



## Research Article

## Defining suitable Safe System projects: The experience of the SaferAfrica project in five African countries



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## ABSTRACT

When dealing with road safety in Africa, one should bear in mind that road safety problems need to be seen in their context as the solutions proposed to address them. While it is relevant to consider international good practices, African stakeholders should become owners of the interventions addressing their problems and take the responsibility for developing and implementing the appropriate solutions, taking advantage of suitable technical assistance, if needed. Based on these considerations, in this paper, a presentation is made of the process used in the European research project *SaferAfrica* to define suitable Safe System projects in Africa. This project aims at supporting policymakers and stakeholders with evidence on critical risk factors, related actions, and good practices drawn from high-quality data and knowledge. In the project, road safety and traffic management capacity reviews at the country level were carried out in five countries (Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa), following the World Bank guidelines. After conducting such a capacity review, these guidelines recommend the preparation and implementation of Safe System projects, “stand-alone, multisector initiatives targeting high-risk corridors and areas, with outcomes large enough to be reliably measured.” In *SaferAfrica*, this approach aims at facilitating the implementation of Safe System projects in the considered countries, by identifying detailed short-term improvement plans and producing contextualized terms of reference for some interventions per selected country. These interventions are remedial, they address high-priority concerns and demonstrate the viability of high potential gains within current administrative and legislative frameworks. To design interventions suitable to the existing context, the transferability audit tool was adopted within a “participative” process, involving all possible interested parties, from the institutions to NGOs. Results from the process are presented and discussed.

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## 1. Introduction

Road safety is a major health concern in society. Around 1.35 million people die, and 50 million are injured in road crashes globally every year [1]. Road traffic crashes are estimated to be the ninth leading cause of death, and projections reveal that it will be the third leading cause of death by 2020 [2]. Relative to their level of motorization, Low- and Middle-Income Countries (LMICs) bear a disproportionately high burden of road deaths when compared to more motorized high-income countries. Approximately 90% of the related deaths resulting from road traffic crashes (RTCs) occur in LMICs, while these countries account for 82% of the world's population and their level of motorization stands at only 54% of the world's registered vehicles [1]. In the same way, the

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accident risk (number of accidents per traffic exposure, such as vehicle-km) is generally higher in developing countries, with far more severe consequences, as well [3,4].

Africa is the worst performing continent regarding road safety. In 2013, the mortality rate in this Continent (26.6 fatalities/10<sup>5</sup> population) was almost three times that of Europe, where the number of road fatalities represented 31% of the relevant global picture [5]. However, the most disturbing concern is the fact that the disparity in road safety results seems to be increasing. Specifically, according to the WHO [1], fatality rates in Africa increased from 26.1 per 100,000 population in 2013 to 26.6 per 100,000 population in 2016.

Progress has been made by some countries in mitigating the number and severity of road accidents [6], but the situation in most LMICs is alarming and worsening [7]. Overall, transport policies in LMICs are often poorly designed and implemented. Infrastructure investments are lagging and price instruments are rarely used [8]. In Africa, several actions are already ongoing, and important high-level documents are already in place, paving the way for road safety improvements, such as the African Road Safety Action Plan 2011–2020 [9], a result of the common effort of the African Union (AU) and the United Nations Economic Commission for Africa (UNECA).

Europe could play an important role in supporting African countries to improve their road safety and traffic management performance due to the improvements achieved in this area. These considerations are addressed through the *SaferAfrica* research project; a joint effort of 17 partners from Africa and Europe, aiming to create favorable conditions and opportunities for the effective implementation of road safety and traffic management actions in the African countries, by setting up a Dialogue Platform between both continents [10].

To improve road safety performance in African countries, many barriers must be overcome [10]. The adoption of the Safe System approach to road safety will be a valuable tool to implement effective countermeasures that may significantly improve road safety in Africa. The Safe System approach to road safety has been proven to be successful in some countries [11] and has been adopted in the United Nations Plan for the Decade of Action for Road Safety 2011–2020 [12].

Towards this direction, the objective of the present paper is to outline the methodology and results of the process used in the *SaferAfrica* project to define Safe System projects in African countries (Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa), which are suitable to their existing contexts.

## 2. Safe system approach

The *Safe System approach* evolved from the visions that emerged in Sweden and The Netherlands in the mid-1990s [13]. In Spring 1995, work on the development of a Safe System approach started within what was formerly the Swedish Road Administration. The results of this development work were documented in a memorandum entitled 'Vision Zero – An idea for a road transport system without unrecoverable health losses' [14]. Vision Zero entails a shift in the road safety planning paradigm. Instead of starting from an existing problem situation, Vision Zero departs from an absolute state of the future – safe road traffic [15]. In the Netherlands, a similar policy was developed in the 1990s by the Dutch Institute for Road Safety Research (SWOV) to promote "inherently safe road traffic". This vision was named "Sustainable Safety" [16].

At that time, scientists and policymakers began to question the prevailing view that the safety of road users was, in the last instance, a matter of their responsibility, and that the task of road safety policy was thus primarily to influence road users' behavior so they would act safely at all times. As the decades-long decreases in the number of road fatalities and severe injuries were leveling out, it became clear that a predominant focus on education, information, regulation, and enforcement was no longer delivering progress.

The Safe System approach represents a "paradigm shift" [13,17,18] in road safety. The shift is from treating road injury factors as notionally equal with the underlying assumption that there will always be injury risks inherent in road travel to conceptualizing and pursuing the development and management of a road traffic transport system that is inherently safe for human users. According to this approach, a "Safe System" has the following characteristics:

- It recognizes that prevention efforts notwithstanding, road users will remain fallible and crashes will occur.
- It stresses that those involved in the design and operation of the road transport system need to accept and share responsibility for the safety of the system, and those that use the system need to accept responsibility for complying with the rules and constraints of the system.
- It aligns safety management decisions with broader transport and planning decisions that meet wider economic, human, and environmental goals.
- It shapes interventions to meet the long-term goal, rather than relying on "traditional" interventions to set the limits of any long-term targets.

The basic strategy of a Safe System approach is to ensure that in the event of a crash, the impact energies on human beings remain below the threshold likely to produce either death or serious injury. This threshold will vary with the crash scenario, depending on the level of protection offered to the road users involved [18].

The concept of a Safe System emerged in countries that have been most successful in reducing road trauma in past decades but saw progress becoming more and more difficult to achieve. Yet it is highly relevant too for LMICs and fast-growing cities, that see increased numbers of road deaths and injuries in the wake of rapid motorization. Unlike many other public health issues, strong economic growth correlates not with fewer road crash injuries but, often enough, with more victims. Safe System thinking offers LMICs and cities that face a deteriorating road death and serious injury epidemic an opportunity to take a bold step forward, towards convergence with performance in pioneer countries [16].

Safe System projects are stand-alone, *multi-sectoral initiatives targeting high-risk corridors and areas, with outcomes large enough to be reliably measured*. These projects should address three broad components, namely: 1) institutional capacity strengthening priorities, 2) targeted interventions in high-risk corridors and areas, and 3) policy reforms where weaknesses have been identified. Moreover, consideration of safety performance monitoring in these projects and the evaluation of their results is also recommended [19].

Bliss and Breen (2013) proposed an eight steps "project preparation" process, starting from the setting of the project objectives to the project implementation priorities. Detailed guidance is provided, from the definition of the project objectives to the detailed project design. In terms of project implementation priorities, they highlight the importance of the "mentoring" role of technical assistance, the comprehensive promotion of the project targeting also road safety stakeholders, and the inclusion of activities related to knowledge transfer to build capacity.

One of the aspects not considered in this approach is the "easiness" of the implementation process, a key issue for developing countries and Africa. Often, these projects tend to get bogged down just before or during implementation. The proposed approach is aimed at easing implementation, with a strong link to the capacity review and trying to remove expected barriers that might arise during the implementation.

Finally, the framework of road safety countermeasures is rather articulated. They can be addressed towards different targets like users, vehicles, infrastructures, governance, emergency system and the initiatives cover the different fields of application. In this way, the

investigation of the funding of the road countermeasures as a whole is then a complex task [20].

### 3. Methodology

This section gives an overview of the methodology used for defining suitable Safe System projects in selected African countries. The process started with a Road Safety Management Capacity Review (RSMCR) in each of the five countries (Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa), that were selected as representing different UN geographic areas of Africa.

Based on the findings of the capacity reviews, a list of desirable road safety intervention projects for each country was developed and prioritized based on some criteria, such as ease and time of implementation, as well as the costs.

Next, for each selected project a terms of reference (ToR) list was compiled, and, finally, to design interventions suitable to the existing context, a SaferAfrica transferability audit tool [21] was adopted within a “participative” process, involving all possible interested parties, from the institutions to NGOs. The tool will indicate which immediate enabling actions are required to overcome legislative, regulatory, organizational, institutional, and other barriers that may prevent measures or actions from being implemented.

#### 3.1. Road safety management capacity reviews

Road Safety Management Capacity Reviews (RSMCRs) were conducted by reviewing and analyzing (the development of) road safety and traffic management in the five selected countries and on-site interviews with high-level major road safety stakeholders.

Dedicated review teams were drawn from the SaferAfrica project partners and assisted by two internationally recognized experts (Martin Small and Jeanne Breen). To ensure that the reviews would follow international best practice, this task was explicitly based on the World Bank guidelines [19], and attended, as well, the ISO 39001:2012 [22] and the policy frameworks as set by Sustainable Safety [23,24] and Vision Zero [13], known generically as Safe System [16]. Furthermore, recommendations on road safety management provided by important EC-funded projects (such as DaCoTa) were considered. Importantly, international experiences and, specifically, experiences related to the institutional framework of policymaking and the relationship between road safety policy and science, were also considered in this process.

The overall objectives of an RSMCR were the following:

- systematically assess the state of road safety and traffic management;
- summaries the strengths and weaknesses of institutional capacities to significantly improve road safety results;
- reach consensus among the key agencies about next steps, and sustainable activities;
- fundamentally improve road safety and traffic management by proposing a long-term headline Safe System strategy and a project concept for the activity to launch it.

This last objective is intended at developing a qualitative and long-term investment strategy covering the three traditional product development stages: establishment, growth, and consolidation phases [19].

#### 3.2. Improvement projects definition and prioritization

Based on the results of the RSMC reviews, this step served to develop and priorities specific future improvement projects for each of the selected countries. These projects are intended to help accelerate the transfer of road safety knowledge and strengthen the capacity of local road safety stakeholders.

To assess the feasibility of further developing these project components and their related enabling projects, several approaches, not strictly related to road safety, were explored to look for further criteria that could be included in the transferability tool. Various of these approaches have a different scope, the most frequent one is *project complexity* used to understand the difficulty of managing a specific project. One of these is the tool called CIFTER (*Crawford-Ishikura Factor Table for Evaluating Roles*) which identifies seven factors that affect the management complexity of a project (Table 1). Each factor is rated from (1) to (4) using a natural values scale which expresses a qualitative metric as a quantitative value. These values are then totaled to produce a *management complexity rating* for the project [25].

#### 3.3. Terms of references preparation

For each selected project a list of terms of reference was compiled, following SMART (Specific; Measurable; Achievable; Realistic and Time-bound) project objectives, and criteria. Following the World Bank guidelines [19,26], the terms of reference prepared, include the specification of the objectives, the outputs and the scheduling of the required technical assistance services, and the professional skills and experience required.

#### 3.4. Identification of the possible barriers to the implementation

The success of a road safety intervention is influenced by many factors. The specific context in which an intervention is applied plays a crucial role in its applicability. Experience shows that the successful application of a road safety intervention in a given country or region does not ensure that its implementation will be equally successful in a different context. Therefore, in SaferAfrica, a method for ex-ante evaluation of the applicability of proposed interventions had to be developed, namely to identify and understand potential barriers influencing the results and effects of the proposed. This type of assessment is based on a range of data, but mainly on interviews with local stakeholders. Therefore, for each project a detailed analysis of the barriers for the implementation needs to be carried out, providing the stakeholders with relevant information about the project.

The method adopted is based on the concept of Road Safety Space proposed by King (2005) to organize the factors influencing a road safety intervention. According to King (2005), in a given country, each

**Table 1**  
CIFTER Assessment matrix [25].

Factors	Quantitative values			
1. Stability of the overall project context	Very High (1)	High (2)	Moderate (3)	Low (4)
2. Number of distinct disciplines, methods, or approaches involved in performing the project	Low (1)	Moderate (2)	High (3)	Very High (4)
3. Magnitude of legal, social, or environmental implications from performing the project	Low (1)	Moderate (2)	High (3)	Very High (4)
4. Overall expected financial impact (positive or negative) on the project's stakeholders	Low (1)	Moderate (2)	High (3)	Very High (4)
5. Strategic importance of the project to the organization or organizations involved	Very Low (1)	Low (2)	Moderate (3)	High (4)
6. Stakeholder cohesion regarding the characteristics of the product of the project	High (1)	Moderate (2)	Low (3)	Very Low (4)
7. Number and variety of interfaces between the project and other organizational entities	Low (1)	Moderate (2)	High (3)	High (4)

road safety issue exists in a three-dimension space defined by economic, institutional, and social/cultural conditions of the country they are applied to and which factors influence it. The dimensions include both broad and specific influences. The position of a road safety issue in that space is unique and varies from country to country, although some dimensional factors may be shared across road safety issues or countries [27].

In the framework of the *SaferAfrica* project, a Problem Priority Matrix (PPM) was adopted to assess the transfer process (i.e. mainly the *applicability*) of international road safety good practices to an African country. To some extent, this entails improving road safety outcomes, but the main objective is to improve the transfer process with the expectation that better outcomes will follow. The tool is based on the methodology adopted in a European project called *SaferBrain*, where the transfer process of interventions improving vulnerable road user safety was assessed for India and Brazil [28].

The basic task is to assess whether a given road safety intervention may contain a problem within one (or more) of the assessment dimensions provided by the Road Safety Space (i.e. society/culture, economy, and institution) describing the receptor context. To this aim, the following six factors are proposed in *SaferBrain*: people, environment, availability of regulation, political commitment, maintenance costs affordability, and technical skills availability (Table 2). Some possible questions related to each factor were derived from existing literature to help assess the applicability of a road safety intervention [28].

The transferability evaluation of each measure was made using a matrix in which country stakeholders rated each factor according to its difficulty (if the implementing the intervention is challenging from that factor perspective) and weight (if the factor is important for the implementation of the intervention in the country). A final aggregated score was then produced for each road safety intervention, which allows serializing the transferability of the analyzed interventions [21].

**Table 2**  
Questions addressing intervention transferability [28].

Component	Factors	Questions to assess a factor
Society/Culture	<i>People</i>	Would the general public and the targeted population accept this intervention? Does any aspect of the intervention go against local social norms? Is it ethically acceptable? Can the contents of the intervention be tailored to suit the local culture? Does the target population at the local setting have a sufficient educational level to comprehend the contents of the intervention? Is the target population aware of the road safety problem?
	<i>Environment</i>	Is it possible to change the built environment in order to accommodate the proposed practice?
	<i>Institution</i>	<i>Availability of regulation</i> Is it legislation relevant to the transferability of the intervention available (standards of service and safety)? <i>Political commitment</i> Does the political environment of the local society allow this intervention to be implemented? Is there any political barrier to implementing this intervention?
Economy	<i>Design, implementation and maintenance costs affordability</i>	Are the essential resources for implementing this intervention available in the local setting? (list of essential resources would help answer this question)
	<i>Technical skills availability</i>	Does the provider of the intervention in the local setting have the skills to deliver this intervention?

## 4. Results

### 4.1. Summary of the key findings from the RSMCR

The five RSMCS [29–33] highlighted both existing issues and provided recommendations at the three levels of the road safety management system model (i.e. Institutional management functions, Interventions, Results). Based on these, it was possible to define strategic priorities to be undertaken during the three development phases (establishment, growth, and consolidation phases) of a road safety management implementation plan. For the selected African countries, the challenges in building capacity in road safety management have been initiated, and the initial steps to establish the organizational structures and procedures have been taken. However, as was evident in countries in Europe, this process will take time. Moreover, as recommended by the World Bank guidelines [19], it is crucial that the political will is channeled into a long-term investment in road safety improvements across all sectors.

In the following, the main evidence from the RSMCR is reported together with examples of the recommended priorities for the establishment phase.

### 4.2. Results focus at the system level: leadership, goal and target-setting

There are relevant differences in how road safety is planned and managed at local and central levels in each country. Considering the framework adopted for undertaking road safety management capacity reviews within the *SaferAfrica* project, a road safety lead agency should be mandated to promote road safety, set strategies and targets for road safety improvement, and perform the seven institutional management functions that produce road safety interventions: Results-focused approach; coordination; legislation; funding and resource allocation; promotion, monitoring, and evaluation; research and development.

The availability of reliable and complete data on fatalities and serious injuries is a major issue for the definition of quantitative targets and strategies. According to the RSMCRs, a national road safety strategy has been adopted in four of the five countries, namely: Burkina Faso, Cameroon, Kenya, and South Africa. 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.

### 4.3. Interventions

*Safe roads and roadsides.* Factors affecting infrastructure safety can be related to road planning and design, construction (e.g. work zone), and maintenance procedures. In all the addressed countries, most of the roads are not paved and, in some countries, like Cameroon and Tunisia, the paved roads are in poor condition. The existent of these problems, together with the lack of maintenance, signage, lighting, and design errors, imply that in these countries, the roads are not safe and are characterized by a high risk of road accidents. Though speed limits are set for all roads, the levels of non-compliance to speed limits are not being measured and documented.

*Safe Vehicles.* There is, in general, a high percentage of powered-two-wheeled vehicles (ranging from 35 to 40% in Kenya to more than 80% in Burkina Faso) but a small proportion of them is insured (10% in Tunisia). Some countries (Kenya, Burkina Faso, and South Africa) have regulations on the safety standards of the vehicles in use, but the standards are limited, and the regulations are weakly enforced. Mandatory vehicle inspections are present in all countries however, these seem not to be carried out periodically (as established by law) and in some cases, not all vehicles are required to be submitted to them.

*Road users.* According to WHO (2018), there are five main behavioral risk factors for road traffic injuries: speed, driving under the influence,

failure to use motorcycle helmets, seatbelts, and child restraints. Regarding speed limit laws, these are present in all the five countries (with related limits) but drivers rarely respect them, and rather speeding is one of the main causes of road accidents. Regarding driving under the influence of alcohol or drugs, each of the five countries has a law regulating it with their respective limits; only Burkina Faso does not have a law that regulates driving under the influence of drugs. Finally, regarding the laws of the helmet and seatbelts each of the five treated countries has a law that regulates these aspects. The law regarding child restraint is present only in Burkina Faso.

*Emergency services and post-crash care.* The quality and coverage of the existing medical services are some of the biggest obstacles to adequate post-crash care. Recommendations to improve emergency care can include the development of a digital trauma registry, the introduction of trauma training for healthcare workers, and the development of trauma teams.

#### 4.4. Institutional management functions

*Coordination.* Weak horizontal and vertical coordination.

*Legislation.* There exists an abundance of road safety legislation (laws, decrees, and circulars) some of which need revision (e.g. Vehicle registration, licensing and roadworthiness, Driver licensing and penalties, Vehicle safety regulations). In Burkina Faso, Laws are not adapted to the local situation.

*Funding and resource allocation.* In some countries, there is a sustainable source of funding (e.g. the Road Fund in Cameroon). However, there is a lack of resources for implementation, and resource allocation procedures are missing.

*Promotion.* Promoting was evaluated as being ineffective compared to international best practices. Statistics on institutional outputs are not published and made available to stakeholders.

*Monitoring and evaluation.* Sustainable systems are not operational to collect and manage data on road crashes and mobility. Even if the majority of countries regularly investigate and record road accidents, road accident data are likely to be underestimated. A critical aspect of road safety management in Africa is the lack of a reliable data collection system and the problem of underreporting. This is confirmed by all the RSMCRs. Accident data are often incomplete, and it is unknown what proportion of road accidents have been reported and recorded in the

official databases used. Modernizing the road safety data collection process seems to be a high priority to enable effective and efficient monitoring and evaluation of road accidents.

*Research and development and knowledge transfer.* There is very little existing research capacity in road safety that has limited research capability in the area of road safety, and this capacity will need to be built or sourced from other (international) organizations.

Based on the previous evidence, a list of common issues/opportunities is reported in Table 3.

#### 4.5. Safe System projects definition: the example of Cameroon

To illustrate the application of the methodology, Cameroon has been chosen among the five countries. In the following, it is reported a description of the application of the proposed methodology.

##### 4.5.1. Road Safety Management Capacity Reviews (RSMCRs) prioritization activities in Cameroon

Based on the results of the RSMCR undertaken in Cameroon [30], it turns out that Cameroon's road safety management system is in a lower phase of development. Drivers, vehicles, and roads are generally of low standard, and a lack of enforcement and supporting road safety infrastructure, all contribute to a declining road safety situation.

The RSMCR allows the development of a strategic action plan in which the strategic priorities are highlighted per development phase. A project concept is defined to address weaknesses in the key institutional arrangements at the national levels. The overall objective of the project is building road safety management capacity through institutional reform and accelerating knowledge transfer through “learning by doing”. The focus is to hasten the process of shifting from a weak to a strong institutional management capacity to govern the evolution of improved road safety results.

The project will encourage agencies to work together constructively to deliver and evaluate a set of well-targeted, best practice multi-sectoral interventions. The successful implementation of the project hinges on the transfer of road safety knowledge, strengthens the capacity of the participating partners and stakeholders, and rapidly produces results in the country that will provide benchmarks to apply to the next stage of investment.

**Table 3**  
Summary of common issues/opportunities in existing countries.

Project Component	Improvement projects	BFA	CMR	KEN	ZAF	TUN
Governance and leadership	Strengthening of institutional management functions of the lead agency	✓	✓	✓		✓
	Capacity building and training	✓	✓	✓	✓	✓
Road Safety Management information	Improved crash registration systems (forms, procedures, capturing)		✓			✓
	Vehicle/driver registration (roadworthiness)			✓		
	Linkages and supporting data (traffic, mobility, ambulances)		✓		✓	✓
Road infrastructure/traffic management	Safety Performance Indicators		✓		✓	✓
	Observational surveys	✓		✓	✓	✓
	Road safety audit/inspection	✓	✓	✓	✓	✓
	Safety standards	✓				✓
	Pedestrian/VRU (management) plans and infrastructure provision	✓			✓	✓
Speed management	Classification and speeds	✓				✓
	Limits; setting and posting standards	✓				✓
Road safety education	Enforcement		✓		✓	
	Safe schools and routes	✓			✓	
Strengthening supporting legislation	Helmets and road use	✓	✓		✓	
	Vehicle registration, licensing and roadworthiness		✓	✓		✓
	Driver licensing and penalties			✓		
Enforcement	Vehicle safety regulations		✓	✓	✓	
	Equipment, standards, protocols, strategies (training and capacity building)		✓		✓	
Post-crash	Penalty systems			✓		✓
	Corruption		✓			
	Training and capacity building	✓	✓	✓		
	Resource management	✓			✓	
	Emergency centers and numbers	✓		✓		

Note: BFA = Burkina Faso; CMR = Cameroon; KEN = Kenya; ZAF = South Africa; and TUN = Tunisia

**Table 4**  
Cameroon project components and related improvement projects.

Project Component	Improvement projects
Project leadership and management	Create and clearly define governmental road safety roles Training programs for road safety institutions Institutional arrangements Project promotion
Multi-sectoral interventions in demonstration corridors	Infrastructure safety improvement Enforcement program Publicity and awareness campaign Post-crash care improvement
Monitoring and evaluation system	Project performance targets definition Survey for project performance measuring Accident data collection operational in Yaoundé, Douala and selected corridor(s) Analysis and reporting
Policy reviews	Road planning and design standards against Safe System principles Police action on speed and drinking driving against best practice deterrence principles Legislative, regulatory and data system needs Institutional delivery by the Ministry of transport/lead agency and its partners of the necessary key interventions to achieve road safety results

The project is structured in 16 improvement projects organized in four main components (Table 4):

#### 4.5.2. Prioritization and draft terms of references preparation

A CIFTER scale was used to determine the most viable improvement projects in the country. Each project was assessed by the RSMCR team considering the seven factors CIFTER criteria. To select those projects to be considered for further assessment by the stakeholders, two criteria have been considered. The first criterion is the total score gained by each project, given by summing all the points across the seven factors. According to CIFTER methodology, higher scores identify complex projects, especially in terms of management, so priority should be given to those projects with the lowest rates. The second criterion is related to the overall scope of the group of selected projects. To this aim, the group of projects should possibly cover the four project component categories: Demonstration projects in targeted high-risk corridors and areas, Policy reviews, Project leadership and management, and Monitoring and evaluation systems.

The CIFTER ratings have indicated that the majority of projects are rated either as highly complex or complex. It will, therefore, be essential that skilled project teams led by experienced road safety project managers are appointed in the execution phase. Based on the results of the assessment, the following projects were considered for Cameroon:

1. Create and clearly define governmental road safety roles
2. Enforcement program
3. Project performance targets definition
4. Survey for project performance measuring
5. Analysis and reporting
6. Accident data collection operational in Yaoundé, Douala, and selected corridor(s)
7. Enforcement review

A detailed description of the selected projects has been prepared in the form of a Terms of Reference, including the following sections:

1. The objectives of the required technical assistance services
2. The outputs of the required technical assistance service
3. The scheduling of the required technical assistance services
4. Professional skills and experience required

#### 4.5.3. Identification of the possible barriers to the implementation and ToRs refinement

A stakeholders' consultation to further assess the feasibility of the selected projects was undertaken. A checklist with possible barriers to project implementation was prepared based on the transferability audit tool [21] defined in the framework of the *SaferAfrica* project. Six stakeholders from the government, NGOs, and research were involved. Each interviewed stakeholder received the used checklist to assess any possible social, cultural, institutional, economic factors representing an obstacle to the selected projects.

*Society/Culture-related barriers.* Some of the proposed interventions (projects N° 1, 2, 6) could be accepted with some resistance by the general public due to low awareness of the possible impact of the projects on the population. The potential solution to this will be to create a period of sensitization and awareness within which the importance and impact of the project will be made known to the target population.

The target population (especially for project N° 3) is aware of the road safety problem but might not have enough educational level to comprehend the contents of the intervention; as such, there should be awareness-raising and sensitization tailored to their level of education to enable clarity and comprehension of the contents of the interventions.

*Institution-related barriers.* In project N° 1, Create and clearly define governmental road safety roles, there is a conflict of interest among key stakeholders resulting from a lack of clear definition of roles. For example, on the roads, the Ministry of Transport and the Ministry of Defense are not working in synergy. The gendarmes are supposed to be there for enforcement while the operational staff should be from the Ministry of Transport but that is not the case. Each Ministry functions independently of the other.

The legislation relevant to the implementation of project N° 2 is partially available because legislation is available for Police action on speed and drink driving. However, the roles of the key players are not clearly defined; agreements or memoranda should be considered at the design stage of the intervention.

*Economy-related barriers.* Weak capacity was highlighted for some projects (N° 3, 5, 6). This has been explained by shortage of trained personnel (e.g. human resources to manage data collection), lack of motivation for the gendarmes and police on the roads, insufficient equipment available (e.g. radars to control speeds). The skills are dispersed and need coordination. There is a need for synergy and coordination to have the right people working in the right departments.

## 5. Conclusions

This paper presented the results of the process used in the *SaferAfrica* project to define Safe System projects in five African countries: Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa. Its applicability in a context like the Africa region makes the procedure very attractive for LMICs. The process includes the Road Safety Management Capacity Review (RSMCR), prioritization of improvement projects according to the CIFTER tool, Terms of References preparation, and identification of the possible barriers to the implementation.

The effective implementation of the RSMCR must be supported by recognized road safety specialists with successful strategic management experience at country and international levels [19]. In this study, the RSMCRs were performed by renowned experts from the *SaferAfrica* project, assisted by two internationally recognized experts. Concerning this issue, it is essential to build knowledge in the region, so that later local

experts can carry out this type of work with the support of international experts.

Regarding the CIFTER scale used to understand the difficulty of managing a specific project, that is to say, the project complexity. There is the limitation of depending on the concept and experience of the expert who performs the analysis. The CIFTER is a subjective tool; in this way, ratings on individual factors may vary for the same project.

There is no single pathway for the adoption, establishment, and implementation of a Safe System. Moving to a Safe System is a learning-by-doing process best described as a journey that presents opportunities, hazards, and challenges along the way. The experiences of the pioneering countries show that each follows its journey, shaped by the cultural, temporal, and local context [16]. Regarding these aspects, it is important to take them into account for the African context.

The methodology was validated in the five African countries: Cameroon, Burkina Faso, Tunisia, Kenya, and South Africa. Nevertheless, this first phase only includes the process to define Safe System projects in these African countries. Therefore, the execution phase is still pending. The work undertaken within the European research project *SaferAfrica* is at the base of a pipeline of projects which are ready to be implemented but require the necessary funds. The financing of such projects will depend closely on the ability of governments to find funds for their implementation. Some have been submitted at calls like the UN Road Safety Trust Fund, others will move forward with blended funding from Development Banks and private funding. In any case, this first step allows a great advance in the objective of reducing road traffic crashes and improving road safety in developing countries and especially in the Africa region.

Cameroon, Kenya, South Africa, and Tunisia are classified as Middle-Income Countries, while Burkina Faso belongs to Low-Income Countries. According to RSMCR findings, in all these countries, the initial steps to establish the organizational structures and procedures have been taken already. However, a well-defined road safety investment strategy still needs to be developed to build capacity and move these countries from the early establishment phase “Focus on driver interventions” to a long-term consolidation phase “Focus on system-wide interventions, long-term elimination of deaths and serious injuries and shared responsibility”.

In Burkina Faso and Kenya, for instance, the RSMCR highlighted a road safety approach focused “on driver interventions”. This was the approach used in high-income countries in the period 1950–1960 when safety management was characterized by a set of uncoordinated decisions and actions [34], and the emphasis was laid on the errors of road users, leading to preventive measures focused on road user training and education [35,36]. This approach deprived the authorities of complete responsibility for road safety and proved of limited value in preventing serious injuries and deaths, especially among non-motorized road users.

Finally, the Safe System approach represents a substantial shift in how road safety problems and solutions are conceived. Strong and sustained leadership to initiate and see through the shift to a Safe System is vital [16]. This requires actions from all fronts: political leaders, leaders of companies, public agencies, policymakers, and academics in a position to influence change in a local, regional or national government, corporate or social setting. However, it is too early for a full critical analysis of the successes and failures of the Safe System projects in African countries. Thus, further studies should be carried out in this direction.

#### Declaration of Competing Interest

None.

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#### References

- [1] World Health Organization, Global status report on road safety, 2018. <http://e-journal.uajy.ac.id/14649/1/JURNAL.pdf>.
- [2] M. Peden, R. Scurfield, D. Sleet, D. Mohan, A.A. Hyder, E. Jarawan, C.D. Mathers, World Report on Road Traffic Injury Prevention, 2004.
- [3] T. Nordfjærn, T. Rundmo, Perceptions of traffic risk in an industrialised and a developing country, *Transp. Res. Part F Traffic Psychol. Behav.* 12 (2009) 91–98.
- [4] J. Sobngwi-Tambekou, J. Bhatti, G. Kounga, L.-R. Salmi, E. Lagarde, Road traffic crashes on the Yaoundé–Douala road section, Cameroon, *Accid. Anal. Prev.* 42 (2010) 422–426.
- [5] World Health Organization, Global status report on road safety 2015, 2015.
- [6] D. Admaite, G. Jost, H. Stipdonk, H. Ward, Ranking EU Progress on Road Safety: 10th Road Safety Performance Index Report, 2016.
- [7] T. Bliss, J. Breen, Meeting the management challenges of the decade of action for road safety, *IATSS Res.* 35 (2012) 48–55.
- [8] V. Foster, C.M. Briceño-Garmendia, Africa’s Infrastructure, The World Bank, 2009. <https://doi.org/10.1596/978-0-8213-8041-3>.
- [9] African Union, United Nations economic Commission for Africa, African Road Safety Action Plan 2011–2020 (2011).
- [10] S. Mavromatis, A. Laiou, G. Yannis, A. Tripodi, L. Persia, Assessing road safety data collection systems and definitions in Africa, *Adv. Transp. Stud.* 45 (2018) 93–106.
- [11] L. Mooren, R. Grzebieta, S. Job, Australasian College of Road Safety Conference “A Safe System: Making it Happen!” Melbourne 1–2 September 2011, 2011 1–2.
- [12] World Health Organization, Global Plan for the Decade of Action for Road Safety 2011–2020, Geneva, 2011.
- [13] C. Tingvall, The Swedish ‘Vision Zero’ and how Parliamentary approval was obtained, *Road Saf. Res. Policing, Educ. Conf.* 1998, Wellington, New Zealand, vol. 1, 1998.
- [14] Vägverket, Nollvisionen – En idé om ett vägtransportsystem utan hälsoförluster, 1996.
- [15] M.A. Belin, P. Tillgren, E. Vedung, Vision zero - a road safety policy innovation, *Int. J. Inj. Control Saf. Promot.* 19 (2012) 171–179, <https://doi.org/10.1080/17457300.2011.635213>.
- [16] International Transport Forum, Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System, Paris, 2016. <https://doi.org/10.1787/9789282108055-en>.
- [17] G. Rechnitzer, R.H. Grzebieta, Crashworthy Systems—a paradigm shift in road safety design, *Transp. Eng. Aust.* 5 (1999).
- [18] International Transport Forum, Towards Zero. Ambitious Road Safety Targets and the Safe System Approach, Paris, 2008.
- [19] T. Bliss, J. Breen, Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms, Investment Strategies and Safe System Projects, 2009.
- [20] R. Alfonsi, L. Persia, T. Antonino, D.S. Usami, Advancements in road safety management analysis, *Transp. Res. Procedia.* 14 (2016) 2064–2073.
- [21] B. González-Hernández, E. Meta, L. Persia, D.S. Usami, J. Cardoso, Development of a methodology to transfer road safety good practices in African Countries, 55th Advance in Transportation Studies 2021, pp. 121–136.
- [22] ISO, Road traffic safety (RTS) management systems - requirements with guidance for use, Geneva, 2012.
- [23] F.C.M. Wegman, A. Schermers, Sustainable safety in The Netherlands: the vision, the implementation and the safety effects, Contribution to the 3rd International Symposium on Highway Geometric Design, 26 June–2 July 2005, Chicago, Illinois, 2005.
- [24] F.C.M. Wegman, L.T. Aarts, Advancing Sustainable Safety: National Road Safety Outlook for 2005–2020, 2006.
- [25] GAPPs, A Framework for Performance Based Competency Standards for Global Level 1 and 2 Project Managers, Global Alliance for Project Performance Standards, Sydney, 2007.
- [26] T. Bliss, J. Breen, Road Safety Management Capacity Reviews and Safe System Projects Guidelines, Glob. Road Saf. Facil, Washington, DC, 2013.
- [27] M.J. King, Case Studies of the Transfer of Road Safety Knowledge and Expertise from Western Countries to Thailand and Vietnam, Using an Ecological Road Safety Space Model: Elephants in Traffic and Rice Cooker Helmets, Queensland University of Technology, 2005.
- [28] V. Appelt, et al., Innovative guidelines and tools for vulnerable road users safety in India and Brazil [SaferBrain]. D2.2 Report on transferability audit developed in SaferBrain, 2011.
- [29] L. Carnis, J. Yerppez, N. Bouhamed, Deliverable 5.6: Road Safety Management Capacity Review - Tunisia. SaferAfrica project, 2018.
- [30] N. Baja, D.S. Usami, Deliverable 5.7: Road Safety Management Capacity Review – Cameroon. SaferAfrica project, 2018.
- [31] J.L. Cardoso, L. Kluppels, F. Vandemeulebroek, Deliverable 5.8: Road Safety Management Capacity Review – Burkina Faso. SaferAfrica project, 2018.

- [32] G. Schermers, P. Omari, S. Aketch, Deliverable 5.9: Road Safety Management Capacity Review – Kenya. SaferAfrica project, 2018.
- [33] G. Schermers, M. Small, E. Niekerk, Deliverable 5.10: Road Safety Management Capacity Review – South Africa, 2019.
- [34] M. Koornstra, D. Lynam, G. Nilsson, SUNflower: A Comparative Study of the Development of Road, Leidschendam SWOV Inst. Road Saf. Res, 2002.
- [35] F. McDermott, Control of road trauma epidemic in Australia, *Ann. R. Coll. Surg. Engl.* 60 (1978) 437.
- [36] F.T. McDermott, D.E. Hough, Reduction in road fatalities and injuries after legislation for compulsory wearing of seat belts: experience in Victoria and the rest of Australia, *Br. J. Surg.* 66 (1979) 518–521.