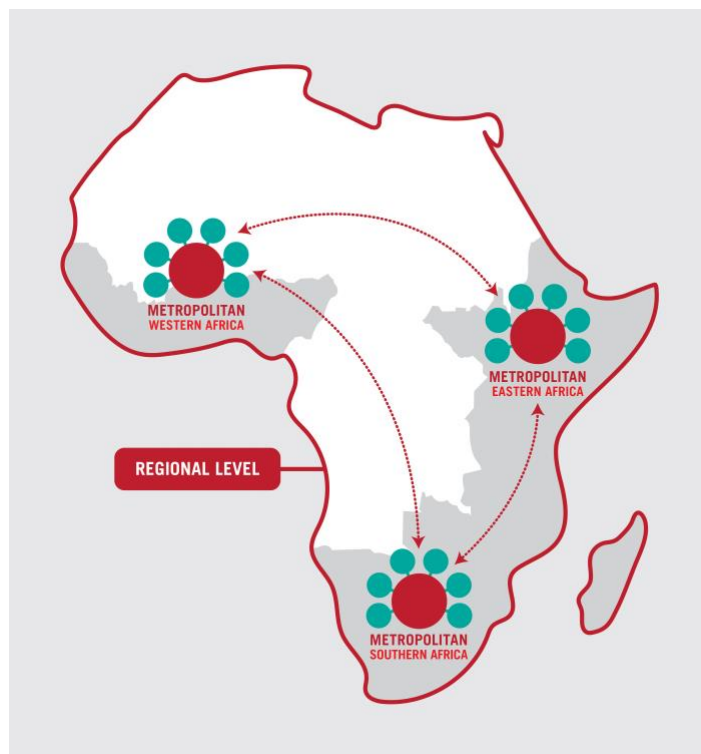




Volvo Research and Educational Foundations

## Mobility and Access in African Cities (MAC)

- a Road Map for Implementation



Final version December 2015

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**List of abbreviations**

ACET	African Centre for Transport Studies
AFCAP	The African Community Access Programme
BRT	Bus Rapid Transit
CODATU	Coopération pour le Développement et l'Amélioration des Transports Urbains et Périurbains
CoE	Centre of Excellence
CSUD	Center for Sustainable Urban Development
FUT	Future Urban Transport
ICT	Information and Communication Technology
ITDP	Institute for Transport and Development Policy
ITS	Institute for Transport Studies
NMT	Non-Motorized Transport
MAC	Mobility and Access in African Cities
MSEK	Million Swedish Krona
SC	Scientific Council [of VREF]
SDG	Sustainable Development Goal
SSA	Sub Saharan Africa
TRIPP	Transportation Research and Injury Prevention Programme
VREF	Volvo Research and Educational Foundations
UCT	University of Cape Town
WRI	World Resources Institute

## Executive Summary

During 2015, VREF started preparations for a new theme in VREF research, known as Mobility and Access in African Cities (MAC). The preparatory activities included two stakeholder workshops in Southern and Eastern Africa, a desktop review of the state-of-the-art, and a wide range of internal and external consultations. An internationally composed Interim Expert Panel had an advisory role to support VREF during the process. A first set of pilot projects were initiated in 2017 and in June 2018 the VREF Board decided to continue the MAC programme over a period 2019 – 2024.

This Road Map sets out the broader frame and approach of the MAC programme. Henrik Nolmark, VREF Director, Jane Summerton, VREF Scientific Council member and David Nilsson, senior adviser to VREF, have written the Road Map. Aimee Gauthier (ITDP), Gina Porter (Durham University), Holger Dalkmann (WRI), and Sue Parnell (African Centre for Cities/UCT) have provided valuable comments on the first draft. The VREF Scientific Council has commented on draft versions of the Road Map.

African societies are still to a large extent rural-based but are currently undergoing rapid change through urbanisation, economic growth and social transformation. Vibrant and dynamic societies, the pioneering of service delivery through radical entrepreneurship, and new technology, and other developments open up new possibilities precisely when African cities are at a critical and formative stage. On the other hand, cities are bursting at their seams through population growth and migration, and much of today's development takes place in informal settings. Access to the opportunities that urban life offers often remains elusive to a majority of the urban population due to poor planning and inadequate policies, outdated mobility thinking among decision-makers, and neglected infrastructure. To harness positive forces toward more just, prosperous, accessible and sustainable African cities at this critical juncture, there is now a great need for developing knowledge and building capacity within Africa,

The purpose of MAC is **to increase the knowledge and capacity base on mobility and access in cities in sub-Saharan Africa** in order to contribute to medium and long-term structural innovation and improvements in African cities. The programme will focus on Anglophone Africa south of the Sahara, structured around the three sub-regions of Western Africa, Eastern Africa and Southern Africa.

The intended outcomes of the MAC programme are:

- Increased academic capacity for research and education in urban access and mobility issues
- New locally situated and cross-disciplinary knowledge that can provide solutions and innovation for urban access and mobility
- Knowledge generated in MAC is communicated and reaches through to public decision-makers, business managers, opinion leaders, students, media and other change agents

These outcomes will be delivered through three mutually supportive operational modes:

- **Building Academic Capacity:** Strengthening capacity at key universities in Sub Saharan Africa for research, education and training; contributing to enhanced knowledge and capacity among key professionals and decision-makers;
- **Research:** Developing knowledge through academic research but also through systematic interaction between academia and actors from industry, policy and other parts of the public sector. The research is expected to be carried out through both case studies of specific urban contexts and comparative research based on work at local, sub-regional and Sub-Saharan regional levels;

- Communication, Dialogue and Impact: Intensive dissemination and communication through local, sub-regional and regional African networks, using a variety of channels and instruments for publication, dialogue, debate and other forms of outreach.

Six thematic clusters have been identified as priority focus areas for the programme:

- User needs and Practices, Equity Issues
- Governance, Politics, Institutions and Finance
- Emerging Business Models and Services Options
- Safety, Health and the Urban Environment
- System Design and Modal Integration
- Analytical Tools

Implementing partners are expected to approach these thematic areas by way of transcending disciplines and incorporating perspectives from e.g. engineering, planning, social sciences and the humanities. Moreover, all three modalities of capacity building, research and communication must permeate the work programme of MAC, cutting across all the thematic clusters.

VREF will provide funding, oversight and follow-up, as well as initiate specific strategic activities. Furthermore, VREF is seeking to establish partnerships with strategic actors for regional and global dissemination and enhanced policy dialogue.

The MAC initiative should be implemented in a staged process to develop the MAC structures and the capacity of African partners in a moderate but steady pace. Experiences from other programs with similar objectives show a progressive production and learning curve, which has its most productive period in terms of academic results and findings that are useful in policy and practice beyond the first 4-5 years. For capacity-building and academic research programmes at this scale it often takes a few years to establish the organisation, recruit staff and students, establish the administrative and managerial routines, and start the first generation of projects. Adding the co-production ambitions of MAC in striving for new processes of knowledge production through close interactions among researchers and stakeholders, it is even more important to give the establishment phase sufficient time to develop.

## 1 Introduction

The Volvo Research and Educational Foundations, VREF, inspires, initiates and supports research and educational activities through its *Future Urban Transport Programme – How to deal with the complexity of urban transport* (FUT). While the VREF is based in Sweden, its calls for proposals are open worldwide to universities and other research organizations of similar academic standard as universities. VREF is independent in relation to the Volvo corporation and tax-exempt under Swedish law, which means that the foundations aim to serve the public good, and all research findings under VREF programs should be made public and accessible for all (see also [www.vref.se](http://www.vref.se))

In November 2014, the Board of VREF decided to start a new initiative called Mobility and Access in African Cities, MAC. During 2015, information was gathered and analyses were carried out, to define the objectives, focus and working modalities of the programme.

The preparatory activities included the following main activities:

- A desktop study on the state of knowledge and research environments in sub-Saharan Africa was conducted; commissioned to University of Cape Town (see [Appendix 2](#));
- An exploratory Workshop with national and regional actors was held in Cape Town, South Africa, June 2015 (report in [Appendix 3](#));
- An exploratory Workshop with national and regional actors was held in Nairobi, Kenya, June 2015 (report in [Appendix 3](#));

Further activities included a report on relevant research environments in specific areas, and a wide range of internal and external consultations.

Henrik Nolmark, VREF Director, led the work with assistance from consultant David Nilsson and the VREF administrator Fabienne Niklasson. Jane Summerton took an active part in preparations as representative of the Scientific Council of VREF.

An Interim Expert Panel was set up to advise VREF; the panel consisted of Aimee Gauthier (ITDP), Geetam Tiwari (TRIPP Delhi), Gina Porter (Durham University), Holger Dalkmann (WRI Embarq), and Sue Parnell (African Centre for Cities/UCT);

A first set of pilot projects were initiated in 2017 and 2018 (see appendix 4), and in June 2018 the VREF Board decided to continue the MAC programme over a period 2019 – 2024.

This Road Map sets out the broader frame and approach of the MAC programme.

## 2 Background and Context

### 2.1 The challenge of urban accessibility in Africa

Africa has experienced an accelerating pace of urbanization in the last 50 years, and this trend is expected to continue. From 14% in 1950, the share of African population living in urban areas has increased to currently 40%, and if trends continue it will be up to 60% by mid-century. The comparatively young African population is growing faster than anywhere else in the world, and coupled with growing economic prosperity, this means rapidly changing cities. No doubt, Africa is already experiencing the ills and thrills of its “Urban Revolution”. Many African cities are characterized by an unequal distribution of resources and poor accessibility for large parts of urban populations to jobs, education, services and leisure. Increasingly, people have to travel long distances. While private car ownership is increasing, and modern public transport solutions such as Bus Rapid Transit (BRT) are being tested in some African cities, the response to mobility needs is still to a

large extent walking and informally operated bus systems. Even in large cities like Dakar, non-motorized transport accounts for over 60% of all trips made.

With formal systems for public transportation largely absent – or inadequate – many cities in Sub-Saharan Africa are characterized by a “paratransit” mode of transportation: small-scale informal operators and entrepreneurs seizing the opportunity presented by the growing mobility demands in cities. Growing motorization in combination with insufficient traffic systems has led to chaotic traffic and severe problems such as congestion, environmental pollution and dangerous street environments. Air emissions in Africa are expected to increase rapidly over the next 25 years, particularly if no policies and regulations are put in place.

At the same time, the dynamic and rapid development of sub-Saharan cities offers opportunities for exploring solutions that may avoid some of the systemic problems in other parts of the world and instead promote more equitable access and sustainable mobility. Efficient and affordable urban transport systems will be needed to harness the huge development potential of Sub-Saharan Africa. Altogether, African cities may be on the verge of a major shift in the technological domain of mobility and access, where new knowledge paradigms and new social and technical solutions can be developed and implemented. In addition, the United Nations Sustainable Development Goals (SDGs) place global attention on developing safer, environmentally sustainable and equitable transport solutions, thus creating a more conducive climate for paradigm change<sup>1</sup>.

To seize opportunities and lead the way toward more equitable access and sustainable mobility, national and local governments need to increase their capacity to manage and develop urban mobility. But there is likewise an urgent need for relevant knowledge - and reliable data - on mobility in African cities. African universities and research organizations must increase their capacity to produce relevant and contextual knowledge on urban mobility that can inform and improve decisions by key actors in the ongoing socio-technical transformation. And this knowledge production must be embedded and enabled in such a way that it makes a difference for what routes African cities will take.

In 2015 VREF commissioned a study on the state-of-the-art of research on non-motorized transport (NMT), paratransit, public transport, as well as governance, environment and health aspects on urban transport in Africa (see [appendix 1](#)). The search listed 529 publications in these thematic areas over the past ten years, with the number of publications on a steady increase. South African universities are clear in a leading position but a few universities in Kenya, Tanzania and Nigeria have also made important contributions to this growing body of literature. Since 2005, greatest research attention has been given to scheduled public transport services, paratransit services and NMT (accounting for a total of 65% of the listed publications, or 29%, 19% and 17% of the publications respectively). African scholars have produced more than two out of three of these publications, but only 54% of publications have been cited in Google Scholar.

## 2.2 VREF and Future Urban Transport

The core of VREF’s activities more generally is focused on generating the knowledge base required for developing Future Urban Transport (FUT) with a vision to contribute to

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<sup>1</sup> SDG target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents. SDG target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons



equitable access and sustainable transport in urban areas. The mission of the FUT programme is:

- To support the development of new knowledge on ideas and solutions that can contribute to equitable access and sustainable urban transport;
- To support the development of educational and outreach programs in the areas of equitable access and sustainable urban transport;
- To contribute to the dissemination and implementation of research findings among both university researchers, practitioners, decision makers and other relevant stakeholders;
- To support and document demonstrative examples and change processes.

Over the past decade VREF has carried out this mission in collaboration with leading researchers, policy-makers, practitioners and institutions on all the world's continents. VREF has developed the role of inspiring, initiating and supporting work at the forefront of urban transportation. Through numerous VREF-supported Centres of Excellence (CoE), new knowledge about urban transport has been produced and disseminated through academic publications and conferences, PhD education, and increasingly also through focused thematic workshops, local policy networks and interaction with decision-makers.

Currently, VREF is supporting two international Centres of Excellence under the theme Urban Freight: MetroFreight hosted by University of Southern California, (Los Angeles, USA) and Centre for Sustainable Urban Freight Systems, hosted by Rensselaer Polytechnic Institute (New York, USA). VREF also currently supports a Centre of Excellence on Bus Rapid Transit at Pontificia Universidad Católica de Chile. The Centres operate as global networked centres with partners in several countries in America (North and South), Africa, Asia, Australia and Europe. Other supported centres have also focused on developing world contexts, including the Transportation Research and Injury Prevention Programme (TRIPP) in Delhi, India; the Centre for Sustainable Urban Development (CSUD) at Columbia University in USA in collaboration with University of Nairobi, Kenya; as well as the African Centre for Excellence for Studies in Public and Non-Motorised Transport (ACET), at University of Cape Town, South Africa, and University of Nairobi. A few smaller research projects are currently ongoing in collaborations with ACET, TRIPP, Columbia University and ITS Leeds, all with support from VREF.

### 3 Purpose and intended outcomes

The purpose of MAC is **to increase the knowledge and capacity base on mobility and access in cities in sub-Saharan Africa** in order to contribute to medium and long-term structural innovation and improvements in African cities. VREF wishes to contribute to forming a new generation of highly skilled university researchers and teachers, professionals, policy makers and actors within civil society.

This purpose is in line with the vision and mission of the VREF FUT programme toward achieving equitable access and sustainable mobility in cities through development and implementation of new knowledge. Ultimately the MAC programme also contributes to the SDGs, notably targets 3.6 (road safety) and 11.2 (accessible cities).

MAC will be geographically focused on Anglophone Africa south of the Sahara and structured around the three sub-regions of Western Africa, Eastern Africa and Southern Africa<sup>2</sup>.

Within its geographical focus area, the intended outcomes of the MAC programme are:

1. Increased capacity for research and education in urban access and mobility
2. New locally situated and cross-disciplinary knowledge that can provide solutions and innovation for urban access and mobility
3. Knowledge that is generated in MAC is communicated and reaches through to public decision-makers, business managers, opinion leaders, students, media and other change agents.

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<sup>2</sup> The focus on Anglophone Africa is mainly due to resource constraints and language considerations. An expansion to other language regions may be considered in the future, for example in joint venture with other funders.

## 4 Thematic priorities and clusters

In order to increase mobility and accessibility for the citizens of Sub-Saharan cities in an inclusive and sustainable manner, new solutions - and innovative re-combinations of existing solutions - need to be developed in ways that recognize and build on the specific prerequisites and conditions of African urban areas. Some locally developed and adapted mobility solutions have gained increasing attention from scholars, city managements, and other urban change agents. These approaches include paratransit solutions and non-motorized transport (NMT), as well as public-informal hybrids and combinations with large-scale public systems like BRT.

Mobility and access are shaped by a range of social, cultural and political processes that are often beyond the scope of one particular mode of transport. For example, mobility and accessibility are framed by urban form, land use planning and design of the urban environment, which in turn has repercussions on safety and public health. Furthermore, issues related to governance and institutional frameworks set boundaries for what decisions can be made, what actors and organizations in the city can do, how the systems develop, and how finance can be mobilised. The kind of academic knowledge and capacity needed to develop and implement working and lasting solutions can therefore not be restricted to a single discipline. In the MAC programme, VREF instead encourages broad and cross-cutting research approaches. The range of competencies that should be enlisted in this research endeavour is broad and non-exclusive; examples of areas that may fruitfully be applied to address the issues of the MAC programme include transport technology, urban studies/urban planning, sociology, geography, anthropology, social psychology, organisational theory and economics. VREF explicitly encourages the participation of Sub-Saharan research environments that traditionally have not applied their knowledge to transport issues, but whose perspectives, approaches and methods might fruitfully be applied in new ways to increase our understanding of these issues.

In particular, VREF notes that there is currently relatively little work in the social or behavioral sciences that is directed toward developing an in-depth understanding of specific challenges, problems, barriers, and potentials entailed in increasing mobility and access in Sub-Saharan cities. The need for new research in these areas includes work that focuses on conceptualizing the diversity of various groups' everyday practices and needs in relation to various travel modes, as well as work that might provide a better understanding of the dynamics of urban planning, including politics and power relations among actors, that are crucial for the possibilities for initiating, implementing and understanding processes of change. There is also growing international work that addresses various dimensions of equity and exclusion in transport and urban development that might be fruitfully extended to work on mobility and accessibility Sub-Saharan cities.

**The MAC programme hinges on** six thematic cluster areas (table 1 below) based on challenges and knowledge gaps identified and discussed during the MAC preparations in 2014-2015, which included exploratory dialogue workshops in Cape Town and Nairobi, and individual consultations with experts from practice as well as research.

*Table 1. Overview of MAC's thematic clusters.*

<b>Cluster 1</b>	<b>User Needs and Practices, Equity Issues</b>
<b>Cluster 2</b>	<b>Governance, Politics, Institutions and Finance</b>
<b>Cluster 3</b>	<b>Emerging Business Models and Services Options</b>
<b>Cluster 4</b>	<b>Safety, Health and the Urban Environment</b>
<b>Cluster 5</b>	<b>System Design and Modal Integration</b>
<b>Cluster 6</b>	<b>Analytical Tools</b>

Each cluster is briefly described in the following sections.

#### **4.1 Cluster 1: User Needs and Practices, Equity Issues**

City planners, transport engineers and government officials make decisions based on pre-existing knowledge on transport flows and mobility needs at the generalised and aggregated level. Implicitly this also contains assumptions about users' behaviour and needs. Yet often people don't behave or make their transportation choices according to the preconceived expectations of decision-makers. In addition, actual mobility needs, also among marginalised groups, cannot readily be transformed into demand and mobility services. Overall, there is a lack of in-depth, qualitative studies of actual travel/mobility practices, problems and needs among heterogeneous groups in sub-Saharan Africa: their everyday patterns of mobility, their needs, preferences and restrictions, their experiences and challenges in gaining access to various modes of travel, and the implications of such barriers for their daily lives. This knowledge gap may result in low load factors of public transport investments, lack of political legitimacy, bad-will and resistance from citizens, or suppression of alternative solutions.

Under this cluster VREF wants to encourage establishment of new knowledge concerning what various groups and peoples in Sub-Saharan cities want and need from mobility solutions. This may include questions such as:

- How can we better understand the needs and preferences of different groups, e.g. women, children, the middle class, the disabled, those with weak socioeconomic resources and others? How do they get about, what access problems do they face, what choices are/are not available to them, and how might we start to think about perhaps radical changes in approaches to access that might start to address the needs of specific groups, particularly marginalized groups?
- How can users (and potential new users) express their preferences, and how can this translate into developing policy and service supply more effectively?
- How are users' preferences influenced by urban form and current planning and mobility paradigms? Conversely, how can urban form and planning be better informed by users' perspectives?

#### **4.2 Cluster 2: Governance, Politics, Institutions and Finance**

The governance systems of cities set the stage for how various actors can influence decisions and the design of systems and services. Governance is embedded in power

relations and is expressed in formal legislation and regulations as well as informal norms, beliefs and value systems. Institutional structures do not only govern what actors can do and how service provision can be organised; it also affects actors' ability to manage economic risks and to finance investments. Historically, the need to mobilise resources and organise services in cities has, in many parts of the world, affected institutional development, thus making governance, institutions and finance closely intertwined.

There is relatively little work on governance processes, dynamics and barriers within transport planning and politics, as well as approaches to transport policies more broadly conceived in Sub-Saharan contexts. VREF therefore encourages research that focuses on governance issues and analyses the political and institutional factors and contexts that shape, constrain or enable innovative mobility solutions in Sub-Saharan cities. VREF welcomes research that examines broad issues such as:

- What factors have significance for the institutional capacity of urban management to develop and govern more equitable access and sustainable mobility?
- How can urban policy, governance and democracy be further developed in ways that explicitly deal with issues of social equity, i.e. that are directed toward increasing the mobility and access of disadvantaged groups?
- What are the characteristics of mobility-related institutions (e.g. their roles, responsibilities, rights, expertise and financing capacity) at different levels and bodies of government that can be considered 'best practice' in Africa, and what are the implications of these practices for developing new approaches to access and mobility in Sub-Saharan cities?
- How can new approaches to finance solutions for mobility be developed that are specifically suited to the institutional context in African cities?

### **4.3 Cluster 3: Emerging Business Models and Services Options**

In many cities in Africa the informal operators provide the bulk of mobility services offered. Despite attempts from governments and urban leaders to outmanoeuvre, regulate or prohibit them, informal service providers often remain the only real option for the majority of low-income populations. The informal services sector has proven both robust over time and flexible in organisation, with services coming in a wide variety of forms: minibuses or 'matatus', the 'boda-boda' bicycles, motorcycle taxis and of late also shared mobility through ICT-applications. This large variation across the continent offers great potential for learning, for recombination and successful innovation.

VREF wants to generate new knowledge that sets out to map, compare and evaluate the many different business models emerging in different parts of Africa among private and informal operators of urban and near-urban mobility services, as well as the ways in which public policies may further develop these services. This can include research on what might be called 'cultures of service provision', by which is meant in-depth work on operators, owners, drivers and passengers in specific sites – their perspectives, practices, values and challenges. This thematic cluster will focus on issues like:

- Are some business models more successful and viable than others?
- How do different service providers view their respective roles? What ways of thinking, operating and organizing service provision create barriers to change? What problems and potential solutions are possible, and what are their implications for potential reform?
- In what ways do formal institutional settings and the public transport systems define/complement/compete with the informal mobility sector – and what approaches might be applied to achieve greater complementarity?

- How can public authorities best collaborate with informal actors to recombine models and establish formal-informal hybrids?

#### 4.4 Cluster 4: Safety, Health and the Urban Environment

Hundreds of thousands of people in African cities die or get seriously injured each year from traffic accidents, from obesity associated with not walking and from poor air quality. Cityscapes often designed during colonial or segregationist regimes are not laid out to be inclusive or with the purpose of granting equal access. This situation has been further exacerbated by a planning paradigm centred on the automobile, has forced people into unhealthy and dangerous mobility practices when traversing these hostile cityscapes. Increasing local pollution from fuel combustion creates negative health externalities for every traveller, but typically hits the low-income population hardest. Accessibility, health and safety thus relates to the overarching urban form and its representations of inequality, but is also directly linked to the configuration and design of urban places and infrastructure, traffic management, attitudes and safety awareness.

Under this cluster VREF encourages research that specifically connects urban form and the design of urban places and infrastructure with safety and health risks for all travellers including pedestrians and cyclists. Possible areas of inquiry include:

- What do we know about mobility-related health effects in Sub-Saharan cities, and what are the implications for future urban planning?
- How might existing African urban forms be re-shaped or transformed in ways that could lead to increased equity, accessibility and safety for broad groups, and what concrete approaches, strategies and policies for implementing such changes might be developed?
- What is the effect of e.g. road safety policies and safety education on different groups of travellers, what makes them effective and what new approaches might be developed?

#### 4.5 Cluster 5: System Design and Modal Integration

Models for improved mobility centred on a particular modal solution are sometimes imported and implemented in a wholesale fashion by city leaders, development partners or service providers. But citywide transport systems that have proved their worth in Asia, Latin America or Europe, are no panacea and there is little evidence that “one size fits all”. There is an urgent need for a system design approach customised to African cities in various sociocultural contexts. In particular, understanding how different modal solutions can be (re)combined and integrated into a continuous, city-wide, system of mobility is seen as a key for improved accessibility.

VREF is interested in supporting systems-oriented research that focuses on design and integration of mobility approaches and solutions at urban levels. Under this thematic cluster we hope to start answering questions such as:

- What are the experiences and policy implications of recent system design including the introduction of specific modal solutions like BRT in Africa?
- How does modal integration and different modal mixes affect system-level performance and sustainability?
- What are the critical barriers for modal integration and system-level mobility design in Sub-Saharan cities, and what new approaches might be developed?

#### 4.6 Cluster 6: Analytical Tools

Decision-makers, urban planners and other leaders in both the public and private sectors need to be able to evaluate and assess different mobility solutions and the diverse dimensions of large undertakings such as public transport systems. However, there is a lack of – or lack of application of - comprehensive analytical tools that capture the dynamics and issues that are entailed in transforming mobility and access in Sub-Saharan cities, including costs and benefits for society and nature, equity issues, and planning/policy approaches. Furthermore, the complexity of social and political processes related to urban mobility and infrastructure is generally poorly understood, often leading to delays or failed projects.

The ICT revolution that is sweeping through large parts of Africa, on the other hand, offers new possibilities for monitoring and analysis, which provides a potential for radically changing consumer-operator interfaces and governance relationships. New applications and enhanced data processing capacity also open up for linking different types of data from different sources in integrated analysis, e.g. transport and health, transport and urban land use. On the whole, new research agendas are opening up in response to such needs, leading to opportunities for developing different types of analytical tools from areas such as urban studies, planning and politics that can be applied to better understanding mobility and consumption in Africa.

VREF particularly encourages the use of enhanced analytical tools and methods, including comparative studies, from interdisciplinary fields and relevant areas within social and behavioural sciences that to date might not have been applied to understanding issues related to mobility and access in Sub-Saharan cities. Examples of approaches:

- How can models and approaches for determining social, economic and environmental costs and benefits of mobility interventions be further developed?
- How does the political economy of an African city in a specific context affect specific urban transport projects, long-term sustainability, and mobility and equitable access in general?
- How can new ICT applications, such as remote sensing, crowd-sourcing and Big Data, be utilised in understanding and improving mobility and access?
- How can analytical tools from multidisciplinary research of various social, economic, political and environmental factors affecting urban development and growth in Africa be applied to strengthen transport planning and policy in Sub-Saharan cities?

## 5 Modes of operation

The modes of operation of the programme need to be customized for the purpose of the MAC programme; contributing to a more solid knowledge base and local research capacity within mobility, access and transportation in cities in sub-Saharan Africa. A cornerstone of MAC will also be to develop strong links to contexts where medium and long-term structural innovation and improvement takes place, e.g. local policy and action in cities and metropolitan regions, national and sub-regional African policy and politics, and transportation industry.

In the design of the MAC programme, VREF builds on its profile and capability to support cutting-edge and pioneering research and education supplemented by selective communication and networking activities. VREF has a specific role and tradition, developed over the years in global circles, in promoting innovation, research and structural change in the area of sustainable urban transportation. While there are several other actors and initiatives with resources and mandates to support capacity

development in general, develop policy frameworks and investment in new infrastructure, VREF is one of few internationally active organisations with a clear mandate and resources to initiate and support the strengthening of academic research capacity. Thus, the core of the MAC programme will be to strengthen academic capacity in SSA and its co-operative links with international expertise on the one hand, and professional and decision-making actors on the other.

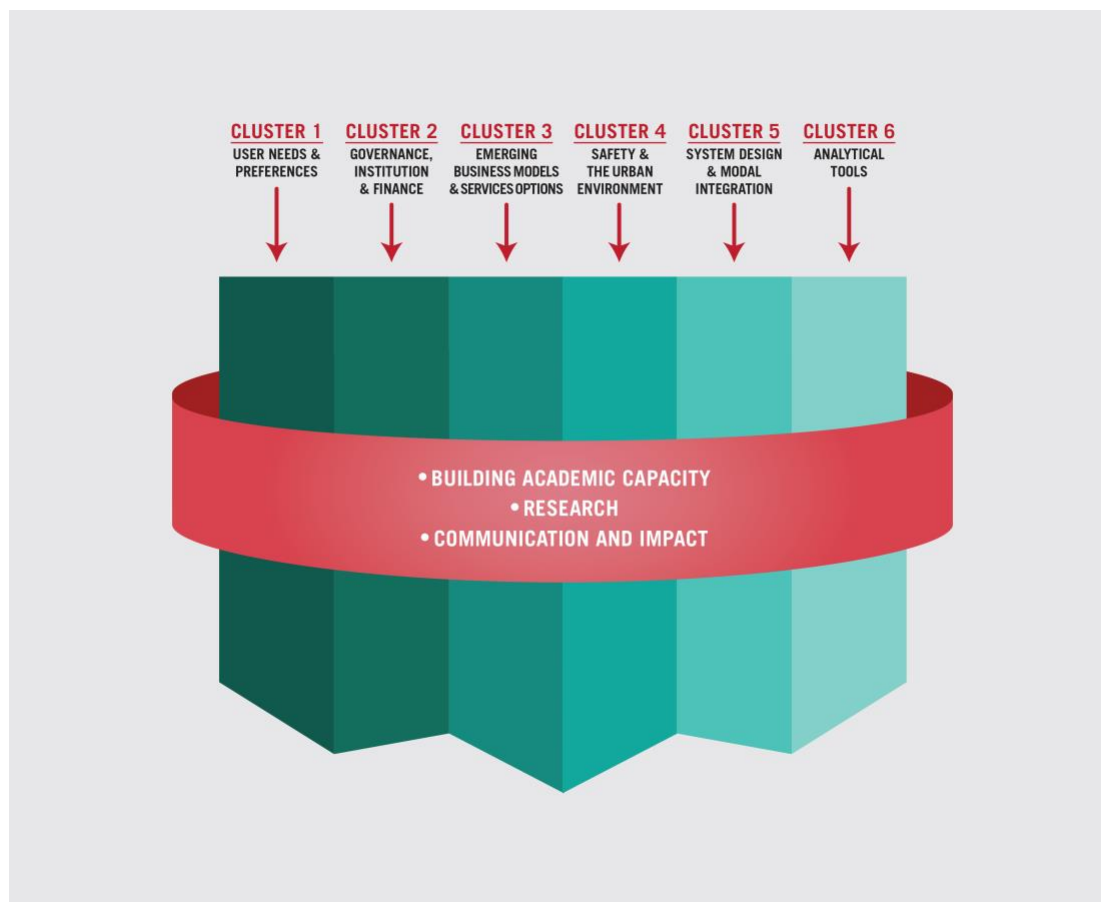
VREF financial support under the MAC Program will primarily go to research, academic capacity building and academic involvement in training, communication and networking. In addition to this, VREF will make efforts within the MAC Program to stimulate and contribute to broader capacity building activities through cooperation with other organizations.

Three intertwined working modalities, which will be synergetic and mutually beneficial, hence permeates the MAC programme:

- Building Academic Capacity: Strengthening capacity at key universities in SSA for research, education and training, and contributing to enhanced knowledge among key professionals and decision-makers;
- Research: Developing knowledge through academic research, but also through systematic interaction between academia and actors from industry and policy. Case study research at metropolitan level will be complemented by comparative research at sub-regional and regional SSA level. The research is expected to be carried out through both case studies of specific urban contexts and comparative research based on work at local, sub-regional and Sub-Saharan regional levels;
- Communication, Dialogue and Impact: Intensive dissemination and communication through local, sub-regional and regional African networks, using a variety of channels and instruments for dialogue, debate and publication.

Implementing partners are free to define specific focus issues within the thematic clusters described in chapter four, and combinations thereof. However, as Figure 1 below seeks to illustrate, the three modalities of academic capacity building, research and communication, are supposed to always be present in the work programmes. A salient feature of the MAC programme is thus that while thematic focus remains optional and flexible, the main operational modes are more or less fixed in order to ensure a co-productive approach throughout.





*Figure 1. The operational modes Capacity building, Research, and Communication and Impact, permeate the work of MAC and cuts across thematic foci areas.*

## 5.1 Building Academic Capacity

Preparatory work for the MAC programme has highlighted that academic capacity to work with mobility, access and transportation issues in African urban contexts is concentrated to a small number of universities, where research groups are comparatively small in numbers and vulnerable in terms of funding and mobility of staff. The report on the state of knowledge and research environments, carried out under the MAC preparatory phase<sup>3</sup> shows that the most productive research environments are heavily concentrated to South Africa, with relatively few universities in other Anglophone SSA countries significantly represented in the publication statistics. Even the most represented research units are comparatively young and small, heavily relying on a few individuals. Furthermore, many of the cities and metropolitan regions in SSA have extremely small, if at all existing, university departments active in the MAC area.

The VREF MAC strategy is to support capacity building at key academic environments for mobility and access issues in Sub-Saharan Africa, in terms of contributions to key staff positions and education programs, and in terms of more elaborated presence and interaction within international communities of research, innovation and expertise. The aim is to contribute to forming a new generation of highly skilled university researchers and teachers with a strong ability to interact with professionals, policy makers and civil society actors. Thus, the focus of MAC capacity building will be at junior levels, but there will also be specific funding streams to support key academic leaders and senior

<sup>3</sup> Mobility and Access in Sub-Saharan African Cities: The state of knowledge and research environments, draft report (UCT May 2015)

researchers.

The MAC capacity building programs can also include customised short-term training courses for key professionals and decision-makers, organised with strong involvement of academics at African universities, but also involving international expertise.

Examples of activities, which are prioritised under the MAC Programme:

- PhD Education and PhD Research Schools: VREF is willing to finance or co-finance a number of PhD student positions at the participating universities. Furthermore, VREF encourages implementing partners in the metropolitan platforms to set-up a sub-regional PhD Research School, involving the MAC PhD students and supervisors in a joint PhD education program;
- MAC positions and Chairs: VREF is willing to finance or co-finance key positions at university research and teaching environments, on both post-doc and more senior levels. This may also include “shared positions”, for practitioners to spend part of their time in academic work, e.g. adjunct professors, industry PhD students, etc;
- Short-term training courses for professionals and decision-makers: VREF is willing to finance or co-finance specifically targeted training courses, seminars etc for key actors in local authorities, industry and policy-making.

Old-fashioned and Euro-centric curricula still prevail in many African universities’ higher education on urban mobility, which is why developing more sustainable and Africa-based Masters Programmes and Masters Courses could also be considered<sup>4</sup>. Other types of activities that may be funded by VREF include “Training of Trainers”<sup>5</sup>, Study Visit Grants, Sabbaticals and endowments to set up funds for long-term support to e.g. scholarships.

An important requirement for support to MAC positions, PhD education and other education and training activities is that the positions and courses are well integrated in the MAC programs for research and other activities under the MAC Programme. Furthermore, VREF welcomes the universities involved and supported under the MAC Programme to be ready to co-finance positions through either university resources or other external funding sources.

## 5.2 Research

MAC research will be implemented around local case studies and analysis, sub-regional comparative research, and SSA regional synthesis and comparative studies. Work at different levels should interact with the other levels in a manner that facilitates the sharing of data, cross-analysis of findings, and joint development of generic knowledge, methods and tools. Interaction with research outside the SSA region should also be an important component of the MAC research programme.

An important aspect of the MAC programme is the need for different types of scientific approaches and disciplinary perspectives, both in the analysis and in the development of ideas, tools, methods, etc. for implementation. VREF encourages the building of multi- and cross-disciplinary teams for research, potentially involving engineering and social

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<sup>4</sup> VREF is willing to support development of curricula for Masters Programs and Masters Courses but will generally not finance the implementation of masters courses or programs. However, in specific cases VREF might consider financing a pilot course or program. VREF is also willing to support certain elements of courses and programs if there is a strong relation and/or contribution to MAC research programs.

<sup>5</sup> Courses specifically targeted at university lecturers, who will function in key roles in university education and professional training.

science, humanities and natural science. This can be done e.g. through local teams, PhD Research Schools, and in sub-regional and regional synthesis projects.

There is need for both quantitative and qualitative research methods, and single in-depth case studies as well as comparative case studies, which are expected to be important components of the research. Research programs under the MAC therefore need to be structured in a way to include studies in a number of local contexts. Furthermore, research cooperation between several urban/metropolitan regions would facilitate comparative analysis and exchange of data and results. VREF encourages research that enables generic knowledge being developed from local and specific investigations, which may require broader comparative and longitudinal approaches at a regional level. In this perspective, issues around data acquisition, access to data and sharing of data is of great importance. These issues include reliability and quality of data, how to set up mechanisms for collecting, managing and sharing data, and making data available across and even beyond the MAC partners.

Examples of research activities, which can be supported under the MAC programme:

- Developing a baseline for research;
- Local case studies, which can be descriptive/narrative, as well as quantitative, data-based analysis. VREF envisages a number of local case studies in several countries;
- Comparative case studies: Complementary to the single case studies, the research program should also include comparative analysis between different local contexts, in order to study on the one hand what the local cases have in common, and what can be e.g. benchmarked and replicated, and on the other hand what specific contextual factors are important for the understanding of differences between cities;
- Research synthesis and literature reviews.

### **5.3 Communication, Dialogue and Impact**

One of the objectives of the MAC Programme is to influence policy-making and encourage demonstration and pilot projects in strategically important cities, with the aim to contribute to medium and long-term structural innovation and improvements in African cities. In order to reach out and actually reach through to key actors in society and have an impact, MAC activities need to engage and involve key stakeholders. Important target groups might also be actors outside of the traditional urban transport sphere, and outreach activities must be tailored to these new groups.

#### *Local communication and dialogue*

Local context actors are essential for the direct impact of MAC and need to be approached and included in early “definition phases”. Such actors include cities, educational bodies, technology providers, consultants and experts, and transport operators in the relevant regions, but also civil society organizations, media, local opinion leaders and other “change agents”. Government institutions (at all levels) and policy makers are often absent in research-based initiatives, and efforts should be made to involve them in, but not restricted to, important activities like communication and debate. Informal public transport operators and their interest groups are of specific importance in the African context.

Local actors can contribute to enhanced quality and relevance e.g. in the identification of issues and research questions, in data gathering, to comment on results and in discussions of conclusions and recommendations. An important methodological aspect of the MAC programme is thus to develop effective and scientifically sound methods for early

involvement of practitioners, and interactive modes of knowledge production, sometimes referred to as “co-production of knowledge”.

### *Communication in sub-regions and beyond*

Equally important is to communicate with policy-makers at national, sub-regional and regional levels, as well as in the global policy discourse, in order to have an impact beyond the cities directly involved in research and capacity building, and to cross-examine and calibrate the MAC findings against current policy debates and directives. In this respect, MAC could, and should benefit from cooperation with already existing platforms. Furthermore, a recommendation from MAC Exploratory Workshops was that regular events – such as a scientific conference - at sub-regional and SSA levels should be part of the MAC work programme. Such events would be adding value to what is already happening in the region, both in terms of capacity building among the scientific community, and in terms of gathering and reaching out to policy-makers at national and African level.

While scientific publication remains essential, communication should not be restricted to this. Written and audio/visual products should be complemented with direct communication such as meetings, webinars, training, and in real-world processes/projects. Social media as well as classical media are important channels for debate and dissemination.

Local and regional policy and advocacy networks in the field of access, mobility and transport need to be identified and mobilized. Networking and building trust relationships with officials and decision-makers in implementing agencies can be developed e.g. through collaborations in organising seminars and policy dialogues of various forms. Such activities are important to develop communities around the MAC programme, noting the importance of networks and personal interactions, as well as the need to maintain academic independence throughout this process.

Examples of activities, which are prioritised under the MAC programme:

- Scientific publication, presence and visibility in international research circles are basic requirements for long-term VREF funding. In relation to this, VREF will explore the necessity to allocate funding to fund open access journal paper publication;
- VREF will continue discussions with other organisations on possible co-operation on an SSA regional exchange platform/knowledge hub;
- VREF will explore the potential and feasibility of holding a regular MAC Conference, in order to summit all MAC partners together with selected actors in policy and industry<sup>6</sup>;
- Active dissemination and communication at policy and industry oriented events at all levels; local, national, sub-regional, SSA regional, African and global;
- Popular science types of publications (written, audio/visual) such as policy briefs, research synthesis papers and graphical representations, are important to reach strategic non-academic audiences.

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<sup>6</sup> At the MAC Exploratory Workshops it was emphasized that MAC could add value by initiating regional transport conferences – noting the revealed importance of the annual Southern African Transport Conference and CODATU events in stimulating scholarly publication.

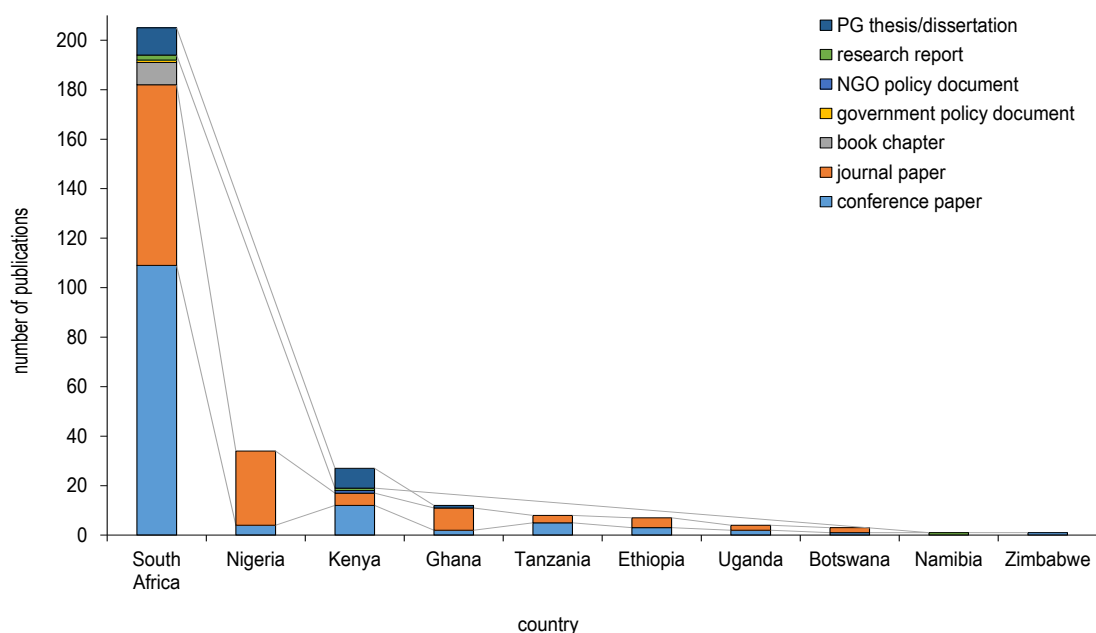
Other interesting communication activities, which have been discussed during the preparatory work are policy dialogues, stakeholder workshops and round tables, “retreats” for decision-makers and key professionals, training courses for journalists, etc.

## 6 Actors in research, education, and communication

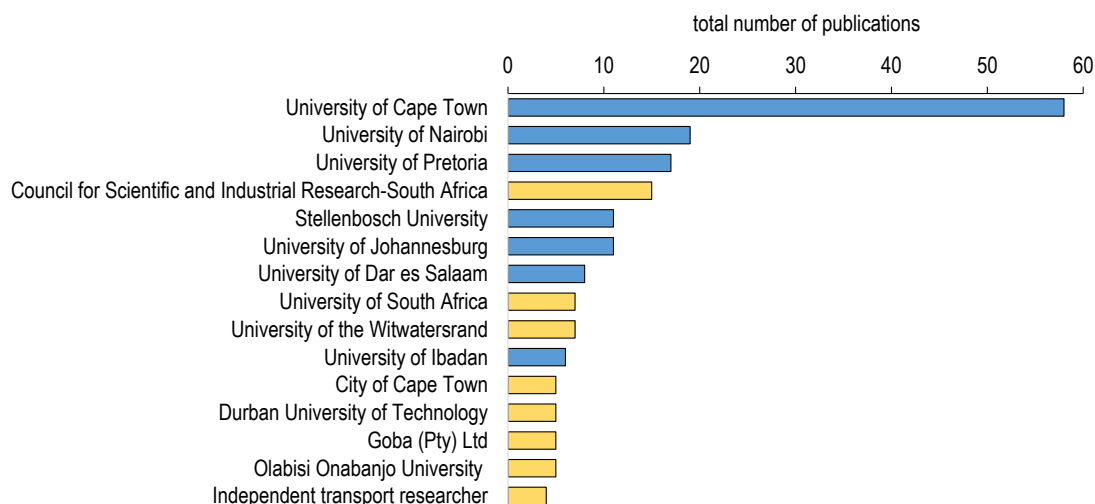
### 6.1 The MAC knowledge landscape

The body of knowledge on urban mobility and access in Africa south of the Sahara is slowly growing, but the number of actors in Sub-Saharan Africa producing scientific knowledge is still small and geographically imbalanced.

A bibliometric analysis of more than 500 publications in this area showed that while the lead authors were affiliated with over 110 different organisations in countries in sub-Saharan Africa, only a few of these organisations had a sustained and tangible level of scientific output in this area. Among the top ten institutions (ranked by number of publications) seven are South African, one is in Kenya, one in Nigeria and one in Tanzania. Within the top ten the output ranges between 58 publications (University of Cape Town) and 6 (University of Ibadan) in the 2004-2015 period.



**Figure 1. Number of publications 2004-2015, per country of lead institution in Africa south of Sahara, in MAC focus areas. Source: Behrens et al 2015.**



**Figure 2. Number of publications 2004-2015, per lead author's institution. Source: Behrens et al (2015).**

A profiling of a set of the seven most productive research environments above (four from South Africa) also revealed a rather thin staffing situation. The number of permanent academic staff ranges from two (University of Pretoria) to seven (University of Johannesburg) plus a varying number of PhD students. During the “exploratory workshops” organised by VREF in South Africa and Kenya in June 2015, participants from universities confirmed that the shortage of qualified staff and senior research positions is a serious capacity constraint for academic knowledge production.

To effectively work with knowledge production, and ultimately for having an impact on urban access and mobility, VREF believes it is necessary to look at knowledge outside “the transport box”, that is, outside traditional transportation research environments. Important contributions can be made from adjacent fields in social sciences, behavioural sciences and the humanities in Africa. Especially when assessing user preferences, social behaviour and governance aspects, or when developing tools on political economy and cost-benefit analysis, there is need for a much broader set of competencies. VREF is thus interested in initiating dialogues with research environments that have not been engaged in transport-related research to date, but which have relevant scientific competence that fruitfully could be applied to contributing to the thematic areas identified earlier, as well as understanding issues related to mobility and accessibility in sub-Saharan Africa more broadly.

During the preparations of the MAC programme, a broad group of actors on the urban mobility knowledge arena have been identified outside of the traditional university world, including several international organisations and NGOs that contribute quality research and best practice applications, as well as carry out training, advocacy and normative work. Others may have important functions for coordination and dissemination. Apart from some large international agencies, these organisations typically do not have any major output in terms of scientific publication, and consequently, have not been identified as key research environments. They may however play important complementary co-productive roles in e.g. policy outreach and communication.

## 6.2 Who may be involved in MAC?

VREF will invite potential implementing partners in Africa to submit applications for funding under the MAC programme.

According to VREF's statutes, grants can be issued only to universities and other research and education institutions that reflect comparable scientific levels in their research

and/or educational activities. Formally this restricts the eligibility of applicants. It is possible for a grantee to form coalitions in which other types of organisations may participate. This is expected to be particularly important for the Communications and Impact sub-theme, where research institutions are encouraged to partner with other local or regional organisations in co-productive settings for both outreach and for sufficiently grounding the knowledge production in local realities.

In its current stage, the MAC programme will aim at recruit implementing partners that have:

- Proven scientific quality and depth in subject matters pertaining to the proposed programme of work. While MAC will support development of capacity as well as new research agendas, the proposed programme must stand on a platform of already established and recognised scientific activity;
- Sufficient geographic spread in the sub-regional setting of Eastern, Western or Southern Africa. Partners are expected to have a permanent base in a country in one of these sub-regions, and involve an organisation from at least one more country in the same sub-region;
- Motivation and ability to work across disciplines and in co-productive modes, transcending spheres of science, policy and practice. Multi-disciplinary teams and coalitions are encouraged and should also be supported by suggested work methods and routines that cut across the science-policy-practice-nexus;
- An interest in effectively communicating knowledge through traditional and unorthodox channels, and a good understanding of its own role in the effect chain (Fig. 1);
- Connection with international research agendas. The implementing partners of MAC should ensure linkage to global research environments, for example by including international scholars in their platform teams, or by describing how interchange with global research will be done through other means.

In summary, VREF wishes to conclude agreements with university partners that offer a solid platform in an African sub-region south of the Sahara, with a scientific record of high quality and of interdisciplinary approach.

### 6.3 Synergies with other initiatives and actors

With some four hundred million people in cities across the continent, the challenge of access and mobility in Africa is a formidable task. VREF is just one of several players and resources are limited. To make a bigger impact, it can thus be advantageous to work in concert with other actors in the same or related areas of operations.

As mentioned above, there are other organisations which are carrying out knowledge generation, training and communication on urban transport and mobility in Africa. VREF and MAC implementing partners need to keep themselves informed about what these organisations are doing and consider establishing synergies, for example from coordinating events back-to-back or “piggy-backing”. This level of cooperation is mainly about exchange of information; no formal agreements nor financial commitments are made.

Organisations that have a distinct role in regional normative processes and that can influence transport and planning policy - as well as attitude shifts and education issues - in Africa could be important partners for VREF. The knowledge generated in MAC, and the actors strengthened through its activities, may need other types of platforms to reach out to a larger audience and to drive a policy agenda. In instances where VREF identifies other organisations and initiatives that could have such a strategic and

complementary role to MAC it would make sense to establish stronger links and closer cooperation with such actors. VREF (and partners) can negotiate agreements for mutual areas of interest that may involve formal and financial commitments for specific activities.

In certain circumstances, VREF may find opportunities to agree on joint work programmes together with other actors, based on a clear and agreed upon division of roles. This may be especially useful in situations where there are complementarities in the mandates or specialisation of organisations. Different organisations often have different eligibility criteria. VREF may find good “matching” with other funders to unlock larger a potential in joint programmes. For example, VREF cannot finance direct implementation or demonstration projects, but such projects may be financed by others after preparatory work by VREF’s MAC partners. This type of cooperation demands well-identified complementarities between the partners, as well as a high level of trust. These kinds of collaborations may thus more realistically evolve as the programme matures.

The potential implementers of MAC will be encouraged to identify and establish collaborative approaches and partnerships already in their applications. VREF will facilitate the formation of partnerships and collaborations in the course of the MAC programme implementation through networking and communication activities.



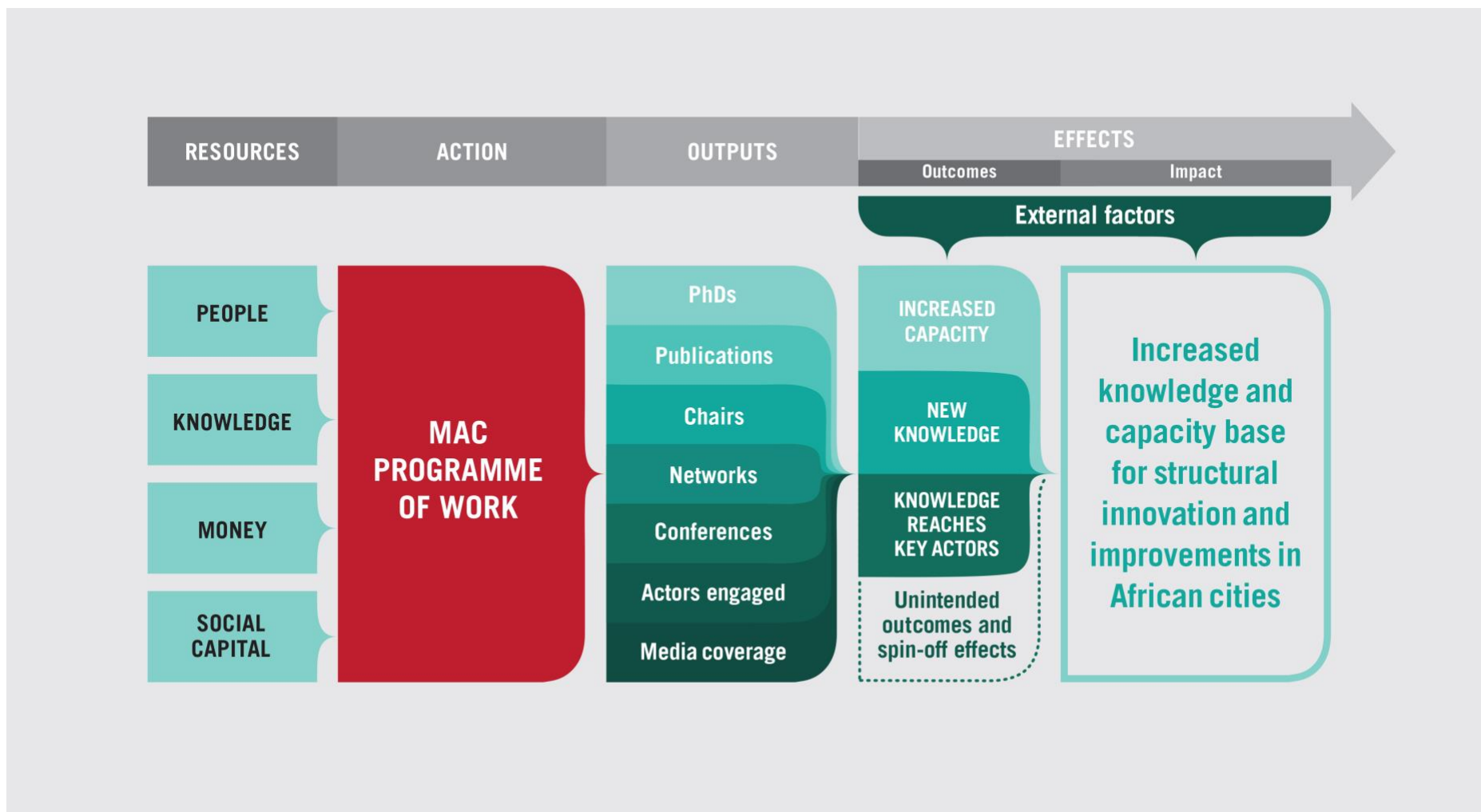
## Appendix 1. Intervention logic of MAC

VREF wishes to contribute to forming a new generation of highly skilled university researchers and teachers, professionals, policy makers and civil society actors. How new knowledge connects with physical, political and social realities is, however, a complex and dynamic process. In practice, the relationship between research, implementation of new knowledge, and the impact and effects in society is never a simple linear process. Nevertheless, for a knowledge investor like VREF it is necessary to – at least conceptually - make logical connections between the interventions financed and the desired outcomes. The schematic effect diagram on the next page illustrates the intervention logic of MAC (based on a modified Logical Framework Approach). On the overall level, the intervention logic breaks down into four key components: resources (1) enable action (2), which generates specific outputs (3), ultimately translating into short and long term effects (4).

The MAC programme will become operational through programmes of work agreed upon with the implementing partners. To execute the work programmes, partners will need resources, such as people and infrastructure, key knowledge and funding. They will also depend on social capital such as trust and a good professional reputation. A range of activities will be carried out under the MAC work programme: for example, research, training of PhD students, interactions between public and civic organisations, workshops and conferences etc. These activities can be quantified along with their resulting outputs: the number of students, number of publications, workshops, media reports etc.

The immediate outputs, however, do not make up the full picture. VREF cannot take for granted, or ensure merely through sustained support and funding, that the production of outputs will translate into the larger social impact that is the purpose of MAC. While outputs are delivered within the activity period of an intervention, effects typically come much later. Outcomes should be possible to identify at the end of the intervention, but larger-scale social impact may materialise only after many years.

The intended outcomes and the impact will also be conditioned upon external factors, beyond the control of VREF and partners. Moreover, there may be unintended effects from the programme, which may be beneficial – or detrimental – to the purpose of MAC. This may happen, for example, where MAC activities act as catalysts for external processes, thus giving rise to spin-off effects. While some effects will be relatively easy to identify and measure, many will not. The less quantifiable and attributable nature of certain results does not necessarily make them less important for the purpose of MAC, which is why it will be important to document and assess the MAC activities in their wider social contexts.



*Illustration of MAC intervention logic and effect chain using a modified Logical Framework Approach. The MAC programme of work and its outputs can be reasonably controlled by VREF and partners, while the medium- and long term effects (outcome / impact) are influenced both by external factors and by unintended outcomes. The process of knowledge uptake and its impact requires a careful and exploratory approach.*

Finally, the transfer and uptake patterns of mobility-related knowledge into the political and social context of African cities are far from fully understood. We know relatively little about the conditions under which politicians, entrepreneurs or consumers are more receptive towards new knowledge or when they are more likely to accept new ideas and change their behaviour. The MAC programme offers a potentially strong opportunity to learn about these processes and to more fully understand the role of knowledge and knowledge actors in urban change dynamics.

VREF also believes in interactive approaches for generating new perspectives and knowledge, for instance through involving decision-makers and users at an early stage when defining research agendas. This type of approach often strengthens the communication between the academic knowledge arena and the societal environment, enhancing the effects of the programme.

A tentative set of indicators has been developed at output and outcome levels for results that can be measured and that are believed to be relevant in the overall intervention logic. These tentative indicators are presented in a draft results framework in [appendix 1](#). Most likely additional and improved indicators will be developed in the initial period of implementation.

