization of Safe System RSMS. There are several examples of frameworks describing the elements of Safe System RSMS, and one of the most well-known recent examples are provided by the ITF (2022). The ITF framework, however, includes several items that it is not straightforward to define operationally, and it is not clear how this framework is based on research examining key elements and their relationships to safety records.

Várhelyi (2016) provides, however, an operationalization of Safe System RSMS in a literature review aiming to describe the most important aspects of effective national road safety programs. The literature review includes a high level of studies, examining common and crucial elements in national road safety programs. The result of the review is 12 twelve essential elements that should be covered by national road safety programs. Varhelyi (2016) refers to these as the systematic approach to road safety management. These 12 elements provide a relatively good depiction of full alignment with Safe System principles for road safety management, and they are also relatively operational (Elvik and Nævestad 2023).

We will outline these elements in the following. The elements include both formal and formal aspects of RSM, and they provide a sequential narrative, so to speak of the elements of RSMS.

1) Define the Burden and Nature of Road Casualties. This involves mapping the number and types of fatal accidents, including defining monetary valuation of the prevention of a fatality/injury accident. Monetary values of statistical life are necessary in socio-economic assessments of infrastructure investments.

2) Gain Commitment and Support from Decision Makers. There is accumulated knowledge among road safety scientists on which strategies and measures are the most efficient, but without commitment from the decision makers, these will not be realized.

3) Establish Road Safety Policy or Vision. E.g. Vision Zero in Norway and Sweden and the "Sustainable safety" policy in the Netherlands.

4) Define Institutional Roles and Responsibilities A crucial issue here is the existence of a responsible body for road safety on the national level, and definitions of institutional roles and responsibilities for important functions of road safety management. This involves responsibility for e.g. accident data registration, road maintenance, vehicle inspection, vehicle register, driver training,

driver testing, driving-license register, enforcement of traffic rules, emergency assistance, road safety analyses, research and documentation services, training of professionals.

5) Identify Road Safety Problems As a basis for road safety actions and countermeasures, the road safety problems of the country should be identified in a systematic way. When presenting the road safety situation for a country or region, risk values based on the number of casualties related to some exposure measure are often used. Varhelyi (2016) writes that access to exposure data for all types of road users allows to perform the so called three-dimensional analysis of road safety problems. This includes: 1) “exposure” (person-kilometres per year), 2) “risk” (number of injury accidents per person-kilometres per year) and 3) “consequence” (number of killed per number of injury accidents per year). To analyse the road safety situation, non-accident-based Safety Performance Indicators (SPIs) should also be used. These are measurements that are statistically related to accidents or injuries and are used in addition to accident or injury statistics in order to indicate safety performance. SPIs are quantifiable and can be compared across countries and over time.

6) Set Road Safety Targets. These should be based on the number of killed and severe injured, in addition to the safety performance indicators, focusing on road users, vehicles and infrastructure, including complementary, non-accident based safety performance indicators of RS. To be able to set Road Safety Targets of relevance, the most salient road safety issues should be identified. Typical problems based on experience from countries where the road safety situation has been analysed, ranked according to the size of their contribution to fatalities and injuries, are: speeding, poor vehicle crashworthiness, high risk of unprotected road users, drinking and driving, insufficient medical and rescue services for accident victims and roadside obstacles (Varhelyi 2016).

7) Formulate Strategy, Action Plan, e.g. with challenging, yet in principle achievable targets, priority to measures with known effectiveness, considerations of costs and expected benefits, a timetable.

8) Allocate Responsibility for Measures The responsibility for each of the indicators/actions, such as e.g. “Speed limit compliance”, “Share of vehicles having 5 stars on NCAP scale”, as well as monitoring of performance and outcome of all the above should be allocated to one respective responsible body.

9) Ensure Funding Resource allocation is critical, and it must be part of the road safety programme. The responsible bodies should be supplied with sufficient funding to implement cost-effective road safety measures.

10) Apply Measures with Known Effectiveness, e.g. based on the Handbook of Road Safety Measures (Elvik et al 2009).

11) Monitor Performance. The status of the target indicators should be monitored on a yearly basis, and feedback on their performance should be given to the responsible bodies and to the national coordinating body; if any of them does not develop in the right direction, suitable countermeasures should be taken.

12) Stimulate Research and Capacity Building. This involves developing research based knowledge on road safety problems and evaluate effectiveness of measures.

These 12 elements provide an ideal picture of effective national RSMS. And it is evident that the described 12 points may be far from the reality in several countries, especially in low and middle income countries. Below, we discuss why.

2.4 What may hinder implementation of RSMS in low- and middle-income countries?

In this section we present background information relevant to the third aim of the study, which is to discuss factors influencing Safe system implementation in the African countries.

Analyses of road safety policies indicate that the weakest components of RSM systems in Europe are policy implementation and funding and the lack of knowledge-based road safety policy making (Alfonsi et al 2016). Muhlrud et al (2011) underline that the RSMS is linked to the external environment, which provide pre-conditions for effective RSMS. The first precondition is a political will at the higher level, which is necessary to set up new institutions cutting across the usual administrative sectoral hierarchies and therefore introducing new links and working patterns. The second precondition is a climate/vision (“road safety culture”) shared by the road safety actors and the road users which makes policy implementation feasible and policy adoption smoother.

Although the safe system approach has proved successful, this success is mostly limited to Western developed countries. Several authors mention explanations for why the safe system approach seems to struggle in individual low-income nations, but their explanations are scattered, making them challenging to synthesize. We find that these explanations mainly revolve around the lack of reliable crash data, traffic-institutional influence, and supporting infrastructure. These problems make implementing a safe system approach in low-income countries difficult. Below, we go through each of these points in more detail.

2.4.1 Lack of reliable crash data.

One of the central aspects of the safe system approach is implementing only evidence-based measures. Without such data, one cannot know where and what type of measures should be implemented. Furthermore, if measures are implemented, one cannot assess their effect with a reasonable degree of certainty. Thus, reliable data on road accidents and SPIs is a precondition of the whole RSMS process of continuous improvement described above, and specified in Varhelyis’ (2016) 12 points.

Other studies using police data from low-income nations seem to question their validity. In their study on traffic crashes in Kenya, concerning the police data, the authors express “Since the police only record crashes that are reported and deaths occurring on the spot, this data source is therefore likely to underestimate the true magnitude of road traffic fatalities” (Odero et al., 2003: 54). Similar concerns were shared for the medical data. The authors state that “The reports, compiled by the health information system unit, are based on data submitted quarterly by only 45% of government health facilities; private and nongovernmental institutions do not normally send reports to the Ministry. The routine reports are grossly incomplete and imprecise with respect to demographic characteristics and information on the cause of injury” (Odero et al., 2003, p. 54).

The WHO global status report on road safety from 2018 shares the same concern regarding mortal traffic crash data. Its report from 2018 lists nearly half of the countries as “Countries without eligible death registration data” (WHO 2018). The traffic deaths in these countries are imputed based on factors such as national speed limits, alcohol consumption, GDP, and the corruption index (Kaufmann et al., 2009). For example, in Pakistan, the WHO estimates are 6.2 times higher than the reported number. In Ghana, they are 3.9 times higher.

2.4.2 Lack of traffic-institutional influence

Successful implementation of a safe system approach relies on a sufficiently financed, functional, and influential road safety agency. The collection, validation, and analysis of traffic crash data, an overview of implementations and intervention, giving input to policy, and guiding research are necessary components of a fully implemented safe system approach. Furthermore, some of these functions should not be performed by the same institution. For example, if one institution is responsible for implementing crash prevention measures and reporting annual crash numbers, conflicts of interest can arise. Institutions can be tempted to report that they did not waste money on ineffective road safety measures.

While traffic-institutional influence is difficult to operationalise, there seems to exist a trend where it is low or non-existent in a considerable portion of low-income countries. WHO (2018) report that

although most countries have a lead road safety agency, the agency often does not have funding based on the national budget, undermining its influence as a national organ (WHO 2018). Furthermore, about half does not have a national road strategy, one-third has a fatality reduction target, and no low-income country has their strategy fully funded.

While a lead road safety agency's existence and funding are simple to operationalise, an agency's influence is difficult to measure. Existing research on the topic has pointed out that this is often missing (Usami et al., 2021). For example, in the Trauma-Ouaga project (ITF, 2016), which aimed at improving the crash data collection in Burkina Faso, the National Road Safety Agency chose not to participate based on what seemed to be resource issues. Similarly, when discussing the development of road safety strategies for low-income countries, Jadaan et al. (2018) state, "However, some of these attempts were not very comprehensive and many were not fully implemented". This also seems to be a problem for some newly industrialised countries (Yahya et al., 2013).

While data is limited, and one cannot generalise across all low-income countries, there seems to be a trend where the traffic-institutional influence is low. A national traffic institution, if it exists, often lacks the funding and influence to operate at a level required for a safe system implementation. Without an influential and capable road safety institution, implementing a safe system approach is very difficult.

2.4.3 Lack of supporting infrastructure / larger societal factors

Finally, the existing research has often pointed towards a lack of supporting infrastructure to back a safe system implementation. We may also refer to many of these as more general societal factors (e.g. economy, corruption, quality of the health care system). A complete implementation of a safe system approach relies on factors outside of pure traffic-related elements. For example, research has pointed out the lack of police resources to measure the blood alcohol levels of drivers and insufficient capacity of the healthcare sector (Museru et al., 2002). Furthermore, nationwide factors such as corruption, quality of the healthcare system, and GDP are relevant.

Equipment. When investigating police records for factors contributing to road traffic accidents in Tanzania, Museru and Mcharo (2002) report that the records show that intoxicated drivers caused 1% of crashes. However, in their discussion, they write that " [...] the Tanzanian Police have no mechanism for measuring blood/alcohol content. The few breath analysers are routinely under utilised and this could be a source of under reporting." (Museru et al., 2002, p. 25). While it is difficult to evaluate the validity of statements not backed by empirical data, based on the fact that the researchers live and work in Tanzania, the statement has some weight. Regardless, if the police are not sufficiently funded or trained, they cannot enforce rules and regulations nor report accurate data. This is especially important as seatbelt enforcement has been found to be one of the most cost-effective road traffic measures (Daniels et al., 2019). Sufficient police funding is necessary for a complete safe system implementation.

Health care. The police are not the only institution that requires sufficient funding. Post-crash care is a vital pillar in the safe system approach. This includes response times, available intensive trauma care beds, and an appropriately trained medical staff. If the healthcare sector is not funded to such an extent that it allows for prioritising traffic crash victims, this is a barrier to implementing a safe system. While such a factor is impossible to operationalise completely, we can retrieve some insight from publicly available data regarding the status of nations' healthcare systems (WHO, 2021). This dataset scores 193 countries on 11 factors, such as Health emergency framework and Health service provision. In table 2, we display the mean of all 11 factors. While we do not argue that this accurately represents the status of each country's healthcare system, as this cannot be reduced to one number, we claim that it nonetheless shows a meaningful difference.

Table 2.1: The raw and standardised score of (1) the mean of all International Health Regulations (IHR SPAR): All capacities, and (2) corruption perception index (TIS, 2021), and GDP per capita (World Bank, 2021). "Other nations"

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations represent all other countries in the relevant data source. The healthcare score includes 166 nations, CPI 153 nations, and GDP 220 nations.

	Other nations	LMIC countries
Healthcare score	67.3	46.8
Standardised healthcare score	0.15	- 0.91
Corruption Perception Index	45.6	28.3
Standardised Corruption Perception Index	0.14	- 0.79
GDP per capita (in 2021)	€ 15 822	€ 728
Standardised GDP per capita	0.07	- 0.61

As can be seen in table 2.1, the difference between the healthcare score of the groups is larger than one standard deviation, which is quite considerable. Thus, the same crash may result in an injury in one nation’s healthcare system, and death in another. Consequently, the road safety standard in countries with less developed healthcare systems must be even higher to prevent deaths to the same extent as in other nations. Below, we discuss why this is difficult.

Corruption. In the table above, we also include the corruption perception index. Although the index has received valid criticism (De Maria, 2008), we see it as a general tool for quickly displaying larger differences between groups of nations. Several low-income nations struggle with corruption, potentially hampering an organisation’s ability to act objectively based on available data. For example, in a project to improve road crash data collection by distributing smartphones to police (ITF, 2022b), the head of the national police in Burkina Faso refused, as he feared the officers would declare the smartphones lost and divert them for personal use. Furthermore, suppose that road safety measures such as installing roundabouts are through nepotism and bribes instead used for improved street lighting in high-income areas. In that case, their effectiveness will naturally be reduced considerably. The safe system approach relies on a research-based implementation of measures, requiring an objective system.

Economy. Finally, it is important to keep in mind that the capital for road safety measures in low-income countries is considerably lower. As indicated in Table 2.1, the average GDP of LMIC countries is € 728, or 1/22 of the average of all other nations. This makes the financing of some measures difficult. For example, safety barriers in rural areas, a highly effective measure, have an estimated installation cost of € 39 070 pr. Kilometer (Daniels et al., 2019; Elvik et al., 2009). Similarly, one helicopter intervention has been estimated at € 13 826 (Daniels et al., 2019; Elvik, 2002). While the costs are probably lower in low-income countries, as labour costs are lower, these measures are probably unfeasible when one’s GDP is below € 1000. Thus, effective but expensive measures for improving road safety can be unfeasible, and GDP represents a barrier to implementing a safe system.

All of the supporting infrastructure has in common that all factors represent a barrier to implementing a safe system approach, but no simple solution to barriers and problems exists. Healthcare, policing, corruption, and GDP are relevant factors for a safe system approach, but they cannot be addressed by it.

3 Methods

3.1 Approach to data collection and analysis

We have mainly used two methods in the study: document analysis and focus group interviews. The formal aspects of road safety management have been covered by document analysis, while the informal aspects have been covered through focus group interviews. The process of data collection, analysis and validation have involved participants from six countries. The document analyses have been done by researchers from each country. Additionally, the interviews have been organized and to a great extent been analysed by researchers from the different countries. At least two people from each country have been key in the data collection and analysis. The meetings, data collection, analyses and discussions have involved between 15-25 people, and also more people than this. However, attendance to meetings and discussions has not always include such large numbers of people, but at least the core groups of country project participants.

To coordinate and mainstream the data collection, analysis and validation among the participants, the project group has held 17 WP2 Teams meetings, in addition to some physical meetings between key WP2 participants, at conferences and AfroSAFE project gatherings. These meetings have served as knowledge transfer workshops, where the project management team has trained WP2 participants from the different countries in using the theoretical framework, compared analyses from the different countries, validated analyses from the different countries, and finally examined the degree and character of alignment with Safe Systems principles, and constraints and opportunities for applying the Safe Systems approach to road safety management in the different countries.

More specifically, the purpose of the WP2 meetings has been to:

- 1) Inform about the objectives of WP2 in general and the WP2 deliverables in specific.
- 2) Inform what was expected of the WP2 participants in each country throughout the project period and before the next meeting.
- 3) Inform about, explain, and discuss the theoretical framework for analysing road safety management systems in the participating countries.
- 4) Train all participants on how to understand and use the theoretical framework.
- 5) Inform about and discuss how and when data was going to be collected and analysed.
- 6) Reach consensus about templates for analysis of documents and interviews.
- 7) Train project participants in using the templates for analysis of documents and interviews.
- 8) Plan and organise the data collection and analysis.
- 9) Present and discuss results from the document analysis and focus groups in each country.
- 10) Validate analyses from the different countries.
- 11) Compare analyses from the different countries.
- 12) Examine the degree and character of alignment with Safe Systems principles.
- 13) Discuss constraints and opportunities for applying the Safe Systems approach to road safety management in the different countries.

Table 1 provides an even more detailed depiction of the approach to data collection and analysis, as it shows the main purposes of the WP2 meetings focusing on the analysis of documents and interviews.

Table 1 Main purpose of the WP2 meetings focusing on the analysis of documents and interviews

Meetings (period)	Topics
-------------------	--------

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

<p>Start up in Lusaka, Zambia, Sept. 2022</p> <p>WP2 Meetings 1-5 (Oct. Dec. 2022)</p>	<p>WP2 leader (Nævestad) informed participants about:</p> <ul style="list-style-type: none"> -The objectives of WP2 in general and the deliverables in specific. -The theoretical framework for analysing RSMS systems in the participating countries. -How data was going to be collected and analysed. Presentations and discussions of templates for analysis of documents and interviews. -Discussion of data protection, GDPR and ethical committees. -What was expected of the WP2 participants in each country (when the document data and the interview data will be collected and analysed). -Preliminary version of the report shared for revision and comments -Discussion and planning of Task 2.2-2.4
<p>WP2 Meetings 6-10 (Dec. 2022-March 2023)</p>	<ul style="list-style-type: none"> -Discussion of progress for document analyses. - WP2 leader (Nævestad) informed participants about preliminary results of document analyses from Norway, to exemplify the method and the results. -Presentation and discussion of road safety trends from each of the participating countries: number of fatalities, trends, road users involved, types of accidents etc. -Discuss criteria to assess the alignment with safe systems. -Present and discuss the structure of the WP2 deliverables. -Discussion of data protection, GDPR and ethical committees. -Presentation and discussion of results of document analysis in different countries -Discussion of Task 2.2-2.4
<p>WP2 Meetings 11-14 (Aug.2023-Nov. 2023)</p>	<ul style="list-style-type: none"> -Discussion of respective lists of interviewees and reference list members. Discuss list of interviews in relation to expected output dependent on whom we speak to. -Preliminary version of the report shared for revision and comments -Discussion of interview guide and how to best coordinate interviews. -Planning of interviews, organization of interviews
<p>WP2 Meetings 15-17 (Dec.2023-April 2024)</p>	<ul style="list-style-type: none"> -Presentation of results from focus group interview data analysis in each country -Preliminary version of the report and different paper drafts based on it shared for revision and comments -Discussion of Task 2.2-2.4
<p>Separate meetings with representatives from each country (October 2023-April 2024)</p>	<p>Separate meetings and communication with representatives from each country to organize and plan data collection in each country.</p>

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

<p>WP2 focus group interviews (64 respondents in total)</p>	<p>Norway (March 2023-April 2024), Sweden (April 2024), Netherlands (November 2023), Ghana (November 2023), Zambia (January 2024), Tanzania (January 2024).</p> <p>In these meetings, national representatives in the African countries were also provided with a presentation of experiences and results of Safe System implementation in Norway, including a discussion of practical implications for African countries, by Rune Elvik, followed by questions and a discussion of the relevance of the results from Norway for African countries.</p>
<p>Conferences, with presentation and discussion of (preliminary) results in conferences</p> <ul style="list-style-type: none"> -Ghana, ICTCT, June 2023 -South Africa, African Transport Research conference, March 2024 -Tanzania, ICTCT, June 2024 -Netherlands, ICTCT October 2024 	<p>In these conferences our (preliminary) results have been presented to larger audiences of African road safety researchers and stakeholders, for their views and feedback.</p> <p>Presentation and discussion of the general conclusions on Safe System alignment and influencing factors to national audiences in Ghana and Tanzania.</p>

The next step in WP2 (during fall of 2024) will be to organize workshops with different road safety stakeholders in the African countries (focus group participants and other interested parties) to discuss results, make a participative review and provide recommendations for revision of existing national road safety programs. In these subject expert/practitioner workshops in the African countries participants will identify concrete ways to develop national safety management practices towards goal-driven Safe System management. Participants will define goals for national road safety management, select KPIs to monitor progress towards goals etc. These workshops will take our analyses of Safe System alignment as their point of departure and also the identified factors influencing the level of alignment with Safe System principles in the national road safety management systems. Findings from each workshop will be assimilated in a report on describing what can be done to progress African road safety management strategies towards Safe Systems approaches (i.e. in Deliverable 2.2).

The participative approach has involved training of all participants in how to understand and use the theoretical framework. The theoretical framework underlying the analyses are a combination of Muhlrad et al’s (2011) policy analysis framework combined with a general sociotechnical approach, inspired by the Pentagon model (Schiefløe 2011) and framework conditions (Nævestad and Phillips 2023). The focus of this approach are relationships between: 1) framework conditions like economy, corruption, national rules, institutional robustness etc., 2) Formal factors (e.g. structure; defined roles, responsibilities and authority, technology) and informal factors (culture) in organisational settings and cooperation between organisation, and 3) Outcomes (e.g. organisational capabilities and performance). In our case the latter point; organisational capabilities and performance are measured and defined through Varhelyi’s (2016) list of 12 essential elements of national road safety programs.

3.2 Document analysis

3.2.1 Information sources

To examine national RSM systems’ alignment with the 12 elements described by Varhelyi (2016), we collected and analysed different types of documents, e.g. policy documents (road safety plans and strategies), reports on the status of road safety e.g. according to the focus areas in action plans, official websites, research reports, papers etc. in the three European and three African countries that we study.

The empirical material was found with purposive sampling, with the pre-specified inclusion criteria being documents concerning the status of the 12 elements described by Varhelyi (2016), especially the formal aspects of road safety (i.e. the written information about strategies and plans). We then did a thematic content analysis (Braun & Clarke, 2006), focusing on the status of the 12 elements in each country.

Table 2 shows different types of documents used in the document study in each country. As we see, the main information sources are strategic documents related to road safety (plans, strategies) issued by national authorities, research reports and paper and documents and reports about the state of road safety and road safety management written by consultancies, or national or international NGOs.

Table 2 Types of documents used in the document study in each country

Country	Types of documents
Norway	National action plan for road safety, national transport plan, white paper on the Norwegian cooperation model for road safety, research reports and papers
Sweden	Analyses from the public roads administration and consultancies, research reports and papers, NGO report.
Netherlands	National action plan for road safety, national transport plan, research reports and papers
Ghana	Strategic road safety documents at the national level, research reports and papers, NGO reports
Zambia	Publications from the national public roads administration, research reports and papers, reports by national or international NGOs.
Tanzania	NGO reports, Road safety policy, research reports and papers.

The identification of relevant documents and the analysis of these documents were done by the national research partners in each country, as these documents generally may be difficult to identify and also written in local languages.

3.2.2 Analysis

To ensure a uniform analysis of the documents and uniform interpretation of the 12 elements described by Varhelyi (2016), the project group has held 17 WP2 Teams meetings (cf. Table 1), in addition to some physical meetings, at conferences and AfroSAFE project gatherings. The purpose of these meetings was to mainstream the perspectives among the project participants in the different countries. In these meetings, the collection, analysis and results of the document analysis was discussed.

3.3 Focus group interviews

3.3.1 Recruitment and composition of the sample

We conducted semi-structured interviews, mainly focus group interviews, with 73 people working with road safety in the six countries. Interviews were conducted either physically, or digitally via Microsoft Teams between April 2023 and April 2024, with interview durations ranging from 40 minutes to 2,5 hours (for group interviews).

We employed a strategic sampling method, where the interviewees were selected based on criteria relevant to the research questions. We focused on assembling a sample that represented various roles in road safety work, including e.g. people working in authorities, NGOs and people working as researchers. The purpose was to include people who had knowledge of the 12 elements of road safety management that is highlighted by Varhelyi (2016). These elements include both formal and informal aspects of road safety management. We can to a large extent obtain information about the formal aspects through review of documents. The informal aspects of road safety management, e.g. the

perceived level of commitment to road safety from politicians, authorities, the extent to which road safety strategies are known and alive, whether road safety is sufficiently funded and prioritized etc. is different from what we find in formal documents. Thus, obtaining information about this requires other methods, like e.g. interviews.

To make the interview results comparable, we have aimed to interview the same types of functions in each country. The interviewees are mainly people who work for national road safety authorities, NGOs working with road safety or mobility/transport, or researchers (cf. Table 3).

Table 3 Types of organisations and functions in each country

Country	Dates	Number	Types of organisations, functions
Norway	08.03.2023 08.04.2024	7+4=11	NGO, authorities, researcher
Sweden	29.04.2024 08.05.2024 04.06.2024	6+1=7	Authorities, NGO
Netherlands	21.11.2023 22.11.2023	3+4=7	Road safety authority, researcher, NGO
Ghana	23.10.2023 24.10.2023	16+9=25	Authorities, researchers, NGOs
Zambia	25.01.2024 06.02.2024	6+4+1=11	Authorities, researchers, NGOs
Tanzania	May 2023 30.01.2024, 31.01.2024	2+5+5=12	Authorities, researchers, NGOs working with road safety
Total		73	Authorities, researchers, NGOs

3.3.2 Themes in the interview guide

We used a semi structured interview guide, which focused on the status of the 12 elements of RSM (Varhelyi 2016) and factors influencing the RSM systems’ alignment with Safe System principles in each of the participating countries. Themes in the latter category were e.g. economy and funding, institutional robustness, corruption, insufficient data etc.

The first theme in the interview guide was to discuss interviewees perceptions of commitment and support to road safety from decision makers, whether interviewees think that road safety is high on the agenda in your country?

The next theme was road safety policy. We asked about: 1) Vision for road safety, 2) Strategic document(s) regarding road safety, 3) Road safety plan at the national level. Our focus was which year the documents are from, what they include, how often are they updated, and whether these documents are known by stakeholders and perceived as important and governing for policy? We also asked what the check mechanism is if the defined road safety policy does not go well, or is potentially not effective, or does not work.

The third theme was definition of institutional roles and responsibilities, e.g. whether it is clear who has the main responsibility for road safety in interviewees’ countries (e.g. if there is a lead agency, or if this function is covered. What the coordinating mechanism for road safety work between different actors is, e.g. a road safety forum, road safety plan etc. We asked: Does the cooperation between the different parties work well?

The fourth theme was about road safety data, e.g. “Identify road safety problems”. We asked whether interviewees think that authorities have good enough data about accident, exposure and risk for different road users, situation, places, whether these data are publicly available.

The fifth theme was road safety targets and the work with the action plans, indicators and road safety measures. We started by asking interviewees whether they think that their country has good enough safety performance and indicators and targets for all stakeholders, e.g. applying to road users (DUI, speeding, seat belt use etc), vehicles (share of Euro NCAP with five stars etc), roads (share of highways with median barriers etc).

The sixth theme was strategy and action plan, e.g. whether there is an action plan for road safety, which is known by road safety practitioners/stakeholders, and whether the plan is implemented and measures are followed up, including their effectiveness. We also asked about responsibility for measures; whether it is clear who has responsibility for implementing the measures in the road safety plan, whether the measures in the road safety plan sufficiently funded, and to what extent measures with known effectiveness are implemented to reduce the identified road safety problems, whether authorities measure or keep track of the safety performance indicators, and who checks the quality and accountability. We also asked to what extent research and capacity building is stimulated.

The sixth theme was a general discussion of whether interviewees perceive that the road safety plans and the formal system for road safety management in their country (“what is written”) is alive and implemented in practice?

We invited them to reflect upon factors that can explain the level of implementation:

- a) Economy
- b) Lacking institutional robustness or capacity
- c) Lacking equipment and technology
- d) Lacking knowledge
- e) Other challenges in society are more pressing
- f) Corruption
- g) Lacking commitment to road safety among politicians
- h) Lacking commitment to road safety in the population
- i) Culture/mentality: road accidents are perceived as unavoidable?

The focus group meetings were recorded, and they were partially or fully transcribed. The interviewers took notes during each interview. In accordance with standard research ethics, the study was reported to the SIKT (Norwegian Centre for Research Data). Interviewees were informed about the purposes of the interviews in written invitations in weeks before the interviews, and informed consent was obtained in the start of the interviews.

3.2.3 Analysis of focus group interview data

We conducted thematic analyses of the interviews in several rounds. The aims of such analyses are to identify systematically recurring themes in the interviewees’ descriptions of specific topics (Braun & Clarke, 2006). In our case, these themes were largely given in the interview guide, which involved a “checklist” of Varhelyi’s (2016) 12 elements. However, thematic analysis was nevertheless relevant in several cases, as several topics required a systematic identification of nuances related to different questions. This relates for instance to what “commitment to road safety among decision makers” mean, e.g. in European countries compared with African countries. Although road safety is not necessarily high on the political agenda (like e.g. environmental issues), the studied European countries have comprehensive institutional systems working with road safety with large budgets, which is an indicator that there is a high level of commitment to road safety among decision makers.

Thematic analysis works in the following way: First, the interviews are carefully read and coded. The codes are then organized and grouped into broad categories. In the next step, the categories are reviewed. During this part of the process, the categories are assessed in relation to each other, and the

material, and necessary adjustments are made. Some categories describe the same overarching concept and are merged, while others emerge as subcategories under a more general theme. The result is overarching descriptions that address the most prominent trends (similarities and differences) in the interview data.

First thematic analyses were conducted following the 12-point list for each country separately, and including relevant subcategories and subthemes. We then compared the African countries and then the European countries for similarities and differences. Then we compared alignment with Safe System principles (12 elements) for African and European countries, and finally we analysed the interview data to identify the most important factors influencing Safe System implementation in European and African countries.

4 Results

4.1 Road safety management in the countries

This section addresses first aim of the study, which is to describe for each case country, the existing (formal and informal) system for road safety management. We describe this according to Varhely’s (2016) 12 key elements of road safety management, based on document analysis and focus group interviews. In order to avoid a too detailed outline, we focus on the main differences between the African and the European countries in this section. A detailed overview of each of the 12 points for each country is provided in Appendix 2. The overview in this section and the analyses in the discussion are based on the detailed overview presented in the Appendix.

4.1.1 Definition of the burden and nature of road casualties

The European countries have high quality data on accidents, injuries accident risk and Safety Performance Indicators (SPIs). Nevertheless, focus group participants in European countries were concerned about underreporting, especially for accidents with pedestrians and cyclists. They mentioned that there is room for improvement in reporting of accidents for pedestrians and cyclices, and mentioned research projects aiming to improve the data on accidents for these groups.

The discussions in the focus in the African countries groups primarily dealt concerns for underreporting with the need for more accurate data. The reporting was described as incomplete, both for injuries and fatalities. The lack of correct details of the geographical location of crash sites and their occurrence in point in time was mentioned as one of the main issues. This could also apply to the causes of accidents, number of people and/or vehicles involved etc. The focus group participants in the African countries also discussed the need for digital registration of accident data, to standardize reporting and make the data more accurate and accessible.

In Table 4.1, we sum up the road safety situation in the studied countries in 2021, including averages for European and African countries. The final row includes the groups with the largest shares of killed road users (car= car driver). The numbers are based on estimates from WHO (2024). Moreover, as indicated by the table, the studied African countries have far higher level of road fatalities per capita than the European

Table 4.1 Road safety situation in the studied countries in 2021, including averages for European and African countries, based on WHO (2024).

	NO	SE	NL	GH	TZ	ZA	EUR	AFR
Road fatalities	82	217	0	8494	10052	3338	300	7295
Million population	5,5	10,4	17,5	32,8	63,6	19,5	11,1	38,6
Killed mill. capita	15	21	34	259	158	171	27	189
Killed road users	Car 52%, MC 19%	Car 56%, MC 14%	Cyclists 36%, Car 32%	MC 33%, Ped 31%	Car: 50%, MC 22%	Oth./unkn.: 48%, Car 35%	Car, MC, Cyclist	MC, Ped. Car

It is important to note that the estimates from WHO are different from the official numbers of fatal accidents reported by national authorities. This largely applies to the African countries. In Tanzania, the WHO estimated number of road fatalities is seven times higher than the official number reported by national authorities. In Ghana the WHO estimated number of road fatalities is 2,9 times higher

than reported, while it is 1,5 times higher than reported in Zambia. In the European countries, the discrepancies are 2 fatalities (Norway), 7 fatalities (Sweden) and 12 fatalities (Netherlands).

These numbers indicate underreporting of road fatalities in the African countries, and that the road accident statistics to a considerable extent are insufficient for effective road safety management. If the officially reported number of fatal road accidents is far lower than the actual numbers, the burden and nature of road casualties is only partly known for authorities. Thus, the basis of effective road safety measures; analysis of the number of accidents in certain areas at certain times, with certain road users etc. will be insufficient. Moreover, with uncertain statistics, it might also be challenging to arrive at reliable estimates of developments and trends over time and effects of counter measures.

Varhelyi (2016) states that monetary valuation of statistical life is important for socio-economic assessments of infrastructure investments that may influence road safety. In contrast to the European countries, the African countries do not have monetary valuation of statistical life. Monetary values of statistical life are necessary in socio-economic assessments of infrastructure investments. The expected changes in accident costs (direct costs for damage, medical treatment, administration, loss of productive capacity, loss of welfare) are to be compared to other cost items (such as travel time savings/losses, environmental costs, etc.) that can be monetised. So, monetary values of statistical life are a necessary base for informed decisions on infrastructure investments. Thus, on this point, the policies of the African countries are not in accordance with the first Safe System principle of road safety management.

4.1.2 Commitment for road safety and support from decision makers

Data from the European countries indicate a relatively high commitment for road safety and support from decision makers. One of the Norwegian interviewees said that there is an unambiguous support for vision Zero in Norway:

(Vision Zero) is also rooted in all political parties, it is very special for Norway, it has unanimous political support, so it actually has, it has actually been less discussed here than in Sweden. In Sweden, there was some open opposition to it to begin with, from a smaller number then, but still.

It was suggested, however, that there is not a “feeling of urgency” related to road safety, in European countries, e.g. compared with politicians’ focus on climate change. Several interviewees in the European countries said that the focus on road safety among decision makers was higher a couple of decades ago, and some humorously referred to this as “the good old days”. Some were however concerned that there was a high concern for mobility over road safety among politicians, and that the safety of pedestrians and cyclists was not given enough attention.

It is somewhat challenging to measure and assess commitment for road safety and support from decision makers through interviews, as most will agree that road safety is important. Support and commitment can be on the “linguistic” level (Schein, 2004) (reflected in statements that “road safety is important”) but without actual implementation (i.e. “do not walk the talk”). One indicator is the therefore the extent to which road safety measures actually are implemented by decision makers in a given country (or whether expressed road safety commitment “is just talk”).

Commitment for road safety and support from decision makers was, however, considered relatively high in the European countries, given that these countries have comprehensive institutional systems in place focusing on road safety, and relatively high public spending on road safety measures. Commitment for road safety and support from decision makers was generally rated far lower among the focus group participants in the African countries, although there were diverging views.

Another possible indicator of decision makers’ commitment to road safety could be how important road safety is perceived as a priority among decision makers compared to other prioritizations. Funding of road safety was e.g. compared with funding during COVID-19 in African countries, or funding to address environmental problems in European countries. One of the interviewees in the

African countries contrasted the societal focus on road safety with the governments' focus on preventing deaths during COVID-19.

“I do not think it [road safety] is high on the agenda. With the complex problems our country is facing, road safety is not seen as important. We see this in the number of road fatalities. There is no reaction to accidents and people killed in traffic by government. It is treated as if this is the normal thing. With COVID we saw a strong response from government, policy makers and private institutions. When it comes to road safety, you do not see those kinds of activities.”

4.1.3 Road Safety Policies and Visions

Vision Zero was adopted in Sweden in 1997, when the parliament passed the Road Traffic Safety Bill, stating that “No one will be killed or seriously injured within the road transport system”. Vision Zero was also adopted as the basis for transport safety policy in 2001 by the Norwegian parliament in 2001. Moreover, Netherlands the “Sustainable safety” policy in 1998, stating that “The transport system shall be adjusted to the limitations and possibilities of road users”. These road safety policies also involve several other key principles regarding shared responsibility, road system owner responsibility, meaning that the traffic system must be designed to tolerate (unintended) errors made by the road users, so that the external forces in accidents do not exceed the human bodies' tolerance for biomechanical impacts etc. i.e. the key principles that make up the Safe System approach.

Some interviewees from the European countries referred to a Vision Zero culture; a common way of thinking and seeing things, which regulates behaviour, and which becomes a common point of reference which limits the choices of politicians. One of the interviewees said that:

I think that Vision Zero provides a common anchoring point, a common guiding star. I have no doubt that it has been incredibly important (...) in discussions, there is a lot of good argumentation in it.

This interviewee mentioned an example where the justice sector in Norway wanted to reorganize its service in a way that would shut down the services of the traffic police. The interviewee said that the transport minister stepped in and complained that it would negatively affect Vision Zero if the traffic police was shut down. Politicians were involved, and the traffic police was not shut down. The basis for not shutting down the traffic police, was that research shows that police enforcement is a very effective traffic safety measure.

The African countries do not have visions and road safety policies like this (with the principles of Safe System when it comes to system owner responsibility), although it can be mentioned that Ghana's vision for road safety is to make Ghana the nation with the safest road transport system in Africa.

4.1.4 Definition of Institutional Roles and Responsibilities

Sector responsibility for road safety (e.g. for public roads administrations) is established in the European countries, although it can be noted that the Dutch system involves far more freedom for e.g. regional authorities. Thus, it is more difficult to ensure that Sustainable safety actually is implemented at lower levels, by regional and municipal authorities. Additionally, national road safety committees exist in the European countries, which follow up action plans targets, etc.

When it comes to the African countries, responsible bodies are defined, but Tanzania stands out as an example where it is unclear which body has the main responsibility for road safety. Participants in the focus groups said that currently, there is no lead agency for road safety in Tanzania. The responsibilities for road safety are distributed to several different bodies with each their mandate that involve road safety. It is not clear in all cases who has the main responsibility for different aspects of road safety management. The cooperation between different parties' work on an ad hoc basis due to the lack of a lead agency. One of the participants from Tanzania stated that

“The responsibility is scattered. There is no lead agency for road safety.”

The participants seemed to agree that there was a need for a lead institution that could co-ordinate the actions taken by these bodies and to ensure a systematically approach to road safety across agencies. In Zambia, several of the focus group participants emphasized the need for a cross sectoral group to manage road safety issues, which currently do not exist in Zambia. Several also emphasized the need for better communication between government and the private sector, ensuring private sector engagement in road safety issues, securing investments and commitment to new standards developed by government.

The studied countries also have definitions of institutional roles and responsibilities for important functions of road safety management to be defined, i.e. who should be the responsible for the accident data register, road maintenance, vehicle inspection, vehicle register, driver training, driver testing, driving-license register, enforcement of traffic rules, emergency assistance, road safety analyses, research and documentation services, training of professionals. A crucial issue is however the coordination of these functions. In Norway, Sweden and the Netherlands, it occurs through sector responsibility or something relatively equal to that, and joint committees working with road safety action plans, with clear definition of responsibilities.

4.1.5 Identification of Road Safety Problems.

As a basis for road safety actions and countermeasures, the road safety problems of the country should be identified in a systematic way. Norway, Sweden and the Netherlands have high quality data on exposure (e.g. person kms per year) and accidents to be able to calculate risk (number of accidents per person-kilometres per year) for different modes of transport. Based on this, countermeasures can target factors related to infrastructure, road user and vehicles when it comes to factors reducing exposure, probability of accidents (risk) and consequences of accidents. Additional Safety Performance Indicators (SPIs) are also relevant, as these are statistically related to accidents or injuries and indicate safety performance. SPI examples are: speed limit compliance, driving under the influence rule compliance, seat belt use, share of cars with five Euro NCAP stars etc.

The European countries have a relatively good identifications of road safety problems, with measures of accidents, exposure and risk, including SPIs that are used actively. The European countries also have risk estimates and SPI numbers for different groups of the population, in different areas, at different times of the year, different days, hours etc. which allow for tailored countermeasures. It should however be mentioned that the use of hospital-registered and police-reported data differs between the three European countries. In contrast to the two other countries, Sweden uses both hospital and police reported data on accidents, which is likely to provide a more accurate basis for accident statistics than just relying on police reported data.

Among the African countries, Ghana has defined SPIs in the road safety plan, but their status is not followed up systematically. Focus group participants in the African countries said that there is incomplete data on accidents and fatalities. This is also indicated by the discrepancies between official data and WHO (2024) estimated numbers of road fatalities in the African countries. The incomplete accident statistics makes it challenging for authorities in to have a good overview of road accidents and contributory factors. The incomplete data makes it difficult to carry out in-depth data analysis to identify high-risk areas, and identify the underlying causes of road safety issues, to enable targeted interventions. Good data on accidents and SPIs is a precondition for Safe System RSMS. One of the focus group participants explained that:

“There are inconsistencies in the data collection. For example, we find discrepancy between police reports and what is recorded at the hospitals. Also, there are incidents that are not even reported or recorded. In my opinion, we really do not have good enough data. We need to work on our data system to improve on quality and improve our performance”.

4.1.6 Setting road Safety Targets

The European countries have quantified targets related to the number of fatalities and severe injuries and quantified targets for SPIs related to all the different Safe System pillars. We will give an example from Sweden. In 2020, the government decided on the new interim targets for Vision Zero. The sub targets for road transport are to reduce fatalities by 50 % and serious injuries by 25 % by 2030. Additionally, there are two traffic related goals: reducing suicide in traffic and reducing the number of seriously injured from single pedestrian falls by 25 % (Trafikverket, 2022b).

The current national road safety strategy identified several important risk factors – Safety Performance Indicators for which specific goals are set for 2030 (Swedish Transport Administration 2022). Much attention is given to further implementation of the middle separation (to prevent frontal collisions) on the roads with the speed limits above 80 km/h, or, where it is not feasible, reduction of the speed limits. Speed limit adherence, and reduction of the average speed, have been identified as the major factors to reduce the number of fatalities, too. In 2021, 52,4% of road user drove within speed limits. By 2030, the goal is to reach speed compliance of 80%, and the average speed to be reduced by 5%.

Other important factors are:

- **Speed limit compliance** - 80 % of all vehicle kms within the speed limit by 2030.
- **Sober traffic** - 25%–30% of fatalities during 2012-2021 were in alcohol- or drug-related. The goal is to reach 99.9% sober drivers by 2030.
- **Seat belts** - While the general usage of seatbelts is very high (97.9% in 2020), still one of three killed car occupants was not wearing the seat belt. The 2030 goal is to reach seat belt usage rate of 99.5%.
- **Helmet usage** - Currently, only half of cyclists use helmets (it is not obligatory by law, except for children). The 2030 goal is to reach 80% helmet usage rate. For moped riders, helmet use is obligatory, but the actual usage is only 98%. It must reach 100% by 2030.
- **Crash worthiness of cars** - 100 % of new cars have the highest safety class according to Euro NCAP by 2030.
- **Heavy vehicles** - 100 % of new heavy vehicles are equipped with emergency brake system by 2030.
- **Safe roads** - 75 % of all vehicle kms on roads with speed limit over 80 km/h are on roads with middle barrier.

The other European countries have similar targets, and the status of them are followed up in annual reports. When it comes to the African countries. Ghana is about to set quantified targets related to the number of fatalities and severe injuries and several SPIs. Tanzania and Zambia do not have the same types of quantified targets.

4.1.7 Formulate strategy and action plans

When the Road Safety Targets are in place, a Road Safety Strategy and Action Plan can be formulated. The action plan should: 1) be balanced (actions in all key areas); 2) have challenging, yet in principle achievable targets; 3) give priority to measures with known effectiveness; 4) consider costs and expected benefits; 5) be realistic (taking account of financial constraints); 6) have a timetable (Varhely, 2016).

The European countries have action plans which seem to fulfil many of these criteria, especially the Norwegian. The Swedish action plan is somewhat different. Instead, there is a system for target management of traffic safety work that was implemented in 2008, to create long-term perspective and better systematics. The key elements in the Swedish strategy and action plan are: the management-by-objectives approach (“målstyrningen”) that involves an annual report, an annual conference, a network for collaboration with key actors (GNS) “the Group for Zero Vision in cooperation”, and the action plan. An analysis of safe system implementation using back casting

technique is the basis for setting targets for the indicators and to make prioritisation of measures / implementation areas. These parts should contribute to various actors that influence the design and use of the road transport system take measures within their operations that contribute to the milestone goals for traffic safety.

In the Netherlands, regional authorities make their own action plans, due to the Dutch decentralized approach. Ghana and Zambia, also seem to fulfil these criteria to some extent, as they have action plans in line with the UN's decade of action for road safety. However, when it comes to the question of whether the action plans are alive, and whether the measures in the action plan are implemented in line with the plans, there seems to be an important difference between the European and the African countries. The road safety plan in Tanzania is from 2009, and in the focus groups it was mentioned that a new plan is under way.

4.1.8 Allocate Responsibility for Measures

The responsibility for each of the indicators/actions, as well as monitoring of performance and outcome of all the above should be allocated to one respective responsible body (Varhely, 2016). Additionally, the responsible bodies should receive incentives to ensure their commitment to the targets, and they should be given the authority to decide on how best to realize the targets.

Responsibility is clearly allocated in the Swedish and Norwegian plans. The situation is a bit different in the Netherlands, where the road safety strategic plan highlights that each party operates on the basis of its own responsibility and knowledge. Moreover, the Dutch plan does not contain concrete measures, as these will be included in the national and regional implementation plans, prepared by the road authorities responsible.

Responsibility for measures does not work properly in Ghana, as the action plans have no unique/dedicated budget for these activities. Instead, actions listed in the plans are to be funded with the operational funds of the agencies. The evaluation of the National Road safety strategy III, in Ghana, has revealed that this practice has partly led to the non-fulfilment of intended activities in the plans. And there is a lack of one responsible body to ensure all safety measures are monitored in Tanzania. This is not in accordance with Safe System principles.

4.1.9 Ensure funding

In the European countries, most of the road safety measures in the road safety action plans are implemented by the public sector. Most measures are funded by general taxation, but large road investments (motor ways) are also funded by road users. Focus group participants in European countries stated that road safety is not sufficiently funded. This applies e.g. to maintenance of roads and infrastructure. Although it is evident that funding of road safety activities is far from perfect in the European countries, the funding is far better than in the African countries. This is related to different economic conditions in the studied countries.

Focus group participants in the African countries agreed that measures for road safety is not sufficiently funded. The participants discussed the lack of funding as a hindrance for work on road safety. It was also mentioned that road safety authorities are understaffed because of lacking funding. One of the participants explained

“They [road safety authority] are really understaffed. They have four-five people covering the whole country. Also, the Department of Transport is understaffed. They should be maybe a 100 people, but they are just a handful of people there today.”

One of the other participants stated that the road safety authority has no funding of manpower or technical equipment. One of the focus group participants from the government in one of the African countries explained that:

“Most of the road safety initiatives that has been mentioned ... they're not well funded, so .. our country still needs a lot, and that's how come we want to partner. We like to partner with other entities in order to fund the road safety initiatives like it has been mentioned here”.

Other entities in this case refers e.g. to larger NGOs and other funding organisations.

4.1.10 Implement measures with Known Effectiveness

Results from the European countries indicate that road safety policy to a considerable extent is evidence-based. Several interviewees mentioned that in order for road safety measures to get funding, e.g. in Norway, you have to justify based on research that the measure actually is related to reductions in road accidents. This is required by national authorities, when funding is allocated to measures in the national action plan for road safety. Thus, it was underlined that the road safety policy to a great extent is science based, and that measures with known effectiveness must be implemented. It can, however, be mentioned that some of the measures in the action plans are not described in detail which makes it hard to draw any strict conclusions on their known effectiveness.

Our data seem to indicate that the situation is worse in the African countries. The focus groups discussions in Tanzania gave the impression that the road safety strategy from 2009 is not characterized by research-based measures with scientifically proven effect on accident reduction. Only one of the focus group participants had been involved in the making of the new strategy for 2024-2030, but the focus group discussion did not give details of the content of this new strategy. Other measures for road safety were discussed.

According to the focus groups participants there has been implemented several ad hoc measures for road safety in Tanzania. According to the focus groups participants in Zambia, there has also been implemented several ad hoc measures for road safety in Zambia, like speed cameras and police checkpoint. The police checkpoints are located at “black spots when it comes to road traffic crashes”. The RTSA are implementing speed cameras on dedicated road sections, based “off the analysis of the statistics of crashes on those roads”. The RTSA are also doing initiatives for “education in communities and in the schools.”

Finally, it is also important to note that even if countermeasures have been tested in various countries, they should also be tested in the country in question, since there may be differences in geographical settings, traffic culture, regulatory aspects, norms and other preconditions that may influence the effect of any countermeasure (Varhely, 2016).

4.1.11 Monitor Performance

The status of target indicators should be monitored on a yearly basis, and feedback on their performance should be given to the responsible bodies and to the national coordinating body; if any of them does not develop in the right direction, suitable countermeasures should be taken. In Norway, Sweden and the Netherlands, there are annual reports and meetings on the status of road safety and the status of measures in the action plans.

In the African countries the document study indicates that the safety performance is monitored regularly. However, the focus group interviews do not indicate that there is such systematic monitoring of accidents, and safety performance indicators related to all the Safe System pillars, like in the European countries. In Ghana, the need for such indicators and their usefulness was recognised, but no data was collected on performance indicators. In Zambia, other than speed cameras and police checkpoints, there were not mentioned any systematic monitoring of road safety performance indicators by a government body in the focus group interviews. One of the participants exclaimed that:

“It is difficult to know if you are improving or not, if you do not have good data. We cannot evaluate if you have improved or underperformed.”

Other than monitoring drivers through vehicles tracking systems, there was not mentioned any systematic monitoring of road safety performance indicators by a government body in Tanzania. One of the participants stated that:

“monitoring performance in the absence of strategy is not possible”.

4.1.12 Stimulate research and capacity building

Comparing the different levels of road safety research in the studied countries, it is evident that there is far more road safety research in the European countries, with large and nationally funded research programs over several years. This is not present in the African countries to the same extent.

4.2 Factors influencing road safety management

The focus of this section is factors influencing road safety management in the African countries.

The focus group interviews indicated ongoing processes of continuous improvement in road safety in the European countries. The road safety management systems in these countries are by and large in accordance with the 12 essential elements described by Varhelyi (2016).

These countries have relatively well organised institutional structures following up accident data and indicators based on comprehensive action plans. In the European countries, the RSM systems comprise stable and comprehensive institutional systems, networks, cultures and routines, encompassing the continuous improvement logic.

In the focus group interviews, e.g. in Norway it was stated that this institutional system ("the Norwegian model for road safety management") is robust enough to limit the choices of politicians. This is partly based on the Vision Zero ethics, which is commonly accepted, the strong scientific foundation and the established continuous improvement approach and cooperation model in the action plan for road safety. One of the focus group participants in Norway said that:

I believe that the work we have done with the national action plan for road traffic safety and the cooperation model that we have, and use in Norway (...) - it contributes to the fact that the politicians do not have big choices, because it is so strongly based on science, so it takes quite a lot of political courage to go against it.

This is different from the situation in the African countries, they lack such institutional systems and the strong Vision Zero culture which is related to these systems, including the focus on scientifically validated measures. The road safety management systems in the African countries are not to the same extent in accordance with the 12 essential elements described by Varhelyi (2016). In this section, we discuss why, based on results from the focus groups.

GH: Ghana has a comprehensive formal road safety plan, with a range of indicators, focusing on different Safe System aspects, but these indicators do not seem to be followed up in practice by road safety authorities. There is no systematic monitoring of road safety performance indicators in Ghana. The importance of such indicators and their usefulness was recognised by focus group participants, but no data was collected on performance indicators. This is to a great extent related to the quality of road safety data in the country.

In the focus group interviews, it was mentioned that the lack of reliable data on road accidents and indicators makes it difficult to carry out a systematic monitoring of road safety performance, identify the underlying causes of road safety issues, to enable targeted interventions. Other factors mentioned were insufficient political commitment to road safety, corruption, lacking funding of road safety work and lacking technology (e.g. access to software and relevant training for it).

Political commitment to road safety was an influencing factor mentioned by several interviewees. It was suggested that this commitment seemed particularly high around election times, although it might vanish later.

(...) we sometimes have to focus our advocacy around elections (...) at that time that we are in the position to get politicians to commit to a road safety target or a road (...) and it's not just in Ghana, like most African countries, that's okay. Around election time, that's when you can get them to, you know, talk about road safety. You can get them to sign petitions, you know, and [later] it's all gone.

ZA: Overall, the participants discussed that there is a lack of implementation of road safety plans in Zambia. The lack of secured financing and limited institutional capacity were mentioned as the primary obstacles for implementation of road safety strategies. It was emphasized that there is a need for a for a cross sectoral group to manage road safety issues, capacity building and more manpower and equipment to the lead agency (RTSA).

One of the participants also mentioned that the:

“culture of the country affects the implementation of road safety measures, because the risk for road accidents are considered to be very low”.

The participant explained that:

“We have to make sure that we build a culture where all road users are aware that anything can happen”.

Another participant explained that:

“... a major problem that we have, I think, in our country is behavioral change. For someone's behavior to change you need to do a lot, so we believe we have to keep talking about the same thing over and over again.”

TZ: Overall, the participants discussed that there is a lack of implementation of road safety plans and lack of a formal system for road safety management in Tanzania. Reasons for the deficit mentioned in the focus group was lack of commitment to road safety among politicians, lack of institutional robustness and capacity, lack of a lead agency for road safety, lack of technology, lack of funding and that there are other more pressing issues in society.

As mentioned before, the participants agreed that the road safety strategy from 2009 needs to be updated and revised. The strategy has not been supervised or evaluated. Some of the participants stated that there is currently no formal national road safety plan to be implemented, and hence there is lack of a formal system for road safety management in Tanzania that is alive and can be implemented in practice.

The participants again mentioned Tanzania's participation in the UNRSC Ten Step approach to improve road infrastructure safety and the TanRAP pilot project. Like stated previously in this summary; “Apart from that we don't have anything formal”.

5 Concluding discussion

5.1 Comparison of the European and the African countries

This section provides a comparison of how the studied European countries address their road safety challenges compared with the African case countries. We make comparisons for each specific 12 points in the results section, and in this section, we sum up the bigger picture.

5.1.1 Insufficient systematic approach in the African countries

The first objective was to examine alignment with Safe System principles for road safety management. The European countries' road safety management systems are mainly in line with the Safe Systems principles for road safety management, as described by Varhelyi (2016). This is not surprising, as Pillar 1 in Safe System largely is based on what these countries do, including principles from occupational safety management (e.g. the Haddon matrix).

The African countries do not have visions and road safety policies like Vision Zero or Sustainable safety, e.g. with the principles of Safe System when it comes to system owner responsibility, forgiving and anticipating road system etc. However, Safe System implementation of road safety management system ("Pillar 1" in the Safe System) is not just about vision, it concerns the continuous improvement process: "Plan-Do-Check-Adjust", which Varhelyi (2016) presents a nuanced and extensive presentation of. What the European Safe System countries have in common is an ongoing continuous improvement process; with alignment between formal and informal aspects of RSM. They have: 1) Adequate statistics and data on accidents, exposure and risk for different groups, 2) Comprehensive safety performance indicators (SPIs) measuring all Safe System pillars, 3) Quantified targets related to SPIs, 4) Strategies and action plans to improve the SPIs to reach the targets, 5) Relatively clearly defined responsibilities for implementation of the measures in the action plans and 6) Annually monitored and reported status of all SPIs. The African countries do not have this continuous improvement process to the same extent. For example, the most recent road safety policy from Tanzania is from 2009. In Ghana and Zambia, there is a gap between formal plans and actual implementation.

A basic factor contributing to the insufficient systematic approach in the African countries is insufficient data on road accidents and indicators. The accident data in the African countries are incomplete, as indicated by the discrepancies between official data and WHO (2024) estimated numbers. Good data on accidents and SPIs is a precondition for Safe System RSMS, as noted in step 1 and 2 of the continuous improvement process listed above.

5.1.2 Lower level of implementation of existing plans

Previous research indicates that the weakest component of RSM systems in Europe is policy implementation and funding, and the lack of knowledge-based road safety policy making (Alfonsi et al., 2016). This applies to an even greater extent in the studied African countries. Ghana and Zambia have formal road safety strategies in place, with SPIs related to different Safe System pillars, but the status for these SPIs is not followed up, neither are the effects of measures evaluated. Thus, when it comes to the question of whether the road safety action plans and strategies are living systems that are used in practice, and whether the measures in the action plan are implemented in line with the plans, there seems to be an important difference between the European and the African countries. The African data indicates challenges related to implementation of the plans, while the action plans seem to be far more "alive", i.e. implemented in the European countries. Thus, there seems to be a larger discrepancy between formal and informal aspects of road safety management (cf. Antonsen, 2009) in the African countries; between plans and implementation.

Additionally, the extent of road safety research and capacity building is lower in the African context compared to the European. This is probably also related to economy, and or commitment to road

safety among decision makers. It should also be mentioned that definition of general responsibility for road safety seems poorer, at least in Tanzania which lacks a lead agency.

5.2 How can we explain the differences between European and African countries?

Focus group interview results indicate that the discrepancy between formal (plans) and informal (implementation) aspects of road safety management is the main difference between the European and African countries. In the African countries, the formal elements of the RSM system (plans, strategies) may be there, but there is not the same progress in the continuous improvement process (Plan-Do-Check-Adjust) as in the European countries. Thus, it is relevant to ask why there is a larger discrepancy between plans and implementation in the studied African countries. In the following, we suggest factors that might shed light on this, based on our results.

5.2.1 Inadequate data collection and analysis

A key factor that was mentioned in the focus group interviews was inadequate data collection and analysis, related to road accidents and SPIs. Good data on accidents and SPIs is a precondition for Safe System RSMS (Varhelyi 2016). The accident data in the three studied African countries are incomplete, as indicated by the discrepancies between official data and WHO (2024) estimated numbers. In Tanzania, the WHO estimated number of road fatalities is seven times higher than the official number reported by national authorities. In Ghana the WHO estimated number of road fatalities is 2,9 times higher than reported, while it is 1,5 times higher than reported in Zambia. In the European countries, the discrepancies are 2 fatalities (Norway), 7 fatalities (Sweden) and 12 fatalities (Netherlands).

Previous research also report inadequate data collection and analysis in LMICs (Odero et al., 2003). Summing up road safety in LMICs, WHO (2018) lists nearly half of the countries as “Countries without eligible death registration data”. The traffic deaths in these countries are imputed based on factors such as national speed limits, alcohol consumption, GDP, and the corruption index (Kaufmann et al., 2009). Studies using police data about traffic accidents from low-income nations seem to question their validity (Odero et al., 2003). Similar concerns were shared for the medical data. The authors state that “The reports, compiled by the health information system unit, are based on data submitted quarterly by only 45% of government health facilities; private and nongovernmental institutions do not normally send reports to the Ministry. The routine reports are grossly incomplete and imprecise with respect to demographic characteristics and information on the cause of injury” (Odero et al., 2003: 5).

Several studies point out problems with data quality in low-income nations. One study employed a full team of data collection staff to accurately collect traffic injury data from a total of five hospitals in Pakistan (Razzak et al., 2012). In total, they registered 3700 deaths and 93,888 injuries. Police records for the same area and time registered 1616 deaths and 2044 injuries. This indicates that 56% of traffic deaths and 98% of traffic injuries never reached police records. The authors point out that this number is probably even higher, as it does not include injuries that were never treated or were treated at smaller hospitals and clinics. Similarly, an epidemiologic study in Ghana showed that of the fatally injured, 31% received formal medical care, and of the nonfatal injured, 58% did (Mock & Maier, 1997). Thus, inadequate data on road safety challenges is a major challenge in LMICs.

5.2.2 Insufficient institutional capacity

Another important factor highlighted in the data from the African countries was that the institutional capacity of road safety agencies and stakeholders is too weak. Tanzania lacks a leading agency. Focus group participants also mentioned a need for better coordination among organisations working with road safety in Zambia.

The finding that the institutional capacity of road safety agencies and stakeholders in the African countries is too weak is in line with results from a recent study from five African countries, which notes that although a lead road safety agency is established the following elements are frequently missing: 1) the legal power 2) and/or dedicated financial and human resources to be effective in defining a comprehensive national road safety strategy and coordinating responsible stakeholders for its implementation. (Usami et al., 2021).

Similar tendencies have been found in other LMIC countries (Jadaan et al. 2018; Yahya et al., 2013; ITF, 2022a; Sheeraz et al., 2019). Additionally, a recent WHO report shows that although most countries have a lead road safety agency, the agency often does not have funding based on the national budget, undermining its influence as a national organ (WHO 2018). This is also in accordance with the results from the African countries in our study. Usami et al (2021) also notes that about half of the countries does not have a national road strategy, one-third has a fatality reduction target, and no low-income country has their strategy fully funded. While existence and funding are simple to operationalise, an agency's influence is difficult to measure.

While a lead road safety agency's existence and funding are simple to operationalise, an agency's influence is difficult to measure. Existing research on the topic has pointed out that this is often missing. In evaluating the suitability of implementing a safe system approach in Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa, one study comments that “However, it can be said that a lead road safety agency, if established, is frequently missing the legal power and/or dedicated financial and human resources to be effective in defining a comprehensive national road safety strategy and coordinating responsible stakeholders for its implementation.” (Usami et al., 2021). For example, in the Trauma-Ouaga project (ITF, 2016), which aimed at improving the crash data collection in Burkina Faso, the National Road Safety Agency chose not to participate based on what seemed to be resource issues. Similarly, when discussing the development of road safety strategies for low-income countries, Jadaan et al. (2018) state, “However, some of these attempts were not very comprehensive and many were not fully implemented”.

This also seems to be a problem for some newly industrialised countries. For example, when reporting on developing a road safety management system in Indonesia, the authors write “ [...] the responsibility for road safety action has been, until recently, quite diffuse.” (Yahya et al., 2013, p. 29). In an attempt to generate a master's level training course in transport planning in Cameroon, the ITF report that “ [...] collaboration between stakeholders is very difficult because of lengthy administrative procedures and lack of clear leadership concerning the design and follow up of the road-safety strategy in Cameroon” (ITF, 2022a, p. 6). Finally, in the abstract of a study on Pakistani road safety, the authors note “It is the common practice that issues of crash prevention is not given consideration in the context of strategic planning” (Sheeraz et al., 2019). This indicates that even if a road safety lead agency exists, this does not mean their responsibilities or functionality do.

5.2.3 Limited financial and human resources

A crucial factor highlighted in the focus group interviews was lacking funding of road safety measures. In Ghana and Zambia it was for instance mentioned that the activities in the road safety action plan are not implemented sufficiently, as action plans do not have unique/dedicated budgets for the activities. The road safety measures in the Zambian road safety plan have lead implementers and the collaborative partners/stakeholders defined. However, the action plans have no unique/dedicated budget for these activities. Instead, actions listed in the plans are to be funded with the operational funds of the agencies. The evaluation of the NRSS III has revealed that this practice has partly led to the non-fulfilment of intended activities in the plans.

Focus group participants in all the countries said that road safety was underfunded in their countries, but this especially applies in the African countries. It is important to keep in mind that the economic capital for road safety measures in the studied African countries is considerably lower than in the European countries. The average GDP of selected LMIC countries is 1/22 of the average of all other

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations nations (cf. Table 2.1). This makes the financing of some measures difficult. African focus group participants also mentioned that road safety authorities are very understaffed.

A relevant factor that was mentioned among focus group participants is corruption. This has also been highlighted in previous research. As seen in Table 2.1, the corruption perception index shows that several low-income nations struggle with corruption, potentially hampering an organisation's ability to act objectively based on available data. Corruption is also a considerable threat against enforcement of traffic laws. The safe system approach relies on a research-based implementation of measures, requiring an objective system.

5.2.4 Commitment to road safety

Muhrad et al (2011) underline, as noted, that the RSMS is linked to the external environment, which provide pre-conditions for effective RSMS. The first precondition is a political will at the higher level, which is necessary to set up new institutions cutting across the usual administrative sectoral hierarchies and therefore introducing new links and working patterns. The second precondition is a climate/vision (“road safety culture”) shared by the road safety actors and the road users which makes policy implementation feasible and policy adoption smoother.

It could be relevant to relate the lacking financing of road safety reported in the African countries to insufficient commitment and support for road safety among decision makers, but this is not necessarily a sufficient explanation. What was clear from the interviews, is that in a situation with scarce resources, road safety must be prioritized, in competition with other concerns. Environmental concerns were mentioned as one important competing issue. The same applies to poverty and various public health issues. COVID-19 was also mentioned among the African focus group participants as a situation with strong commitment from decision makers, which was contrasted to decision makers' current focus on road safety. And it was mentioned that the number of road fatalities is very high in the African countries, warranting a strong political focus.

5.2.5 Culture and understanding of road safety

The European focus group participants referred to a relatively strong and common Vision Zero or Safe System mindset and culture, which provided a way of seeing, thinking and interpreting things. This is one of the factors which explain the implementation of Safe System in the European countries, in line with Muhrad et al (2011). This is one of the shared mental aspects of the European Safe System implementation. The Safe System approach, the way of doing things, and way of thinking was to a great extent taken for granted among the European focus group participants in a manner that we did not find among the focus group participants in the African countries.

In conformity with this, implementation of Safe Systems involves both the implementation of formal routines for road safety management and certain informal cultural attitudes. Green et al (2022) states that “traditional” approaches to road safety (i.e. pre “Vision Zero/Safe System) viewed the driver as the cause of crashes, and thus the driver was responsible for ensuring a crash did not occur (“the person view”). Additionally, there was a prevailing view and acceptance that fatalities and serious injuries were a fundamental component of transport, and that the individual should adjust to the road network as opposed to the network being tolerant of the individual (Green et al 2022). The Safe Systems approach, however, involves a cultural change in the sense that it took the focus from blaming the vehicle operator and instead reframed road safety to a more holistic systems-based approach, congruous to models operating in occupational health and safety (“the system view”) (Green et al 2022). Although the European focus group participants also mentioned that the person view was prevalent among several stakeholders in the European countries, it seems that a cultural shift to a system view is an important precondition for Safe System implementation in the African countries.

It is important to note that the European countries do not fully comply with the Safe System principles in general (although they seem to be relatively well aligned with the principles for Pillar 1 Road safety

management). Focusing on speed limits, road design, road maintenance, vehicle safety and road user compliance with road traffic law, Elvik (2023) states that estimates for Norway indicate that by complying perfectly with Safe System principles in all these areas, the number of fatalities could be reduced by 50–70%. This indicates that road safety improvement is an ongoing process which requires constant attention, and which never is finished. In the interviews in the European countries, the focus group participants were well aware of this, and stressed that knowledge exists on how to improve road safety in their countries even more, but the required measures are not implemented. The reason they gave was that both politicians and the population found that more restrictive measures would be a too harsh infringement on the populations' (perceived need for) freedom to take risk, and that too restrictive measures would not be accepted. Thus, national culture, ideology and political views inhibit road safety progress in the European countries.

Similar cultural explanations were coined in the African focus group interviews, although with a different tone. One of the focus group participants mentioned that the “culture of the country affects the implementation of road safety measures, because the risk for road accidents are considered to be very low”. This seem to involve an attitude that “this will not happen to me”, or “it seldom happens”, or that it happens because of individual risk taking (cf. the “person view”), and not that road accidents tend to me more frequent in “less safe systems” (cf. the “system view”).

Another cultural factor that we have identified in a previous study is related to fatalism. Fatalistic beliefs refer to a tendency for individuals to view life events as predetermined and inevitable (Esparza et al, 2015). People who hold fatalistic beliefs tend to believe that they do not have control over events, as these events are controlled by external factors (Kouabenan 1998). A review of available literature on the relationship between fatalistic beliefs and road safety behaviour, conclude that fatalistic beliefs are related to less safe behaviours (Boua et al 2024). McIlroy et al (2020) cite a wide range of studies from African countries reporting a relatively high level of fatalistic beliefs among road users, and which indicate relationships between fatalistic beliefs and unsafe road behaviours. Summing up relevant research, Boua et al (2024) mention several studies examining the relationship between fatalistic beliefs and risk taking in traffic. Omari and Baron-Epel (2013) found that drivers with high levels of fatalism were less likely to make their children wear a seatbelt than those with low levels of fatalism.

In a recent study, we compared road safety culture in the same three African countries (Tanzania, Ghana, Zambia) and the same three EU countries as in the present study (Norway, Netherlands and Sweden). We compared road safety culture among car drivers and pedestrians across countries, based on a quantitative survey with about 3800 respondents (Nævestad et al forthcoming). The main difference between road users in the countries were related to fatalistic beliefs. The link between road safety culture measured as fatalistic beliefs and road safety violations is that, if your fate is predestined, what you do (i.e. risk taking) will not make a difference. We had several questions measuring fatalistic beliefs, but two examples can be mentioned to illustrate. First, a total of 40% of the African respondents agreed with the statement: “I believe that some people die in road crashes as punishment for some bad deeds”, while 5% of the Europeans agreed. Second, a total of 65% of the African respondents agreed in the statement: “I believe that spiritual intervention, such as prayers, can prevent road crashes”, while 4% of the Europeans agreed.

In our study, we suggest that fatalistic beliefs are in a way a competing approach to Safe system, as it assumes that humans cannot prevent road accidents, as they are caused by the will of God. According to fatalistic beliefs, road users' risk taking will not make a difference for the will of God; nor will Safe System policies. Thus, fatalistic beliefs may impede both road safety policies and road users' safety behaviours. Priests, imams, and other religious representatives in the African countries need to nuance and counter such views in the future. We concluded that it seems that the Safe system also needs to expand to the religious sector in the African countries to be effective. An important question for future research, is whether fatalistic beliefs among stakeholders at different levels is competing with the Safe System ideological approach (in manners that may impede Safe System implementation).

5.3 Recommendations to the African countries

5.3.1 General recommendations based on the analysis

This section focuses on the fourth aim of the study, which is to develop recommendations as to how the African countries can learn from the Safe System countries in their road safety management. We have several specific recommendations to the African countries, based on the study.

From a basic point of view, a general recommendation based on our study, would be that Ghana and Zambia should implement their existing road safety strategies better; follow up the recommended measures and monitor and further develop indicators to follow up the road safety situation including safety performance indicators. In addition, Tanzania should update their road safety policy, develop an action plan and implement it. These are, however, very general recommendations. We will go more into detail below.

First, a general recommendation to all the African countries is to improve the collection of road accident statistics and data, as this is a basic premise of an effective road safety management system. This is a precondition of the continuous improvement process described by Varhelyi (2016), which is in accordance with the Safe System approach. One of the central aspects of the safe system approach is implementing only evidence-based measures. Therefore, road administrative units should not implement measures that have shown little to no effect on reducing serious injury or death in traffic. This requires reliable data regarding who, where, when, and how serious injuries and death occurred. Without such data, one cannot know where and what type of measures should be implemented. Furthermore, if measures are implemented, one cannot assess their effect with a reasonable degree of certainty. Thus, reliable data on road accidents and SPIs is a precondition of the whole RSMS process of continuous improvement described above, and specified in Varhelyis' (2016) 12 key elements.

Our general recommendations as to how the African countries can learn from the Safe System countries in their road safety management are:

- 1) Establish a lead agency with coordinating responsibility for road safety, and a monitoring and coordination forum, consisting of the parties involved in road safety work.
- 2) Base the general road safety strategy on Safe System and Vision Zero, and work systematically with the Safe System pillars, as described in the following points:
- 3) Improve the collection of road accident statistics and data, as this is a basic premise of an effective road safety management system.
- 4) Establish comprehensive safety performance indicators (SPIs) measuring all Safe System pillars, and monitor and report the status of these at least annually.
- 5) Set quantified targets related to accidents and SPIs measuring all Safe System pillars.
- 6) Develop strategies and action plans to improve the SPIs to reach the targets. Choose the most effective and relevant measures based on scientific research.
- 7) Provide a clear definition of responsibilities for implementation of the measures in the action plan.
- 8) Monitor and report annually the status of the measures and their effectiveness when it comes to fulfilling the targets.

5.3.2 Recommendations taking impeding factors into account

Given the factors impeding road safety management system implementation in the studied African countries, e.g. economical conditions, insufficient institutional robustness etc., it might be more realistic to start off in a smaller scale than suggested above. At least a smaller scale approach seems

to be more realistic as an immediate approach, while building institutional robustness and a systematic continuous improvement approach is a more long term project. The same applies to e.g. improving national economy, as we have seen that poor economy is an important constraining factor. Thus, the point of departure for the recommendations taking impeding factors into account is e.g. resource scarcity, which requires prioritizations.

With this in mind, we recommend to choose one main road safety challenge and have a primary effort on this (e.g. pedestrian fatalities). It is probably also necessary to focus on certain routes, areas or destinations (e.g. schools). This means to have a living continuous improvement process related to one main challenge in one limited area; to implement Safe System elements related to one specific issue in a given area, instead of a “total makeover”. If resources only allow a full continuous improvement process in one geographical region, that might also be possible. We presuppose that this is possible, with limited resources. Thus, this means to follow the continuous improvement steps we have described with respect to one road safety challenge in one specific area. It might also be possible to implement the steps within one organisation. Thus, focusing on one challenge in one area, the road safety management system described above can be used, adapted to one challenge in one area:

- 1) Establish a unit with coordinating responsibility for the measure, and a monitoring and coordination forum, consisting of the parties involved.
- 2) Base the general road safety strategy on Safe System and Vision Zero, and work systematically with the Safe System pillars, as described in the following points:
- 3) Develop an adequate system of road accident data collection and analysis, as this is a basic premise of an effective road safety management system.
- 4) Establish comprehensive safety performance indicators (SPIs) measuring all Safe System pillars relevant to the issue at hand.
- 5) Monitor and report the status of these at least annually, of more often.
- 6) Set quantified targets related to accidents and SPIs measuring all Safe System pillars.
- 7) Develop strategies and action plans to improve the SPIs to reach the targets. Choose the most effective and relevant measures based on scientific research.
- 8) Provide a clear definition of responsibilities for implementation of the measures in the action plan.
- 9) Monitor and report annually the status of the measures and their effectiveness when it comes to fulfilling the targets.

5.4 Methodological weaknesses and possible bias

It is important to note that the descriptions of the situation in the different countries in this study are based on focus group interviews with limited groups of people at a given point in time. Thus, the current situation may be different from what we describe: policies, strategies, may have changed. It is, for instance, important to note that some interviewees mentioned that new strategies were currently being developed in Zambia at the time of the focus group interviews.

It must also be noted that the sample of interviewees is relatively limited in some of the countries, and that we might not have been able to recruit all relevant parties in all the countries. This influences the basis from which conclusions can be drawn, e.g. our abilities to generalise about each country, based on the interviews and also our comparisons between countries. On the other hand, the interviewees were recruited by national partners working with road safety, and these partners also made quality assurance of the results. We generally interviewed researchers, NGOs and authority representatives working with road safety. In addition, the results are also based on extensive documents studies of policies, strategies and research reports.

5.5 Issues for future research

5.5.1 How important is culture among stakeholders?

In a previous study we found that the biggest cultural difference between car drivers and pedestrians across in the three European and the three African countries we studied were related to fatalistic beliefs. According to fatalistic beliefs, road users' risk taking will not make a difference for the will of God; nor will Safe System policies. Thus, fatalistic beliefs may impede both road safety policies and road users' safety behaviours. As noted, previous studies have found that road users with high levels of fatalistic beliefs were involved in less safe road behaviours compared to those with low fatalistic beliefs (Ngueutsa and Kouabenan, 2017; Teye-Kwadjo, 2019). Similar results were reported by Şimşekoğlu et al. (2013). In a recent study, McIlroy et al (2020) found that pedestrians who reported strong fatalistic beliefs tended to report less safe behaviours and more unsafe road safety attitudes. It is interesting to examine whether these cultural beliefs also apply to stakeholders at different levels. Or in other words: whether fatalistic beliefs among stakeholders at different levels is competing with the Safe System ideological approach in manners that may impede Safe System implementation.

5.5.2 How can lead agencies be strengthened?

One of the main conclusions of the present study is that the institutional system of road safety management is crucial to implement the continuous improvement process which comprise successful work with Safe System road safety management systems. The European countries seem to exemplify well-functioning institutional structures, with lead agencies and cooperation forums responsible for action plans and management by objectives.

More research is needed to map the required institutional preconditions for successful road safety management. This seems to be contingent on a range of different premises. As mentioned, Usami et al (2021) notes that although a lead road safety agency is established the following elements are frequently missing: 1) the legal power 2) and/or dedicated financial and human resources to be effective in defining a comprehensive national road safety strategy and coordinating responsible stakeholders for its implementation. (Usami et al., 2021). Thus, a crucial issue for future research seems to be to develop ways to strengthen the lead agencies for road safety, or defining the necessary conditions for this. How should a lead agency look like? Can it be a stakeholder forum of different participants, how should the work be funded, what kind of enforcing mechanism is needed etc. It seems that such a lead agency is needed to coordinate the mentioned continuous improvement process.

5.5.3 How can a sense of urgency be created?

Focus group participants in all countries stressed that there is not a sufficient feeling of urgency related to road safety problems. This is understandable in the European countries, who are the top performers in the world, but it is surprising in the studied African countries. It was mentioned that the number of road fatalities is very high in the African countries, warranting a strong political focus. As noted, interviews indicate that in a situation with scarce resources, road safety must be prioritized, in competition with other concerns.

Future research should examine how a sense of urgency be created related to road safety challenges in the African countries. Perhaps highlighting the economic costs can be effective, or perhaps the understanding of urgency is related to cultural understanding of road accidents, e.g. fatalism. COVID-19 was mentioned among the African focus group participants as a situation with strong commitment from decision makers, which was contrasted to decision makers' current focus on road safety. Relevant questions could be why was there presumably more resources allocated to COVID-19 in the African countries? How was the systematic work to prevent COVID-19 infection in the African

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations countries, seen in light of the 12 key elements provided by Varhelyi? How was this compared with the measures targeting road safety? What can we learn from it?

6 Acknowledgements

The study is conducted within the EU funded Horizon Europe research project AfroSAFE; “Safe System for radical improvement of road safety in low- and middle-income African countries” (Grant agreement: 101069500).

References

- Antonsen, S. (2009). The relationship between culture and safety on offshore supply vessels, *Safety Science*, 47
- Academic Expert Group (2020) 'Saving lives beyond 2020: the next steps'. Recommendations of the Academic Expert Group for the 3rd Global Ministerial Conference on Road Safety.
- Alfonsi, R. L. Persia, and A. Tripodi, "Advancements in Road Safety Management Analysis", In: Proceedings of the 6th Transport Research Arena. 18–21 April, Warsaw, 2016.
- Boua, M., Kouabenan, D.R. & Belhaj, A. (2024) Fatalistic Beliefs, Naive Causal Explanations of Accidents and Road Safety Behaviors. *Psychol Stud* 69, 49–58
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Daniels, S., Martensen, H., Schoeters, A., Van den Berghe, W., Papadimitriou, E., Ziakopoulos, A., Kaiser, S., Aigner-Breuss, E., Soteropoulos, A., & Wijnen, W. (2019). A systematic cost-benefit analysis of 29 road safety measures. *Accident Analysis & Prevention*, 133, 105292.
- De Maria, B. (2008). Neo-colonialism through measurement: a critique of the corruption perception index. *Critical perspectives on international business*.
- Elvik, R. (2008) "Road safety management by objectives: a critical analysis of the Norwegian approach", *Accid. Anal. Prev.*, vol. 40, no. 3, pp. 1115-1122
- Elvik, R. (2002). Cost-benefit analysis of ambulance and rescue helicopters in Norway: reflections on assigning a monetary value to saving a human life. *Applied health economics and health policy*, 1(2), 55-63.
- Elvik, R. (2022). Vision Zero in Norway. In K. E. B. S. O. H. M.-Å. B. C. Tingvall; (Ed.), *The Vision Zero Handbook: Theory, Technology and Management for a Zero Casualty Policy*. Springer.
- Elvik, R. T.-O. Nævestad (2023) Does empirical evidence support the effectiveness of the Safe System approach to road safety management?, *Accident Analysis & Prevention*, Volume 191
- Elvik, R., Høye, A., Vaa, T., & Sørensen, M. (2009). *The Handbook of Road Safety Measures* (2 ed.). Emerald Group Publishing Limited.
- Elvik, R. (2023). What would a road safety policy fully consistent with safe system principles mean for road safety?, *Accident Analysis & Prevention*, Volume 193
- Esparza, O. A., Wiebe, J. S., & Quiñones, J. (2015). Simultaneous Development of a Multidimensional Fatalism Measure in English and Spanish. *Current Psychology*, 34(4), 597–612.
- Gitelman, V. and E. Doveh (2016) "Investigating road safety management systems in the European countries: Patterns and particularities", *J. Trans. Tech.*, vol. 6, pp. 378-404, 2016
- Green, M. C. Muir, J. Oxley, A. Sobhani (2022) Safe System in road safety public policy: A case study from Victoria, Australia, *IATSS Res.*, 46 (2022), pp. 171-180
- Green, M. C. Muir, J. Oxley (2024) What is the purpose? Practitioners' perspectives of the Safe System approach to road safety in Australia, *IATSS Research*, Volume 48, Issue 1, pp. 84-99,
- Haddon, W. (1980). Options for the prevention of motor vehicle crash injury. *Israel journal of medical sciences*, 16(1), 45-65.
- ITF. (2016). *Zero road deaths and serious injuries: Leading a paradigm shift to a safe system*. OECD Publishing.

- Deliverable D2.1 State of road safety management in selected African countries—review and recommendations
ITF. (2022a). *The Safe System Approach in Action Road-safety management and capacity building in Cameroon*.
- ITF. (2022b). *The Safe System Approach in Action The Trauma–Ouaga Project, Burkina Faso*.
- Jadaan, K., Al-Braizat, E., Al-Rafayah, S., Gammoh, H., & Abukahlil, Y. (2018). Traffic safety in developed and developing countries: A comparative analysis. *Journal of Traffic and Logistics Engineering* Vol, 6(1), 157.
- Kennisnetwerk SPV (2019). *Door to door safety Road Safety Strategic Plan 2030: A joint vision on the approach to road safety policy*.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). *Governance matters VIII: aggregate and individual governance indicators, 1996-2008*. World bank policy research working paper(4978).
- Khan, N., S. Das, (2024). *Advancing traffic safety through the safe system approach: A systematic review*, *Accident Analysis & Prevention*, Volume 199,
- Kouabenan, D. R. (1998). Beliefs and the perception of risks and accidents. *Risk Analysis*, 18(3), 243-252
- McIlroy RC, Kokwaro GO, Wu J, Jikyong U, Nam VH, Hoque MS, Preston JM, Plant KL, Stanton NA. (2020) How do fatalistic beliefs affect the attitudes and pedestrian behaviours of road users in different countries? A cross-cultural study. *Accid Anal Prev*. May;139:
- Mock, C. N., & Maier, R. (1997). Low utilization of formal medical services by injured persons in a developing nation: health service data underestimate the importance of trauma. *Journal of Trauma and Acute Care Surgery*, 42(3), 504-513.
- Muhlrad, G. Vallet, I. Butler, V. Gitelman, E. Doveh, E. Dupont, P. Thomas, R. Talbot, E. Papadimitriou, G. Yannis, L. Persia, G. Giustiniani, K. Machata, and C. Bax, (2014) *Analysis of road safety management systems in Europe*. *Transport Research Arena 2014*, 14–17 April, Paris 2014.
- Muhlrad, N, Gitelman V, Buttler I. (Ed) (2011). *Road safety management investigation model and questionnaire*, Deliverable 1.2 of the EC FP7 project DaCoTA
- Ngueutsa, R. D.R. Kouabenan, (2017) *Fatalistic beliefs, risk perception and traffic safe behaviors*, *European Review of Applied Psychology*, Volume 67, Issue 6, Pages 307-316,
- Nævestad, T.-O. (2010). *Cultures, Crises and Campaigns: Examining the Role of Safety Culture in the Management of Hazards in a High-Risk Industry*. Ph.D. Dissertation, Centre for Technology, Innovation and Culture, Faculty of Social Sciences, University of Oslo, Oslo, Norway.
- Nævestad, T.-O. et al (forthcoming) *Deliverable 5.2 Mapping of Road Safety Culture*, AfroSAFE report.
- Museru, L., Mcharo, C., & Leshabari, M. (2002). Road traffic accidents in Tanzania: a ten year epidemiological appraisal. *East and Central African Journal of Surgery*, 7(1).
- Odero, W., Khayesi, M., & Heda, P. (2003). Road traffic injuries in Kenya: magnitude, causes and status of intervention. *Injury control and safety promotion*, 10(1-2), 53-61.
- OECD (2021), ‘Sweden: Road Safety Country Profile’, Sweden: Road Safety Country Profile, 2021 (itf-oecd.org)
- Omari, K., & Baron-Epel, O. (2013). Low rates of child restraint system use in cars may be due to fatalistic beliefs and other factors. *Transportation Research Part F: Traffic Psychology and Behaviour*, 16, 53–59

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

Razzak, J. A., Shamim, M. S., Mehmood, A., Hussain, S. A., Ali, M. S., & Jooma, R. (2012). A successful model of road traffic injury surveillance in a developing country: process and lessons learnt. *BMC public health*, 12(1), 1-5.

Schein, E. H. (2004). *Organizational culture and leadership* (3rd ed.). San Francisco: Jossey-Bass.

Schiefloe, P.M. (2011), *Mennesker og samfunn*, Fagbokforlaget, Bergen.

Sheeraz, K., Jafri, S. F., Khan, S., Rehman, I., Ateeq-ur-Rauf, & Ahmed, S. (2019). STRATEGIC TRAFFIC CRASH AVOIDANCE TRANSLATING SCATTER PLOTTING EVALUATION MODEL. *JOURNAL OF MECHANICS OF CONTINUA AND MATHEMATICAL SCIENCES*

Swedish Transport Administration (2022), 'Analys av trafiksäkerhets utvecklingen 2021: Målstyrning av trafiksäkerhetsarbetet mot etappmålen 2030' (Trafikverket, Swedish Transport Administration), 2022:093, <https://www.diva-portal.org/smash/get/diva2:1657137/FULLTEXT01.pdf>, accessed 20 December 2022.

SWOV (2022). Road deaths in the Netherlands. SWOV fact sheet, April 2022. SWOV, The Hague.

Teye-Kwadjo, E. (2019). Risky driving behaviour in urban Ghana: The contributions of fatalistic beliefs, risk perception, and risk-taking attitude. *International Journal of Health Promotion and Education*, 57(5), 256–273.

TIS. (2021). Corruption perceptions index 2021. <https://www.transparency.org/en/cpi/2021>

Trafikanalys (2016) Nystart för nollvisionen – ett intensifierat arbete för trafiksäkerheten i Sverige [Restart Vision Zero – intensify the work for traffic safety in Sweden], <https://www.trafa.se/globalassets/styrdokument/regeringsuppdrag/broschyrrer/nystart-for-nollvisionen---ett-intensifierat-arbete-for-trafiksakerheten-i-sverige.pdf>, accessed 16 Mars 2023.

Trafikanalys (2022), 'Vägtrafikskador 2021. Sveriges officiella statistik' [Road traffic injuries 2021. Swedish official statistics], <https://www.trafa.se/globalassets/statistik/vagtrafik/vagtrafikskador/2021/vagtrafikskador-2021---korr.-2022-05-15.pdf>, accessed 4 November 2022.

Trafikverket (2022a), '2021 års uppföljning av Aktionsplan för säker vägtrafik 2019–2022' [2021 follow up of the Action plan for safe road traffic 2019–2022], https://bransch.trafikverket.se/contentassets/7364c999c32444eca84ffe49d56e4b2c/2021_ars_uppfoljning_av_aktionsplan_for_saker_vagtrafik_2019-2022.pdf

Trafikverket (2022b), 'Aktionsplan för säker vägtrafik 2022-2025' [Action plan for safe road traffic 2022-2025], <http://trafikverket.diva-portal.org/smash/get/diva2:1656013/FULLTEXT01.pdf> accessed 9 Mars 2023.

Usami, D. S., González-Hernández, B., Persia, L., Kunsoan, N. B., Meta, E., Saporito, M. R., Schermers, G., Carnis, L., Yerpez, J., & Bouhamed, N. (2021). Defining suitable Safe System projects: The experience of the SaferAfrica project in five African countries. *IATSS research*, 45(4), 594-601.

Usami, D. S., Persia, L., Meta, E., Fava, A., Azarko, A., Saporito, M. R., Kunsoan, N. B., Taniform, P., Mavromatis, S., & Yannis, G. (2020). Improving road safety knowledge in Africa through crowdsourcing: the African Road Safety Observatory. *Transportation research procedia*, 45, 418-425.

Varhelyi, A. (2016). Road safety management—the need for a systematic approach. *The Open Transportation Journal*, 10(1).

Wegman, F., Aarts, L., & Knaap, P. v. d. (2022). Sustainable Safety: A Short History of a Safe System Approach in the Netherlands. In K. E. Björnberg, S. O. Hansson, M.-Å. Belin, & C.

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations Tingvall (Eds.), *The Vision Zero Handbook: Theory, Technology and Management for a Zero Casualty Policy*. Springer.

Weijermars, W.A.M. & Aarts, L.T. (2010). *Duurzaam Veilig van theorie naar praktijk*. R-2010-23. SWOV, Leidschendam, The Netherlands [Sustainable Safety from theory into practice; In Dutch, with a summary in English].

Weijermars, W. & Wegman, F. (2011). Ten years of Sustainable Safety in the Netherlands. An assessment. In: *Transportation Research Record*, vol. 2213, p. 1-8.

Wijnen, W. (2022). *Maatschappelijke kosten van verkeersongevallen in Nederland: actualisatie 2020*. In opdracht van het Kennisinstituut voor Mobiliteitsbeleid KiM. W2Economics, Utrecht.

WHO (2016) ROAD SAFETY IN THE AFRICAN REGION 2015, https://www.afro.who.int/sites/default/files/2017-06/Road_Safety_AFRO_for_web_0.pdf

WHO. (2018). *GLOBAL STATUS REPORT ON ROAD SAFETY 2018*.

WHO. (2021). *International Health Regulations (IHR SPAR): All capacities*. <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/ihr---all-capacities>

WHO & United Nations Regional Commissions. (2021). *Global plan for the decade of action for road safety 2021-2030*. World Health Organization. https://cdn.who.int/media/docs/default-source/documents/health-topics/road-traffic-injuries/global-plan-for-road-safety.pdf?sfvrsn=65cf34c8_35&download=true

WHO (2023) *Global status report on road safety 2023*, <https://iris.who.int/bitstream/handle/10665/375016/9789240086517-eng.pdf?sequence=1>

WHO (2024) *Country profiles*: <https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/global-status-report-on-road-safety-2023>

World Bank. (2021). *GDP per capita*. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

Yahya, M., Faulks, I. J., Hambleton, P., & Wass, C. (2013). Development of an integrated road safety management system in Indonesia: Traffic police as lead agents in a Safe System approach. *Journal of the Australasian College of Road Safety*, 24(2), 28-38.

Zambian National Road Safety Policy and a Road Safety Action Plan (2016) Contract Ref: FED/2013/328-556, Contract Title: Consultancy services for capacity, building to the Zambian road transport sector, Consultancy Services to Develop a National Road Safety Policy and Strategy National Road Safety Policy, Strategy and Action Plan (Final Draft)

Appendix 1: Interview guide

1) Define the burden and nature of road casualties;

2) Commitment and support from decision makers.

-Do you think that road safety is high on the agenda in your country?

-Why-why not?

3) Establish road safety policy;

Please describe the most important road safety policy documents. Could be: 1) Vision for road safety, 2) Strategic document(s) regarding road safety (“national transport plan” or something), 3) Road safety plan at the national level.

-Which year are the documents from, what do they include (“12-point elements”), how often are they updated?

Are these documents known by stakeholders and perceived as important?

-Is the road safety policy in your country perceived as important and governing for policy?

What is the check (correction) mechanism if the defined road safety policy does not go well, is potentially not effective, or does not work? (what happens?)

Do you check this regularly?

4) Define institutional roles and responsibilities

-When it comes to institutional roles and responsibilities related to road safety in your country

-Is it clear who has the main responsibility? (is there a lead agency, or is this function covered?)

-What is the coordinating mechanism? A road safety forum, road safety plan etc..

-Does the cooperation between the different parties work well?

-What is effective/ working well, what is ineffective/ not working so well?

5) Identify road safety problems;

-Do you think that you have good enough data about accidents, injury, exposure and risk for different road users, situation, places? Also for vulnerable road users?

-Is road safety data publicly available? What level of details?

6) Set road safety targets;

Do you have good enough safety performance and indicators and targets for all stakeholders? And for road users (DUI, speeding, seat belt use etc), vehicles (share of Euro NCAP with five stars etc), roads (share of highways with median barriers etc) etc.

7) Formulate a strategy and action plan;

-Is there a strategy or action plan for road safety, providing a plan on how to fulfil the targets?

-Is the action plan for road safety known by road safety practitioners/stakeholders?

-Is the plan implemented?

-Do you follow up the measures and their effectiveness?

8) Allocate responsibility for measures;

-Is it clear who has responsibility for implementing the measures in the road safety plan?

9) Ensure funding and allocation;

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

-Are the measures in the “road safety plan” (or the document describing road safety measures) sufficiently funded? (if there is no such document, ask about funding of road safety in general)

- How is the funding distributed to provinces and allocated to measures?

- How are measures prioritized for funding?

10) Apply measures with known effectiveness;

-To what extent is measures with known effectiveness implemented to reduce the identified road safety problems?

11) Monitor performance;

- Do you measure or keep track of the safety performance indicators?

- Who does the quality check and accountability?

12) Stimulate research and capacity building.

-To what extent is research and capacity building stimulated in your country? And specifically in your organization?

Additional questions about implementation of road safety plans and measures

To what extent are the road safety plans implemented?

Overall, do you think that the road safety plans and the formal system for road safety management in your country (“what is written”) is alive and implemented in practice?

Which factors can explain the level of implementation?

- a) Economy
- b) Lacking institutional robustness or capacity
- c) Lacking equipment and technology
- d) Lacking knowledge
- e) Other challenges in society are more pressing
- f) Corruption
- g) Lacking commitment to road safety among politicians
- h) Lacking commitment to road safety in the population
- i) Culture/mentality: road accidents are perceived as unavoidable?

Appendix 2: Road safety management in the countries

This section provides a detailed description for each case country, the existing (formal and informal) system for road safety management: organisation of actors involved, strategies and plans governing the road safety work. We describe this according to Varhely's (2016) 12 points of the key elements of road safety programs, based on document analysis and focus group interviews.

1) The burden and nature of road casualties

NO: The societal costs of the injuries reported by the police in 2021 was 11,989 million Norwegian crowns (NOK). Fatalities represented 2,576 million NOK (cost of a fatality 32.2 million NOK), very serious injuries 867 million NOK (cost per case 28.9 million NOK), serious injuries 5,552 million NOK (cost per case 10.3 million NOK) and slight injuries 2,995 million NOK (cost per case 0.77 million NOK) (Statens vegvesen 2021).

SE: In 2017 the cost of traffic accidents was estimated to be around 13,4 billion, or 2,6 % of GDP, based on official statistics using police reported accidents and not corrected for underreporting (OECD 2021). The monetary value of statistical life is 40,5 million SEK.

NL: The Netherlands' Road Safety Research Institute (SWOV) publishes a yearly report on road traffic crashes. The road traffic crash fatalities have been published for different subgroups based on age, mode of transport and road type. Focus group participants voiced that in the Netherlands, the overall deaths have been decreasing; however, the deaths of cyclists and old-age road users have been increasing. The focus group experts also expressed that the data related to vulnerable road users' deaths and serious injuries is underreported.

The social costs of road crashes in 2020 in the Netherlands are estimated at € 27 billion (with a bandwidth of € 15 to € 36 billion). This is equivalent to 3% (1.9-4.5%) of the gross domestic product (GDP). Of this total cost 15% are attributed to road death, 52% to seriously injured, 17% to slightly injured, 3% to other injuries, and 13% to property damage only (Wijnene, 2022). The costs are about € 6.5 million per road death and € 0.7 million per serious road injury (SWOV, 2022).

GH: Official road accident statistics is based on police reports. There is incomplete reporting, even for fatalities. It usually takes about two years to finalise statistics. Thus, by the end of 2023, 2021 was still the most recent year for which statistics was available. In the focus group interviews, there was mention of starting to use an accident recording system developed by the Transport Research Laboratory (UK). This recording system is GPS-based and will accurately record the location of an accident. The societal costs of the traffic fatalities and injuries reported by the police in 2021 have not been estimated. However, a study by the BRRI in 2006 estimated the economic cost of road traffic deaths to be equivalent to 1.6% of Ghana's GDP. Monetary values of statistical life have not been estimated, and as noted above traffic fatalities are under reported.

TZ: Official road accident statistics are based on police reports. In the interviews, the reporting was described as incomplete, both for injuries and fatalities. The data is not updated regularly, and the reporting would typically lack details about the cause of accidents, number of people and/or vehicles involved etc. The discussions in the focus groups primarily dealt with the need for a more robust system to accurately capture and integrate road casualty data from various sources, like hospitals. There is no detailed monetary valuation or evaluation of the societal costs of the fatalities or injuries reported by the police. One of the participants stated that the general monetary valuation was “about 2% of GDP”.

ZA: Official road accident statistics are based on police reports. In the interviews, the reporting was described as incomplete, both for injuries and fatalities. Most recording is done manually, in handwriting, and is not digitalized. One of the participants stated that; “[the data] ...is not recorded

up to standard”. Another participant explained that: “Manually collected information has challenges. For example, not all incidents are reported, and we have missing information on road traffic crashes.”

The discussions in the focus groups primarily dealt with the need for more accurate data. The lack of correct details of the geographical location of crash sites and their occurrence in point in time was mentioned as one of the main issues. The focus group participants also discussed the need for digital registration of accident data, to standardize reporting and make the data more accurate and accessible.

Traffic accidents are estimated to cost Zambia 3% of its GDP (0.812 billion US Dollars or 5.075 billion Zambian Kwacha) through attending to road accidents and accident victims, damage to property, loss of income to affected persons, hospital bills, and cost of funerals. Monetary values of statistical life has not been estimated, and as noted above traffic fatalities are under reported.

2) Commitment and support from decision makers

NO: All political parties in Norway support Vision Zero. Vision Zero is also supported by motoring organisations and by industrial associations representing, for example, companies involved in goods transport. There is essentially no opposition to Vision Zero in Norway. Several interviewees said that the focus on road safety among decision makers was higher a couple of decades ago, and that there is not such a strong feeling of urgency related to road safety as a couple of decades ago.

SE: After strong and science-based lobbying by committed road safety experts, the majority of the members of the Swedish Parliament were convinced in the necessity of change in paradigm of road safety work and consequently adopted a new concept for road safety, the Vision Zero in 1997. The Vision Zero strategy goal is that no one should be killed or seriously injured in a road accident. Vision Zero has had a good effect on road safety in Sweden but when the curve started flattening out around 2010 there was a decision from the government to review and intensify the road safety work. This also served as renewing the commitment to Vision Zero (Trafikanalys 2016; OECD 2021).

Focus group participants said that the focus on road safety among decision makers was higher a couple of decades ago, and some humorously referred to this as “the good old days”. Traffic safety is part of a larger package and is less of an individual issue, at the same time that it has not really been properly integrated into sustainability, a bit of a step backwards.

Traffic safety does not have the same political support at local and regional level. For example, it is difficult to get through speed reductions and there may be political resistance to implementing it. Sometimes low-hanging fruit is dropped because it can be difficult to get road safety into the regional road network where the decisions are made by the political regions. Traffic safety is lost in favor of other priorities such as accessibility. Accessibility is a very high priority, especially for professional traffic, there is pressure from business on politics. There is still a clear mobility paradigm.

Road safety is really high on the agenda and it is easy to take the issue a little for granted. Traffic safety work in Sweden does not have the highest priority, politicians and decision-makers probably get the impression that it is "rolling on". The number of accidents has decreased very much and there is no longer the same sense of urgency. In 2016, when the new start for the zero vision came, there was little sense of urgency and it was clear from the political side that they didn't think it was being done enough. There was a gathering of forces and the Swedish Transport Agency was given the government task of leading cooperation for traffic safety. Now here we are again, we don't seem to reach the goals but it doesn't get that response

NL: The focus group experts strongly echoed that road safety is still a political problem, especially cyclists, vulnerable road users, and children safety in the Netherlands. The political commitment fluctuates based on the need, funding, and urgency. However, there was a consistent concern by the focus group experts that, in recent years, the political commitment has not been steadfast for road safety. Compared to the previous decade, it has decreased. It is not an urgent matter on the list of priorities of the national government. Thus, it is not an urgency in the country anymore.

The Dutch Sustainable safety approach was first published in 1992 in a document entitled ‘Towards a sustainably safe road traffic’ and was put in practice afterwards in a number of demonstration projects followed by a large-scale implementation. This first phase and the start-up programme involved a covenant between the central and local authorities. It was followed in 2005 with the second phase which included a second edition ‘Advancing Sustainable Safety – National Road Safety Outlook for 2005-2020’ which was embedded in the national policy, and a third edition in 2018 ‘Sustainable Safety 3rd edition: the advanced vision for 2018-2030’. Although it is not a standalone formal legal document, it has been widely adopted by many stakeholders, and integrated into the Dutch road safety policies, guidelines and practices. Its principles have been refined over time through collaboration between various government agencies, transportation experts, and road safety organizations.

GH: Focus group participants said that road safety was high on the political agenda in Ghana, but that this tended to be the case before elections, and that attention was quickly reduced after elections. Ghana has a road safety action plan and has endorsed the target of the UN second decade of action for road safety (reducing fatalities by 50 % from 2021 to 2030).

Initiatives that might indicate commitment to road safety were identified in the document study. For instance, to demonstrate the government's commitment to road safety, for instance, the erstwhile President of the Republic of Ghana, His Excellency Prof. John Evans Atta-Mills, signed the foreword to the National Road Safety Strategy (NRSS) III (2011-2020). Again, in 2018, His Excellency the President of the Republic of Ghana, Nana Addo Dankwa Akufo-Addo, set up an Inter-Ministerial Committee comprising the Ministries of the Interior, Transport, and Roads and Highways to prepare an Action Plan to deal with road traffic fatalities and injuries in the country. As part of this project, the government dedicated GHC 6.5 million to fund the road safety activities in the action plan submitted by the committee.

TZ: Focus group participants said that road safety was not high on the political agenda in Tanzania, and that it was “not given priority”. There was a consensus on the necessity for stronger commitment from policymakers towards road safety. One of the participants stated that: “There is a lack commitment on road safety from politicians.” Another participant explained that they do not have commitment or support from policy makers “...because of a reluctance to establish a lead agency for road safety and not having a strategy in place”.

In the document study, projects indicating show commitment to road safety include:

- i. Ten step Plan Project – The project aim is to address skill gaps and develop participant’s skills (obtain road safety experts). Also, prioritize safety of road users and reduce high traffic death.
- ii. Road to inclusion and socio-economic opportunities (RISE) project – the purpose of this project is to improve rural roads and building capacity in the sustainable management of roads.

ZA: The participants in the focus group interviews seemed to agree that the commitment and support from policy makers had, historically, been low. There were differing opinions on the status of the commitment to road safety among policy makers today.

Some participants thought that the commitment and support was still low today, others emphasized that commitment was changing, and that it is “being given more and more attention to road safety” and that “the mindset of policy makers in the road space is changing slowly.” Others again referred to the commitment as “high on the agenda” and mentioned several initiatives for improving road safety.

Especially, non-motorized transport is being given attention. There is “a lot of talk and change happening”. For example, it is being built road designs that to a larger degree consider pedestrians

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations and cyclist. The UN Road Safety Fund (RSF) project Safe Roads Zambia was mentioned¹. The Road Development Agency's (RDA) Strategic Plan for 2022-2026 was also mentioned as an example of policy makers commitment, setting targets for improvements of road infrastructure.

Others emphasized that, even though new roads are being constructed, the “safety is lacking.” For example, potholes and uncovered drainage systems constitutes major safety hazards in Zambian roads.

In 2021, the Zambian government demonstrated a commitment to road safety through several initiatives, including the implementation of the Road Traffic Safety Management System, which aims to reduce road traffic accidents and fatalities by improving road safety management. The government also launched the National Road Safety Policy and the National Road Safety Action Plan, which outline strategies and actions for reducing road traffic accidents and fatalities. Specifically, the 2022-2026 strategic plan which commenced in 2021 includes the continuous development of new ideas and skills to meet current and future challenges in ensuring road safety for all (RTSA, 2021).

3) Road safety policies and visions

NO: Norway adopted Vision Zero as the basis for transport safety policy in 2001. It applies to all modes of transport and states that the long-term ideal for a safe transport system is that nobody is killed or sustains permanent injury as a result of a transport accident. In the most recent version of the National Transport Plan, covering the period 2022-2033, a target was set for zero traffic fatalities in 2050. All political parties in Norway support Vision Zero. Vision Zero is also supported by motoring organisations and by industrial associations representing, for example, companies involved in goods transport. There is essentially no opposition to Vision Zero in Norway. There is no doubt that Vision Zero has been a successful policy innovation in Norway (Elvik 2022). After it was adopted, the annual decline in the number of traffic fatalities increased from 2 % to more than 6 %.

SE: In 1997, the Swedish Parliament adopted Vision Zero as the overarching goal for road safety in Sweden. The long-term goal of Vision Zero is that no one should be killed or seriously injured in road transport accidents. Vision Zero has been effective and the number of fatal accidents has been halved since implementation. There is, however, more to do and there was a restart to intensify road safety work and to recommit to the goal of vision zero. A greater focus was also to be put on vulnerable road users since they have not had the same positive trend (Trafikanalys 2016). The current interim targets of Vision Zero was decided by the parliament in 2020 and they are to reduce fatalities by 50 % and serious injuries by 25 % by 2030. There are also the additional goals of reducing the suicides committed in the road transport system as well as reducing the number of serious injuries caused by single pedestrian falls with 25 % between 2020 and 2030 (Trafikverket 2022b).

Focus group participants said, however, that the system thinking has not really gained traction all the way, there is still a notion that it is a personal responsibility and that it is not possible to do much more on the part of society. Traffic safety work still carries the old approach that it is personal responsibility and rules that apply. Thus there is not sufficient focus on the system owner responsibility.

NL: The Netherlands adopted the Sustainable Safety vision approach in 1998, which is shared by many road safety professionals and which was first implemented in the Netherlands on a large scale in 1998-2002. In the following years, there have been two updates of the vision, the second edition was published in 2005/2006, and the third edition later on in 2018. The ultimate goal of the vision is to reach the target of zero fatalities and serious injuries in 2050. It is estimated that the implemented measures between 1998-2007 have prevented between 1600-1700 fatalities, and that these measures were cost effective having a benefit-cost ratio of 3.6:1 (Weijermars and Wegman, 2011). The

¹ <https://roadsafetyfund.un.org/projects/safe-roads-zambia-creating-cities-non-motorized-transportation-users>

sustainable safety principles are widely adopted in the Netherlands in everyday practice. It consists of five main principles, three of which are design principles: functionality of roads, biomechanics, and psychological factors; and two additional principles that are organization principles: responsibility and learning and innovation. This third edition puts emphasis on cyclist crashes not involving motorized vehicles, and advocates for in-depth analysis of all fatal crashes. In addition, this edition calls for a pro-active and risk-based approach, using both crash statistics and road safety performance indicators as a basis for action.

GH: Since 2008, Ghana has had an existing National Road Safety Policy that provides a guideline for developing, implementing, monitoring and evaluating national road safety programmes and activities from 2008 and beyond. This Road Safety Policy document has been developed within the context of the National Transport Policy, which is the primary governance document for the transport sector. Despite a road safety policy and a national transport policy, there is no specific (SMART) target the policy intends to achieve, as is the case for Vision Zero and other road safety policies implemented as best practices. However, Ghana's vision for road safety is to make Ghana the nation with the safest road transport system in Africa.

TZ: Through the focus group discussions, it did not appear that Tanzania have formulated a long-term ideal for road safety, like Vision Zero. Tanzania uses the National road safety policy which was developed in 2009 under the Ministry of Infrastructure Development, now called the Ministry of works and Transportation. The 2009 policy was aiming to reduce road deaths by at least 25% by 2015 with reference to 2008 data. The policy has been developed in accordance with the five strategies for prevention of accidents which are engineering and traffic environment, education and information, enforcement and legislation, emergency response and evaluation & other comprehensive actions. The vision in the policy is “to ensure nobody is killed or seriously injured as a result of road traffic accidents”. In the focus group interviews, it seemed to be of a common understanding that there was a need for a new, revised strategy and a policy. New strategy and/or policy should be followed up on and evaluated, as well as being made more known to people working with road safety in the country and the public in general. According to one of the participants a new strategy spanning from 2024-2030 is currently under preparation.

ZA: During the focus group discussions, it did not appear that Zambia have formulated a long-term ideal for road safety, like Vision Zero. Among government strategies for improved road safety the following were mentioned: The Road Development Agency's (RDA) strategic plan for improvements of road infrastructure spanning from 2022-2026, The Zambia's Non-Motorized Transport Strategy, developed in 2020 and The Road Transport Safety Agency (RTSA) strategic plan. The Zambian National Development Plan 2022–2026 was also mentioned. Contributors to the development plan was the Zambian Ministry of Health, RTSA, the United Nations Development Programme (UNDP), the United Nations Road Safety Fund, and RTI International.

The National Road Safety Action Plan for Zambia was developed in 2016, covering the period 2016-2021 with objectives to reduce road traffic accidents and fatalities, improve road user safety, and strengthen institutional capacity for road safety. The Ministry of Transport and Communications guided the development of a new National Road Safety Strategy in 2021, which is awaiting the finalization of the African Road Safety Action Plan before its release in 2022.

4) Defining institutional roles and responsibilities

NO: The Norwegian Public Roads Administration has a defined sector responsibility for road safety, which involves coordination of all the different parties involved in the road safety work. An important objective in the development of the road safety action plans in Norway, has been to involve as many stakeholders as possible and define their roles and responsibilities as clearly as possible. Still, ensuring a formal commitment to improving road safety from absolutely all stakeholders that can influence it is a formidable task. The most recent plan contains 179 road safety measures. For each of them, it is stated explicitly who is responsible for implementing the measure. A forum for policy-

making has been created in order to develop the road safety action plan. This plan is developed every four years. The current plan covers the years 2022-2025. All stakeholders are invited to contribute to the plan by developing road safety measures. In the current plan 179 road safety measures are listed. For each measure, an organisation responsible for implementing the measure has been assigned. The responsible stakeholders include both large public organisations like the Public Roads Administration and the police as well as, for example, organisations seeking to promote cycling or a responsible use of alcohol. An annual report is written to monitor implementation of the road safety action plan.

SE: In 2018, the government gave the responsibility to lead the collective road safety work the Swedish Transport Administration (STA). Part of it is to bring different agencies, organisations and additional road safety stakeholders together to develop a common action plan for road safety. The first action plan was put together in 2018 and the second and current one was developed in 2021 after the government decided on the new road safety targets for 2030 in 2020 (Trafikverket 2022b). There are many stakeholders involved in the road safety work in Sweden. The Swedish Transport Administration is responsible for the long-term planning and the operation of the transport system as well as the coordination of the road safety work. The Transport Agency is - among other things - responsible for traffic regulations and collecting traffic accident data. The police enforces the regulations etc. Additionally, there are local governments, municipalities as well as other organisations and companies involved. The stakeholders' commitments can be seen in the action plan and the yearly review of the action plan. Vision Zero puts the emphasis of responsibility on the system designers as it assumes that accidents will happen but that they should not lead consequences like death and serious injury.

Focus group participants said that it is clear that it is the Swedish Transport Administration's responsibility to lead the collaborative work in Sweden; to conduct dialogue, follow up, analyze, etc. They said that the previous Road Administration (pre 2018) clearly had the role of coordinating the traffic safety in Sweden. When the new administration was formed, the responsibility was spread between several agencies and there was less traction. Things that worked well were shut down and it takes time to build it back up.

NL: One of the five main principles of the sustainable safety vision, which governs road safety work in the Netherlands, is effective allocation of *Responsibility*. The national government is responsible for the system in the first place, and as such carries the ultimate responsibility. It sets long- term and intermediate targets. Spatial planners, road authorities, enforcement officers, lawmakers, safety education officers and other traffic professionals carry operational responsibility to realize what is in fact a sustainably safe traffic system. The private sector – including vehicle manufacturers - also carry the responsibility of developing products that are safe by design. Social organizations examine whether the road safety interests of their clients are sufficiently served and develop improvement initiatives when necessary. In the Netherlands, a forum for policy-making on road has been created in order to develop the 'Road Safety Strategic Plan 2030: A joint vision on the approach to road safety policy', (Kennisnetwerk SPV, 2019). This plan is developed jointly by the government, provinces, municipalities and the transport regions together with civil society organisations.

GH: The National Road safety authority (NRSA) is the lead agency for road safety management in Ghana. It is mandated to develop and promote road safety in the country, to coordinate and regulate activities, procedures and standards related to road safety, and to provide for related matters. Further, the responsibilities of the NRSA involve coordinating the activities of all the stakeholders involved. In addition to the lead agency's responsibility, some institutions are key contributing stakeholders to road safety management, specifically the National Road safety strategy (NRSS) IV and 2022-2024 action plans. These institutions are called the 'Implementing Agencies' of the National Road Safety Strategy and its action plans.

They are thirteen (13) in number, namely: National Road Safety Authority (NRSA), Driver and Vehicle Licensing Authority (DVLA), Ghana Highways Authority (GHA), Department of Urban Roads (DUR), Department of Feeder Roads (DFR), Motor Traffic and Transport Department

(MTTD) of the Ghana Police Service, Ghana National Fire Service (GNFS), Ghana Red Cross Society (GRCS), National Ambulance Service (NAS), National Disaster Management Organisation (NADMO), St. John Ambulance, Ghana (SJAG), Ghana Health Service (GHS) and Local Government Service Secretariat (LGSS).

The responsibilities of these stakeholders have been clearly defined in connection with the activities in the action plans. These roles have been grouped following the six pillars of the NRSS IV: Improved road safety management, Safer road infrastructure, Safe vehicles, Safe road users, Emergency post-crash response and enforcement. In the focus group interviews, it was stated the co-ordination between the 13 bodies working with road is not very effective and can be improved, and that there is a need for co-ordinating the actions taken by these bodies.

The national road safety authority (NRSA) obtains its crash data from the Motor Traffic and Transport Department (MTTD) of the Ghana Police Service. It is subsequently subjected to further analysis and validated by the Building and Road Research Institute (BRRI) of the Centre for Scientific and Industrial Research (CSIR). In Ghana, it is required by law for road users to report all road traffic crashes to the Ghana Police Service. This legal requirement is per Section 124 of the Road Traffic Act 2004 (Act 683). Thus, the primary source of road traffic crash data is the Ghana Police Service.

TZ: Participants in the focus groups said that currently, there is no lead agency for road safety in Tanzania. The responsibilities for road safety are distributed to several different bodies with each their mandate that involve road safety. It is not clear in all cases who has the main responsibility for different aspects of road safety management. The cooperation between different parties' work on an ad hoc basis due to the lack of a lead agency. One of the participants stated that "The responsibility is scattered. There is no lead agency for road safety." The participants seemed to agree that there was a need for a lead institution that could co-ordinate the actions taken by these bodies and to ensure a systematically approach to road safety across agencies.

Document analyses indicate that there are 6 main institutions that are directly responsible in enforcing road safety in the country. Each institution or organization have different duties and responsibilities and they are as named below:

- a) Ministry of Transport, Works and Communication
 - Direct association with Tanzania National Roads Agency (TANROADS).
 - Develop road safety policies.
 - Oversee and monitor all safety issues.
- b) National Road Safety Council
 - Promote research into causes of road accidents
 - Propose amending of traffic and road safety legislation with a view to reducing road traffic accidents
 - Effective central organization to intensify road safety activities.
- c) National Institute of Transport
 - Conducting research and provide consultancy concerning road safety.
 - Initiating road safety training programs.
 - Accessing competency of road users.
- d) Land Transport Regulatory Authority
 - Certify the roadworthiness of vehicles.
 - Coordinate transport safety activities.
- e) Tanzania Police Force (TPF)
 - Collect and compile Road Traffic Accident (RTA) data
- f) Tanzania Rural and Urban Roads Agency
 - Establishing, maintaining and improving road management systems
 - Conducting engineering traffic and economic studies for maintenance and improvement of the road network.
 - Improve road safety and manage environmental impacts on road network.

In Tanzania, all road traffic accidents and crash data are collected by the Tanzania Police Force (TPF) specifically the traffic division. This data is shared to the Ministry of Works and Transport. The Data contains key issues such as time of occurrence, number of fatalities and injured persons and condition of road and weather.

ZA: The Road Transport and Safety Agency (RTSA) was established by an Act of Parliament in 2002. The purpose of the RTSA is to contribute to national economic development by implementing government policy on road transport, traffic management, and road safety. The agency aimed to achieve this through the systematic implementation of its Corporate Plan 2015-17, which focuses on implementing measures to protect the lives of road users, undertaking functions related to the registration, examination, and licensing of drivers and motor vehicles in Zambia, and establishing a sustainable financial base for the provision and maintenance of road infrastructure.

The Committee of Ministers on Road Management Initiative (RMI) has the overall responsibility for the policy governing the road sector agencies. The Committee comprises Ministers from various ministries, including Finance, Transport, Local Government, Agriculture, Works and Supply, Energy, Justice, and Tourism. The Committee of Permanent Secretaries on RMI comprises Permanent Secretaries from the RMI ministries.

The Ministry of Transport and Communications (MTC) is responsible for policy, planning, setting standards, monitoring and evaluation in the transport sector, and is the supervising ministry for RTSA. The ministry is currently developing a national transport policy that should address road safety and incorporate the necessary measures.

The Road Development Agency (RDA) is responsible for the development and maintenance of the national road network, as defined under the Public Roads Act No. 12 of 2002. The National Road Fund Agency (NRFA) was established to receive funding from the government and road user charges, which are used to pay for road development and maintenance. The Ministry of Local Government and Housing (MLGH) provides policy guidance for the Local Road Authorities (LRAs) and takes on the procurement role when the procurement threshold for LRAs is exceeded. The 103 LRAs are responsible for urban and rural roads, as designated under the Public Roads Act.

The implementation of the National Road Safety Action Plan in Zambia involves coordination among several government agencies and stakeholders (Chishala, 2020). The Ministry of Housing and Infrastructure Development is responsible for road design, construction, and maintenance, while the Road Development Agency is responsible for road rehabilitation and maintenance (RTSA, 2021).

The Zambia Police Service and the RTSA are responsible for enforcing road safety laws and regulations (Chishala, 2020). The Ministry of Information and Broadcasting Services and the Ministry of General Education are responsible for promoting public education and awareness on road safety issues, while the RTSA is responsible for implementing road safety campaigns (RTSA, 2021). The Ministry of Health and the Zambia National Service are responsible for providing emergency medical care to road traffic accident victims, while the Ministry of Home Affairs is responsible for coordinating emergency response efforts (Chishala, 2020). The RTSA is responsible for collecting and analyzing road safety data (RTSA, 2021), and the Ministry of Transport and Communications and the RTSA are responsible for building the institutional capacity of road safety agencies and stakeholders to develop and implement effective road safety policies and programs (Chishala, 2020).

The Road Transport and Safety Agency obtains crash statistics from the Zambia police Traffic department in accordance with The Roads and Road Traffic ACT No. 8 of 2022 Section 233 providing for the collaborative framework between Zambia Police Service and the Agency including, but not limited to, traffic law enforcement and the system for collecting, storing and disseminating road crash statistics.

Several of the participants in the focus group interviews emphasized the need for a cross sectoral group to manage road safety issues, which currently do not exist in Zambia. Several also emphasized the need for better communication between government and the private sector, ensuring private sector

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations
engagement in road safety issues, securing investments and commitment to new standards developed by government.

5) Identification of road safety problems

NO: In Norway this involves analysing accidents to describe how the number of killed or injured road users has developed over time for different groups of road users, to compare different types of roads, to analyse how accidents are distributed between different types of accidents. If data on traffic volume are available, accident rates are computed (accidents per million vehicle kilometres) for different types of roads. If national household surveys of travel behaviour are available, accident rates for different means of transport or modes of travel, are estimated. Focus group participants underlined that underreporting of especially VRU accidents is a problem in Norway. There is underreporting in this area and room for improvement, but research projects aiming to improve the data on accidents for vulnerable road users are currently being conducted. The same applies to terrain-based vehicles in Norway, e.g. ATV, UTV and snow mobile. It was also mentioned that the number of fatal accidents is very low, with around 100 annually, and that focus should be shifted to more detailed analyses of severe injury accidents, which are 5-6 times higher. This would provide a better basis for learning and management.

SE: To identify road safety problems traffic accident data must be collected and analysed. The Swedish transport agency is responsible for STRADA (Swedish Traffic Accidents Database Acquisition) which combines police and hospital data to provide a basis for the evaluation of road safety in Sweden. The Transport Administration also performs in-depth studies of every fatal road accident in Sweden. The aim is to find out why the accident ended up being so serious that someone lost their life in and use that information to see how the outcome could have been avoided. There is an annual publication compiling and analysing the data on fatalities, injuries and other road safety indicators.

Focus group participants underlined that there is a lot of good data. The in-depth studies for the fatal road accidents are extremely important, but they said that there is more to learn about the seriously injured. These accidents are also important in Vision Zero, and the number is higher than for fatalities. Thus, the statistical basis is better for learning and developing counter measures. Participants said that the data that exists should be used better. For example, pedestrian fall accidents are missing in large parts of the analysis report. Thus, the entire road safety problem in the Swedish society is not made visible. It was mentioned that road safety data is necessary to work systematically with a road safety problem. Previously, there was no information or a method to obtain information about the suicide problem in road traffic. Now, the data about suicides in traffic is there, including factors involved in these accidents. Thus, authorities know about the prevalence of these incidents, where they happen etc. Authorities can shed light on the issue, and push for measures such as installing jump protection on bridges. Similarly, data about work-related road accidents and contributory factors are developed, in order to allow for systematic prevention of these. Additionally, the road system is being scanned, and knowledge of how it actually looks on the roads in the country will increase.

NL: Focus group participants expressed concern that recently, cyclist fatalities, especially old-age cyclist fatalities, have been increasing; thus, it is a major issue to resolve in the Netherlands. It has been discussed amongst the policymakers. In the Netherlands accidents are analysed to understand the development in the number of fatalities and injuries over time, and as well the characteristics of the accidents by road type, road user, demographics, vehicle type and type of accident. If data on exposure (e.g., traffic volume and/or kilometres travelled) is available, accident rates (e.g., accidents per million vehicle kilometres) are computed for different types of roads. If national household surveys of travel behaviour are available, accident rates for different means of transport or modes of travel, are estimated. Similarly to Norway and Sweden, underreporting of especially VRU accidents and single bicycle accidents is a problem in the Netherlands.

GH: Official road accident statistics is based on police reports. There is incomplete reporting, even for fatalities. It usually takes about two years to finalise statistics. Thus, by the end of 2023, 2021 was still the most recent year for which statistics was available. There was mention of starting to use an accident recording system developed by the Transport Research Laboratory (UK). This recording system is GPS-based and will accurately record the location of an accident. Focus group participants appeared to be well aware of the weaknesses of accident statistics.

TZ: Focus group participants said that there is incomplete data on accidents and fatalities. This makes it challenging for authorities in Tanzania to have a good overview of road accidents and contributory factors. The incomplete data makes it difficult to carry out in-depth data analysis to identify high-risk areas, and identify the underlying causes of road safety issues, to enable targeted interventions. Some of the participant had the experience that the data was made unavailable, because it was seen as confidential and found it problematic to get access to the data. Other participants had the experience that the data was easily available upon request.

ZA: Focus group participants underlined that there is incomplete data on accidents and fatalities from police reports. This makes it challenging to have a good overview of road accidents and contributory factors. As one of the participants stated: “We all rely on the information that the Zambian police gives us”. Another participant stated that: “Data is really hard to come across when it comes to road safety here in Zambia”. The incomplete data makes it difficult to carry out in-depth data analysis to identify high-risk areas, and identify the underlying causes of road safety issues, to enable targeted interventions. One of the participants explained that:

“There are inconsistencies in the data collection. For example, we find discrepancy between police reports and what is recorded at the hospitals. Also, there are incidents that are not even reported or recorded. In my opinion, we really do not have good enough data. We need to work on our data system to improve on quality and improve our performance”.

6) Setting road safety targets

NO: The first quantified target for reducing the number of killed or seriously injured road users in Norway was set in the road safety action plan for the 2010-2013 term. Before that, Norwegian politicians did not support quantified targets, arguing that they could be misinterpreted to mean that a certain number of killed or seriously injured road users was desirable, when the only desirable number was zero. This resistance has been overcome, and targets are always stated as the maximum number of killed or seriously injured road users that will be accepted in the target year. The first quantified road safety target in Norway had a time horizon of 10 years. In the road safety action plan for 2018-2021, this was extended to 12 years, as a target was set for the year 2030. An interim target for 2024 was also set. Long-term targets can be more effective than short-term targets by giving more time to implement road safety measures.

In addition to targets for the number of killed or injured road users, it is useful to set targets for road safety performance indicators. These targets usually refer to risk factors that are associated with accidents or injuries. The most recent road safety action plan for Norway contains quantified targets for:

1. Compliance with speed limits
2. Share of traffic under the influence of alcohol or drugs
3. Seat belt wearing (specified for adults and children)
4. The number of killed or seriously injured children aged 0-14
5. The risk of injury to car drivers aged 18 or 19 years
6. The risk of injury to car drivers aged 75 years or more
7. The risk of injury to pedestrians or cyclists
8. Cycle helmet wearing
9. Use of pedestrian reflective devices
10. The risk of injury to motorcycle riders

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

11. The share of heavy goods vehicles passing periodic inspection without defects
12. The share of vehicle kilometres on roads with a speed limit of 70 km/h or more protected by median guard rail
13. The number of municipalities licensed as safe (see section 5)
14. The number of counties licensed as “Traffic safe county authorities”.

This is a large number of safety indicators. However, it spans a broad range of road safety problems and is thus intended to ensure a broad commitment to improving road safety.

SE: In 2020, the government decided on the new interim targets for Vision Zero. The sub targets for road transport are to reduce fatalities by 50 % and serious injuries by 25 % by 2030. Additionally, there are two traffic related goals: reducing suicide in traffic and reducing the number of seriously injured from single pedestrian falls by 25 % (Trafikverket, 2022b). The two latter are, however, not adopted by the government yet. There is also a fifth target focusing on the number of seriously injured cyclists in single accidents.

The current national road safety strategy identified several important risk factors – Safety Performance Indicators for which specific goals are set for 2030 (Swedish Transport Administration 2022). Much attention is given to further implementation of the middle separation (to prevent frontal collisions) on the roads with the speed limits above 80 km/h, or, where it is not feasible, reduction of the speed limits. Speed limit adherence, and reduction of the average speed, have been identified as the major factors to reduce the number of fatalities, too. In 2021, 52,4% of road user drove within speed limits. By 2030, the goal is to reach speed compliance of 80%, and the average speed to be reduced by 5%.

Examples of other important factors are:

- **Speed limit compliance** - 80 % of all vehicle kms within the speed limit by 2030.
- **Sober traffic** - 25%–30% of fatalities during 2012-2021 were in alcohol- or drug-related. The goal is to reach 99.9% sober drivers by 2030.
- **Seat belts** - While the general usage of seatbelts is very high (97.9% in 2020), still one of three killed car occupants was not wearing the seat belt. The 2030 goal is to reach seat belt usage rate of 99.5%.
- **Helmet usage** - Currently, only half of cyclists use helmets (it is not obligatory by law, except for children). The 2030 goal is to reach 80% helmet usage rate. For moped riders, helmet use is obligatory, but the actual usage is only 98%. It must reach 100% by 2030.
- **Crash worthiness of cars** - 100 % of new cars have the highest safety class according to Euro NCAP by 2030.
- **Heavy vehicles** - 100 % of new heavy vehicles are equipped with emergency brake system by 2030. (not implemented as an indicator yet)
- **Safe roads** - 75 % of all vehicle kms on roads with speed limit over 80 km/h are on roads with middle barrier.

There are also other targets, e.g. for speed reduction in (sub)urban areas, provision of safe infrastructure for pedestrians and cyclists and increased share of vehicles reaching five stars according to Euro NCAP standard.

Discussing the targets in the focus groups, participants said that the objectives are based on what is estimated, and will thus produce the outcomes that are targeted for. It was mentioned that the indicators could perhaps be a little more actionable, i.e. a little more concrete and driving. It was also mentioned that the indicators that are mostly linked to the road administrator role, and that additional indicators related to other roles could be included, e.g. the role as an employer or the role as a transport buyer. Finally, participants said that we work with speed but not with traffic volumes, why don't we have an indicator related to reducing car traffic? The background for this is are other goal than traffic safety, e.g. that reducing the growth in car traffic also is a political goal.

NL: In the Netherlands, road safety is a national priority. The coalition agreement of October 2017 explicitly mentions road safety. It states: “*The number of victims must be reduced. Together with (branch) organisations, provinces, municipalities and enforcement agencies, we are committed to the realisation of the manifesto, Road safety: a national priority.*” The national government sets targets in terms of the maximum number of road deaths and serious road injuries, in combination with intermediate goals (road safety performance indicators or SPIs) for road safety. These intermediate goals provide the framework for agreements with directly involved stakeholders. SPIs can also be used for integrated policy formation.

In 2020, the target was to reach a maximum of 500 fatalities and a maximum of 10,600 serious road injuries. However, this target was not met. For the next period, the Netherlands has not determined (yet) a new target, however, the aim is to reach zero road casualties in 2050, with an annual reduction of almost 11% (SWOV, 2022). If the EU and UN targets of 50% reduction in road casualties in 2030 compared to 10 years before, this would mean a target of 300-350 road fatalities. Regarding SPIs, the recent Dutch road safety strategic plan 2030 defines risk-based policy through the analysis of the major risks. By identifying the most important risks based on data and indicators, public authorities can take the most effective measures to minimise the number of road injuries. The plan describes nine policy themes with the most important road safety risks:

- Three themes examine risks arising from the traffic system and the vehicle:
 - A safe infrastructure
 - Heterogeneity in traffic
 - Technological developments
- Two themes concern specific risk groups (young people and senior citizens) and modalities (two-wheelers, pedestrians):
 - Vulnerable road users
 - Inexperienced road users
- The last four concern risks arising from individual road users and their behaviour:
 - Driving under the influence
 - Speeding
 - Distraction in traffic
 - Traffic offenders

There are 3 phases in achieving the transition:

- Phase 1: Implementation – Introduction period (2018–2020)
- Phase 2: Implementation – Experience, learn and evaluate (2020–2025)
- Phase 3: Adjust and professionalise (2025–2030)

Several SPIs and tools have been developed. For example, PROMEV (provincial roads), VIND (national roads) and CycleRap (cycling infrastructure). These methods identify to what extent infrastructure complies with applicable guidelines. Other SPIs have been developed for speeding and driving under the influence of alcohol. These SPIs must have a proven relationship with road safety, and they should be measurable to monitor development.

The RSSP 2030 does not contain concrete measures. These will be included in the national and regional implementation plans, prepared by the road authorities responsible. Therefore, the themes form the framework for national and regional policy. The regions themselves determine what are for them the most concrete risks that need to be tackled.

GH: Ghana has a road safety action plan covering the period 2021-2030. The target is to reduce the number of fatalities by 50 % from 2021 to 2030. The plan has three phases and progress is monitored at the end of each phase. No data on progress so far were presented during the focus group.

Under the NRSS III (2011 -2020), Ghana as a member of the UN, adopted the road safety performance targets set by the UN in line with the UN Decade of Action for Road Safety (2011 - 2020). The target was to halt the unacceptable levels of Road Traffic Fatalities (deaths) and Injuries

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations

(Serious Injuries) by 2015; after that, reduce road traffic fatalities and serious injuries by 50% by the end of 2020. However, over the years, Ghana was unable to meet these targets. Subsequently, the NRSS IV was developed from 2021 – 2030, which coincides with the Second UN Decade of Action for Road Safety 2021 – 2030 and hinges on the safe system approach to road safety with the target to reduce road traffic fatalities and injuries by at least 50 per cent during the period.

Aside from the UN targets, the NRSS IV has developed KPIs for progress monitoring of performance towards achievement of the goal of the NRSS IV. The KPIs have been defined to encompass all the road safety pillars and will be measured and reviewed at the end of each action plan phase. These include:

<p>Road Safety Management</p> <ul style="list-style-type: none"> % change in the number of fatalities % change in the number of serious injuries Severity index (number of deaths per total casualties) The fatality rate per (100,000) population
<p>Safer Roads</p> <ul style="list-style-type: none"> % of roads with audited designs % of roads ranked using iRAP ratings or inventoried for road safety features % of road length with road shoulders % of roads with signalised intersections % of road length with a roadside barrier % of road length with facilities for separation of slow, vulnerable traffic and other motorised traffic % of high-risk and critical roads dualised
<p>Safe vehicles</p> <ul style="list-style-type: none"> Composition of the vehicle fleet: % of cars, vans, buses, trucks and motorcycles in total # of registered vehicles % of vehicles with certified roadworthiness per annum % of vehicles with insurance cover per annum % of motorcycles with certified road worthiness per annum % of motorcycles with insurance cover per annum Fatality rate per (10,000) vehicles
<p>Safe road users</p> <ul style="list-style-type: none"> % of drivers with valid driver's license % of motorcyclists with valid rider's license % of seat belt use among vehicle occupants % of children <12 years (correctly) sitting in a child's seat % of crash helmet use among riders
<p>Post-crash response</p> <ul style="list-style-type: none"> % of calls to emergency medical services due to RTC Average arrival time of emergency medical services at the crash scene % of fatalities at RTC sites and % at hospitals

Average length of stay in the hospital after a RTC
Share of road traffic casualties who died during hospitalisation
Enforcement
Annual number of random breath tests (per vehicle)
% of drivers failing random breath tests (above legal BAC) at police checks
% of surveyed drivers exceeding speed limits on various road types
% of drivers violating seat belt use in police checks
Technical means/equipment available to the MTTD
% change in coverage of TRAFFITECH
% of prosecutions, convictions, fines against arrests

As far as we know, no specific targets related to the indicators have been established. We are unaware of the status of the indicators in Ghana.

TZ: The absence of specific, data-driven targets was a major concern in the focus group interviews. Several participants advocated for the establishment of realistic and measurable targets to measure progress on road safety initiatives. As mentioned previously, a new strategy spanning from 2024-2030 is currently under preparation, that is said to include official targets on the reduction of traffic accidents.

The document study indicates that the road safety target included in the policy from 2009 was to reduce the number of fatalities by 25% by the year 2015 from 2008. The official fatality rate increased, however, from 2,905 people in year 2008 to 3,468 people by the year 2015. Since then, the Government set new targets to promote road safety in the country, e.g. Re-evaluation and development of a new National Road Safety Policy, Reduction of road safety fatalities by 50% as per UN Decade action 2021 – 2030, Improvement of road infrastructure by construction of new roads to a 3-star or better for all road users.

ZA: Several of the focus group participants emphasized that the incomplete data on accidents and fatalities makes it difficult to carry out in-depth data analysis to identify high-risk areas, and identify the underlying causes of road safety issues, to enable targeted interventions. Some of the participants stated that there are safety performance targets related to road safety plans in Zambia, other participants were unsure of the content of the policies and whether they included safety performance targets. One of the participants stated that: “I think we have good enough safety performance targets.” Another participant stated that: “I am not sure of the exact content of the policies, but my impression is that they could need updating and better follow up.” Generally, the existence of meaningful road safety targets is based on accident data and SPIs of sufficient quality.

Specific road safety targets based on government strategies, or the content of governmental road safety plans were not discussed in detail during the focus groups. Sources to road safety targets that were mentioned when posing this question during the focus groups:

- According to two of the participants the RTSAs strategic plan for road safety includes road safety targets. One of the participants stated that: “The strategy indicates all the plans that we intend to do ... and it indicates the activities that we plan to undertake in order to reduce the number of road traffic crashes”. The specific content of the road safety targets was not mentioned during the focus group.
- One of the participants explained that the RTSAs strategic plan is based on The Zambian National Development Plan 2022–2026. The national plan includes a road safety investment

case, that offers a selection of evidence-based interventions to reduce pedestrian injury and estimates the costs and benefits of implementing them.¹

- The UN Road Safety Fund (RSF) project Safe Roads Zambia was again mentioned, with its own action plan. One of the participants read from the action plan: “The 3-year-long project is expected to reduce the number of pedestrian and bicycle user fatalities in these cities by 66% by March 2023, saving a projected 600 lives and preventing 1,500 injuries”.

7) Formulate strategy and action plans

NO: Norway started to develop road safety action plans in 2002 and the current plan is the sixth of this kind. The plan has grown more detailed over time and the current plan contains 179 road safety measures and more safety performance indicators than any of the previous plans. It is stated clearly for each of the 179 measures who is responsible for implementing it. Key focus areas within the plan are: speed, driving under the influence, seat belt use and proper protection of children, inattention, children (0-14 years), youth and young drivers, older road users, pedestrians and cyclists, motorcycles and mopeds, goods transport by road, head-on accidents and single accidents, road operation and maintenance, use of new technology in road safety work, road safety work in private and public enterprises and work to strengthen the knowledge base about road safety. Within each focus area, a level of ambition has been specified, either in the form of concrete targets for the state of development until 2026, or in the form of an overarching formulation that points out the direction and the ambition for the effort within the area. The description of ambition level is followed by an overall discussion of the operators' planned road safety efforts. Each of the focus areas ends with a summary of measures that it is planned to take place.

The description of each road safety measure in the Norwegian plan is quite short. Only a few of the road safety measures have been quantified. To help assess whether a measure has been fully implemented, quantifying it is an advantage. By quantifying a measure, it also becomes easier to estimate its expected impact on the number of killed or injured road users. Such estimates have not been developed for the measures included in the Norwegian road safety action plan. This must be regarded as a weakness of the plan.

In the focus group interviews, e.g. in Norway it was stated that the institutional system comprised of the national transport plan, the national action plan for road safety, the cooperation model of involved parties etc. is robust enough to limit the choices of politicians. This institutional system is also referred to as "the Norwegian model for road safety management". One of the focus group participants in Norway said that:

I believe that the work we have done with the national action plan for road traffic safety and the cooperation model that we have, and use in Norway (...) - it contributes to the fact that the politicians do not have big choices, because it is so strongly based on science, so it takes quite a lot of political courage to go against it.

The strength of this institutional system is partly based on the Vision Zero ethics, which is commonly accepted, the strong scientific foundation and the established continuous improvement approach and cooperation model in the action plan for road safety.

SE: Sweden does not have an action plan in the sense that is referred to in Varhelyi (2016). Zero vision was introduced in 1997 with the goal that no person should be killed or seriously injured in road traffic. In 2008, a system was introduced for target management of traffic safety work to create

¹ https://www.undp.org/sites/g/files/zskgke326/files/2023-12/zambia_road_safety_investment_case.pdf Focus is on 5 road safety interventions: speed bumps, roadside pathways, road crossings, post-crash prehospital care and alcohol breath testing. The report provides an estimate of the economic costs of current road traffic injuries in Zambia, with an emphasis on pedestrian injury. It offers evidence for selecting the above set of cost-effective interventions to reduce pedestrian injury and estimates the costs and benefits of implementing them. The health and economic benefits of these interventions are forecast for a period of 30 years at two coverage levels (50 and 80 percent).

long-term perspective and better systematics. The key elements in the Swedish strategy and action plan are: the management-by-objectives approach (“målstyrningen”) that involves an annual report, an annual conference, a network for collaboration with key actors (GNS) “the Group for Zero Vision in cooperation”, and the action plan. An analysis of safe system implementation using back casting technique is the basis for setting targets for the indicators and to make prioritisation of measures / implementation areas. These parts should contribute to various actors that influence the design and use of the road transport system take measures within their operations that contribute to the milestone goals for traffic safety.

There are six focus areas in the action plan for road safety: right speed, sober traffic, safe cycling, safe walking (with a focus on falls), prevention of suicide, and leadership for safe road traffic. In these focus areas there are a total of 250 measures that the 33 stakeholders have committed to implement (Trafikverket, 2022b). For every focus area there is a text describing some of the measures in more detail as well as a list of all measures and the organisation that is responsible for the implementation. The description of each measure is short with few details. Some of them contains mentions of costs, benefits or time plan. Many measures are not quantified.

NL: In 1991 the sustainable safety approach was introduced in road safety policy in the Netherlands. This was followed with an implementation plan composed of two phases, In the first phase that started in 1998, the start-up program, consisted of 24 actions that were agreed upon by all tiers of government. In the second phase, a system wide implementation and application of sustainable safety principles was planned (Weijermars and Wegman, 2011). A wide variety of road safety measures were implemented from 1998 through 2007 in many different policy areas: infrastructure, enforcement, public information campaigns, education, and vehicle safety. Among the most important actions were categorization of the road network and traffic calming measures. The sustainable safety vision was later updated in 2005/2006, and again in 2018.

To ensure the commitment of all stakeholders to improving road safety, it is important to create a forum for policy-making in which the stakeholders are involved and mutually informed about what other stakeholders are thinking and planning to do. In the Netherlands, such a forum for policy-making has been created in order to develop the ‘Road Safety Strategic Plan 2030: A joint vision on the approach to road safety policy’, (Kennissetwerk SPV, 2019). This plan is developed jointly by the government, provinces, municipalities and the transport regions together with civil society organisations.

Following the previous plan, Road Safety Strategic Plan 2008–2020, the current plan covers the years 2018-2030, and it describes a new approach to structurally improve road safety, a proactive policy and broad cooperation between parties. Each party operates on the basis of its own responsibility and knowledge. The plan focuses on five core elements:

- More structural attention to road safety.
- More unity and cooperation between public authorities and civil society organisations.
- Risk-based policy through the analysis of the major risks.
- Promoting an integral road safety policy.
- Monitoring and adjusting the implementation in consultation.

To increase the safety of roads in the Netherlands strong liaison is established not only between public authorities, but also between public authorities and civil society organisations. At regional level, round tables are set up where parties prepare joint implementation agendas, discuss their implementation and adjust them, if necessary. In addition, there is an annual national official ministerial consultation where progress of the (implemented) policy is discussed and adjusted, if necessary.

GH: A broad framework dubbed the National Road Safety Strategy serves as a blueprint for road safety management in Ghana. Ghana has implemented three road safety strategies over the past decades – the first National Road Safety Strategy (NRSS I) 2000-2005; the second National Road Safety Strategy (NRSS II) 2006-2010 and the third National Road Safety Strategy (NRSS III) 2011-

Deliverable D2.1 State of road safety management in selected African countries—review and recommendations 2020, with the latter being following requirements of the UN Decade of Action for Road Safety 2011-2020.

Following the expiration of the NRSS III, the fourth National Road Safety Strategy (NRSS IV), which is the fourth in a series of strategic blueprints, has been prepared to provide the broad framework for road safety management in Ghana over the next ten-year period, that is, 2021 to 2030. It builds on the shortcomings and successes chalked during implementation of the previous strategies and seeks to address known and specific national and regional road safety challenges.

The NRSS IV coincides with the Second UN Decade of Action for Road Safety 2021 – 2030 and hinges on the safe system approach to road safety with the target to reduce road traffic fatalities and injuries by at least 50 per cent during the period. The strategy continues to build upon the six main focus areas for implementation towards achieving national and local road safety gains. The focus areas, herein referred to as the pillars, are:

- i. Improved Road Safety Management
- ii. Safe Road Infrastructure
- iii. Safe Vehicles
- iv. Safer Road Users
- v. Effective Post-Crash Response
- vi. Improved Enforcement

In addition to the NRSS IV, the first tranche of action plans spanning 2022 – 2024 has also been developed to define the first set of actionable activities to realise the broad road safety goal of the strategic framework. The NRSA adopted a consultative approach involving key road safety stakeholder entities at the national, regional, and district levels to solicit inputs for the NRSS IV and the 2022 – 2024 action plans. The planned activities cover all six objectives (pillars) of the NRSS IV and focus on institutional development and project-level activities. Each stakeholder institution will be responsible for implementing its action plan activities with its internal mechanisms and resources. At the same time, the NRSA will have oversight responsibility for implementing the Action Plans.

ZA: The document analysis indicates that the Zambian government has developed a National Road Safety Policy and a Road Safety Action Plan that provide a framework for improving road safety in the country. The National Road Safety Policy and a Road Safety Action Plan was published in 2016, in a project funded by the European union (Zambian National Road Safety Policy and a Road Safety Action Plan 2016). We are also familiar with previous road safety action plans and strategies, and it was mentioned that a new one is currently underway.

The National Road Safety Action Plan is aligned with the United Nations Decade of Action for Road Safety 2011–2020 and sets out a roadmap for reducing the number of road traffic accidents and fatalities in Zambia (RTSA, 2017). The National Road Safety Action Plan includes a range of measures to improve road safety, including infrastructure improvements, law enforcement, public education and awareness, data collection and analysis, institutional capacity building and emergency response. The National Road Safety Action Plan also provides a time frame for the implementation of specific actions and identifies the responsible government agencies and stakeholders. (RTSA, 2017).

The road safety action plans and strategies were, however, generally not known to the majority of the focus group participants. These said that Zambia does not have a national policy solely dedicated to traffic safety. One of the participants explained that: “we do not have a road safety policy as a stand-alone item.” Rather, several strategies encompass different aspects of traffic safety.

Among government strategies for improved road safety the following were mentioned during the focus groups: The Road Development Agency’s (RDA) strategic plan for improvements of road

infrastructure spanning from 2022-2026, The Zambia Non-Motorized Transport Strategy and The Road Transport Safety Agency's (RTSA) strategic plan.

Participants working with road safety management within government had the impression that these two strategies are well known “in the space of policy makers” and among local government. One of the participants emphasized that “usually, when we have these strategies, we share them with stakeholders. They can be used to obtain financial investments from the private sector.” Based on other participants statements it seems the strategies are not necessarily well known by the local public or in the private sector.

One of the participants stated that; “there have been talks of evaluating how far that strategy went [The Non-Motorized Transport Strategy], what were the successes, what were the challenges and also creating a new strategy for the next year.” According to one of the participants The Zambia's Non-Motorized Transport Strategy spanned from 2020 to 2023 and is currently being updated for a new period from 2024 and four-five years ahead. According to one of the participants RTSA's strategy spanned from 2019-2021 and is currently being updated for a new period.

Other traffic safety plans that were mentioned was the RTSA's road safety plans, that functions as a governing document for road safety measures to be implemented. No specific time frame for the safety plans were mentioned during the focus group. The action plan of the UN Road Safety Fund's (RSF) project Safe Roads Zambia was also mentioned. The project was estimated to span from 2020-2023. The participant mentioning the Safe Roads Zambia project, was not informed of the status of the project at the time of the focus group. The Zambia National Development Plan spanning from 2022–2026 was also mentioned. Contributors to the development plan was the Zambia Ministry of Health, RTSA, the United Nations Development Programme (UNDP), the United Nations Road Safety Fund, and RTI International.

Specific road safety targets based on government strategies or road safety plans were not discussed during the focus groups. The focus groups participants seemed to be divided in the opinion of the quality of the strategies. One of the participants stated that: “We have good policies, but the problem is implementation.” Another participant stated that: “We need better strategies that will be meaningful in improving road safety.”

TZ: Other than the strategy from 2009 and the new strategy currently under preparation (spanning from 2024-2030) it was not referred to any national policy or action plan concerning road safety during the focus groups. The focus group participants explained that there is a need for a cohesive, comprehensive road safety policy, strategy and action plan, which calls for a unified approach that includes all stakeholders and addresses all aspects of road safety. One of the participants stated that: “we do not have a formal plan fully established, only in piloting stages. We do have the 10-step plan, the “Ten Step Project” funded by The United Nations Road Safety Fund (UNRSF). Apart from that we don't have anything formal”. Another participant stated that: “ad hoc measures are implemented, and the measures are followed up and evaluated for their effectiveness.”

There have been various government-led strategies, policies and initiatives towards road safety in Tanzania. Notable ones include; Establishment of the National Road Safety Council in 1973; establishment of the Traffic Police Force in 1976 under the Police Force Ordinance, Cap. 322 with the aim to enforce the traffic laws and regulations; amendments of various traffic regulations and rules. Introduction of mandatory installation of speed governors for all public transport vehicles; establishment of the Tanzania National Roads Agency (TANROADS) in July, 2001 aimed at efficient execution of road maintenance and development of works for trunk and regional roads network; Involvement of the National Institute of Transport (NIT) and the Vocational Education and Training Authority (VETA) in driver training.

The Tanzania National Road Safety Policy of 2009 stipulates that the Ministry of Home Affairs will ensure that all road crashes reported to the police are registered on report forms and consolidated reports are to be passed on to the Ministry of Infrastructure Development and Road Authorities for

appropriate use and design of countermeasures. In-line with the main road safety goals which are to continually reduce the occurrences and severity of road crashes and consequently the level of fatalities and injuries in an efficient and professional manner with a target of reducing road deaths by 25% by the year 2015 from the year 2008, with improved statistics and better knowledge about the expected effects from different countermeasures these goals may be revised.

8) Allocate responsibility for measures

NO: The **Norwegian road safety action plan** lists for each measure who is responsible for implementing the measure. For some measures, more than one responsible agent is listed. When several actors are listed, and none of them is designated as the principal actor, there is a risk of pulverising responsibility. To what are the measures included in the road safety action plan implemented? The most recent survey of this concerns the plan for the 2018-2021 term (Statens vegvesen et al. 2022). That plan included 136 measures. 88 were fully implemented, 23 were partly implemented and 17 were not implemented. For 8 measures, implementation was on schedule in 2018 and 2019, but was then disrupted by the Covid-19 pandemic. A clear majority of the measures were implemented. Progress with respect to implementation of measures is followed up in an annual report.

SE: The most important aspect to describe here is the assignment from the Swedish government to STA for coordinating the traffic safety work in Sweden and facilitating knowledge-building and implementation of all actors (“samverkans-uppdraget”).

The **action plan for road safety** lists each measure and the stakeholder that is responsible for implementing it. The stakeholders suggested their own measures that they can and want to work with, and then collaborated with the Transport Administration about the exact wording and content in the action plan (Trafikverket 2022b). The stakeholders have authority to decide how to implement their measures, but every stakeholder must report the progress for the follow up of the action plan that the Transport Administration publishes every year. The measures are categorized according to three tiers depending on if the implementation is ongoing. The last follow up was of the previous action plan with 111 measures of which 90 were implemented or going according to plan, 12 were paused or not going according to plan and 9 were not started or no longer relevant (Trafikverket 2022a).

NL: The Netherlands’ **road safety strategic plan** highlights that each party operates on the basis of its own responsibility and knowledge. The RSSP 2030 does not contain concrete measures. These will be included in the national and regional implementation plans, prepared by the road authorities responsible. Therefore, the themes in the plan form the framework for national and regional policy. The regions themselves determine what are for them the most concrete risks that need to be tackled. However, for each of the nine themes the responsible parties are clearly defined in the road safety strategic plan. For example, the road authorities (central government, provinces, water authorities and municipalities) are responsible for the safety on existing and new infrastructure. Road authorities prepare their own programmes and schedules based on risk inventories to prioritize measures for their road network. However, even though local road authorities make the decisions for their road network, they still discuss at regional and national level to increase the efficiency and uniformity in road design.

GH: The **national road safety action plan** indicates which stakeholder is responsible for implementing each measure as contained in the action plans. For instance, the measures are assigned based on the agencies' mandate. In most cases, the actions are assigned to individual agencies. Still, they are to be implemented in collaboration with other agencies whose mandates may overlap with the institution tasked with the actions. Therefore, actions have lead implementers and the collaborative partners/stakeholders. However, the action plans have no unique/dedicated budget for these activities. Instead, actions listed in the plans are to be funded with the operational funds of the agencies. The evaluation of the NRSS III has revealed that this practice has partly led to the non-fulfilment of intended activities in the plans. Following the implementation of the set of action plans under the NRSS III, evaluations have been conducted at the end of each batch of action plans to assess the level of implementation of the activities stated in the action plans. Results have shown the level

of completion of each activity stated in the action plan i.e., if the activity is partially completed, fully completed, or could not be implemented. For instance, out of the total 111 activities contained in the NRSS III, 40.5% were fully completed, 37.8% were partially completed, and 21.6% could not be completed

ZA: The implementation of the **National Road Safety Action** Plan in Zambia involves coordination among several government agencies and stakeholders (Chishala, 2020). The Ministry of Housing and Infrastructure Development is responsible for road design, construction, and maintenance, while the Road Development Agency is responsible for road rehabilitation and maintenance (RTSA, 2021). The Zambia Police Service and the RTSA are responsible for enforcing road safety laws and regulations (Chishala, 2020). The Ministry of Information and Broadcasting Services and the Ministry of General Education are responsible for promoting public education and awareness on road safety issues, while the RTSA is responsible for implementing road safety campaigns (RTSA, 2021). The Ministry of Health and the Zambia National Service are responsible for providing emergency medical care to road traffic accident victims, while the Ministry of Home Affairs is responsible for coordinating emergency response efforts (Chishala, 2020). The RTSA is responsible for collecting and analyzing road safety data (RTSA, 2021), and the Ministry of Transport and Communications and the RTSA are responsible for building the institutional capacity of road safety agencies and stakeholders to develop and implement effective road safety policies and programs (Chishala, 2020).

TZ: Tanzania explains the responsibilities of some of the measures in the **Roads Act (2007)**. The road authority (TANROADS) is the one who is responsible for prescribing the speed limit, erection of road furnitures and ensuring the safety of the road users during design, construction, maintenance and operation by providing sidewalks, overhead bridges, zebra etc. Tanzania also has other organizations that have different responsibilities but contribute directly to the implementation of road safety. These organizations include the Ministry of Home Affairs (MOHA) in direct association with Traffic Police, the National Road Safety Council under the Prime Minister, Ministry of Works and Transport in affiliation of Tanzania National Roads Agency (TANROADS) and the President's Office Regional and Local Administration consisting of Tanzania Rural and Urban Roads (TARURA), Tanzania Roads Fund Board (RFB) and Fire and rescue. All in all, there is a lack of one responsible body ("leading agency") to ensure that all safety measures are monitored in TZ.

9) Ensure funding

NO: Road safety measures are implemented by both private and public organisations. Most of the road safety measures listed in the road safety action plan are implemented by the public sector. In Norway, most of the measures implemented by the public sector are funded by general taxation. There are some exceptions to this rule. Large road investments, which include building new motorways, are often funded by a mixture of general public expenditures and road user payment by means of toll schemes. The toll payments are a form of private funding, as most road users are private individuals or organisations. Some large road investments should be regarded as road safety measures. Motorways, for example, have been found to reduce the number of killed or seriously injured road users by about 75 % (Elvik et al. 2017). Focus group participants mentioned that road safety to some extent is underfunded in Norway, pointing e.g. to a maintenance deficit on county roads. These comprise nearly half of the road network in Norway, have lower traffic volumes, lower standards and higher accident risk than e.g. national roads. Several participants were concerned that the economy of county authorities was insufficient to provide a satisfactory maintenance of the county roads.

SE: The funding to implement the measures in the action plan is the responsibility of the stakeholders. Some of the stakeholders are national authorities, regional governments and a few municipalities. The measures committed to by these are mainly founded through taxation. Other organisations involved are private corporations like insurance companies and non-profit associations for vulnerable road users etc. The Swedish road safety NGO NTF gets some funding from Transport Administration. There is possibility to apply for funds for projects aimed to improve road safety through

Skyltfonden; a pool of money from personalised license plates that is administered by the Transport Administration.

Focus group participants said that there is insufficient funding to carry out the necessary infrastructure measures and to reach the objectives of the indicators or the calculated traffic safety scenarios. It was noted that things become more expensive because traffic safety is often added afterwards, after something has been built. The limited resources to rebuild to a safe infrastructure mean that it has to be worked in another way as well. Private actors and other authorities, in the form of employers and clients, must be involved in the issue.

NL: Road safety measures are implemented by both private and public organisations. Most of the road safety measures listed in the road safety action plan are implemented by the public sector. In the Netherlands, most of the measures implemented by the public sector are funded by general taxation. There are some exceptions to this rule. Large road investments, which include building new motorways, are often funded by a mixture of general public expenditures and road user payment by means of toll schemes. The toll payments are a form of private funding, as most road users are private individuals or organisations. Some large road investments should be regarded as road safety measures.

Focus group participants said that in recent years, the funding has been diverted to more pressing issues. Recently, the funding is not consistent. In the Netherlands, usually, the funding is shared between national and local (municipalities) authorities. Funding is related to political choices. The national government provides 50% of the funding, and 50% is ensured by municipalities. Provinces have their mechanism to allocate the funds to various measures. Focus group participants informed that the central government and municipalities must motivate each other to ensure sustainable funding. Sometimes, funding is approved by the central government if the municipalities submit the road safety plan.

GH: The availability of sustainable funding is critical for attaining effective road safety interventions. In Ghana, road safety funding comes from four primary sources: the Consolidated Fund, the Ghana Road Fund, and the National Insurance Commission and Development Partners. However, no funding sources for road safety provide adequate funding for road safety activities.

TZ: The organization responsible for allocating funds in the road sector is the Tanzania Roads Fund Board (RFB). It acts by ensuring full collection of revenue through collecting agencies, disbursement of funds to the agencies and monitoring of funds utilization by the Road Agencies such as TANROADS and TARURA. The Board provides operational planning guidelines to the Implementing Agencies and ensures their adherence to the operational plans. In its approval and disbursement for road maintenance programs, the board will monitor the effectiveness of road infrastructure ensuring that road programs facilitate and enhance safety for all road users. Not much information is available on how they allocate fund for road safety programmes.

Focus group participants agreed that measures for road safety is not sufficiently funded. The funding is distributed to provinces through the government budget for institutions. The participants discussed the lack of funding as a hindrance for work on road safety, combined with a lack of management of the funds, especially priorities made from the national road fund. Road maintenance is given priority with 70 % of the funds. One of the participants stated that “We do not have a well-organized division of the budget according to any action plan for road safety”.

ZA: In Zambia funding of road safety activities, either directly or indirectly, by all the road safety stakeholder organisations, is far from adequate. The source of funding for RTSA, including for road safety-related operations, is the Road Fund administered by the NRFA. This is complemented by Development Partners. All agree that measures for road safety is not sufficiently funded. One of the participants stated that: “... the funding of road safety in Zambia is usually not that adequate enough”. Another stated that: “... road safety is actually underfunded in the country”.

The focus groups participants discussed a serious lack of manpower in the RTSA and in the Department of Transport. One of the participants explained that: “They [RTSA] are really understaffed. They have four-five people covering the whole country. Also, the Department of Transport is understaffed. They should be maybe a 100 people, but they are just a handful of people there today.” One of the other participants stated that: “The RTSA have no funding of manpower or technical equipment.”

Lack of governmental funding and manpower were considered mayor issues for road safety management and for the implementation, follow up and evaluation of road safety measures.

One of the participants from government explained that: “Most of the road safety initiatives that has been mentioned they're not well funded, so .. our country still needs a lot, and that's how come we want to partner. We like to partner with other entities in order to fund the road safety initiatives like it has been mentioned here”.

10) Implement measures with known effects

NO: Policy is evidence-based if it consists mainly or only of road safety measures that are known to reduce the number accidents or the number of killed or injured road users. Road safety policy is not strictly evidence-based in any country. In Norway, road safety policy is to some extent evidence-based. This means that some of the measures included in the road safety action plan are likely to reduce the number of killed or seriously injured road users. However, for most of the measures included in the road safety action plan, their effects on the number of killed or seriously injured road users is unknown.

SE: The Swedish Transport Administration has for a long time based its work on socio-economic analyzes and other evaluations on qualified relationships between a measure and an effect (“effektsamband”). Today, the Swedish Transport Administration has six "effect catalogs". At the Swedish Transport Administration, they select measures based on effect relationships, but there are areas where there is less knowledge, for example related to vulnerable road users, or how the infrastructure interacts with the new functions on the vehicles; how it should be optimized. Trade-offs are made for measures. For example, the center rails that are used are not in accordance with Vision Zero, as they do not work for all vehicles and for all speeds.

Certain means of transport are more difficult to obtain measures for for various reasons. For example, active trips are less heavily weighted by historical tradition. MC difficult to find measures (if vehicle measures?).

For much of what is done, there is no effect relationship, for example collaboration. However, experience says that by collaborating and having a dialogue, you get commitment. Something that also became apparent when the Swedish Transport Administration got rid of sector responsibility.

Solutions that can be passed or solutions that we know would have the greatest effect but cannot be passed. Sometimes it is feasibility that rules? We know that helmet is important for safety but it is not accepted by those who are against it.

The measures in the action plan are not described in detail which makes it hard to draw any strict conclusions on their known effectiveness. There is probably a mix of measures that are scientifically proven to have an effect on the number of killed or injured as well as measures that are likely to contribute to road safety. For example, one of the focus areas in the action plan is speed which is a critical component in road safety. Some of the measures in this area are municipalities lowering the speed limit and building speed securing or calming infrastructure where vehicles and vulnerable road users interact. This is important and known to have an effect on accident occurrence and outcome. However, there are different ways of building speed calming infrastructure that can be more or less effective.

NL: In the Netherlands, road safety policy is to some extent evidence-based. One of the sustainable safety principles is learning and innovating. This means that traffic professionals continually learn how they can improve their policy. The Deming cycle is relevant here: it starts with the development of effective and preventive system innovations based on knowledge of causes of crashes and hazards (Plan). By implementing these innovations (Do), by monitoring their effectiveness (Check) and by making the necessary adjustments (Act), system innovation ultimately results in fewer crashes and casualties. One of the most important barriers for the complete implementation of Sustainable Safety is the lack of stakeholder knowledge about the effectiveness of various measures (Weijermars and Aarts, 2010).

Focus group participants said that usually, in the Netherlands, the measures are applied based on the principles of the safe system approach. However, the regional comparison is not easy since there is no concrete list of measures dictated by the national government to the local government. Focus group participants expressed that the local government could apply measures since road safety is decentralized in the Netherlands. Some of the focus group experts expressed that to improve road safety, sometimes measures not liked by the public have been implemented. In this process, if politicians do not support it, then such measures may not be implemented, and in turn, it will affect road safety.

GH: Evaluation studies indicate the effectiveness of the NRSS III, the impact of the activities on fatalities and injuries, the impact of interventions on road safety promotion, assessment of resource inputs, etc. In addition, the NRSA undertakes special evaluation/assessment for road safety campaigns that have been implemented.

ZA: According to the latest statistics from the road traffic and safety agency (RTSA), there has been a 10% reduction in the number of road traffic accidents in Zambia since the implementation of the National Road Safety Action Plan in 2019 (RTSA, 2021). In addition, there have been a 15% reduction in the number of road traffic fatalities during the same period (RTSA, 2021). It has been suggested that these improvements can be attributed to the measures implemented under the Action Plan, such as improvements in road infrastructure, enforcement of road safety laws and regulations, and public education and awareness campaigns (Chishala, 2020). However, more work still needs to be done. to achieve the targets set under the action plan, particularly in areas such as improving emergency response and medical care for accident victims, and strengthening the institutional capacity of road safety agencies and stakeholders (Chishala, 2020).

TZ: The 2009 policy recognised that research and monitoring road safety remains an integral part of complying with road safety vision goals. However, so far little research result has been used for decision making due to inadequate communication between researchers and road safety managers. Furthermore, road safety research is seriously underfunded thus, jeopardizing the research agenda.

11) Monitor performance

NO: In Norway, an annual report monitoring the progress of road safety is published. This report focuses on the status of the different road safety targets, e.g. accidents and safety performance indicators. This is followed up by the main parties involved in the action plan. Based on the Swedish model, there has also been an annual result conference each year, where the status of the indicators in the action plan for road safety is evaluated. Performance is also monitored at county level and municipal level in regional and local action plans for road safety. One of the interviewees said that:

(...) in the national action plan, target curves have been drawn up for the whole country. Then the target curves have been broken down at the county level. [we can see] whether we are going in the direction of the targets that we set ourselves for the next period towards Vision zero. It is also broken down at county level, so it has been stated in the national plans, so in that sense, all the county authorities have had a curve to relate to.

SE: The Transport Administration publishes both a yearly report analysing the status of road safety as well as a yearly follow up on the measures in the action plan (Swedish Transport Administration 2022; Trafikverket 2022a). The report focuses on the road safety targets like number of people killed or injured as well as other road safety indicators like speed compliance, sober driving and helmet use. The Transport Administration also arranges a yearly one-day conference to discuss the yearly status of the individual Safety Performance indicators.

Focus group participants said that the indicators are followed up in a good way, but not everything that is done connected to them. The activities included in the action plan are followed up, but there is no follow-up of what is done by all the actors involved in road safety work out there. Focus group participants asked questions like: What do the various actors do? What is happening regionally and locally? They also asked whether there could be some benchmarking between the municipalities to get more drive in the matter, and whether it would be possible to break down national data at municipal or regional level?

NL: As in Norway and Sweden, an annual report is published, focusing on the status of different road safety indicators and accidents. The road safety performance indicators are monitored at the regional level in the Netherlands. The responsibility of performance monitoring lies with the local government and municipalities.

GH: The document study indicates that the safety performance is monitored regularly. However, the focus group interviews indicate that there is no systematic monitoring of road safety performance indicators in Ghana. The need for such indicators and their usefulness was recognised, but no data was collected on performance indicators.

ZA: The document study indicates that the safety performance is monitored regularly. However, the focus group interviews indicate that there is no systematic monitoring of road safety performance indicators. Other than speed cameras and police checkpoints, there were not mentioned any systematic monitoring of road safety performance indicators by a government body in the focus group interviews. One of the participants exclaimed that: “It is difficult to know if you are improving or not, if you do not have good data. We cannot evaluate if you have improved or underperformed.” The monitoring and evaluation of indicators were recognized as crucially important for the development of greater road safety.

TZ: The document study indicates that the safety performance is monitored regularly. However, the focus group interviews indicate that there is no systematic monitoring of road safety performance indicators. Other than monitoring drivers through vehicles tracking systems, there was not mentioned any systematic monitoring of road safety performance indicators by a government body in Tanzania. One of the participants stated that: “monitoring performance in the absence of strategy is not possible”. The monitoring and evaluation of indicators was recognised as crucially important for the development of greater road safety. The TanRAP pilot projects was again mentioned as a valuable tool for gathering data and insights that could inform targeted interventions, although there were concerns about scalability and integration into broader road safety strategies.

12) Stimulate research and capacity building

NO: Norway has had several large research programmes for transport safety during the last 20 years. The first two, RISIT and TRANSIKK, were run by the Research Council of Norway and lasted from about 2002 to about 2018. From about 2015 to about 2018, the Public Roads Administration ran a research programme called BEST. A new research programme covering the period 2022-2025 has been launched. Although research of high quality has been made in Norway, there is still no formal education to become a road safety expert.

SE: The Transport administration finance research in road safety based on a research program that is updated in a few years interval.

NL: In the Netherlands the Ministry of Infrastructure and Water Management works in close cooperation with the Scientific Research on Road Safety (SWOV) which carries out research directed to improving road safety. SWOV is an independent organisation and makes knowledge available to professionals involved with road traffic and road safety. In addition, in the road safety strategic plan a knowledge centre SPV and a data task force have been put in place to support the need for knowledge, the definition of indicators and collection of data. Furthermore, road safety is covered in formal education at higher educational institutes in the Netherlands from different disciplines.

The Road Safety Research Institute (SWOV) is a dedicated agency researching road safety issues in the Netherlands. Focus group participants expressed their opinion that research collaboration with the universities in the Netherlands is sound and continuous.

The focus group participant from the Ministry of Road Infrastructure and Management trains informed us that they have in-house capacity-building programs for new engineers. There are also programs to enhance the competencies of the engineers. They also share knowledge with the Netherlands' universities and other road safety stakeholders. Similarly, the participants from the local government also opined to have a similar mechanism at the local level. Thus, it can be concluded that research and capacity building in the Netherlands is sustainable.

GH: Over the years, there has been some research conducted on road safety. Road safety research is primarily initiated and sponsored by the lead agency through its operational budget or funding from donor agencies such as the World Bank. Soon, the NRSA intends to explore opportunities for partnership/collaboration on road safety with leading research institutions such as the Queensland University Transport (QUT)/ Transport Accident Commission (TAC) of Australia, International Road Assessment Programme (iRAP), Regional Transport Research and Education Centre, Kumasi (TRECK, KNUST), Johns Hopkins University (USA). The NRSA also seeks to engage with Academic Affairs Directorates of tertiary institutions to generate interest in road safety-related research/studies.

ZA: Road Safety Research is not routinely undertaken in Zambia, partly due to the absence of detailed and reliable accident data. The Road Transport and Safety Agency does conduct research and recently commissioned two road safety studies, namely: Zambia road safety study (jointly funded by MoH and RTSA) to analyse the current state of road safety in Livingstone, Lusaka, Chibombo, Kabwe, Ndola, Kitwe, and Solwezi Districts; and, Link Zambia 8000 Km, Chama-Matumbo Road Survey (currently under construction), the purpose of which was to carry out a thorough, base line investigation sample survey to determine the levels of road safety knowledge.

TZ: There have been various research projects implemented in the country with the aim to improve the national capacity in road safety. Among these projects include the Ten Step Plan for Safer Road Infrastructure. It is funded by United Nations Road Safety Fund (UNRSF) and the Global Road Safety Facility of the World Bank (GRSF), brings together the Government of Tanzania through the Ministry of Works, TANROADS and TARURA, the United Nations Economic Commission for Africa (UNECA), World Bank, International Road Federation (IRF), World Road Association (PIARC), International Road Assessment Program (iRAP), Tanzania Road Federation (TARA), research institutions, NGOs and industry stakeholders. Also, there are other research activities conducted by an international NGO called AMEND on road safety.