

THE WHEELS OF CHANGE:

Safe and Sustainable
Motorcycles in
Sub-Saharan Africa

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CONTENTS

FOREWORD	1
AN ACTION AGENDA FOR MOTORCYCLES IN SUB-SAHARAN AFRICA	3
EXECUTIVE SUMMARY	5
INTRODUCTION	7
MOTORCYCLES IN SUB-SAHARAN AFRICA: THE STORY TO DATE	13
A BRIEF HISTORY	14
COMMERCIAL MOTORCYCLES: USES, USERS AND ORGANISATION	19
WHAT IS BEHIND MOTORCYCLES' POPULARITY?	25
ACCESSIBILITY	26
INCOME GENERATION	28
WHAT ARE THE DOWNSIDES TO THE GROWTH OF MOTORCYCLE USE?	35
TENS OF THOUSANDS OF DEATHS EACH YEAR... AND MANY MORE INJURIES	36
AIR AND NOISE POLLUTION	47
CRIME, INSECURITY AND EXPLOITATION	49
GOOD PRACTICES, INITIATIVES AND OPPORTUNITIES	51
GETTING CERTIFIED HELMETS ON HEADS	52
PRACTICAL TRAINING FOR RIDERS	53
EFFECTIVE REGULATION OF THE MOTORCYCLE-TAXI SECTOR	54
SAFE ROAD INFRASTRUCTURE FOR MOTORCYCLES	56
RIDE-HAILING AND DELIVERY APPS	58
ELECTRIC MOTORCYCLES	61
RECOMMENDATIONS	65
INCORPORATING MOTORCYCLES INTO SAFE, SUSTAINABLE AND EQUITABLE TRANSPORT POLICY	66
IMPROVING ROAD SAFETY MANAGEMENT: THE SAFE SYSTEM APPROACH	67
INCREASING THE USE OF STANDARD, GOOD-QUALITY HELMETS	70
PRIORITISING TRAINING, TESTING AND LICENSING	71
ENSURING ROADWORTHINESS OF MOTORCYCLES	73
CONSIDERING MOTORCYCLES IN PLANNING, DESIGN AND MAINTENANCE	73
REGULATING THE COMMERCIAL MOTORCYCLE SECTOR	75
FORMALISING AND SUPPORTING MOTORCYCLE-TAXI ASSOCIATIONS	78
STRENGTHENING ENFORCEMENT	79
REGULATING THE RIDE-HAILING AND DELIVERY APP SECTOR	80
EDUCATING OTHER ROAD USERS	82
ENABLING THE SAFE TRANSITION TO ELECTRIC MOTORCYCLES	83
CONCLUSION	85

ABOUT THE FIA FOUNDATION	87
ABOUT THE FÉDÉRATION INTERNATIONALE DE MOTOCYCLISME	87
ABOUT AMEND	88
ABOUT THE AUTHORS	88
APPENDIX A: COUNTRY PROFILES AND CITY SNAPSHOTS	89
APPENDIX B: ESTIMATED NUMBERS OF MOTORCYCLES PER COUNTRY, 2020	107
REFERENCES	109





FOREWORD

Africa is facing a transport crisis that threatens many countries' development. Transportation systems are failing, unable to meet the needs of the millions of people trying to get into, across and out of the continent's dense urban centres – to schools, markets, business centres, hospitals and leisure activities. Where other modes of transport have failed, motorcycles have filled the gap.

With fast-growing populations and rapid urbanisation, cities' roads are congested and chaotic, with motorcycles weaving in and out of traffic – dangerous and inefficient. Over the past two decades, the exponential rise in the commercial use of motorcycles – as taxis and for deliveries – has occurred in a policy vacuum, with laws and regulations only recently scrambling to catch up with the runaway growth in numbers and the resultant social impacts. The commercial motorcycle sector now supports the livelihoods of millions of people across the continent, but it is a precarious way of life.

As a trauma surgeon and injury epidemiologist, I have seen emergency and surgical departments in hospitals across Africa overwhelmed by road traffic injuries, in particular motorcycle-related injuries – suffered by riders, passengers and pedestrians (including children). In some hospitals a large portion of the surgical department budget goes to caring for such patients – competing with other life-saving procedures, especially in obstetrics and child health. Direct medical costs of treating road traffic injuries – ambulance services, emergency operations, intensive care, and long periods of rehabilitation for some –

make these injuries very costly and impoverishing for individuals and families as well as for hospital budgets and national economies.

African countries need to pay urgent attention to urban transport. The goal should be to develop effective mass-transit systems, including buses and light rail, which can transport thousands of people safely, sustainably and equitably, prioritising public transport over private vehicles. These urban transit systems should be supported by other forms of transport, including walking, cycling and – yes – motorcycles.

Bold and decisive planning and execution are essential to change the overall mobility dynamics of our cities. Our dependence on motorcycles must be reduced so that they can play a supporting role – rather than dominating our roads.

In the immediate term, action must be taken to mitigate motorcycles' negative impacts – crashes and injuries, as well as pollution and crime. Policies must address regulation and enforcement, and investments must be made in infrastructure and new technologies, as well as improved post-crash care.

Dr Olive C. Kobusingye

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AN ACTION AGENDA FOR MOTORCYCLES IN SUB-SAHARAN AFRICA

Motorcycles have become integral to people's way of life in many African cities, towns and villages. For tens of millions of people, they provide employment, income and access. But they also have significant downsides, including crashes, pollution, exploitation and crime.

Our Action Agenda highlights the highest-priority, actionable opportunities to save lives, improve environments and enhance livelihoods.



MOTORCYCLES IN SAFE AND SUSTAINABLE TRANSPORT POLICY

Current transportation policies favour the private car, to the detriment of public transport, other forms of shared transport, and non-motorised modes such as walking and cycling.

Motorcycles will continue to play a role in transportation in Africa well into the future. They need to be adequately incorporated into wider improved transport and mobility policy, with an institutional framework that prioritises safety, sustainability and equity. Policy must favour the development of mass transit and promotion of active mobility over private cars, and align with the Safe System approach to road safety. Policy should support the transition to electric motorcycles to reduce air pollution and climate emissions, while also addressing safety concerns.



MOTORCYCLE HELMET STANDARDS, TESTING FACILITIES AND ENFORCEMENT

Good-quality helmets are the single most effective way of reducing motorcycle head injuries and fatalities. But current rates of helmet use among riders and passengers in Africa are low. And, where helmets are worn, they often do not meet a certified standard, are poor quality, are damaged or worn incorrectly.

Certified standards for motorcycle helmets are needed to ensure that they provide appropriate protection while also being affordable. Facilities should be established to test helmets to ensure they meet countries' standards before they become available on the market. The use of helmets should be enforced by qualified and trained officers, and counterfeit helmets should be removed from the market.



EFFECTIVE MOTORCYCLE RIDER TRAINING

Where rates of formal training among motorcycle riders in Africa are higher, the proportion of riders and passengers who have been involved in a crash is lower. Properly trained riders are also more likely to wear appropriate protective equipment, particularly helmets. But, currently, fewer than one in five riders have undertaken training. And training often lacks any practical element, focusing only on laws and road signs.

Minimum training standards are needed, including a practical component, with training tied to testing and licensing. Training must be affordable, including for motorcycle-taxi and delivery riders.



ANTI-LOCK BRAKING SYSTEMS FOR MOTORCYCLES

Worldwide, anti-lock braking systems (ABS) on motorcycles have proved to be one of the most effective technologies at reducing fatalities. But very few motorcycles in Africa are fitted with ABS. In other parts of the world, countries – most notably India and China – have mandated the fitting of ABS on new motorcycles.

African governments should introduce legislation requiring that all motorcycles imported, manufactured, assembled and/or sold in their countries are fitted with ABS, at a minimum on the front wheel.



MOTORCYCLES IN ROAD DESIGN

The intrinsic characteristics of motorcycles put riders and passengers at greater risk of serious injuries than those in other vehicles. But very little consideration has been given to motorcycles in the development of roads in almost all African countries.

Road infrastructure design must consider motorcycle safety. This will involve including motorcycles in road designs and engineering manuals, providing dedicated motorcycle lanes, and keeping motorcycles off pedestrian footpaths.

The road ahead is clear. If all stakeholders work together on these crucial action items, acknowledging shared responsibility among those who design, manage and use roads and vehicles and provide post-crash care, real progress can be made towards safer, healthier and more prosperous and sustainable lives across Africa.



EXECUTIVE SUMMARY

Over the past two decades, the number of motorcycles – both 2- and 3-wheelers* – in Sub-Saharan Africa** has grown rapidly. This growth has been made possible by the availability of low-cost motorcycles from China and India, and has been generated largely by the informal commercial use of motorcycles, with riders charging a fare to carry passengers or to do deliveries. Our research has found that today, in 2022, there are an estimated 27 million registered motorcycles in Africa – up from under five million in 2010. An estimated 80% of motorcycles are being used as passenger taxis or for delivery services.

There are broad variations from country to country. Motorcycles are most popular in countries in West Africa and East Africa. As of 2020, the estimated numbers of motorcycles in Nigeria and Burkina Faso, in the west, were 5.1 million and 2.1 million, respectively. In the east, Kenya, Tanzania and Uganda each had well over one million motorcycles by 2020. On the tiny island of Mauritius in the Indian Ocean, the number was approximately 125,000. Meanwhile, countries in Southern Africa have not experienced such growth, and motorcycle-taxis are uncommon – though motorcycles used for deliveries appear to be on the rise. In South Africa, as of 2020, there were only approximately 600,000 motorcycles, and in Namibia the number was only around 6,500.

The map opposite shows the estimated number of motorcycles per 1,000 members of the population in each African country in 2020, with the darker colours representing a greater density of motorcycles. Burkina Faso has the highest density, estimated at over 100 motorcycles per 1,000 people.

In many countries, the economic, social and other forces behind the growth in numbers of commercial motorcycles are strong, with continued population growth, rapid urbanisation, poor roads, lack of infrastructure for walking and cycling, and limited employment opportunities for young men. The growth is likely to continue in the coming years, or even

accelerate, possibly with the spread of motorcycles into new countries and increases in private ownership – as have been seen in Asia.

Urban residents use motorcycle-taxis to get to their shops and offices, weaving through African cities' notorious traffic jams. Children are taken to school on them, two, three or more squeezed on at the same time. Delivery motorcycles are becoming increasingly common. Farmers use motorcycles to get their produce to market along bumpy village tracks. Health workers use them to access remote villages. And pregnant women are taken to hospital on them.

Commercial motorcycles have created millions of jobs across the continent, mostly for riders – typically young men who struggle to find other forms of employment, and who often become the breadwinners in their families. As well as an estimated 27 million motorcycle-taxi and delivery riders, there are also millions of motorcycle owners, mechanics and spare parts salespeople who make a living through the sector.

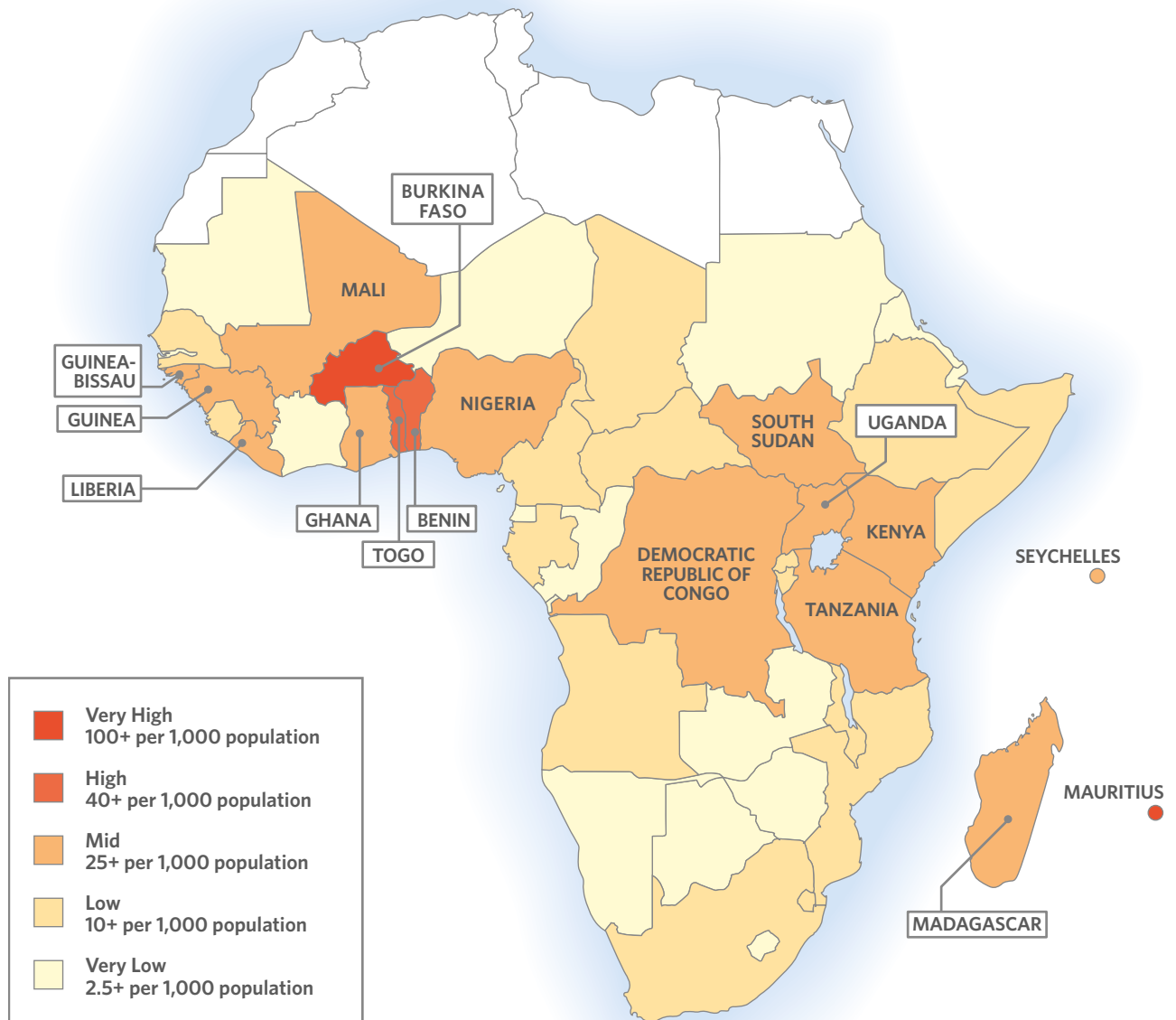
Riding a motorcycle-taxi or delivery motorcycle is a precarious occupation, and there are also risks for passengers and pedestrians. In some African countries, deaths of motorcycle riders account for more than half of all road deaths: In Togo, the figure is over 70%.¹ More than half of all child pedestrians injured on the roads in Dar es Salaam, Tanzania, are hit by a motorcycle.² While in other parts of the world, road traffic death rates are falling, in Africa they are rising³ – driven partly by motorcycle-related deaths.

As well as the risk of injury, there are wider negative environmental, health and social impacts. Ambient air pollution – which includes pollution from motorised vehicles – contributed to the deaths of over 350,000 people in Africa in 2019.⁴ Despite their small engines, motorcycles can cause noise pollution. Motorcycles are also sometimes associated with crime, from minor theft to armed robberies, vigilantism and banditry,⁵ and exploitation of both passengers and riders.

* Unless otherwise specified, throughout this report the term 'motorcycles' refers to both 2- and 3-wheelers.

** Defined as all 49 internationally recognised countries that lie fully or partially south of the Sahara, referred to from here on as 'Africa'. (The dynamics surrounding motorcycles in North African countries – Algeria, Egypt, Libya, Morocco and Tunisia – are different, so are not covered in this report.)

Estimated numbers of motorcycles per 1,000 of the population, 2020



For countries to create a mobility system that maximises the benefits of motorcycles while managing and minimising their negative impacts, they must be incorporated into wider improvements in transport policy that focuses on safety, sustainability and equity. Specific opportunities for improving commercial motorcycle sectors exist in regulation, rider training, protective equipment, enforcement, infrastructure and technology. As well as the above Action Agenda, detailed recommendations are provided later in this report.

In those countries where motorcycle-taxis and delivery motorcycles are already embedded in the transportation system, collaborative efforts should be

made to strengthen policy. This will include efforts to improve safety, reduce pollution and other negative impacts, to coordinate motorcycle-taxis with the wider public transport and non-motorised network, and also to improve working conditions for riders. In those countries and cities where bans on motorcycle-taxis are currently imposed, reviews should be undertaken to ensure they are achieving targeted objectives and are not unnecessarily stifling opportunity, and to explore whether new technological developments provide opportunities to address road safety, personal security and air quality concerns. In those countries and cities where commercial motorcycles are not currently operating, governments should monitor the situation and prepare for their arrival.



Peter Kizza at Usafi Market, Kampala, Uganda

INTRODUCTION

If anyone knows the benefits and the costs of *boda boda* work in Africa, it's Peter Kizza. Peter has worked riding motorcycle-taxis – known across East Africa as 'boda boda' – in Uganda's capital Kampala for over 20 years. The five motorcycles he has owned in that time have helped him to build a life and provide for his family, but several crashes have given him serious injuries and left him in constant pain.

"As a youth, I rode a bicycle-taxi, earning money by carrying passengers," Peter explains. "I saved up, and the first thing I bought was a plot of land. Then, in the year 2000, I bought my first motorcycle."

"These two things – my land and my motorcycles – have given me a good life. I rear pigs and grow yams and vegetables – using the motorcycle to carry food for the pigs and fertiliser for the farm, and then to carry the crops to my customers when selling. To earn my day-to-day money, I go to town and use my motorcycle as a taxi. I take home around 30,000 Ugandan shillings (over US \$8) each day, mostly doing deliveries for other people – these days, carrying passengers makes little money."

With the profits from his motorcycle and farming, Peter has built a house and put his five children through school, two of whom will soon be completing their teaching qualifications.

However, over twenty years on Kampala's streets have not been without risk. Peter estimates that he's had at least thirty crashes in that time, with the worst of those coming in 2014.

"I was knocked down by a car, and one of the sacks of beans that I was carrying fell on my leg. My knee was so badly damaged that my leg could be folded in all directions. I feared that I would never walk again. I spent six weeks in hospital, having operations and other treatments. In total, the treatment cost around 3.5 million Ugandan shillings (almost US \$1,000), which is a lot of money – I had to use my savings, sell my chickens, and accept money from relatives, friends and other boda boda riders."

Peter was fortunate that he could walk again, but he was unable to work for around six months. His middle daughter, at 14 years old, had to stay at home to

help look after him – she missed two years of school, initially to look after him, and then because he could not afford to pay her school fees.

Following another serious injury in 2019 in a collision with a lorry, Peter considered giving up riding a boda boda, especially as he was unable to retrieve his motorcycle after it had been picked up by the police. But he managed to get a new motorcycle with help from a small-loans organisation.

"I've benefitted from the boda boda business, but I'm getting old and I have pain in my knee and chest. I want to stop, to focus on my pigs and my garden. Things are not easy these days – fuel is so expensive, and passengers don't have money to pay. The roads are so dangerous. Drivers are careless – even boda boda riders drive so badly. I'm grateful for the life I've built riding boda bodas, but I won't miss the streets."

'RIDER' VS 'DRIVER'

'Rider' is the commonly used term for a person who sits on and controls a motorcycle.

The term 'driver' is more commonly used in relation to cars or larger vehicles.

A 'passenger' is a person travelling on a motorcycle but not controlling it.

The commercial use of motorcycles as taxis and for deliveries began independently in different countries across the continent, and increased and spread in a bottom-up, unplanned way. This growth occurred in response to rapid urbanisation, the failure of public transportation systems and urban planning to provide for the poor majority, private cars remaining the reserve of the well-off minority, a scarcity of good roads and other forms of motorised transport in rural areas, and a lack of decent employment opportunities for young men.



Motorcycle-taxis are a form of 'paratransit' – an on-demand passenger transport service that does not operate on a set route or timetable. They offer mobility to people who previously had very few transport options. In many countries, they are found on street corners, at marketplaces and in village centres, or are summoned by mobile phone. They can provide a door-to-door service, and connect (usually in an unplanned way) with wider public transportation networks, waiting at bus stops to take passengers home. They serve the 'first mile' and 'last mile' in rural connectivity, enabling rural communities to access vital services.

As Peter Kizza's story shows, commercial motorcycles can be both a blessing and a curse. They support livelihoods and economies, providing jobs, business opportunities and access to markets and services. But crashes cause death and disability and the knock-on effects that those can have for individuals, families and wider society. Motorcycles cause local air pollution and have other negative environmental, health and social impacts.

Commercial motorcycles have the potential to both catalyse and impede African countries' development. To catalyse development – providing access, jobs and opportunities – motorcycle-taxi and delivery sectors need to be regulated and supported to be safe, sustainable and equitable, coordinated with an expansion of non-motorised transport and mass public

transit, and to provide decent employment for riders. Without such appropriate regulation and effective support, motorcycle sectors can be dangerous, polluting and exploitative, impeding development efforts.

There is no single approach for how African countries can maximise the benefits and minimise the downsides of commercial motorcycles. Rather, it is for policy-makers, planners, authorities and other stakeholders to understand the full range of issues that are involved and make balanced and appropriate decisions. This report aims to provide an overview of the key issues surrounding motorcycles in Africa to give context and facts – and to provide recommendations – to help all involved to make informed decisions that will maximise the benefits that motorcycles offer and to reduce the risks.

The report draws on multiple sources – primary research and surveys undertaken in nine countries specifically for this report; case studies; peer-reviewed papers; international databases; national statistics; 'grey' literature such as newspaper articles, blogs and anecdotes; and the authors' personal experiences. Overall, there is a lack of good-quality data, which means that it is hard to be precise on numbers and trends. However, we have used the best available information to try to capture and present the everyday reality – good and bad – of motorcycles in Africa.



PRIMARY DATA GATHERED FOR THIS REPORT

In writing this report, to add to the authors' years of experience living, working and undertaking research around motorcycles in Africa, we undertook primary research in the major cities of nine different countries.

This research consisted of:

- Background-information gathering on motorcycle-related regulation, policy, stakeholders and data (early 2021 to early 2022);
- Face-to-face surveys of one hundred commercial motorcycle riders in each of the nine cities, to gather information on demographics, working conditions, finances, injuries and more (January-February 2022);
- Roadside observations of one hundred motorcycles in each of three different locations in each of the nine cities - to gather data on rider and passenger genders, helmet use, mobile phone use, type of use (be it motorcycle-taxi, delivery or private), loads and rider behaviour (early 2022, except Douala, Dar es Salaam and Lomé [early 2021]); and

- Case studies of commercial motorcycle riders, passengers, and other stakeholders and initiatives (January and February 2022).

The research was carried out in the following cities and countries:

- Douala, Cameroon
- Accra, Ghana
- Conakry, Guinea
- Maputo, Mozambique
- Lagos, Nigeria
- Kigali, Rwanda
- Dar es Salaam, Tanzania
- Lomé, Togo
- Kampala, Uganda

Key findings of this research are presented throughout the report. Snapshot summaries of each country and city are included in Appendix A.

COUNTRIES AND CITIES OF PRIMARY RESEARCH

This map shows the countries and cities where we carried out primary research for this report, highlighting some of the characteristics of motorcycles across the continent.



MOTORCYCLE-TAXIS

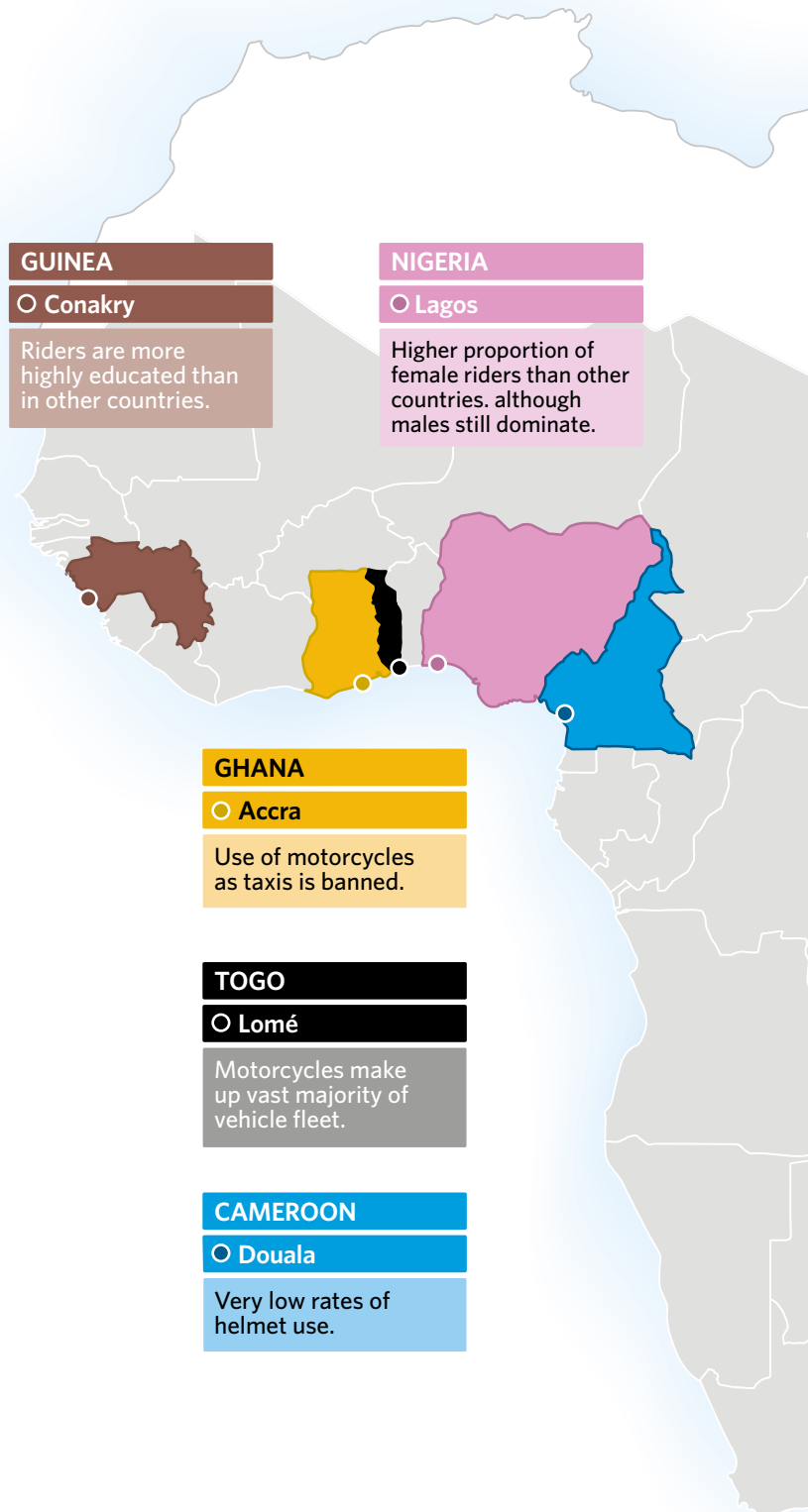
These tend to be small-engine (125 or 150cc) Chinese or Indian brand motorcycles that can carry multiple passengers as well as cargo.

Brand names include Boxer, KingLion, T-Better, TVS, Fekon and Haojue.

Local names include 'okada', 'boda boda', 'zemidjan' and many more.



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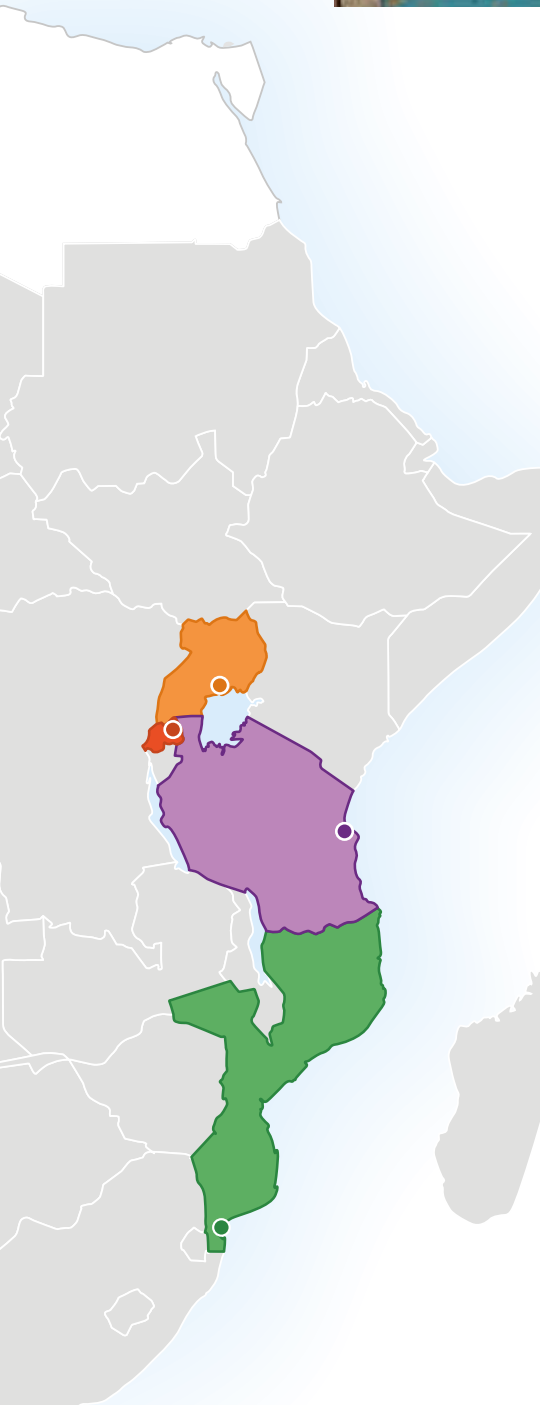




MOTORCYCLE CULTURE

Motorcycles are a symbol of freedom and opportunity to the many individuals who use them, their importance permeating into culture.

Motorcycle-taxi riders create bonds over their work, music and other aspects of popular culture, with these ties being the foundations of social support networks.



UGANDA

○ Kampala

Motorcycle-taxi associations have considerable political power.

RWANDA

○ Kigali

Very high rates of compliance with laws.

TANZANIA

○ Dar es Salaam

High rates of crime against riders, including robberies.

MOZAMBIQUE

○ Maputo

Motorcycle-taxis are rare in Maputo but widespread elsewhere.



MOTORISED 3-WHEELERS AS TAXIS

With one wheel at the front and two at the back, these are most-commonly an Indian brand, carrying passengers who perhaps feel a little safer than on a motorcycle or want to stay out of the rain or sun.

Local names include 'bajaj' 'keke' and 'tuktuk'.



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MOTORISED 3-WHEELERS FOR CARGO

With larger wheels and a more powerful engine, these are often Pakistan-made, and are used for carrying heavy cargo on poor-condition roads.

Local names include 'toyo', the name of a common brand in East Africa.



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MOTORCYCLES IN SUB-SAHARAN AFRICA: THE STORY TO DATE

A BRIEF HISTORY

As African countries gained their independence in the late 1950s, '60s and '70s, the removal of restrictions on businesses and movement of people led to a boom in demand for transportation.⁶

The formal public bus companies that had been established in many capital cities under colonial rule could not meet this demand, and so an opportunity arose for informal minibuses – often going by names derived from their original price, like 'matatu', 'trotro' and 'daladala'* – to serve increasing numbers of urban immigrants.⁷

The economic downturn that struck most African nations between the 1970s and 1990s upended many countries' transportation sectors. Governments attempted to plug financial gaps with loans from international financial institutions, with conditions including the privatisation of sections of the economy and the dropping of import restrictions on used vehicles.^{8,9} This led to an explosion in unemployment and the slashing of funding for public transportation. Weakened public transportation, high rates of urban unemployment and easier importation of vehicles from abroad created a boom in informal transportation across much of the continent, including the start of the use of motorcycles as taxis.¹⁰

The rise of commercial motorcycles was not uniform across the continent – it originated independently in multiple places. In Nigeria, the use of motorcycle-taxis began in the 1980s, taking the nickname 'okada', after a local airline. In Uganda and Kenya, motorcycles began replacing bicycle-taxis in the 1990s.

Their use has grown more quickly in some countries than others. A recent study using documentary evidence to track their expansion across the continent found initial clusters were around port cities in West and East Africa, and their usage spread from there. The study suggests that motorcycle-taxis are today present in 60% of cities in coastal countries, compared with just 35% of cities in landlocked countries.¹¹

It is largely Chinese and Indian manufacturers who now dominate the sector, having been successful at bringing down the costs while providing motorcycles that can cope with Africa's terrain and climate, and the people's needs. Across the continent, 125cc and 150cc 2-wheeler motorcycles can be bought new for as little as US \$800, with smaller-engined scooters selling for even less.

In some countries, the different parts of motorcycles are imported separately – to reduce import duties – and the vehicles are then assembled locally. For example, in Togo in 2016, Dayang invested US \$15.5 million in an assembly plant with the capacity to assemble up to 3,000 motorcycles per month. And an estimate of only 15% of the motorcycles assembled in Togo remain in the country.¹² The rest are taken to Benin, Burkina Faso, Mali, Niger, Nigeria and beyond.

After two decades characterised by more or less the same business model – hiring a motorcycle, waiting for customers, haggling over the price and taking payment in cash – the past few years have seen significant innovation and change in the commercial motorcycle industry. Asset-financing companies began financing motorcycles in the early 2010s, allowing more riders to become owners. Ride-hailing mobile

* *Matatu* comes from 'threepence' in Kikuyu. *Trotro* also meant 'threepence' in Ga. And *daladala* was from the English – 'dollar dollar'.

phone apps launched in the mid-2010s, digitising the process of seeking a motorcycle-taxi and offering potential improvements in efficiency and safety. Electric motorcycles are newer still and have the potential to offer cost savings to owners, as well as environmental benefits. Most recently, the COVID-19 pandemic spurred growth in delivery services, along with the digital economy run through mobile phone apps.

African countries and cities have taken wide-ranging approaches to policy and regulation of commercial motorcycles. Most commonly, commercial motorcycles are lightly regulated, with authorities struggling to control widespread flouting of laws. But in some cities – and even some countries – complete bans have been introduced on the use of motorcycles as taxis, usually citing safety and security concerns. Ghana imposed a nationwide ban on motorcycle-taxis in 2012, which is still in place today but is widely breached. Cities such as Abidjan in Côte d’Ivoire and Lagos in Nigeria have opted for citywide bans, but these have led to protests by riders.

More-innovative legislation is found in Rwanda, where all motorcycle-taxi riders in Kigali have recently been required to use fare-calculators or join a ride-hailing app. Though this legislation is young, and disputes remain around the commissions that the app company and the riders earn, it has the potential to address some of the safety and security concerns, as well as pricing issues.

Motorcycles are also used in ways other than as taxis and for deliveries, although in far smaller numbers. Some people have their own private motorcycles, for urban commuting or rural access. Some companies and institutions have fleets of motorcycles to support their service provision. And there are small motorcycle motorsport communities in several countries. But, mostly, the story of motorcycles in Africa is one of small motorcycles ridden by young men, carrying passengers and goods – and the wide-ranging spinoff effects of this for communities and economies.



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ESTIMATING THE NUMBER OF MOTORCYCLES IN SUB-SAHARAN AFRICA

In writing this report, we wanted to know how many motorcycles – both 2- and 3-wheelers – there are in Africa. We found that reliable data are limited, with sources such as the *United Nations Comtrade International Trade Statistics Database*¹³ and the World Health Organization’s *Global Status Reports on Road Safety*¹⁴ having incomplete data.

For example, the Comtrade database – which contains data on importations – has data missing for many countries (particularly for recent years), and also uses different measures of import valuation. This makes it impossible, where numbers are missing, to assume a standard motorcycle price and thereby derive the number of motorcycles from the total value. The Comtrade database also does not contain data on re-exports, but it is known that re-exporting is common in some countries, such as Togo, from where motorcycles are taken to Nigeria and other neighbouring countries.



The WHO’s Global Status Reports on Road Safety publish the number of motorcycles in each country for which data are available. However, these numbers are obtained from official government sources in each country, and are not always reliable. For example, official numbers are subject to changes in registration policies – a country may have a campaign to register motorcycles in one year that is not sustained in the next. Looking at Benin as an example, the Status Reports show that the number of registered motorcycles dropped from 15,600 in 2007 to 1,155 and 828 in 2011 and 2013, respectively, before skyrocketing to 195,157 in 2016. This is highly

unlikely. Also, many countries do not have a system of vehicle de-registration, and their official figures for the total numbers of registered vehicles are simply the cumulative numbers registered each year since records began, without considering vehicles that have been taken off the road. Motorcycles in Africa have a lifespan of between five and seven years.

In light of these data discrepancies, we developed a model to calculate what we believe to be more reliable estimates of the number of motorcycles in each African country. We used in-depth online research, our own personal knowledge and experience, and the knowledge of our network of in-country stakeholders, to estimate the prevalence of motorcycles in each country. We then assigned each country a ‘density factor’. Beginning with Very Low, these ranged through Low, Mid, High and Very High, representing 2.5, 10, 25, 40 and 100 motorcycles per 1,000 people, respectively.

We triangulated our estimates against the Comtrade and WHO data, for those countries in which we had confidence in those data, verified against a third source. We also assigned a degree of certainty to each country’s density, reflecting how confident we were in our estimation of the prevalence of motorcycles.

Our model estimated that as of mid-2022, there were a total of 27,043,682 motorcycles in Sub-Saharan Africa.



The estimated numbers of motorcycles in each country - as of 2020 - can be found in Appendix B of the report.

As well as estimating the current number of motorcycles in Africa, we also wanted to understand past and future growth.

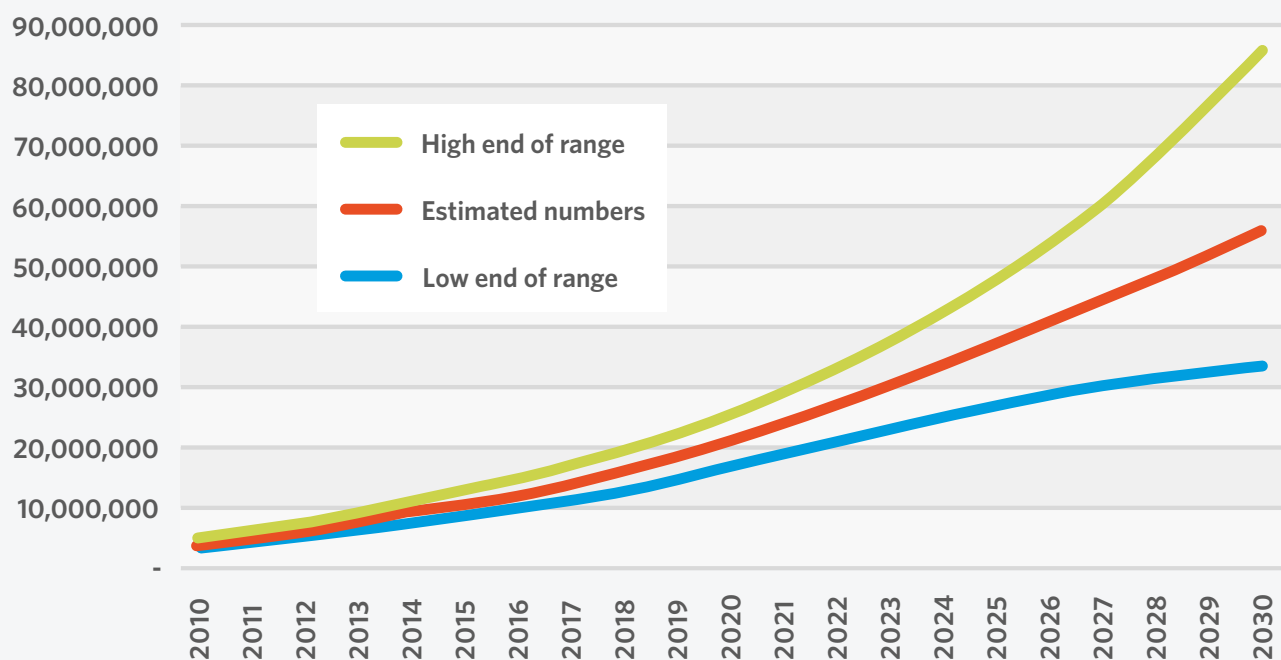
In order to project the numbers forward to 2030, we used the most credible data available from the WHO's Global Status Reports on Road Safety for the period from 2006 to 2017. We calculated individual countries' growth rates, using a total of 135 data points across thirty-seven countries, and then averaged these out for the entire region, effectively assuming that the growth rate would be even - across the region - hence removing inconsistencies.

From 2022 to 2030, we calculated an average annual growth rate of around 9.54%, with the rate of growth decreasing by 0.61% each year, from 11.98% in 2022 to 7.10% in 2030. We used a similar technique to estimate backwards to 2010.

The chart below shows the estimated total number of registered motorcycles in Africa from 2010 to 2030.

The chart shows that in 2010, there were only around five million motorcycles in Africa. This increased more than fivefold to over 27 million in 2022, and is projected to increase to almost 55 million by 2030. However, the projected estimates for 2030 range from a little over thirty million to almost 85 million, and will depend on numerous factors. For example, it could be that a saturation point is reached, and then the total number of motorcycles begins to plateau. Or it could be that rising incomes lead to a demand for private ownership, which would generate a surge in numbers - as has been seen in some countries in Asia.

Estimated total number of registered motorcycles (2- and 3-wheelers) in Africa, 2010 to 2030



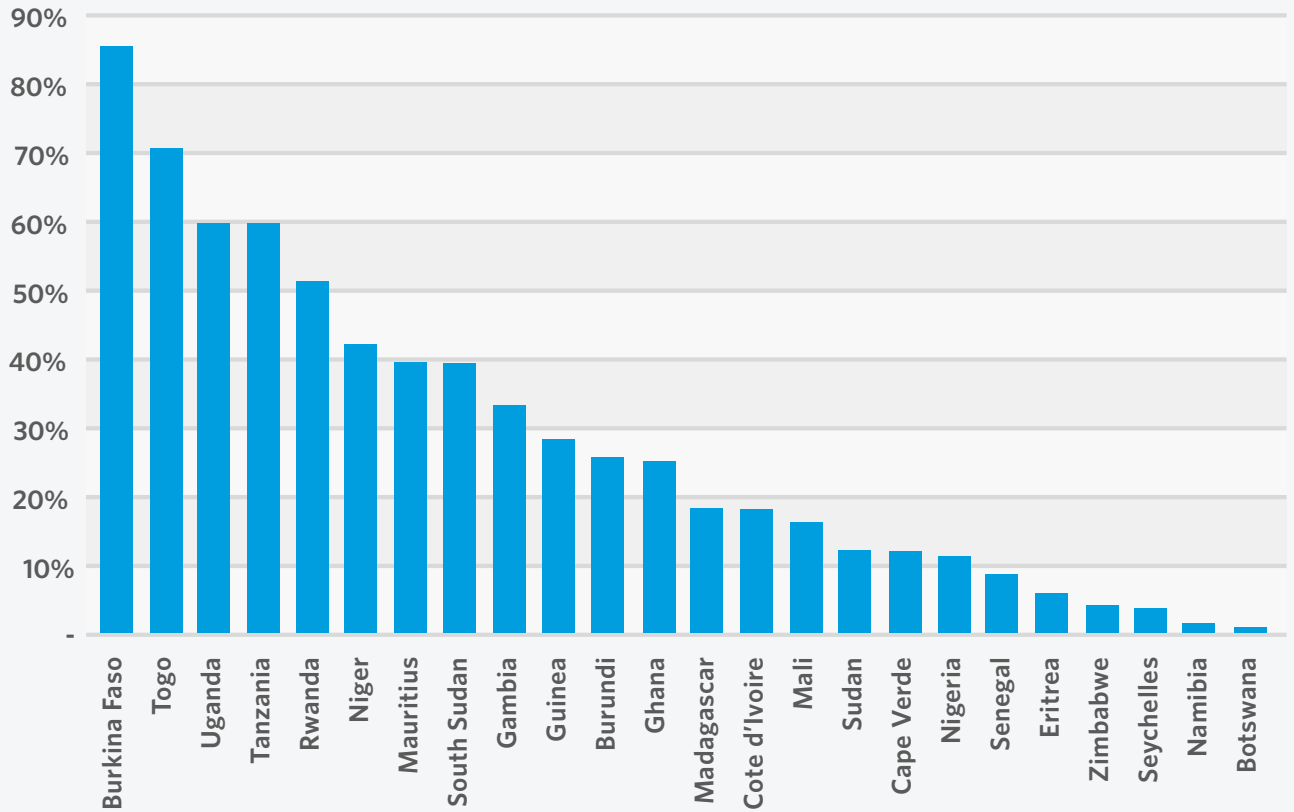
Also interesting to look at is the proportion that motorcycles make up of the overall vehicle fleet. Again, data in this area are limited, with the most reliable source being the WHO's 2018 Global Status Reports for Road Safety. Discounting a number of countries for clear discrepancies - such as that of Benin, explained above - data were available for twenty-four countries. These are shown in the chart opposite.

The chart shows that in 2015/16, Burkina Faso had the highest proportion of motorcycles at around 85%. This was followed by Togo at around 70% and Tanzania and Uganda, both at around 60%. Of the twenty-

four countries for which data were available, nine of them had motorcycles making up more than 30% of the overall vehicle fleet. In six countries, motorcycles made up less than 10%, with the figure in Botswana being less than 1%. The average proportion across the twenty-four countries is 28%.

Separate analysis by the management consulting company McKinsey, looking at the potential for electric vehicle uptake in Sub-Saharan Africa, estimates that 2-wheeler motorcycles (both electric and petrol) will make up between 45% and 57% of the overall vehicle fleet by 2040.¹⁵

Registered motorcycles as a proportion of the overall vehicle fleet (2015/16)



COMMERCIAL MOTORCYCLES: USES, USERS AND ORGANISATION

MOTORCYCLE-TAXIS

The roadside surveys carried out for this report in the largest cities of eight countries across Africa found that an overall average of three-quarters of all motorcycles observed were motorcycle-taxi, either carrying or seeking passengers. An average of 5% of motorcycles were observed as being used for deliveries, with the remaining 20% being for private use.

The motorcycle-taxis were identified in different ways in different cities – by the riders wearing uniforms, by licence plates or other forms of identification, or by rider or passenger behaviour. Only in Maputo was it not possible to confidently differentiate between private motorcycles and motorcycles being used as taxis. There was significant variation between the cities, with

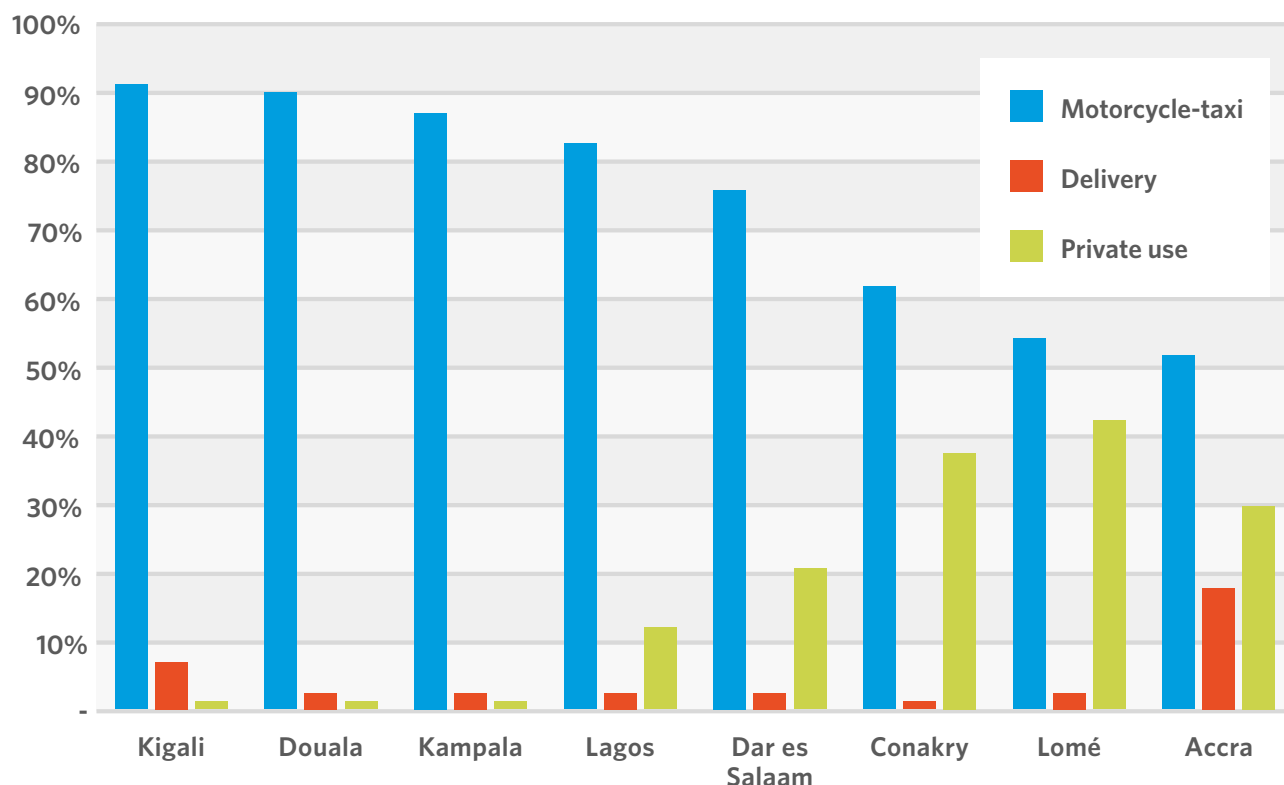
Kigali having the highest proportion of motorcycles used as taxis, and Accra (where they are banned) having the lowest proportion. Accra had the highest proportion of motorcycles being used for deliveries, and Lomé had the highest proportion of motorcycles being used for private use.

The chart below shows the types of use of motorcycles observed in the eight cities where it was possible to differentiate between motorcycle-taxi, delivery motorcycles and private use. In all cities, more than half of the motorcycles observed were being used as taxis.

Our roadside surveys also found that the majority of motorcycles observed were carrying passengers. In Lagos, 93% of the motorcycles observed were carrying at least one passenger, and the average across the eight cities was 59%.

Most common is for motorcycles to carry just one passenger, but carrying two or more is not uncommon, often irrespective of laws banning such practices. In Douala, Conakry and Lagos, motorcycles were seen to commonly carry two or more passengers: 32% of all motorcycles observed in Douala, 21% in Conakry and 20% in Lagos.

Types of use of motorcycles in surveyed cities



It is not only in cities that motorcycle-taxis are common – they are also widely found in rural areas. A 2015 study on rural roads in Tanzania found that 90% of all motorised vehicles were motorcycles and 52% of motorcycles were carrying one or more passengers.¹⁶

DELIVERIES AND CARGO

In many countries, motorcycles have come to be the carriers of nearly anything they can possibly carry. They carry cargo ranging from small store commodities and farm produce to live animals, furniture and even other motorcycles – sometimes regardless of regulations on cargo dimensions. In towns and cities, motorcycles are commonly found waiting around market places and shopping centres. In rural areas, they carry agricultural produce that was previously transported by bicycle or animal, such as sacks of maize or beans and bunches of bananas.

During the COVID-19 pandemic, many cities saw an increase in the use of motorcycles for deliveries, including for take-away food, online shopping and delivery of medicines. Larger restaurant chains often own fleets of delivery motorcycles.¹⁷

An average of almost one-third of all motorcycles observed during our surveys were carrying cargo, with this figure rising to around a half in Accra, Kampala and Kigali. Around half of all loads were deemed to be unsafe, either extending excessively to the rear or side of the motorcycle, causing the rider or passenger to not sit correctly, obscuring visibility, or not being securely fastened. In Dar es Salaam, over two-thirds of loads were deemed to be unsafe.

SERVICE DELIVERY

Motorcycles are also used for service provision in many African countries by utility companies, health providers and others.¹⁸ They can be around ten times cheaper than a 4-wheeled vehicle and are thus optimal for one-person work. In areas where road quality is poor or there are not all-weather roads, they are able to navigate these and provide access to vital services. Vaccine campaigns, health surveys, emergency health transport and more are conducted with motorcycles, including in Nigeria, Malawi and the Gambia.¹⁹



Carrying truck tyres in Cotonou, Benin. ©Jason Florio

COMMERCIAL MOTORCYCLE RIDERS

Gender

The vast majority of motorcycle riders in Africa are male: It is very rare to find a woman motorcycle rider, and it is even rarer to find a woman riding a commercial motorcycle.

The roadside surveys carried out for this report found that an average of 99% of motorcycle riders were male: Only 1% were female. In Lomé, 5% of riders were female, but all of these were riding private motorcycles, not motorcycle-taxis. Only in Lagos were women observed riding motorcycle-taxis. In many countries on the continent, gender roles are strongly defined, and riding a motorcycle-taxi is seen as a male occupation.

A March 2022 article on The Guardian's website highlighted the example of a woman in Kampala, Uganda, whose husband "refused completely" when she asked him to teach her how to ride a motorcycle. But she found others to teach her, and now works as one of only three female motorcycle-taxi riders employed by ride-hailing company SafeBoda, out of a total of around 26,000 riders.²⁰

Elsewhere in Uganda, in the small town of Fort Portal, a group of women came together to form the Kabarole

Women's Boda Boda and Farmer Association after they recognised the importance of transportation in their day-to-day activities and realised that they could not rely on men.²¹

In other parts of East Africa, there are small initiatives supporting women motorcycle-taxi riders, including the Malkia Moto Club in Kenya and Pikilily in Tanzania.



Teddy Kabatoro, a female boda boda rider in rural Uganda

THE CHALLENGES FACED BY WOMEN MOTORCYCLE-TAXI RIDERS

In Kenya, where small numbers of women motorcycle-taxi riders can be found, the Malkia Moto Club, which promotes women's interests in motorcycling, has researched the challenges that these women face.

Firstly, women face challenges to simply get hold of a motorcycle. Owners are reported to resist leasing motorcycles to women, claiming they are at higher risk of robbery. Women have less access to credit and are less likely to take the high interest rates that are attached to most motorcycle loans.

Personal safety is a clear concern, with reports of women riders being groped by male passengers while riding. The risk of assault and theft of the motorcycle is a constant worry.

The early starts, long hours and late finishes needed to make a profit from riding motorcycle taxis are often incompatible with women's other responsibilities, such as childcare. Riding a motorcycle while pregnant or soon after childbirth is not advisable. And some women do not like to ride their motorcycle during menstruation.

However, the Malkia Moto Club has identified demand for women riders from certain customers. Some women passengers prefer a woman motorcycle taxi rider, and some business owners prefer to use women riders for deliveries, considering them to be more reliable and careful.

Ride-hailing apps have the potential to support women's employment in the motorcycle-taxi industry. By allowing flexible working hours, increasing security through passenger registration and GPS tracking, and allowing business owners and women passengers to choose women riders, women could be encouraged to join the millions of men already earning money on two wheels.

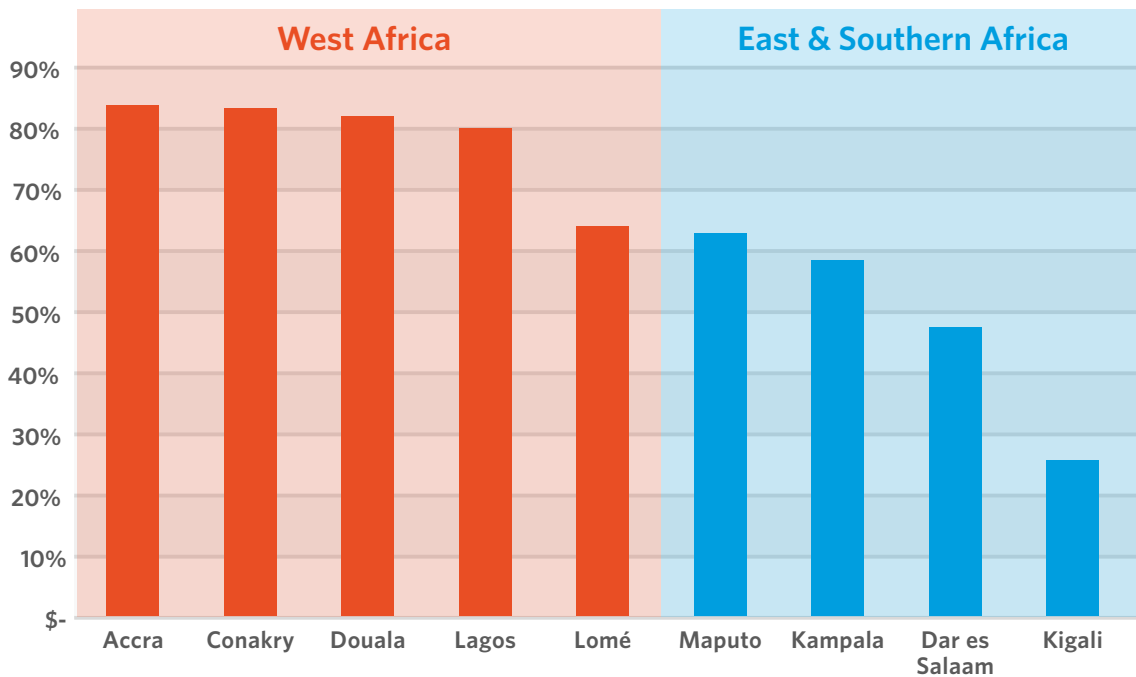
Age and education levels

The average age of the motorcycle-taxi riders surveyed across the nine cities was 33 years, with Accra having the youngest riders (averaging 29 years) and Lomé having the oldest (averaging 37 years). However, in a number of the cities surveyed, the average age was pushed up by a small number of significantly older riders in their 40s or 50s. The most common age of riders tended to be lower than the average – for example, in Accra the most common age was 24 years and in Lomé it was 32 years.

Our survey found a marked difference in education levels of riders, with riders found to be more highly educated in the cities in West Africa than elsewhere on the continent. In the main cities of Cameroon, Ghana, Guinea, Nigeria and Togo, an average of 78% of riders had completed an educational level of secondary school or above. In Conakry (Guinea), 51% of riders had completed tertiary education.

On the other hand, in the main cities of Rwanda, Tanzania and Uganda in East Africa, and Mozambique in Southern Africa, an average of only 49% of riders had completed secondary school. In Kigali, 20% of riders had not completed primary school.

Riders educated to secondary level or above



MOTORCYCLE-TAXI PASSENGERS

Motorcycle-taxi passengers cover the full spectrum of society – female and male, from children to the elderly, professionals, informal workers, students, people with disabilities, and more.

The surveys carried out for this report found that on average – across nine cities – 62% of passengers were male and 38% were female. However, there was wide variation between the different cities: In Accra, only 5% of passengers were female, while in Lomé, 54% were female.

The decision to use a motorcycle-taxi is determined by several factors, such as the price, the availability of other modes of transport, the perceived safety compared to alternatives, and the enforcement of laws. For example, in Kampala, Uganda, where for many people motorcycle-taxis are the only affordable door-to-door service, they are used in similar numbers by men and women alike.²² But when there is a safer alternative, such as the 3-wheeler tuktuks in Kisumu, Kenya, women have been found to be more likely to choose the safer option.²³

In urban areas in East Africa, women are more likely to be running small businesses, and to use motorcycle-taxis to get around – sometimes at higher rates than their male counterparts.^{24,25} In rural, low-income areas, women’s mobility is often restricted because of more entrenched gender norms and women’s lower relative earning power.²⁶ This often reduces women’s usage of motorcycle-taxis compared to men.

People commonly have the numbers of several trusted riders saved in their mobile phones, whom they can call upon for trips or to run errands.

STAGES

Motorcycle-taxis can be found gathered waiting for passengers at areas called ‘stages’, ‘stations’, ‘stops’ or another of a handful of local equivalents. In cities, these are typically at junctions, shops, markets, hospitals or bus stations, and in busy areas there is one on every street corner. In rural areas, a small number of motorcycle-taxis can often be found in the village centre.

Stages provide a hub for motorcycle-taxis in their neighbourhoods. They are a source of support and camaraderie for riders, a place to catch up and to exchange information. They create fraternity among riders, who can then create committees and small savings associations to help each other. Through this network and their constant presence in the neighbourhood, they can develop relationships with residents who come to trust them, potentially acting as a crime deterrent.

In some countries, stages developed spontaneously and operate largely free from regulation. In others, like Rwanda, they are tightly regulated. And in others, including Uganda, they were partly pushed into creation by the authorities.

ASSOCIATIONS

Motorcycle-taxi associations exist in many countries, and they have a wide variety of forms. These range from local, informal associations, made up of just a few riders at a single stage, to highly organised nationwide associations that bring together and formalise numerous local associations. The Boda Boda Safety Association of Kenya, for example, has chapters in all 47 counties and an estimated 800,000 members, including both motorcycle-taxi riders and owners.



A boda boda stage on Namirembe Road in Kampala city centre, Uganda



Paying for a trip using an app in Lomé, Togo



Association members commonly pay a joining fee and a monthly membership. The associations provide benefits to riders such as financial support in the case of an injury, or assistance in issues with police. They can encourage or support their members to obtain licences and insurance, to undertake training, and to enter into hire-purchase agreements.²⁷ Larger associations may lobby for more supportive legislation such as reducing taxation on motorcycle imports.

Associations can help legitimise motorcycle-taxi in the eyes of authorities, political leaders and the broader public. They can help to increase awareness of government initiatives and regulations, and to protect their members from corrupt or heavy-handed security forces.²⁸ In some countries, including Rwanda, Kenya and Tanzania, attempts have been made by governments to work with associations to help regulate the motorcycle-taxi sector – with varying degrees of success.

Due to their large number of highly mobile members, associations can hold influence and therefore are at risk of being politicised. Associations are sometimes supported by politicians with vested interests, with members used during political campaigns or as enforcers.

APPS

In larger cities, use of mobile phone ride-hailing apps is becoming more common, for both passenger trips and deliveries. Seven of the nine cities surveyed had apps for passengers, and eight of the nine had apps for deliveries. These apps include multinationals such as Uber and Bolt, as well as homegrown start-ups such as the Ugandan-founded SafeBoda. SafeBoda now operates in Uganda and Nigeria, has over 25,000 riders, and claims to have completed more than 40 million trips for over one million customers.

However, government regulation of the apps is limited – only four of the nine cities surveyed had any form of regulation of apps – and relationships between riders and the app companies are often strained.

As well as the ride-hailing applications, riders commonly use social media and messaging services, such as WhatsApp, to communicate and share information with each other – such as on the location of police checkpoints – widely and in real time.





WHAT IS BEHIND MOTORCYCLES' POPULARITY?

The rapid growth in numbers of motorcycles across Africa and their diverse uses and groups of users are testament to how important and popular they have become. The author of one recent study – Professor Roger Behrens of the University of Cape Town – said of informal transport, including motorcycle-taxis, “If you were to take them away, the economies of most Sub-Saharan African cities would collapse. They are absolutely essential to how the economies function.”²⁹ And in one study in rural areas of Kenya, 70% of the people surveyed described their overall opinion of motorcycle-taxis as ‘Excellent or Good’.³⁰

There are two main drivers behind commercial motorcycles’ popularity: Accessibility and Income Generation.

ACCESSIBILITY

The term ‘accessibility’ refers to the ability to reach desired destinations, such as markets, schools, hospitals and offices. Commercial motorcycles greatly improve accessibility in many African settings, cutting through cities’ traffic jams and weaving along bumpy rural roads and paths that can be impassable to 4-wheeled vehicles.

Motorcycle-taxis and delivery motorcycles today fill many niches that other transport modes cannot. Alternative door-to-door services are provided by 4-wheeled taxis, which are expensive, or bicycles, which are uncomfortable and slow. Motorcycle-taxis provide feeder services from villages to main roads and towns. In cities with ever-increasing congestion, they allow users to reduce time sitting in traffic.

URBAN ACCESSIBILITY

In many cities across Africa, notorious hours-long traffic jams snarl up private cars and public buses,

causing delays, frustration, pollution and economic losses. This is partly due to the failure of public transportation and urban planning, as Kumar identified in his study for the World Bank in 2011. Many of the challenges remain the same a decade later, including rapid growth, urban sprawl, inadequate road infrastructure, increasing numbers of private vehicles, poor facilities for walking and cycling, and incomplete public transport systems. While some cities have made notable strides to improve these, such as the bus rapid transit system in Dar es Salaam or new bicycle lanes in Nairobi, there are still significant gaps in provision, particularly in secondary cities. A lack of infrastructure for walking and cycling – which should be an option for shorter trips – actually encourages the use of motorcycles.



A journey that takes hours in a public minibus can take a fraction of the time on a motorcycle-taxi. A typical trip by minibus will likely involve first getting from your origin to the bus stop, waiting for the bus to fill up before leaving (or fighting for a seat, or standing, if boarding part-way along a route), sitting in a traffic

jam, squeezed in, with heat and dust, stopping at bus stops to pick up and drop off other passengers, possibly interchanging onto another minibus, and then getting from where the bus drops you to your final destination. The same journey on a motorcycle-taxi will likely involve walking to the street corner, choosing a rider, jumping on the back of the motorcycle, winding through any traffic jams, and arriving at your exact destination.

Motorcycle-taxi fares typically lie in between the cost of a similar trip by public minibus and by private taxi. While certainly not affordable to all urban residents, they are more affordable than regular private taxis, and it is the time-cost savings that make them attractive. The table below gives indicative costs and durations of a 15-kilometre trip by different modes of transport in Accra and Dar es Salaam.

		Accra, Ghana	Dar es Salaam, Tanzania
Public minibus	Cost	\$1.30	\$0.50
	Duration	2.5 hours	1.5 hours
Private taxi	Cost	\$7	\$14
	Duration	1.5 hours	1 hour
Motorcycle-taxi	Cost	\$6	\$7
	Duration	45 minutes	20 minutes

Motorcycle-taxis improve accessibility for residents living in informal urban settlements, in a way enabling the suburban sprawl that is a feature of many African cities. Further from the presence of police in the city centre and on main roads, two or more passengers commonly ride together, dividing the fare. Motorcycle-taxis can work throughout the night, often beyond the hours of minibus operations.

While the construction of mass transit systems is improving public transport in some cities, such as the bus rapid transit system in Dar es Salaam, bus stations remain far from the homes of many urban residents. Motorcycle-taxis play a key role as a feeder mode, bringing passengers from peri-urban areas and neighbourhoods to transport arteries. This is especially true in larger cities, where the cost of using a motorcycle-taxi from the edge of the city to the centre can be prohibitive.

Commercial motorcycles also provide critical delivery services. The informal economies of many African cities and towns host huge numbers of small shops whose owners buy only a few cartons of goods at a time. These can be easily and cheaply transported on the back of a motorcycle, with the help of rubber ties and ropes kept on hand by nearly every rider.

It is not only in major cities that commercial motorcycles have become ubiquitous – it is also the case in smaller secondary cities and towns, where in many cases they are replacing bicycles.

In countries where bans exist on using motorcycles as taxis, this is likely to be enforced only in the largest cities. In Ghana, which has a nationwide ban, it is less strictly enforced in smaller cities and towns than it is in Accra.

RURAL ACCESSIBILITY

Across Africa, walking and cycling remain the dominant modes of transport outside towns and cities. But in many countries, motorcycles are now by far the most common form of motorised transport in rural areas. The relatively low cost of motorcycles in comparison to other motorised vehicles means they quickly proliferated beyond cities and towns into villages. Supported by the increased availability of mobile phones, motorcycle-taxis can now easily be called upon in many rural communities. Motorcycles can find their way around potholes, mud and floods, and can be lifted over obstructions such as fallen trees or ditches. They can travel along footpaths and tracks, and cross small bridges, meaning that they effectively bring road transport services to villages and households living away from the road – especially as in many countries less than half of the rural population lives within 2 kilometres of an all-season road. This has fundamentally altered rural access.³¹

Before the spread of motorcycles, in much of rural Africa, isolation was the norm, with low-density populations having only very sporadic motorised transport options.³² Historically, bicycles have been the reserve of higher-income rural people, leaving walking



Carrying goats on a motorcycle in rural Uganda. ©Jason Florio

as the only option for the vast majority – although this is time-consuming, tiring and exposed to sun and rain. A recent study in rural Tanzania found that of a total of 11,500 motorised vehicles observed using the study roads, 88% were motorcycles.³³

On rural roads, motorcycles often carry two or three passengers at a time – despite the safety risk – reducing the cost per passenger. Passengers can sometimes even be seen sitting on top of sacks of farm produce. Motorcycles are far quicker, less tiring and have higher carrying capacities than pedal bicycles, making them more popular despite the cost of fuel.

In many countries, the introduction of motorcycle-taxis has changed transportation and accessibility in rural areas even more than it has done in towns and cities. Improving motorcycle access in rural areas has been shown to lead to improved access to health and education facilities and to promote market integration, while also providing jobs for youths.³⁴ Farmers are able to transport greater quantities of produce to market more quickly than in the past. Village shopkeepers, predominantly women in many societies, benefit hugely from the ability to have small goods directly delivered from the town to the village, allowing them

to sell a greater variety of products at a lower price. Just a phone call away, motorcycles can be available 24 hours a day, allowing their use in medical and other emergencies, sometimes carrying pregnant women to hospital for childbirth.³⁵ In one small town in rural Liberia, a study found that 74% of women at a maternity hospital had travelled there by motorcycle.³⁶

INCOME GENERATION

Motorcycles have created new opportunities for employment and income generation. Accurate employment statistics are difficult to come by, but in several countries, the commercial motorcycle sector is estimated to be one of the largest sources of employment outside agriculture.³⁷ In Uganda, for example, motorcycle-taxis were estimated to provide livelihoods for 2.9% of the total population in 2014 – a figure that is likely even higher now considering the continued growth of the industry.³⁸ Researchers have estimated that 500,000 jobs could be created by stimulation of the commercial motorcycle sector in Ethiopia.³⁹

COMMERCIAL MOTORCYCLE RIDERS

Commercial motorcycles have created millions of jobs for riders. In countries where the majority of employment opportunities are in the informal sector with low pay and poor working conditions, riding a motorcycle can offer a relatively lucrative and attractive livelihood, with few barriers to entering this line of work. In many countries, young men are demonstrating entrepreneurship as they move out of less lucrative activities and into commercial motorcycle operations.⁴⁰

Previous research into motorcycle-taxis in rural areas found that in Kenya, more than half of all riders had previously either been students or had been unemployed, while in Ghana, Tanzania and Uganda, around a third of riders had previously been working as farmers or fishermen. Other common previous professions included manual labour and small-scale business.⁴¹

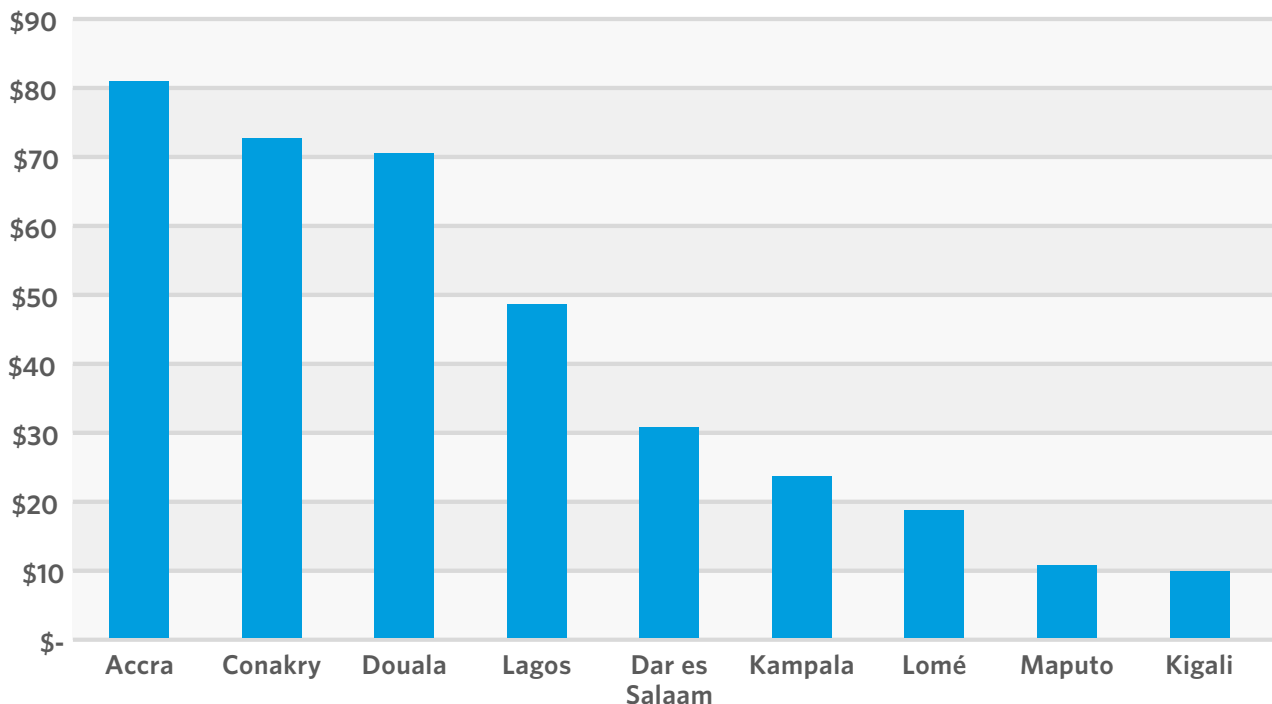
The majority of riders are self-employed, working in the informal economy. Some rent the motorcycles that they use, paying a daily or weekly fee to the owner, some own their own motorcycle, and some have a

hire-purchase arrangement. A small but growing number of commercial motorcycle jobs are formal or semi-formal, such as those with ride-hailing apps or delivery companies.

The amount that commercial motorcycle riders can earn varies widely and depends on several factors. Profits vary from country to country, and within countries they vary from cities to towns to rural areas. Profits vary depending on whether the rider owns or rents the motorcycle. For those who rent the motorcycle, profits vary depending on the type of agreement they have with the owner for the costs of fuel and maintenance. And profits vary on the type of service the rider provides – carrying passengers or doing deliveries – and whether they are on a ride-hailing platform or delivery app.

Of the major cities of the nine countries surveyed for this report, average profits were found to be highest in Accra, at around US \$80 per week, which is over US \$300 per month. To put this in perspective, it is more than the average Ghanaian entry-level teacher's salary, which is around US \$200 per month. Riders' profits were found to be lowest in Kigali, at around just US \$10 per week.

Average weekly profit



I WHAT IS BEHIND MOTORCYCLES' POPULARITY? I

Riders using ride-hailing or delivery apps earned more than those not on an app - but whether this is the result of them getting more work, or simply the intensive level of subsidisation of the apps (as the app companies attempt to gain market share) is unclear.

MOTORCYCLE OWNERS

For those who can afford it, owning a motorcycle can represent a modest investment to generate extra income. Owners can rent motorcycles out to riders for a daily or weekly fee.

As with riders' earnings, the profits that owners can make vary based on several factors. It can take between one and two years for owners to recoup their investment. In our face-to-face survey of riders, we found that the average fee that owners charged to riders was highest in Lagos at around US \$37 per week, and lowest in Lomé at around US \$13 per week.



BUSINESS WOMAN SEEKS CALM, POLITE, RESPONSIBLE MEN

Oluwakemi Orenuga, or Kemi, as she is known in her neighbourhood, makes money from motorcycle-taxis, but she doesn't do it from riding them - she owns them. In Durumi, a suburb of Abuja, Nigeria, she employs men to ride her fleet of five motorcycle-taxis.



Kemi Orenuga - an entrepreneur in Abuja, Nigeria

Kemi is careful about whom she rents her motorcycles to, having had bad experiences in the past when renting to young, irresponsible men. She now focuses on employing riders with whom she has a strong relationship. She looks for men who are calm, polite and responsible, and signs an agreement with them, asking for two guarantors.

She bought her motorcycles outright, and now reaps the benefits of her investment. Each of Kemi's riders pays her 15,000 ₦ (US \$36) a week, and she estimates she makes 300,000 ₦ (US \$721) monthly. She also works as a banking agent to supplement her income and support her family.

She faces challenges in government bans - which restrict business in some areas, but do not prevent it altogether - and fuel scarcity, but she is able to keep her motorcycles on the road earning money. In the future, she's planning on expanding into cars that could work on Bolt or Uber, but hasn't been able to afford that transition yet. In the meantime, she enjoys the work. "I would recommend other women to get into the okada business to reduce unemployment and help ease the mobility problems."

MOTORCYCLE SUPPORT SERVICES

Our surveys found that in a month, the average commercial motorcycle rider spends almost US \$100 on fuel, US \$25 on general maintenance and US \$12 on oil. With tens of thousands of commercial motorcycles in larger cities, this expenditure creates many indirect jobs in the wider motorcycle industry. There are informal open-air garages, where mechanics fix the intensively used motorcycles, and shops selling spare parts. In some countries, motorcycle assembly takes place at least partly in-country, providing factory jobs. Riders often eat while out at work, supporting local catering businesses, which are often run by women. And other small businesses can thrive around motorcycle-taxi stages, selling items like drinks, snacks and mobile phone vouchers.

Motorcycles also drive the import business, including the importation of motorcycles themselves, together with spare parts and fuel.

And the many new innovations in the commercial motorcycle sector, from ride-hailing apps to the introduction of electric vehicles, are spurring

entrepreneurs and local tech industries. Commercial motorcycle tech companies have generated millions of dollars in investments, including Gozem in West Africa, which has raised over \$12 million since 2018.⁴²

SUPPORT TO THE WIDER ECONOMY

Commercial motorcycles play a critical economic role for the people who use their services. They enable farmers and small producers to move goods more easily to market, potentially allowing them to achieve higher prices.⁴³ They make it easier to accomplish small errands in town, and to get to work and home during peak hours.

As well as the benefits that motorcycles bring in terms of accessibility and income generation, there are a number of other factors behind the growth in their numbers. These include the lack of other employment opportunities, the lack of government regulation and other barriers to starting work as a motorcycle-taxi or delivery rider, the lack of laws to protect the rights and safety of commercial motorcycle riders, and the inadequacy of public transport systems.



Motorcycle repair in Kampala, Uganda

COMMERCIAL MOTORCYCLE FINANCES

The income that can be generated by commercial motorcycles is what drives the sector, with profit made by riders, owners and service providers, and revenue generated by authorities.

Capital cost of a motorcycle

A new motorcycle – of the types commonly used as motorcycle-taxis – costs around US \$500 from a manufacturer in China or India.

Shipping and import duties and costs, which vary from country to country – plus the profit made by the dealer – result in the retail price of a new motorcycle in Africa typically ranging from US \$800 to US \$1,200.

Many riders cannot afford this, so they have three options:

1. To buy a used motorcycle, which could cost between US \$300 and US \$600, depending on the condition. But again, such a capital outlay is unaffordable for many riders;
2. To enter into a lease-to-own agreement, which may be through a private arrangement, or, in some countries, through small-loans companies; or
3. To enter into a borrowing arrangement, paying a daily or weekly fee to the owner.

In the East African cities of Dar es Salaam, Kampala and Kigali, only around one-third of riders bought their motorcycle with a one-off payment, while in West Africa – in Accra, Conakry and Douala – almost three-quarters of riders bought their motorcycle with a one-off payment.

Motorcycle ownership as a business

For those people who have the capital to buy one or more motorcycles outright, they can rent them out to riders for a daily or weekly fee. In Dar es Salaam, Kigali and Lagos, the weekly fee charged by the owner to the rider can be upwards of US \$30, while in Lomé and Kampala, it is only around half that.

Depending on the weekly fee, and on the arrangement between the owner and riders around payments for petrol and maintenance, it can take owners anywhere from six months to two years to recoup their

investment. It would take a similar time for a rider on a lease-to-own scheme to pay off the debt.

As commercial motorcycles are used intensively, often on poor roads, they have a typical lifespan of only four to five years, meaning that a motorcycle would be profit-generating for between two and four years.



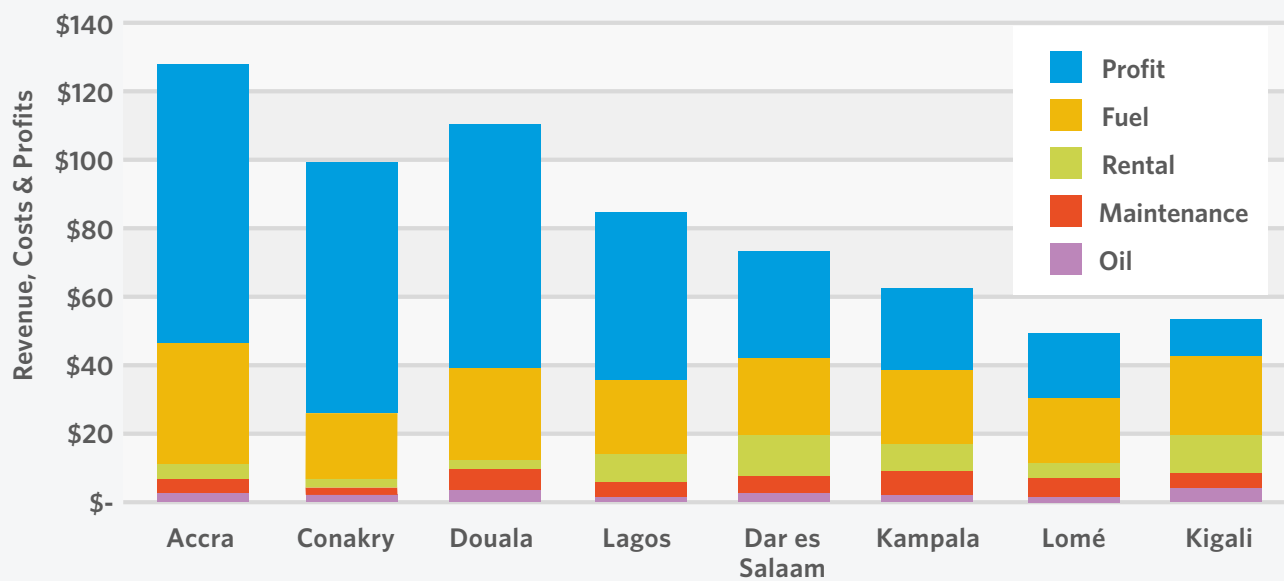
Riders' costs and profits

As well as the daily fee to the owner, riders often cover the costs of petrol, oil and maintenance. Petrol is the largest of these costs, averaging almost US \$25 per week, with maintenance around US \$5 per week and oil around US \$3 per week. Of the cities surveyed, Accra was the most expensive, at around US \$42 per week, and Conakry was the cheapest, at around US \$25 per week.

Profits vary significantly from city to city – with higher rates of motorcycle ownership by riders in West Africa resulting in higher profits (as there is no fee paid to the owner): around US \$80 per week in Accra and over \$70 per week in Conakry and Douala. In the East African cities, and also in Lomé, where ownership rates among riders are lower, weekly profits range from just US \$10 to US \$30.

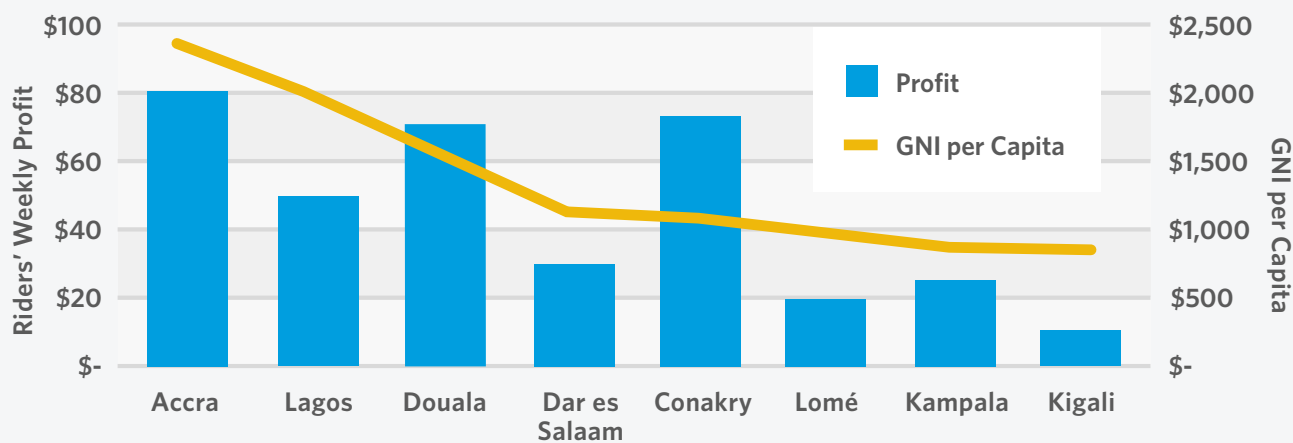
In the following chart, the full height of each city's bar represents weekly revenue, and the different colours in the lower half of each bar represent costs, with the upper portion of each bar representing rider profit. The cities are ordered by rider profit, from left to right.

Average weekly revenue, costs and profit of motorcycle-taxi riders



Plotting riders' profit against each country's gross national income (GNI) per capita, the chart below shows that riders make more profit in countries with higher GNI.

Average weekly profit and gross national income



Government revenue

Governments generate revenue from duties and taxes imposed on the importation and sale of motorcycles and spare parts, as well as on the sale of petrol.

Authorities apply fees to obtain a driving licence and/or motorcycle-taxi operating permit. Revenue is also generated through fines for infringements of laws.

However, as motorcycle-taxis operate in the informal sector, and as regulations are weakly enforced in many countries, governments lose out on huge amounts of potential revenue – for example, no tax revenue is generated from owners' profits, motorcycles are smuggled across international borders with no duties paid, petrol is sold illegally with no tax, and bribes are taken by police officers rather than official fines being paid.



Fuel for sale at the roadside in Cotonou, Benin. ©Jason Florio



WHAT ARE THE DOWNSIDES TO THE GROWTH OF MOTORCYCLE USE?

As well as the benefits that motorcycles bring to individuals and economies, they also have significant negative impacts. Crashes cause injuries that have lifelong impacts for the direct victims, produce knock-on effects for the families of those injured, and put additional burden on already struggling health systems and economies. The fumes and dust spewed out and stirred up by motorcycles gets into people's lungs, eyes and brains, causing health problems and compromising educational development in children. Petrol-powered motorcycles can be very noisy, with engines droning and screeching through the streets. Motorcycles are sometimes used in crime, and both riders and passengers may be victims of exploitation.

TENS OF THOUSANDS OF DEATHS EACH YEAR... AND MANY MORE INJURIES

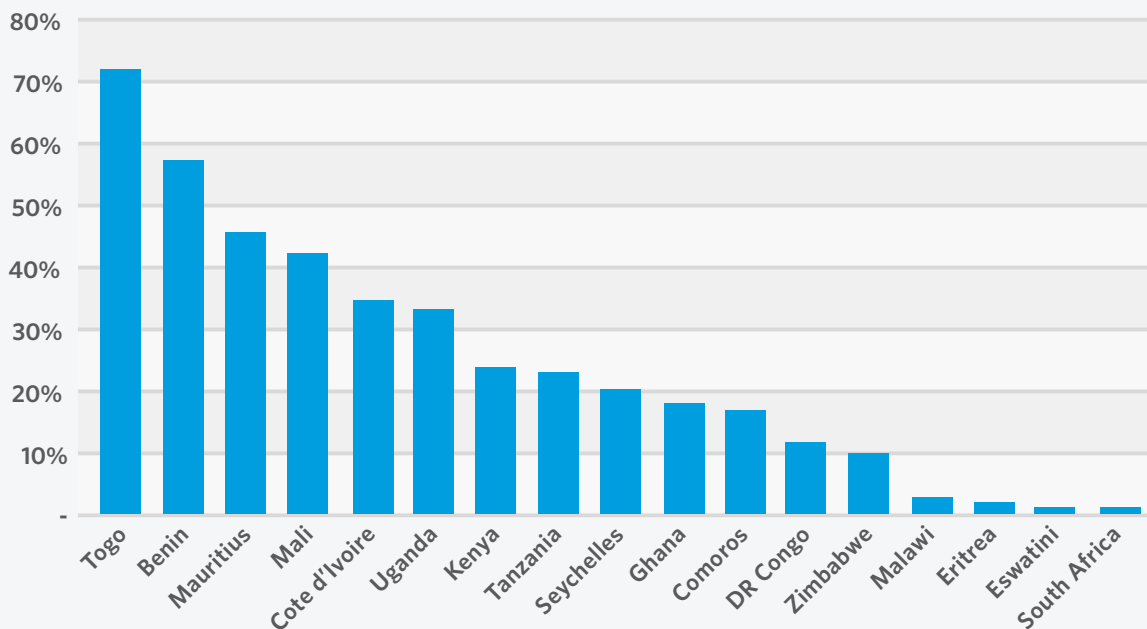
As the use of motorcycles in Africa has increased, so have deaths of motorcycle riders and passengers. Official government statistics show that motorcycle riders and passengers accounted for around 9% of all road deaths in 2007⁴⁴, and that this figure rose to around 15% by 2010⁴⁵ and then to over 24% by 2016.⁴⁶



Cecilia was hit by a motorcycle that was driving on the footpath on her way to school in Dar es Salaam, Tanzania

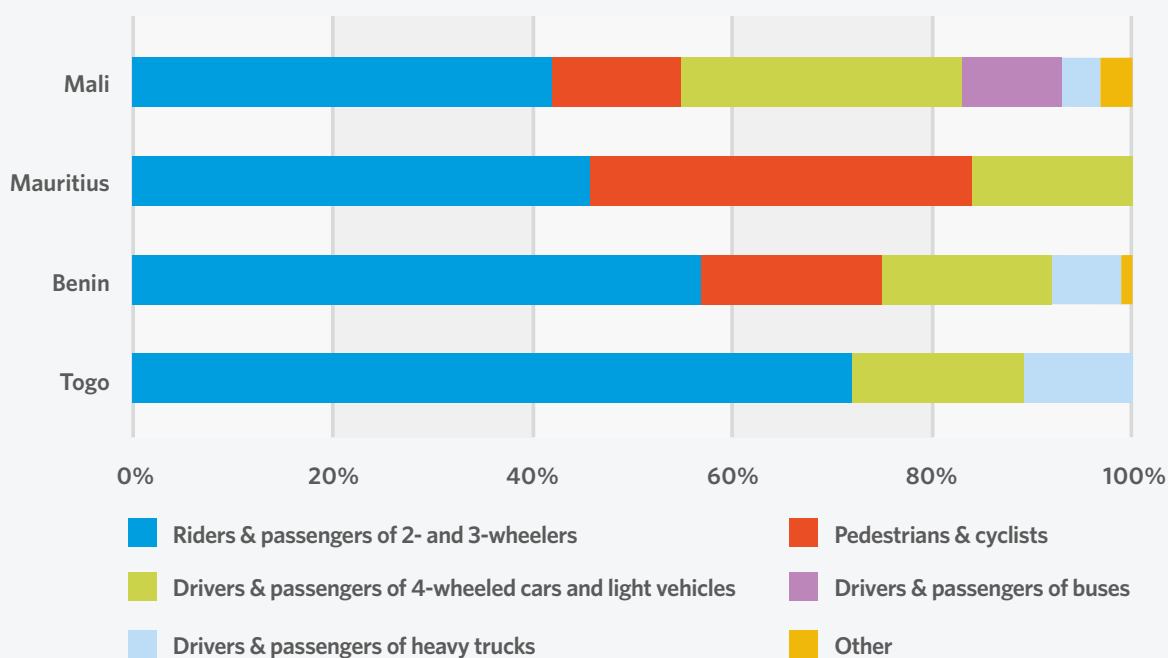
The chart below shows the deaths of 2- and 3-wheeler riders as a proportion of all road user deaths in 2016, for countries for which data are available, taken from official government statistics.

Motorcycle rider deaths as a proportion of all road deaths, 2016



In several countries, 2- and 3-wheeler riders account for higher numbers of deaths than any other group of road user. This is shown in the chart below, for selected countries for which data are available, using official government statistics for 2016.⁴⁷

Deaths by road user category, 2016



I WHAT ARE THE DOWNSIDES? I

However, official road traffic injury data released by governments – including data on motorcycle-related injuries and deaths – are often unreliable, with issues including under-reporting and lack of detail. The World Health Organization (WHO) categorises all but two Sub-Saharan Africa countries (Mauritius and South Africa) as ‘Countries without eligible death registration data’.⁴⁸ The other forty-seven Sub-Saharan African countries either submit incomplete vital registration data or no data at all to the WHO.

Recognising the weaknesses of many countries’ data on road traffic injuries, the WHO uses sophisticated statistical models, developed from other areas of public health, to estimate the number of road traffic deaths (although it does not break the estimates down by road user type). It presents these in its regular Global Status Reports on Road Safety. The estimated numbers are frequently five or six times higher than the official national road traffic death statistics.

A report funded by the World Bank and African Development Bank⁴⁹ analysed data from the WHO’s 2018 Global Status Report to produce an estimate of the total number of deaths of motorcycle riders and passengers (including both 2- and 3-wheelers) on the entire African continent, including the countries of North Africa, in 2016. It put this figure at around 55,700.

However, the methodology used to produce this estimate was limited by the lack of robust data. Most notably, while the methodology did not use the official national statistics for the total number of road deaths

(recognising that these are unreliable and so using the WHO estimates instead), it did use the official national statistics for the proportion of deaths by road user type, despite the fact that these are likely to also be unreliable. As such, we consider the figure of 55,700 to be a low estimate. And with the almost doubling of the estimated number of motorcycles in Sub-Saharan Africa from 2016 to 2022, it is conceivable that 100,000 or more motorcycle riders and passengers lose their lives on Africa’s roads each year.

Also, the estimate of 55,700 deaths covers only riders and passengers – it does not include the pedestrians and other road users who are killed in collisions with motorcycles. And it does not take account of the injuries and disabilities that motorcycle crashes cause, which can have devastating effects on individuals and families. Numerous researchers have found very high rates of crashes among motorcycle-taxi riders. For example, Agyekum⁵⁰, Bishop⁵¹, Oginni⁵² and Perego⁵³ all found that around half of the riders they surveyed in Ghana, Uganda, Nigeria and Tanzania, respectively, reported having been injured in a crash. One study in Dar es Salaam, Tanzania, found that more than half of all child pedestrians injured on the roads were hit by a motorcycle.⁵⁴

In our face-to-face surveys of riders, an average of 52% reported that they had suffered a serious injury while riding a motorcycle. The highest reported rate was 71% in Accra, while the lowest was 27% in Lomé. Across all cities in our survey, riders who had suffered a serious injury spent an average of thirty-seven days unable to work.



Boda bodas passing a sign restricting their use of Namirembe Road, Kampala

“TEN YEARS ON, THE PAIN IS STILL THERE”

Zelda Kweyambe was an ambitious young woman. In 2012, she had finished her first degree, was working in her first job and was applying to begin a master's degree at the Open University in Morogoro, Tanzania.

But one ordinary day, her life changed forever.

She was heading to work, on a boda boda, sitting side-saddle and with no helmet as usual, when out of the blue, a truck hit them and pushed them off the road. To this day, she has no idea what happened, but she remembers coming around in a ditch, being helped by a Good Samaritan.

Her pelvis was shattered, and she had lost a lot of blood. She spent four painful and frustrating months in a hospital bed or on an operating table before starting physiotherapy to learn to walk again.

Ten years on, she has had more than ten operations, some requiring travel to India, and has spent more than US \$10,000, an enormous sum in a country where the per-capita gross national income is just a little over US \$1,000. She now walks with a stick and a limp. But worse than the physical injuries are the psychological scars.

But she is moving on with her life, trusting in God. She doesn't blame the rider of the motorcycle-taxi she was on, or even the driver of the truck that hit them. But she thinks back and asks what could have happened differently: "Why did the rider not tell me the risks of riding side-saddle?"

Zelda now advocates for road safety. She has written a book about her experience and speaks at events. She hopes that improvements can be made to motorcycle-taxi rider training, so that riders can tell their passengers how to be safe. She knows that too many people are suffering like her.



Zelda, with her husband, after speaking at a training event for motorcycle-taxi riders in Dar es Salaam, Tanzania

I WHAT ARE THE DOWNSIDES? I

The factors that characterise motorcycle safety in many African countries are described below.

UNTRAINED AND UNLICENCED MOTORCYCLE RIDERS (AND OTHER DRIVERS)

In most of the African countries where commercial motorcycles operate, the vast majority of riders have received no formal training. Riders have usually been taught by friends or relatives, or have taught themselves. Our survey found that less than 10% of riders had undergone any formal training in Conakry, Lomé and Kampala, and the average across all nine cities was only 20%. Kigali had the highest percentage of formally trained riders, at 65%.

A previous study found even lower percentages of riders having undertaken formal training in rural areas: just 1% in rural Ghana, 2% in rural Uganda and 3% in rural Tanzania.⁵⁵ In Ghana and Tanzania, the study found that the most common reason given by riders for not undertaking training was the lack of locally available training. In Kenya and Uganda, however, the

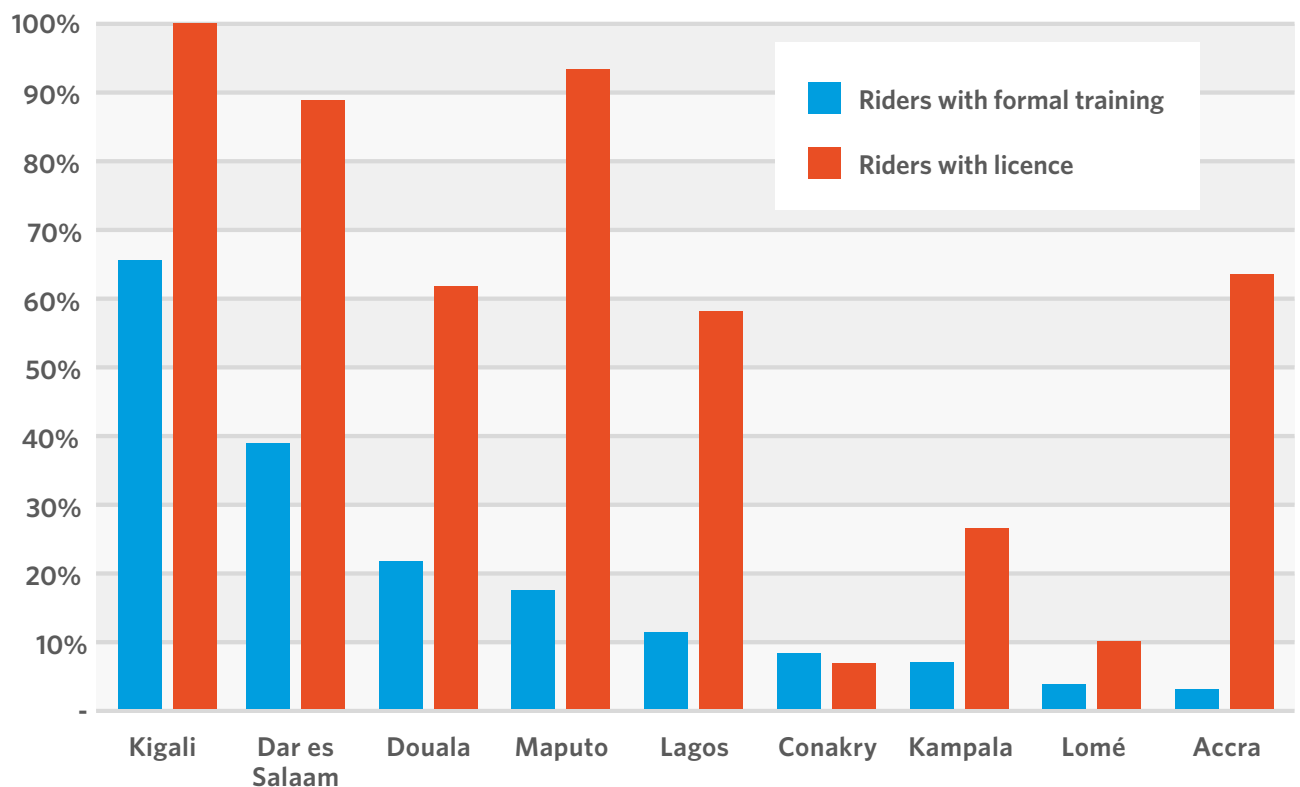
cost of training was cited as the primary reason for not undertaking formal training.

Where riders have undertaken training, it is likely to have been only theoretical, focusing on traffic laws and road signs, with no practical element.⁵⁶

In many countries, a lack of formal training is not a barrier to being able to work as a motorcycle-taxi rider. While the law in most countries requires motorcycle riders to have a licence, and to have undertaken training to obtain that licence, in some countries this is not effectively enforced. Our study found that across the nine cities, an average of 57% of all riders had a licence, but that it was only 7% in Conakry and 10% in Lomé. On the other end of the spectrum, 100% and 94% of riders had licences in Kigali and Maputo, respectively.

The chart below shows the proportion of riders who have undertaken formal training and who have a licence. It shows the very low levels of trained riders in most of the cities surveyed, and clearly shows that riders are able to obtain licences without having undertaken any training.

Rider training and licensing



A previous study found even lower percentages of riders having a licence in rural areas: just 6% in rural Ghana and 6% in rural Uganda.⁵⁷

In some countries, it is possible to obtain a licence through corrupt means, without undertaking any training or assessment.⁵⁸

As a result of the lack of training, the basic skills of many riders are poor. Braking techniques, changing gear, use of mirrors, lane discipline, overtaking – all are commonly done in a manner that is not safe. Bad habits – such as a fear of using the front brake – are passed from rider to rider. Combined with the fact that riders earn more money the more trips they make, this results in fast and unsafe driving – weaving in and out of traffic, driving on pedestrian footpaths, competing for passengers at bus stops, and so on. Also, the larger the load, the more money the rider can ask for, incentivising the carriage of dangerous loads.

It should also be recognised that the problems associated with motorcycle training are also prevalent in training of drivers of other vehicles, including cars, trucks and public minibuses. Reckless driving is a common feature on the roads of many African countries – and this includes by drivers of 4-wheeled vehicles as well as motorcycle riders. This can create an ‘us and them’ mentality. Our survey found that out of eight different groups of people with whom riders commonly interact, on average they felt the least respect from drivers of other vehicles. Perhaps surprisingly, they felt less respect from drivers of other vehicles than they did from police officers or government officials.



‘Look, no hands’ in Kampala, Uganda

LOW RATES OF USE OF GOOD-QUALITY HELMETS AND OTHER PROTECTIVE EQUIPMENT

Injuries to the head and neck are the main cause of death, severe injury and disability among users of motorcycles.⁵⁹ In low-income countries, head injuries account for the majority of fatalities of motorcycle riders and passengers.

Motorcycle helmets are the single most effective way of reducing head injuries and fatalities. They do this by reducing the force of impact between the brain and the skull, spreading that impact over a wider area, and preventing direct contact between the skull and the ground or any other object into which the helmet comes into contact.

Despite all the evidence that helmets save lives, in some African countries, helmet-wearing rates remain low – although there are high levels of variation between different countries. In surveys carried out for this report, 86% of motorcycle riders observed in Douala were not wearing a helmet, and only around half of riders were wearing helmets in Lagos, Kampala and Maputo. On the other hand, over 90% of riders were seen wearing helmets in Accra, Kigali and Lomé.

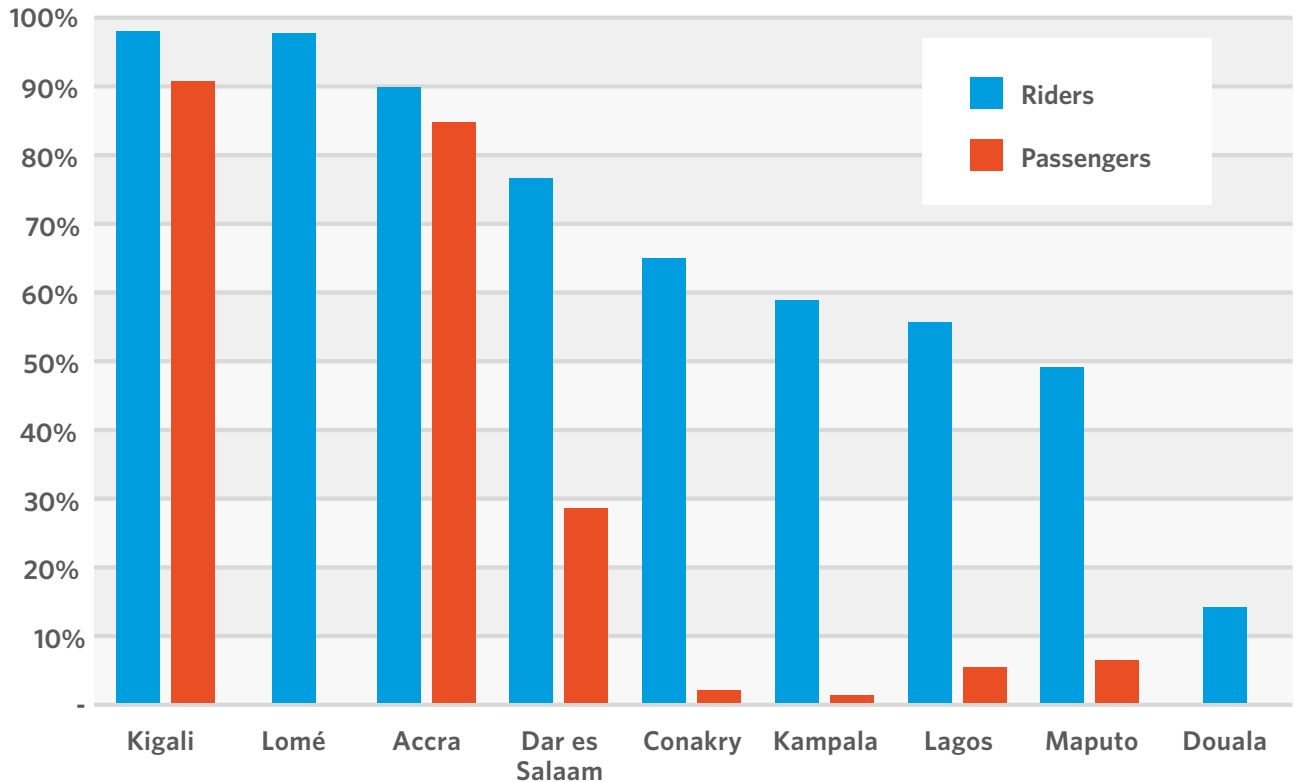
In a separate survey, helmet use among motorcycle riders was also found to be low in rural areas, with only around one-quarter of riders in both Kenya and Uganda saying that they always wear a helmet.⁶⁰

Where helmets are worn, they are often of low quality⁶¹ and do not meet any certified international or national standard. One study in Kampala found that around half of all helmets have some form of damage or defect, such as cracks or missing inner shells, straps or visors.⁶² And in many cities, riders are seen wearing t-shirts, shorts and sandals, providing no protection in the event of a crash. Very few countries have facilities to test helmets.

Passengers also commonly do not take safety precautions. Our survey found an average of only 24% of passengers wearing helmets across all nine cities. In both Douala and Lomé, no passengers were seen wearing a helmet, and this figure was also below 10% in Conakry, Kampala, Lagos and Maputo. Only in Kigali and Accra were the majority of passengers seen to be wearing a helmet, at 91% and 85%, respectively.

Passengers – in particular, female passengers – can sometimes be seen sitting side-saddle, giving them far less stability and so increasing the risk of falling.

Observed helmet-wearing among riders and passengers



CHALLENGES AROUND REGULATION AND ENFORCEMENT

On paper, most African countries have road safety laws that apply to motorcycles, such as requiring helmets or limiting the numbers of passengers that can be carried. Some countries have also introduced regulations specifically applying to motorcycle-taxis, from outright bans, ‘no-go’ areas and curfews, to the requirement for riders to provide helmets for passengers, to mandatory registration with associations.

In practice, however, in many settings, enforcement of laws and regulations presents significant challenges. Enforcement is dependent first and foremost on the local strength of the government, police and other enforcement agencies. Corruption in areas such as testing, licensing and on-road policing undermines the impact of regulations.⁶³ In some cases, police officers may not understand the regulations.⁶⁴ In situations where motorcycle-taxi associations have significant power, the balance between riders and the police can be in constant flux, reducing the police’s ability to enforce.

Outright bans on motorcycle-taxis may simply push their operation underground, with riders finding ways to continue to earn money, for example by simply claiming their passenger is a family member or friend. In places where motorcycle-taxis are already widespread, attempts to ban them can cause fierce opposition from riders as well as resentment from members of the public. In 2020, an attempted ban on motorcycle-taxis in Kampala, Uganda, did not last past lunchtime on the first day, as riders pushed their way through police roadblocks.⁶⁵ Recent attempted bans in Freetown (Sierra Leone) and Lagos were regarded by riders as police money-making operations, leading to protests and confrontation.⁶⁶

Non-compliance with certain road safety laws is overwhelming in some cities, where the authorities have very little capacity, ability or appetite for enforcement. For example, in our survey in Douala, more than 90% of motorcycles were seen passing through red lights, but not one was stopped by police.

Political leaders can also undermine regulations through their connections to motorcycle-taxi associations. Politicians provide support to

motorcycle-taxi riders, for example by pressuring authorities to relax enforcement, in return for votes.⁶⁷ They use motorcycle-taxi associations in their political campaigns, with highly visible and noisy motorcycle rallies during campaigns.⁶⁸

Governments in several countries have attempted to pass part of the responsibility for enforcement to motorcycle-taxi associations or formalised stages. In Uganda, riders are required to become members of stages, and associations are registered with transport regulators or local authorities. In Tanzania, attempts have been made to require associations to set

regulations in line with government requirements, and to take responsibility for ensuring members adhere to them.

While a number of countries, most notably Rwanda, but also Kenya, have made progress in improving compliance through associations and stages, regulation and enforcement remain a significant challenge in many countries.

In rural areas of many countries, police presence is very low, so enforcement of regulations tends to be almost non-existent.

MOTORCYCLE-TAXIS IN MAPUTO: THE NEED FOR REGULATION

In Maputo, Mozambique, the few motorcycle-taxis that operate do so in a grey area. There is no law that bans their operation, but they are not recognised as modes of public transport and so authorities do not issue permits. Riders are effectively undertaking a form of unauthorised business, and so are at risk of being apprehended by police.

Speaking to riders who do offer motorcycle-taxi services is not easy – many do not admit to how they earn money or are suspicious that anyone asking questions may be working undercover for the authorities. But for this report, we were able to gain the trust of five riders operating around Maputo's famous market, Mercado Estrela, and to speak to them on condition of anonymity.

All the riders we spoke to carry passengers for a fare as a way of supplementing the income they make by doing deliveries – which is permitted. One started out by charging extra if a customer wanted to travel together with his or her cargo. Others started by giving lifts to friends and neighbours, charging to cover fuel, before recognising the potential for business.

They say that trust is difficult to come by, with riders fearing they will be assaulted by passengers, and passengers fearing they will be attacked by riders. While there is an informal stage at the market where some riders wait for passengers, most prefer to carry people they know, with communication through messaging apps and social media. As well as fear of attack, carrying strangers brings the risk of refusal to pay the fare upon reaching the destination or of carrying

illegal cargo, such as drugs, and being implicated. The busiest of the five riders we spoke to says that he can carry up to twenty paying passengers in a day – when he focuses on passengers over deliveries. Two other riders carry up to ten passengers a day, and the remaining two riders carry only two or three passengers a day. But they are all certain that the demand for motorcycle-taxi services is significant, and the numbers of riders providing passenger service is increasing.

Maputo's public transport system is notoriously poor, and hours spent queuing – and then pushing and shoving – to get into overcrowded buses both morning and evening is the norm for many of the city's residents. Others pile into the dangerous 'My Loves' – open-backed pickup trucks – which continue to operate despite being banned. With these alternatives, it should come as no surprise that the speed and relative comfort of motorcycle-taxis will attract passengers.

All the riders we spoke to said they know of more and more people – mostly young men – who are turning to the motorcycle-taxi business. Many of the new riders start out doing deliveries, a business that boomed during the COVID-19 lockdowns, and have now seen the potential of carrying passengers.

As has been seen in other cities, when the growth of the motorcycle-taxi sector is uncontrolled, it can lead to overwhelming flouting of laws. With this growth seemingly on the horizon in Maputo, either the authorities must strengthen restrictions and provide alternatives, or formalise the sector with regulations and enforcement to reduce the risks of crime, crashes and pollution.



UNSAFE ROAD INFRASTRUCTURE AND POOR ROAD SURFACES

The quality of road networks in many countries in Sub-Saharan Africa is poor. In the World Economic Forum's Quality of Roads index,⁶⁹ Chad scores the lowest of any country globally, with a score of 1.9 out of 7. The highest in the region is Namibia, with a score of 5.3. The average score of the thirty-four Sub-Saharan African countries for which data are available is 3.3, while the global average score is 4.1.

However, of greater concern than the physical condition of roads is the lack of safety infrastructure. Very little consideration has been given to reducing the risks faced by motorcycles – or to road safety as a whole – in the development of the road networks of almost all African countries. The International Roads Assessment Programme (iRAP) rates around 57% of almost 19 billion kilometres of vehicle occupant travel surveyed in Africa as only 1-star – the most dangerous rating (with the safest rating being 5-star) – for motorcycles. Over 30% is rated 2-star, with only 13% being 3-star or higher.⁷⁰

The road environment has a significant influence on the risk of crashes involving motorcycles. Contributing factors include:

- Interaction with larger vehicles;
- Intersection designs that do not adequately cater for very high flows of motorcycles making turning movements;
- Road surface issues (such as roughness, potholes or debris);
- Water, oil or moisture on the road;
- Excessive linemarking or use of raised pavement markers;
- Poor road alignment;
- Presence of roadside hazards and safety barriers;
- Number of vehicles and other motorcyclists using the route.⁷¹

Roads engineers are rarely taught through their studies or guided by their manuals on how to design for the safety of motorcycles. The focus of road design on mobility – getting from A to B as quickly as possible – leads to higher speeds and more dangerous conditions for all road users.

In urban areas, as they are so mobile, easy to manoeuvre and unpredictable – and with weak enforcement of regulations – motorcycles present a challenge to engineers looking to design for safety. The provision of dedicated lanes for motorcycles – and, similarly, the provision of footpaths for pedestrians and dedicated lanes for bicycles – has seen very little uptake in Africa, with concerns that the lanes would require too much road space and might be overrun by other uses, including by roadside vendors and as motorcycle-taxi stands.

Roads often have dangerous roadsides with little or no protection, and a lack of overtaking provision means that larger vehicles will overtake despite an oncoming motorcycle, forcing the motorcycle to move to the side. Road markings, signage, traffic signals and lighting are often poor. Where there is no dedicated infrastructure at bus stops, riders will compete for passengers dropping from buses, causing risk to those passengers and themselves.

Where footpaths exist, these may be used by motorcycles, or they may be used by vendors setting up stalls, pushing pedestrians into the carriageway. Where not prevented by kerbs, motorcycles can be seen leaving the carriageway to bypass speed humps, putting pedestrians and other road users at risk.

In Uganda, Kampala's non-motorised zone – Namirembe Road – has been overwhelmed with boda bodas ignoring restrictions.

During the rainy season, drainage systems often cannot cope, so flooded roads are common. Rains and poor maintenance result in potholes, which can cause risk for motorcycles.

DANGEROUS VEHICLES

Without the outer frame that other vehicles have, motorcycles offer riders and passengers very little protection in the event of a crash.

The vast majority of motorcycles in Africa are low-cost Chinese or Indian models, without the advanced technological features that are found on motorcycles in high-income countries and increasingly across Asia.

Anti-lock braking systems (ABS) in particular have the potential to improve safety, having been found to reduce the number of severe and fatal crashes by up to 42% in one study in Europe.⁷² ABS increase rider stability and reduce stopping distances. Crucially, as many motorcycle riders in Africa are nervous about braking, ABS give the rider more control while braking, thereby



Boda bodas using a pedestrian footpath in Kampala, Uganda



The Namirembe Road non-motorised zone

I WHAT ARE THE DOWNSIDES? I

increasing confidence. It is effective even on unsealed roads. The cost of fitting ABS has reduced in recent years, and they can be fitted to only the front wheel.

Maintenance cultures vary widely across the continent. Where maintenance is poor – worn tyres and brakes, non-functioning lights, and so on – it increases the risk of a crash, as well as shortening the lifespan of the motorcycle. Few countries have effective regulations or systems of roadworthiness testing.

On top of poor maintenance, motorcycle-taxi riders are known for modifying their motorcycles – to improve performance, for ‘show’ or to sell parts that they deem unnecessary. Mirrors may be removed or shortened, brake cables cut, over-bright LED lights may be installed, or lights may be partially taped over with a hand-cut fashion logo.



POOR POST-CRASH CARE

In African cities, it is common to hear that hospitals have wards dedicated to injuries sustained in motorcycle crashes, and while that is often not strictly true, it is certain that a high proportion of trauma cases are associated with motorcycles. A recent study in Guinea found that over 58% of all admissions to six district hospitals were for motorcycle-related injuries.⁷³

There are also anecdotal reports of healthcare workers treating motorcycle-taxi riders differently from other patients – not prioritising the riders’ treatment or not allocating them a bed, leaving them to lie on the floor while they wait to be treated⁷⁴ – as riders are seen to be at fault for their injuries. This undoubtedly contributes to worse outcomes for motorcycle crash victims.



AIR AND NOISE POLLUTION

LOCAL AIR POLLUTION

Air pollution can result in chronic respiratory problems, growth stunting and delays in cognitive development.⁷⁵ Studies in cities across Africa have shown that air quality has deteriorated in recent years. Particulate matter (PM) pollution has nearly tripled in cities like Kampala and Nairobi over the past half century.⁷⁶ The concentration of PM2.5 pollution – including carbon monoxide and sulphur dioxide – is now at 4.5 times the World Health Organization’s recommended level across African cities.⁷⁷

Exposure to PM2.5 led to an additional 449,000 infant deaths in Sub-Saharan Africa in 2015, accounting for 22% of all infant deaths.⁷⁸ In 2019, air pollution caused the deaths of around 1.1 million people in Africa. A third of these deaths were a result of ambient air pollution, which includes pollution from vehicles.⁷⁹

Transportation is a fast-growing contributor to air pollution. Fossil fuel engines are filling cities’ streets with poisonous pollutants. These gases and particles are inhaled by residents, causing both short-term and long-term health problems, shortening lives and hindering children’s development.

The rapid increase in transport-generated pollution is caused not only by the growth in the number of motorised vehicles, but also by the low-quality fuel that is sold in many African countries.⁸⁰

Motorcycles contribute directly to air pollution through burning gasoline, which produces aerosols, sulphur dioxide, carbon monoxide and other gases. The motorcycles found in Africa generally do not have the emissions-reducing technology, such as catalytic converters, that is found in other regions of the world.⁸¹ Additionally, some older motorcycles still use two-stroke engines, which are characterised by incomplete combustion of fuel and significant emissions of black carbon.⁸² As motorcycles age rapidly through intensive usage, their emissions worsen.⁸³ Motorcycles also release particles into the air through tyre, brake and suspension wear, as well as stirring up dust.



I WHAT ARE THE DOWNSIDES? I

In urban areas, where motorcycle-taxi riders' stages are often at busy junctions, riders can spend ten hours or more per day exposed to low-quality air. In the face-to-face survey carried out for this report, 30% of riders in Douala, and 20% in Dar es Salaam, reported breathing problems.

And it is not only in cities that motorcycles contribute to air pollution – they also release fumes and stir up dust in rural areas. In a study of rural motorcycle-taxi riders in Kenya, 20% complained of health issues associated with their work, including respiratory problems and eye problems caused by dust.⁸⁴

GREENHOUSE GAS EMISSIONS

Another environmental impact of motorised vehicles is the production of greenhouse gas emissions – especially carbon dioxide (CO₂) – and the consequent effect on the global climate. While Africa is only responsible for 2-3% of global greenhouse gas emissions, these emissions are rising rapidly in African cities.⁸⁵ Petrol-powered motorcycles release around 55-59 grams of CO₂ per kilometre, which, based on a motorcycle-taxi's average

daily travel distance of around 100 kilometres, works out to 5.5-5.9 kilograms of CO₂ per motorcycle-taxi per day.⁸⁶

All forty-nine Sub-Saharan African countries have announced their commitments (or 'nationally determined contributions' [NDCs]) to reduce greenhouse gas emissions.⁸⁷ The rise of motorcycle-taxis and other petrol- and diesel-powered vehicles threatens the potential of African governments to meet these commitments. The increasing availability of electric vehicles powered by renewable energy offers some hope,⁸⁸ although it will only have a significant impact if electrification is just one part of a wider policy framework that promotes a fully sustainable mobility system.

NOISE POLLUTION

As well as air pollution, motorcycles contribute to noise pollution in many African cities and towns. While noise pollution in Africa is an under-studied topic, it is a growing public health concern.⁸⁹ In towns and cities, the noise of motorcycle engines and horns is a constant presence.



CRIME, INSECURITY AND EXPLOITATION

THE USE OF MOTORCYCLES IN CRIME

In Africa, motorcycles are associated with a broad range of crimes. In many cities, snatching of items like handbags and mobile phones by motorcycle passengers is common – even, in one memorable case caught on camera, from a police officer in Nairobi.⁹⁰ Motorcycles have been used by suicide bombers in attacks in Cameroon, Chad, Nigeria and Uganda. And stories of motorcycle-riding bandits attacking villages are common in northern Nigeria.

In many African countries, the use of motorcycles in crime harms the reputation of motorcycle-taxi riders. Criticisms of the motorcycle-taxi sector often focus on security, portraying riders as criminals and a security threat. However, it must be recognised that motorcycle-taxis may be used by criminals without the riders' knowledge.

Their perceived association with crime and negative reputation with authorities leads to a feeling among motorcycle-taxi riders that they have to look after each other. At the extreme end, this can result in mob violence. For example, if a rider is injured in a crash, a mob can quickly form and lynch those they believe to be responsible. Recent high-profile incidents of such violence have occurred in Nairobi and Kampala.

EXPLOITATION AND ANTISOCIAL BEHAVIOUR BY RIDERS

A number of forms of exploitation and antisocial behaviour are commonly associated with motorcycle-taxi riders. These include harassment of females, including the exploitation of young female passengers – for example, offering free trips in exchange for sex – which can lead to teenage pregnancies,⁹¹ sexually transmitted diseases and girls dropping out of school,⁹² and the use of alcohol and drugs.⁹³

RIDERS AS VICTIMS

Commercial motorcycle riders themselves are often the victims of theft and assault. Riders are known to carry phones and cash, making them a target, and for more serious criminals the motorcycles represent a

relatively easy target and a not-insignificant asset. In a recent case in Kenya, a gang is suspected of stealing twenty-three motorcycles, murdering at least seven riders to obtain them.

In our survey, we found that almost one-third of all riders reported being a victim of a serious crime – either theft (without force), robbery (using force) or assault – during the course of their work. The highest proportions of riders – over 50% in each case – who had been victims of such crimes were found in Conakry, Douala and Kigali. The lowest proportions were found in Maputo, with no cases, and in Lomé, with just 6% of riders having been victims of such crimes.⁹⁴

As well as the more serious crimes, riders also reported suffering verbal abuse. This was found to be especially prevalent in Conakry, Dar es Salaam and Douala.

Commercial motorcycle riders also often suffer from difficult working conditions, including long hours and a lack of job security.

GOVERNMENT RESPONSES TO CRIMINALITY

Insecurity in the motorcycle-taxi sector lends itself to a security-focused – and often heavy-handed – approach from the authorities. Crackdowns against riders can be violent and punitive. During the COVID-19 lockdown, bans on motorcycle-taxi operations in Uganda were particularly strongly enforced, with police accused of killing a number of riders, often at night, and sometimes taking the lives of passengers as well.⁹⁵

In their defence, motorcycle-taxi riders and associations typically seek to distance themselves from criminality by claiming that they have been “infiltrated” by criminals. For example, following a recent incident in Nairobi, the Boda Boda Association of Kenya issued a press release condemning sexual harassment and gender-based violence and saying that they were working to “remove criminals from our sector”.⁹⁶ In some countries, associations have signed up to work with security ministries to boost their credentials, protect themselves from security forces and play their part in reducing crime on motorcycles. However, it remains to be seen whether this will be enough, or a more targeted and sustained approach will be needed to disassociate motorcycle-taxis from criminality.





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GOOD PRACTICES, INITIATIVES AND OPPORTUNITIES

The previous sections of this report explored the history of motorcycles in Africa, their use and growth in numbers, as well as the benefits and downsides of this form of mobility. This section profiles examples of good practice and initiatives currently taking place in Africa to improve motorcycle safety and commercial motorcycle operations, and to reduce the negative environmental and social impacts of motorcycles.

GETTING CERTIFIED HELMETS ON HEADS

Motorcycle helmets are the single most effective way of reducing head injuries and fatalities.⁹⁷

The highest-profile example of best practice around motorcycle helmets in recent years comes from Vietnam. More than twenty years of work led by the AIP Foundation involved the design and production of high-quality, affordable helmets, new legislation, hard-hitting public awareness campaigns and much more. It is estimated that over a ten-year period, as a result, 15,000 lives and US \$3.5 billion were saved. Full details can be found in the publication *Head First: A Case Study of Vietnam's Motorcycle Helmet Campaign*.⁹⁸

As the example from Vietnam shows, getting good-quality motorcycle helmets on the heads of riders and passengers requires strong cooperation over a long period of time, with a combination of education, awareness-raising, standards, enforcement and increasing the supply of helmets.

There are a number of initiatives currently underway to improve the quality of helmets and to increase their use in Africa, with several of these being supported by the FIA Foundation's Motorcycle Initiative. This initiative brings together helmet practitioners in Africa with experts from elsewhere, including Vietnam and the United States.

KENYA NATIONAL HELMET WEARING COALITION

Launched in June 2021 and led by international NGO Transaid, this coalition is working with the Kenya Bureau of Standards to restrict the importation of below-standard helmets and to improve the standard of helmets manufactured locally, and it is working with local motorcycle-taxi associations to increase helmet use among riders and passengers.

Tuwurinde

Rwanda has very high rates of helmet-wearing – far higher than most other African countries. However, the helmets sold are not required to be certified to any standard of protection, and no quality control is enforced in their construction. As such, these non-standard helmets are failing to prevent head injuries. The causes of this include a lack of equipment, expertise and testing capacity needed to assure safe helmets. “Tuwurinde” – which means ‘Let’s protect the head’ in local language Kinyarwanda – aims to build that expertise and create an institutional capacity and knowledge to promote local manufacturing of helmets that meet international standards. Given the lack of testing facilities across Africa, the Rwandan lab could even support other countries’ national standards bureaus.

THE SAFE AND AFFORDABLE HELMET PROGRAMME

The Safe and Affordable Helmet Programme is led by the Fédération Internationale de l'Automobile (FIA). The FIA's Safety Department, which normally designs safety equipment for motorsport, oversaw the development of an innovative new helmet, designed specifically for motorcycle users in low-income countries. The helmet meets international standards (Standard ECE 22.05 [Regulation 22]) for helmets, is comfortable in hot and humid climates, and has a target selling price of around US \$20.

While this exceeds the average of around US \$15 that riders surveyed for this report said they spent on their current helmet, around one-third of riders said that they would be willing to pay more for a better-quality helmet.

Kenya was the first African country to benefit from the FIA's programme, with 7,500 helmets being distributed in June 2021.

PRACTICAL TRAINING FOR RIDERS

Most motorcycle-taxi riders in Africa have never undertaken a formal training course. And, for those who have received training, it often focuses on traffic laws and road signs, with no practical component.

However, having started in Tanzania, a practical motorcycle-taxi training programme led by the international NGO Amend is now being rolled out in eight countries, and is planned for wider implementation.

A PRACTICAL MOTORCYCLE-TAXI SAFETY TRAINING PROGRAMME

Building on research and work supported by UK Aid and the philanthropic organisation Fondation Botnar, Amend developed a practical safety training programme targeted specifically at motorcycle-taxi riders in Tanzania.

The structure of the training is based on the UK's Compulsory Basic Training for motorcycles, but it has the flexibility to allow local training experts to tailor it to meet the specific needs in different cities and different countries. Preparation for the training involves research into local regulations, surveys with riders and roadside observations to understand rider behaviour, allowing the training to be tailored.

Following a theoretical introduction on riders' responsibilities, the training covers a basic mechanical inspection and practical exercises on five common manoeuvres: overtaking, use of roundabouts, use of junctions, u-turns and emergency stops. The training is delivered to small groups of riders at a time, over two days, with a lead trainer and an assistant. After completion of the training, each rider undertakes a one-on-one practical assessment with the trainer, with their performance graded and feedback provided.

The training is carried out in cooperation with local police and the leaders of local motorcycle-taxi associations.



Practical training for motorcycle-taxi riders in Tanzania

PRACTICAL SAFETY TRAINING IN EIGHT AFRICAN COUNTRIES

Following the development of the motorcycle-taxi safety training programme described above, the TotalEnergies Foundation is now supporting its implementation in eight countries across Africa. As of August 2022, including the development work in Tanzania, training has been delivered to a total of more than 1,400 riders in Cameroon, Ghana, Guinea, Mozambique, Senegal, Tanzania and Togo. Later in 2022, it will be delivered in Madagascar, and refresher training will be delivered in Senegal and Togo.

The intention is to bring more partners into this initiative, to take it to more countries, to undertake an impact evaluation of the training programme and to mainstream its use.

MOTORCYCLE TRAINING INSTRUCTORS' MANUAL

In 2019, with the support of UK Aid, a training manual was developed for motorcycle and tricycle riders in African countries, with a focus on motorcycle-taxi riders. The training is delivered through classroom sessions, practical demonstrations and instruction, and group discussions. It is designed to be applicable to existing riders as well as new riders. As well as modules on the basics such as riding skills, manoeuvring and road signs, it also contains modules on customer care, HIV/AIDS awareness, crash management and first aid.

The manual is available on the Research for Community Access Partnership website.⁹⁹

EFFECTIVE REGULATION OF THE MOTORCYCLE-TAXI SECTOR

In several countries, governments have identified that regulating motorcycle-taxis and working with motorcycle-taxi associations have the potential to improve the sector. Two countries – Rwanda and Kenya – stand out as examples of good practice.

Rwanda

Kigali, Rwanda, has long stood out as an example of good practice in managing motorcycle-taxis, with the aim of reducing crash rates. In the late 1990s, the government reviewed road safety regulations and the operations of traffic police. New laws on helmet use and numbers of passengers were enforced with strict penalties, accompanied by a country-wide public

awareness campaign. Two helmets were required to be included with the sale of any motorcycle. By the mid-2000s, deaths started to fall.¹⁰⁰

During the 2010s, motorcycle-taxi associations were strengthened, with riders required to become members. The Rwanda Federation of Motorcycle Transport Cooperatives (FERWACOTAMO) emerged as the dominant umbrella organisation, with a clear, hierarchical structure – local cooperatives of around ten riders each feeding into unions. The survey carried out for this report found that 99% of riders in Kigali were members, paying a monthly fee of 5,000 RWF (US \$4.90).

Our surveys found very high levels of compliance with laws in Kigali in comparison to the other cities surveyed. Riders in Kigali were more likely to have a driving licence, to have undertaken formal training and to have insurance than those in any of the other cities. The surveys also revealed that a lower proportion of riders in Kigali reported having been involved in a serious crash or being a victim of crime than the average for the other cities.



Motorcycle-taxis in Kigali. ©Jason Florio

We observed 98% of riders and 91% of passengers in Kigali wearing helmets, compared to averages of 64% and 16% in the other cities. And we observed 100% of riders stopping at red lights, compared to an average of 56%.

In 2021, the government passed legislation requiring all riders to use a fare-metering service. While there was some resistance from riders, over 15,000 meters were installed within the first year.¹⁰¹

The success of Rwandan management of motorcycle-taxis has been partly made possible by strong cooperation between the institutions involved, including the Rwanda Utilities Regulation Authority, the Rwanda Transport Development Agency, the Rwanda Cooperative Agency and FERWACOTAMO. However, it is also important to note that the strength of the Rwandan state is well-known, and compliance with government mandates is understood to be much higher than in many other African countries.¹⁰²

Kenya

Aside from Rwanda, it is in Kenya where the most progress has been made in managing the motorcycle-taxi sector. Many associations have been created, starting organically as riders organised themselves at the stage level, then formalising – registering with government under the Societies Act – and expanding. The largest of these is the Boda Boda Safety Association of Kenya (BAK), which was founded in 2017 and now has branches in all forty-seven counties of the country.

BAK is a highly structured organisation, with offices at the national, regional, county and sub-county levels. BAK management has monthly visits to different county offices, holding townhall-style discussions to hear motorcycle-taxi riders' views. Elections are held every two years for all local offices, and the national office positions are elected every five years.



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BAK works with government to advocate for more rider-friendly policies, such as a reduction in import taxes to make motorcycles more affordable. It is a member of the Kenyan National Helmet Wearing Coalition. It works to connect riders with insurance and motorcycle financing through third-party schemes. And it has plans to set up a rider training school.¹⁰³ And it encourages riders to take up new technologies, such as electric motorcycles and delivery apps. During the COVID-19 pandemic, it supported riders with the distribution of masks and hand sanitiser.

However, BAK is under-resourced and relies largely on volunteers. There are claims that it has become politicised, and some members are transferring to other associations.

A MANUAL FOR MOTORCYCLE-TAXI ASSOCIATIONS

In 2019, with the support of UK Aid, a manual was developed for motorcycle-taxi associations in African countries. The manual provided guidance for setting up an association and detailed the responsibilities of associations. As well as providing guidance on associations' management structure and membership, it also contains sections on rider safety, training and mentoring, customer care and determining fares.

The manual is available on the Research for Community Access Partnership website.¹⁰⁴

SAFE ROAD INFRASTRUCTURE FOR MOTORCYCLES

With such rapid growth in the numbers of motorcycles in many countries, governments have struggled to keep up in terms of infrastructure planning and design. Roads have been – and largely continue to be – designed and built without considering the needs of motorcycles and the risks that they present.

However, there are only a few examples of good practice of planning and designing for motorcycles in Africa.

MOTORCYCLE AND BICYCLE LANES IN OUAGADOUGOU

Ouagadougou in Burkina Faso has around 71 kilometres of dedicated lanes that are shared by

motorcycles and bicycles, separate from other vehicles, with the aim of organising traffic flow and reducing crashes. These lanes are mostly rated 4- or 5-star for motorcycles by the International Roads Assessment Programme, with speed humps to keep speeds low, traffic control, road markings and pedestrian crossing facilities at junctions. The dedicated lanes are not very popular with bicyclists, as mixing with motorcycles can be risky.

While motorcycle and bicycle riders account for the vast majority of road users, these lanes take up only a quarter of road space: the other three-quarters is allocated to 4-wheeled vehicles.¹⁰⁵ At busy times, the dedicated lanes are congested, causing some riders to choose to use the regular traffic lanes instead.

CONSIDERING MOTORCYCLES IN PUBLIC TRANSPORT REFORM

The World Bank is currently supporting public transport sector reforms in the capital cities of Mozambique and Zambia: Maputo and Lusaka, respectively. In both of these cities, the numbers of motorcycles are currently very low in comparison to cities in neighbouring countries to the north. And, while the use of motorcycles as taxis to carry passengers is prohibited, research carried out for this report and other reports suggests that some may be operating.¹⁰⁶



Studies have been carried out to investigate motorcycle use in Maputo and Lusaka in the context of the planned public transport reforms. These found demand for motorcycle passenger trips by women, students and people in informal employment in Lusaka, and a steady growth in motorcycle ownership in Maputo.

MOTORCYCLE TRAILS AND BRIDGES IN RURAL AREAS

Motorcycle trails provide critical transport services for people living in off-road villages, allowing them to access healthcare, markets and education. They are relatively low-cost to develop, using existing paths with improvements such as small bridges and short paved sections to ensure all-season access. They are recognised as being appropriate on relatively low-density routes (fifty to one hundred motorcycles per day).

In rural areas of Liberia, a donor-funded project has seen the upgrading of existing footpaths to motorcycle-navigable tracks.¹⁰⁷ These 2-metre-wide tracks cost an estimated US \$3,000 to \$4,000 per kilometre, as opposed to a 5-metre-wide road, which could cost US \$50,000 to \$60,000 per kilometre. Local communities are involved in the construction, and local materials are used. The only professional input needed is a supervising engineer with knowledge of how to upgrade footpaths to tracks, proper drainage and timber bridge-building. With the support of the German and Swedish development agencies (GIZ and SIDA) and others, Liberia's Ministry of Public Works is developing a manual for motorcycle trail development.

Similar initiatives are being advocated in Sierra Leone and Tanzania.

The organisation Bridges to Prosperity builds trailbridges to provide rural communities with access to healthcare, education and economic opportunities. The bridges are designed to be used by motorcycles – as well as by pedestrians, bicycles and livestock – with design features that specifically allow motorcycles yet prevent larger vehicles from crossing. Bridges to Prosperity has constructed more than 175 bridges in seven African countries, including Ethiopia, Rwanda and Uganda, serving more than 930,000 people.

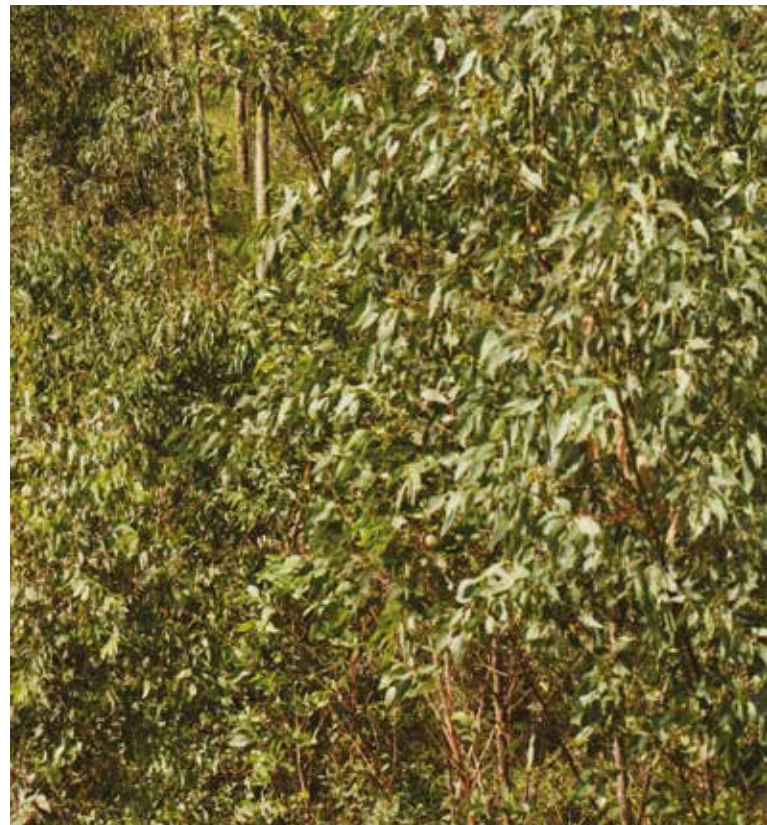
The World Bank has recently acknowledged the role that motorcycle trails have to play in providing access in rural areas, including them as one of four types of rural access infrastructure in a key policy document: *The Global Roadmap of Action Toward Sustainable Mobility – Universal Rural Access*.¹⁰⁸

TANZANIA'S MANUAL FOR LOW VOLUME ROADS

In 2016, Tanzania's Ministry of Infrastructure Development published its *Manual for Low Volume Roads*.¹⁰⁹ This recognises the need to cater for significant numbers of motorcycles and gives design



A motorcycle trail in Liberia



A motorcycle using a trailbridge in Rwanda



recommendations – including on the road surface and geometric design – specific to motorcycle safety. A supporting document was produced under a UK-funded project, to supplement the manual, providing specific guidance to District Engineers for motorcycle safety in low-volume rural roads.¹¹⁰

Since the publication of the manual, several major rural roads projects supported by the World Bank in Tanzania have recognised motorcycle riders and passengers as key stakeholders in an innovative ‘people-centred design’ approach to the development of rural roads.

Following the publication of the manual in Tanzania, similar manuals were developed and published in Malawi and Zambia.

RIDE-HAILING AND DELIVERY APPS

Ride-hailing and delivery apps that allow customers to book passenger or delivery trips now exist in many major African cities. These apps include multinationals such as Uber and Bolt, as well as local start-ups such as SafeBoda in Uganda (and also now Nigeria), Max in Nigeria and M-Auto in Togo.

These apps offer a number of potential benefits, including:

- Opportunities to improve road safety: Some of the app companies require that riders have licences and a minimum number of years’ experience before starting work. Some apps require riders to undergo some form of safety training to improve their riding skills and/or provide safety equipment such as helmets and reflective jackets. The now-defunct SafeMotos in Rwanda attempted to use riders’ smartphones to monitor riding behaviour, disqualifying riders who did not meet certain safety standards.
- Opportunities to improve personal safety: With users’ details registered on the app, and with the option to provide feedback and the possibility of tracking, both riders and passengers are incentivised to behave positively towards each other and dissuaded from hassling or robbing each other. Fares are set by the app and payments can be made electronically, reducing haggling and exchange of cash. Some of the tech companies running the apps install a GPS tracker in the motorcycle itself, which allows it to be traced if stolen.



- Riders earn more: A 2018/19 study of the SafeBoda ride-hailing app found that their riders in Uganda earned slightly more than non-app riders – though this study was conducted at a time of heightened trip subsidies from SafeBoda.¹¹¹ In our face-to-face survey, riders using apps made an average of 29% more revenue than non-app riders, although the precise reasons for this are unclear, with app riders possibly working longer hours than non-app riders. Some apps offer financing schemes that help riders to buy their motorcycles, which over time helps riders to earn more.
- Lower fares for passengers: Many apps subsidise the fares for passengers – to make trips on the app cheaper than motorcycle-taxis found at a stage or hailed on the street – knowing that price is the most important factor for many people.
- Improved credibility for riders: One of the reasons why motorcycle-taxi riders join ride-hailing apps is to improve their reputation in the eyes of the authorities. This has especially been the case in Uganda, with SafeBoda enjoying the respect of police and others. Our survey found that respect felt by riders from police was perceived to be nearly twice as high for app users – compared to riders not using apps – in Lagos, Kampala and Kigali.
- Potential to push electrification: A growing number of apps, such as M-Auto in Togo, are providing electric motorcycles for their riders. The Swedish-Kenyan electric vehicle manufacturer Roam (formerly OpiBus) has signed a deal to supply 3,000 electric motorcycles to Uber in Kenya in 2022.

Despite these benefits, the long-term sustainability of ride-hailing and delivery apps remains in question. The apps are run by for-profit companies that connect passengers to riders, taking a cut of between 10% and 25% of riders' earnings. The apps must therefore create a system that allows riders to increase their earnings by greater than that. The theory is that the apps increase rider earnings by increasing passenger numbers and enabling efficiencies – such as by connecting a rider to the nearest passenger, reducing the need to return to the stage after each trip, thereby saving fuel. However, in reality, many of the apps currently rely on

investments to subsidise losses, with the hope that profits will come in the future. It should be noted that it took global market leader Uber thirteen years to make an operating profit – and only after increasing prices significantly across its core markets.¹¹²



An Uber rider in Kampala, Uganda

Many motorcycle-taxi ride-hailing apps suffered during the COVID-19 pandemic, starting in 2020. With fewer passengers – especially for those apps that rely on more affluent customers – the apps became less attractive to riders. With fewer riders, remaining customers found themselves waiting longer for the motorcycle to arrive, creating a downward spiral. Fortunately for some of the apps, at this same time, there was a significant increase in the number of deliveries, especially for food.

The future for apps may lie in diversification, and the creation of so-called 'super-apps'. This model, pioneered in Southeast Asia by the now multi-billion-dollar companies Gojek and Grab, sees an ever-expanding range of services being offered – taxi rides, food delivery, medicines, other shopping, banking and more. In West Africa, super-app Gozem has explicitly modelled itself on Gojek and has over 5,000 riders across Togo, Benin, Cameroon and Gabon. In January 2022, SafeBoda entered the banking sector in Uganda, launching their own form of mobile money. It remains to be seen whether similar attempts will be successful in African markets.

INNOVATIONS IN TOGO'S MOTORCYCLE-TAXI SECTOR

Atama Richard of Lomé, Togo, is many things. He is a motorcycle-taxi – or ‘zemidjan’ – rider. He is an early adopter of new technologies. He is a father and a husband who owns a small plot of land on the outskirts of the city. And Atama knows all about the innovations in Togo’s motorcycle-taxi sector, having worked at both Olé and Gozem before recently moving to M-Auto.

Atama started working as a ‘zem’ rider in 2000, haggling the fares for thousands of trips over the years. In 2017, he heard of Olé Togo, a company providing motorcycles with a taximeter that would automatically calculate fares.

However, Olé retained ownership of the motorcycle, and required the rider to pay CFA 2,000 (US \$3.60) every day. When the motorcycle had maintenance issues and riders had to wait for company mechanics, they were still charged for a full day. And there was no path to owning the motorcycle, to escape the daily fees, or selling it off for a lump sum.

So when Gozem came along with the offer of lease-and-pay contracts that would allow him to own a motorcycle after eighteen months, Atama left Olé. Gozem also used a ride-hailing app, which made it easier for Atama to find passengers, and offered a useful tracking facility.

“Customers are more comfortable with riders on apps – there is no argument over the fare, and the motorcycle can be tracked with GPS, reducing both riders’ and passengers’ fears of being robbed.”

Most recently, Atama shifted to yet another new app: M-Auto. His interest here is their use of electric motorcycles – cheaper than buying petrol, and with no noise or heat. His reputation follows him, with police recognising his commitment to professionalism and safety. He is helping M-Auto to improve their app, and he has so far recruited more than forty riders.

Atama’s story is a clear illustration of the fast pace of change within the motorcycle-taxi sector in Togo.



Paying with mobile money in Togo

ELECTRIC MOTORCYCLES

Reducing the use of fossil fuels improves local air quality and cuts greenhouse gas emissions. In transportation, the goal is to shift from petrol and diesel engines to electric motors, preferably powered by renewable energy.

Motorcycles are the starting point for the electrification of transport in Africa. They are small and lightweight, so require smaller – cheaper – batteries than 4-wheeled vehicles. One recent analysis concluded that electric motorcycles are currently commercially attractive in 15 African urban markets.¹¹³

The standard electric motorcycle batteries available today have a range of between 60 and 90 kilometres, and while this is less than many motorcycle-taxis travel in a day, innovative solutions for recharging and extending their range are available.

Electric motorcycles offer several potential benefits, including:

- Local air quality improvements: Electric motorcycles do not produce the emissions associated with petrol-powered engines, so reducing pollution of the environments in which they operate.
- Reduction in greenhouse gases: The overall environmental credentials of electric motorcycles depend on how the electricity they use is generated – although, due to higher efficiencies, electric motorcycles tend to be cleaner than petrol-powered models even if the electricity they use is produced using fossil fuels. Fortunately, many countries in Africa have high usage of clean hydroelectricity, and solar and wind power plants are being plugged into the grid at a rapid rate.¹¹⁴ In the coming years, the use of renewable energy in Africa is expected to increase further – the African Development Bank estimates that less than 10% of the continent’s hydropower capacity has been exploited, and the future potential for solar, wind and geothermal electricity generation is also significant.¹¹⁵
- Reduction in noise pollution: Electric motorcycles do not create any engine noise, and so are far quieter than petrol-powered motorcycles.



Changing a battery on a Zembo e-moto in Uganda

- Reduced costs for riders: While the purchase price of electric motorcycles is currently greater than that of petrol-powered motorcycles, the operating costs of electric-powered motorcycles can be significantly cheaper. One kilowatt-hour of electricity will power a motorcycle for nearly the same distance as one litre of petrol, and while there is significant volatility in global energy markets, in many African countries one litre of petrol costs five to ten times one kilowatt-hour of electricity (although if riders replace their batteries at a charging station, the station will charge the riders extra on what they draw from the grid, to pay back the capital costs of the battery and make a profit). Our survey across nine cities found the weekly energy costs of electric motorcycles to be around two-thirds those of petrol motorcycles, and the weekly maintenance costs to be less than half.

There are various challenges facing the mass uptake of electric motorcycles in Africa. These include:

- Addressing road safety issues related to electric motorcycles, including awareness of pedestrians and other road users
- Addressing other potential safety issues, including the risk of fire caused by overcharging
- The need for new legislation and regulations, including related to road safety
- Ensuring a reliable supply of renewable, low-carbon electricity
- Expanding the charging and battery-swapping networks
- Standardising batteries and charging infrastructure
- Increasing awareness of the viability and benefits of electric motorcycles among stakeholders, including policy-makers and motorcycle owners and riders
- Developing responsible ways of reusing, recycling or disposing of end-of-life batteries and other equipment

There are a number of examples of good practice and initiatives promoting the electrification of motorcycles in Africa.

ELECTRIC MOBILITY ADAPTATION POLICY IN RWANDA

Governments can promote the transition to electric motorcycles by developing supportive policies.

Rwanda currently has some of the most extensive policies to support the transition. The government's *Strategic Paper for Electric Mobility Adaptation* sets out a wide range of incentives, including:

- VAT and import duty exemptions for electric vehicles, spare parts and charging equipment
- A preferential corporate income tax rate for investors in the electric mobility sector
- Reduced electricity costs for charging stations and electric vehicles¹¹⁶

As well as incentivising the use of electric vehicles, the Rwandan government is also planning to introduce a carbon tax to disincentivise the use of polluting vehicles.

ENTREPRENEURSHIP IN ELECTRIC MOBILITY

The past two or three years have seen entrepreneurs moving into the electric mobility sector, including in electric motorcycles. East Africa has seen the rise of companies such as Ampersand, Ecobodaa, Fika, Mazi Mobility, Roam and Zembo, while M-Auto and Max are making inroads in West African markets.

One focus of these entrepreneurs has been to make electric motorcycles more affordable by introducing battery-swapping initiatives. The electric motorcycle is sold without the battery – thereby significantly reducing the initial purchase price – and the owner rents a battery from a swapping station, where used batteries are swapped for full ones. The swapping stations recharge the used batteries – in some cases using solar power.

Other areas of entrepreneurship include the development of battery packs, the assembly of electric motorcycles and the conversion of existing petrol-powered motorcycles to electric. The electric motorcycles found in Africa are often designed to look like the existing dominant motorcycle brands in shape and style, to improve acceptance by motorcycle-taxi riders and passengers.¹¹⁷

“I MAKE ALMOST DOUBLE THE EARNINGS”

Alfred Kariuki is not your regular boda boda rider in Nairobi, Kenya. Contrary to many stereotypes of motorcycle-taxi riders all being young, Alfred is 52, and joined this work after decades as a salaried employee. He began working as a boda boda rider in 2011, when he tired of the lack of flexibility in salaried employment. He has found the work pays well enough to support his wife and five children.

Alfred became interested in electric motorcycles when in early 2021 he had the chance to test a silent, smooth, lease-to-own motorcycle from the company Ecobodaa. Alfred soon made the shift, and he hasn't looked back. “It helps me get more cash in my pocket,” he said. “I make almost double the earnings. It is nearly maintenance

free.” He doesn't have to change the oil, and the reduced number of parts makes it much easier to take care of.

He also finds the ride to be much smoother and appreciates that there is no smoke-emitting exhaust pipe. The battery-swapping that has replaced re-fuelling happens once a day, and he finds he can ride around 80 kilometres on a full battery.

The reduced noise is the most intriguing factor for him – he now has to use his horn more to warn people of his presence. But when customers call his mobile phone, he finds it much easier to hear them, as they don't have to compete with the sound of a rumbling engine.

In the future, Alfred hopes Ecobodaa will open more battery-swapping stations, and he looks forward to riding his electric motorcycle far into the future.

INTERNATIONAL SUPPORT

There is significant donor support for African countries to transition to electric mobility, including through the United Nations Environment Programme (UNEP) and the Global Fuel Economy Initiative (GFEI).

UNEP's Electric Mobility Programme is currently supporting over ten African countries to develop e-mobility policies and roadmaps and carry out pilot projects. In Kenya, UNEP carried out a demonstration

project to compare the functionality of electric motorcycles with petrol-engine vehicles, and has engaged the Kenya Bureau of Standards to perform a study of international best practice in standardisation of batteries and charging infrastructure.

GFEI has set global goals of reducing CO₂ emissions caused by motorcycles and motorised 3-wheelers by 80% by 2035 and by 95% by 2050. To work towards these targets, it works with governments to develop fuel economy policies and transition to electric mobility.





A swapping station in Kampala, Uganda



RECOMMENDATIONS

There is no one-size-fits-all approach to managing motorcycles in Africa. However, here we provide a menu of recommendations for governments and other stakeholders to save lives, improve environments and enhance livelihoods.

INCORPORATING MOTORCYCLES INTO SAFE, SUSTAINABLE AND EQUITABLE TRANSPORT POLICY

Current transport policy in many African countries discriminates against the majority of people, by favouring the wealthy minority who can afford to drive private cars. This results in numerous problems, including congestion, pollution, injuries, poor health and lack of opportunity.



To allow countries, cities and people to thrive, governments must adopt safe, sustainable and equitable transport and mobility policies. These should prioritise the development of mass transit and promotion of active mobility over private cars, and adhere to the Safe System approach to road safety.

Motorcycles will continue to play a role in transportation in Africa well into the future, so they must be incorporated into improved transport and mobility policies. Motorcycle-taxi riders must be respected as road users and service providers. Our recommendations for incorporating motorcycles into safe, sustainable and equitable transport and mobility policy are:

PREVENT UNCONTROLLED GROWTH IN MOTORCYCLE NUMBERS

If uncontrolled, the increase in the numbers of motorcycles looks set to continue for the foreseeable future. Governments should control this growth, addressing both the supply side – for example, through regulation of the commercial motorcycle sector – and the demand side – for example, through the provision of alternative modes of transport, such as public transport and facilities for walking and cycling.

PROVIDE A SAFE, SUSTAINABLE AND EQUITABLE OPERATING ENVIRONMENT

Governments should work to ensure that motorcycles, including commercial motorcycles, are able to operate in a way that is safe and secure for riders and passengers, does not harm the environment, and is free from exploitation and crime. Achieving this will require understanding motorcycle-related issues and adopting appropriate policies, considering the recommendations in this report.



IMPROVING ROAD SAFETY MANAGEMENT: THE SAFE SYSTEM APPROACH

In line with international recommendations, the majority of African countries have established lead government agencies for road safety and have developed national road safety strategies. But the reality is that management of road safety in many countries remains uncoordinated and ineffective.

Our recommendations on improving road safety management for motorcycle riders are:

ADOPT THE 'SAFE SYSTEM' APPROACH TO MOTORCYCLE SAFETY

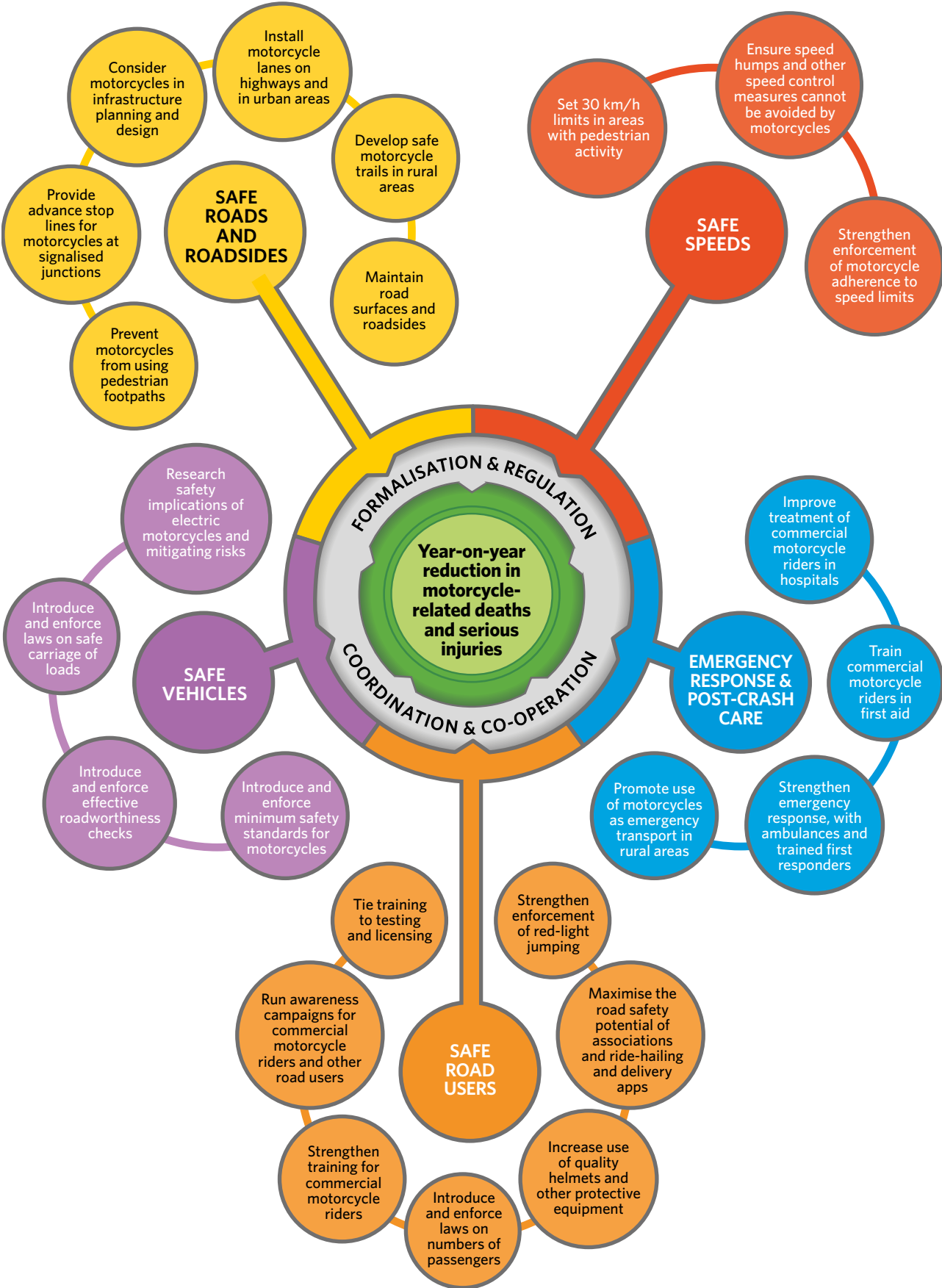
The Safe System approach recognises that road transport is complex and that safety should be central. It acknowledges that people will make mistakes and therefore aims to ensure that no one will be killed or seriously injured in the event of a crash. It does this by looking at road users, vehicles, roads, speeds and post-crash care together, through the development and implementation of coordinated policies.



The Safe System approach can be summarised by the phrase 'The whole is greater than the sum of the parts,' meaning that if road safety action effectively addresses road users, vehicles, roads, speeds and post-crash care together, it will be more successful than if each component were to be addressed separately.

This is very important for motorcyclists, who, due to their lack of protection and potential for high speeds, are vulnerable to collisions, injuries and death.

An example of the Safe System approach as it relates to motorcycles is shown opposite.



STRENGTHEN COLLECTION OF DATA ON MOTORCYCLE-RELATED INJURIES

Governments should strengthen the collection, reporting and use of data on motorcycle-related deaths and injuries, with the support of the African Road Safety Observatory.

REVIEW EXISTING MOTORCYCLE-RELATED LAWS, POLICIES AND SYSTEMS

Governments and other stakeholders should carry out reviews of existing laws, policies and systems related to motorcycles, to identify opportunities for improving motorcycle safety.

ALLOCATE BUDGETS TO MOTORCYCLE SAFETY

While many countries have lead road safety agencies and national road safety strategies, these are often poorly funded. Improving motorcycle safety requires adequate funding, and this can be justified by the contribution that motorcycles make to the economies

and livelihoods, and by the financial losses incurred by individuals and national budgets as a result of injuries and healthcare.

STRENGTHEN COORDINATION AND COOPERATION

Coordination and cooperation between stakeholders – especially between the different government stakeholders – is critical to the improvement of motorcycle-related road safety.

IMPROVE POLITICIANS' UNDERSTANDING OF – AND COMMITMENT TO – ROAD SAFETY

Politicians at all levels have the potential to improve road safety, both by promoting positive behaviour and initiatives, and avoiding actions that advance their political aims at the expense of motorcycle safety. For example, politicians can act as 'champions' for motorcycle safety, supporting authorities in enforcement efforts – they should not use their political power to influence authorities to reduce enforcement.



INCREASING THE USE OF STANDARD, GOOD-QUALITY HELMETS

Widespread use of good-quality helmets has the potential to save many thousands of lives. But it must be recognised that to achieve this requires a strategic approach that coordinates many different components and may take many years. Efforts to increase helmet use should focus on passengers as well as riders, and this may include the need for helmets for children.

The WHO has published a manual to provide guidance on how to develop and implement a helmet-wearing programme. The guidance in this manual is appropriate for African countries, and includes:

- Assessing the existing situation
- Establishing a working group
- Preparing an action plan
- Developing and implementing a helmet law
- Developing and implementing a helmet standard
- Improving compliance
- Involving the public and educating young people
- Ensuring appropriate medical response
- Evaluating the programme¹¹⁸

In addition to the WHO's guidance, our recommendations specific to increasing use of quality motorcycle helmets in African countries are:

INTRODUCE HELMET STANDARDS

Over 90% of African countries have helmet laws, and almost all of those apply to both riders and passengers. However, many countries' laws do not cover the details of helmets' design. Governments should either adopt the international standard ECE 22.05 or develop their own standards based on the international standard. In countries where children ride as motorcycle passengers, standards should cover child helmets.



ENFORCE HELMET STANDARDS

Enforcing against the use of non-standard helmets is a significant challenge. Non-standard replicas sometimes bear the standards' logo, and it can be difficult for standards officers or police to tell the difference between a genuine helmet and a low-quality counterfeit. Techniques to differentiate genuine helmets from counterfeits should be developed, together with training for officers.

DEVELOP TESTING FACILITIES

To ensure that helmets manufactured locally or imported from elsewhere meet the standards, countries should develop testing facilities. Non-standard helmets should be removed from the market.

ENSURE HELMET DESIGN IS APPROPRIATE

Helmets' design must be appropriate for the local environment and culture. For example, they must be made of materials that do not degrade over time, and the design should be acceptable and functional for riders and passengers. Studies have shown that a white or lighter-coloured helmet may reduce the risk of a crash.¹¹⁹

ENSURE HELMETS ARE AFFORDABLE

The majority of motorcycle users in Africa are not prepared to spend more than a few dollars on a helmet. The challenge for stakeholders is to make good-quality helmets available at a price that

riders and passengers are willing to pay. This could be achieved through initiatives to support local manufacturing, reducing tax and preventing the importation of helmets that do not meet the required standard, or through requiring that all motorcycles are sold together with two good-quality helmets.

ADDRESS HYGIENE CONCERNS

Sharing of helmets is common in many African countries and is one of the key factors that contributes to low rates of helmet use, particularly among passengers. Even when a rider has a helmet to offer a passenger, many passengers are reluctant to wear it, citing hygiene concerns. Use of headscarves or hairnets – as is common in Kigali – is one way to alleviate such concerns.

PRIORITISING TRAINING, TESTING AND LICENSING

Appropriate training delivered by qualified trainers will play a key role in improving motorcycle safety. Research in four African countries found that where rates of formal training among riders were higher, the proportion of both riders and passengers who had been involved in a crash was lower.¹²⁰

To ensure that motorcycle riders are well-trained, an effective system of testing and licensing is also necessary.

Our recommendations on training, testing and licensing are:

DEVELOP MOTORCYCLE TRAINING STANDARDS, INCLUDING A PRACTICAL COMPONENT

Countries should develop national minimum standards for motorcycle rider training, for both 2- and 3-wheelers.

Training must provide riders with the essential practical skills that they need to keep themselves, their passengers and other road users safe. Training should include practical exercises on techniques, including braking, manoeuvring, use of mirrors, emergency stop, safe carriage of passengers and safe loading of cargo. Training that covers only the laws and road signs is not sufficient.





INCREASE AVAILABILITY OF AFFORDABLE MOTORCYCLE TRAINING AND TESTING

In many countries, availability and affordability are the two biggest barriers to commercial motorcycle riders undergoing training. Stakeholders such as the public transport regulatory authority, the police, driving schools, motorcycle-taxi associations, delivery companies and app companies should work together to increase availability of training and testing programmes. This will include increasing the number of qualified trainers and assessors.

Training and testing programmes must be affordable to riders, or subsidised, possibly through associations or grants or sponsorship by the private sector.

The development of training programmes must recognise that many commercial motorcycle riders earn money from day to day and are not able to take significant periods of time away from their earning activities. Training should be relatively short in duration, and should be delivered at off-peak hours, when riders are not busy with passengers or deliveries.

TAKE A PHASED APPROACH TO SCALING UP TRAINING

The target should be that all commercial motorcycle riders are trained. However, in countries with large numbers of commercial motorcycle riders, this will pose a significant challenge. A phased approach should therefore be taken to scaling up training, prioritising the highest-risk riders, who are likely to include new riders and those operating in the highest-risk areas – probably cities and towns.

While being lower priority, experienced riders should not be ignored or forgotten, as even though they may have been riding for several years, they are likely to have developed unsafe habits during that time.

And riders in rural areas should not also be ignored or forgotten, as research has shown that they also face risk of injury.¹²¹ However, increasing availability and affordability of training in rural areas is likely to pose a greater challenge than in cities and towns.

TIE PRACTICAL TRAINING TO TESTING AND LICENSING

Proper training needs to be backed up by effective testing and licensing. Tests should evaluate the



practical skills that riders possess. Licences should only be issued when the test has been passed.

INCLUDE FIRST AID IN MOTORCYCLE RIDER TRAINING

Due to the high numbers of commercial motorcycle riders in many cities, they are often the first on the scene in the case of a road crash. Providing them with first-aid training could play a role in improving emergency response.

INCLUDE GENDER ISSUES IN MOTORCYCLE-TAXI RIDER TRAINING

Stories of harassment and violence against women by motorcycle-taxi riders are not uncommon. Covering respect for women in motorcycle-taxi rider training programmes could play a part in reducing this.

ENSURING ROADWORTHINESS OF MOTORCYCLES

Vehicles in poor condition create risks for riders, passengers and other road users. Our recommendations on roadworthiness are:

SET AND ENFORCE MINIMUM SAFETY STANDARDS FOR MOTORCYCLES

Governments should introduce safety standards for motorcycles, ensuring that those imported from overseas or assembled locally meet minimum standards. These standards should be enforced through checks upon importation and at assembly plants.

INTRODUCE REQUIREMENTS FOR ANTI-LOCK BRAKING SYSTEMS ON MOTORCYCLES

Anti-lock braking systems (ABS) on motorcycles prevent wheels from locking up under braking, so prevent skidding, thereby reducing the risk of a crash.

Many countries around the world, including India and China, now have regulations requiring that ABS are mandatory on motorcycles. However, no countries in Africa have introduced such regulations to date.



Governments should introduce regulations requiring that all motorcycles imported, assembled and/or sold are fitted with ABS.

UNDERTAKE REGULAR ROADWORTHINESS TESTING

Governments should introduce regular roadworthiness testing for motorcycles. Motorcycles that do not pass the test should not be permitted to operate on public roads until problems have been rectified.

INCLUDE ROADWORTHINESS IN RIDER TRAINING

Rider training should cover basic motorcycle roadworthiness, teaching riders about the importance and correct use of the vehicle's features.

CONSIDERING MOTORCYCLES IN PLANNING, DESIGN AND MAINTENANCE

If effectively planned, motorcycle-taxis have the potential to play a part in safe, clean and equitable transport systems that include non-motorised modes and mass transit, and reduce dependence on the private cars. Considering motorcycles in the design and maintenance of road infrastructure can bring improvements in safety for motorcycles and other road users.

Our recommendations on planning, designing and maintaining for motorcycles are:

CONSIDER MOTORCYCLES FROM THE PLANNING STAGE

Motorcycles – including commercial motorcycles – should be considered from the earliest stage of planning related to public transport, planning and infrastructure development. This will involve research into their existing use, connectivity with other modes, public perceptions of them and more.

INCLUDE MOTORCYCLES IN ROAD ENGINEERING MANUALS

In those countries with high numbers of motorcycles, they should be included in road engineering manuals, providing guidance to engineers on how to design for motorcycle safety, as well as protecting pedestrians, cyclists and other vulnerable road users.

The International Roads Assessment Programme provides ratings of practical infrastructure measures that can be implemented to improve motorcycle safety,¹²² with provision of dedicated motorcycle lanes, the replacement of junctions with roundabouts and the removal of roadside hazards as examples of effective improvements.

It is not only in urban areas that infrastructure improvements can improve motorcycle safety – it is also possible in rural areas. In rural areas, roads must be wide enough for a motorcycle to pass a 4-wheeled vehicle without leaving the main roadway, and road

shoulders must be kept clear of overgrowth and loose gravel.¹²³ Motorcycle trails and bridges should be included in rural roads manuals, which should also give consideration to the safety of pedestrians and cyclists.

MAINTAIN ROAD SURFACES

Having only two wheels, motorcycles are particularly sensitive to the road surface. A pothole that can cause discomfort for those in a 4-wheeled vehicle can cause a serious crash for a motorcycle. The effective maintenance of road surfaces is particularly important in areas with high numbers of motorcycles.

PROTECT PEDESTRIANS AND OTHER VULNERABLE ROAD USERS

The safety of pedestrians, cyclists and other vulnerable road users needs to be given serious consideration when planning for motorcycles, with effective measures needed to segregate motorcycles from pedestrians and to limit the speeds of motorcycles in areas where they do interact with pedestrians, including around schools and shopping areas and at public transport interchanges.

FURTHER RESEARCH INTO DEDICATED MOTORCYCLE INFRASTRUCTURE

There are very few examples of dedicated infrastructure for motorcycles in Africa. Research should be carried out into those examples that do exist, such as the dedicated motorcycle and bicycle lanes in Ougadougou, and into what can be learned from motorcycle infrastructure in Asia.



REGULATING THE COMMERCIAL MOTORCYCLE SECTOR

As we have seen, commercial motorcycles have multiple benefits – in terms of accessibility, job creation and more – as well as significant downsides – in terms of crashes, pollution, association with crime and more.

Effective regulation of the commercial motorcycle sector is essential if the benefits are to be maximised and the downsides are to be minimised. Our recommendations related to regulation are:

DECISION-MAKING SHOULD BE INFORMED AND COLLABORATIVE

Policy and regulatory decisions that will affect the operations of commercial motorcycles – in particular those that will alter existing operations – should be made based on a full understanding of the issues. This will involve decision-makers supporting research and engaging with a broad range of stakeholders.

In countries where relationships between stakeholders are not currently constructive and transparent, efforts should be made to strengthen them, developing coalitions that can work together.

MOTORCYCLE STAKEHOLDERS

Motorcycle stakeholders include, but are not limited to, the following:

- Public transport regulatory authority
- Licensing authority
- Testing authority
- Police
- Labour ministry
- Road safety agency
- Environment ministry
- Infrastructure ministry
- Energy ministry
- Bureau of standards
- Technology/telecommunications agency
- Tax authority
- Ministry responsible for local government
- Motorcycle-taxi riders and their associations
- Motorcycle-taxi owners
- Ride-hailing and delivery app companies
- Motorcycle and spare parts vendors and importers
- Motorcycle assembly plant owners
- Manufacturers and importers of helmets and other personal protective equipment
- Driving schools
- Passenger/consumer groups
- Civil society, including organisations representing communities, women, youth, children and people living with disabilities
- Development partners
- Academia/researchers

RESTRICTIONS ON OPERATIONS SHOULD BE CONTEXT-BASED, TARGETED, PROPORTIONATE AND CONSISTENT WITH WIDER TRAFFIC MANAGEMENT OBJECTIVES

Any restrictions imposed on the operations of commercial motorcycles – for example, on the areas and hours they are permitted to operate within – should be clearly related to and targeted at the specific issue for which they are being imposed, should be proportionate to the scale of the issue they are addressing and should aim to impact the smallest number of people possible.

For example, if high numbers of crashes are experienced on highways, it may be reasonable to impose restrictions in specific areas. Or if motorcycle-related crime is experienced in certain urban areas at night, it may be reasonable to impose a curfew in those areas. Where restrictions are imposed, the implications – such as on rural access or on the ability of women to travel safely at night – must be carefully considered.

Any restrictions imposed should be consistent with the provision of an equitable and sustainable mobility transport system.

IF IMPOSING NEW RESTRICTIONS, BE FULLY PREPARED

In countries and cities where commercial motorcycles are already operating, imposing restrictions can be extremely challenging. Prior to implementation of restrictions, governments must be fully prepared, for example by:

- Communicating effectively with stakeholders – in particular with riders, passengers and customers – about which restrictions are to be introduced and for what reason. This is likely to involve public awareness campaigns
- Providing alternative means of transport – although this is not easy, as commercial motorcycles (motorcycle-taxis in particular) provide a unique service
- Providing alternative opportunities for employment and income – although this is also very challenging, as commercial motorcycles provide employment and livelihoods for many people

These last two points demonstrate the importance of imposing any restrictions in a targeted way, to minimise the impact on people’s accessibility and livelihoods.



IN COUNTRIES OR CITIES WHERE COMMERCIAL MOTORCYCLES ARE NOT CURRENTLY WIDESPREAD, MONITOR THE SITUATION TO PREPARE FOR THEIR POTENTIAL ARRIVAL

The extremely rapid growth in the number of commercial motorcycles in some countries and cities has demonstrated how quickly their use can spread if unchecked. In those countries and cities where commercial motorcycles are not currently popular – such as those in Southern Africa – governments should monitor the situation. Where it is identified that demand and supply are increasing – such as appears to be the case currently in Maputo, Mozambique and Eastern Province in Zambia – informed and collaborative decisions should be taken on how to regulate the sector.

TACKLE CORRUPTION AND UNETHICAL BEHAVIOUR WITHIN THE COMMERCIAL MOTORCYCLE SECTOR

Corruption and unethical behaviour are at the root of many of the problems within the commercial motorcycle sectors of many African countries. While such behaviour – for example, the soliciting of bribes by police officers enforcing laws and officials issuing documentation, manipulation of riders and authorities by politicians for political gain, exploitation of riders by app companies, or dishonest practices by insurance companies – is allowed to take place, any efforts to improve the commercial motorcycle sector will be undermined.

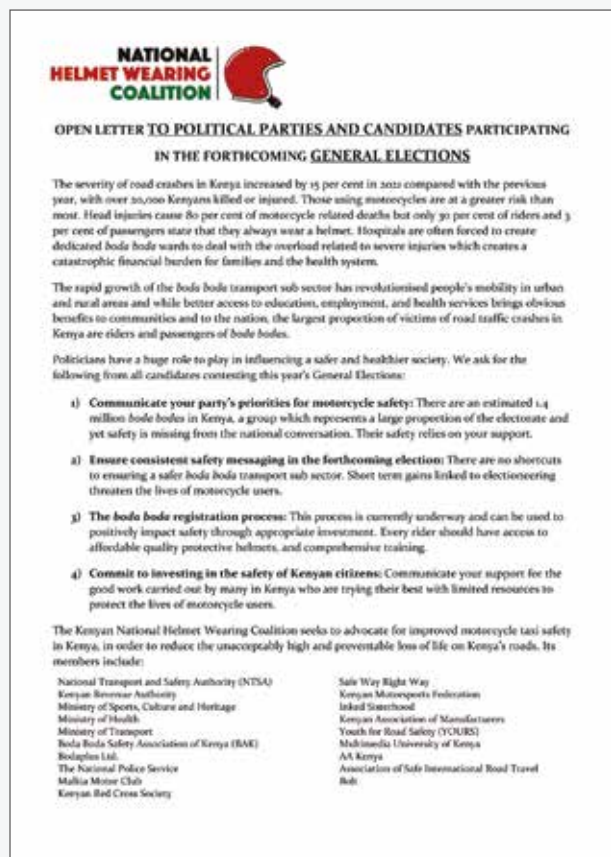
POLITICIANS: DO NOT TRADE SAFETY FOR VOTES

In the run-up to Kenya's general election in August 2022, a coalition of high-profile road safety stakeholders published an open letter to the country's politicians, telling them not to do anything that would make the roads more dangerous.

As in many African countries, motorcycle-taxi riders make up a large, important and vocal part of the electorate in Kenya. Recognising this, politicians build loyalty among riders by helping them to bypass regulations and avoid enforcement, sometimes even buying motorcycles for them. It is not uncommon for politicians to pressure licensing authorities to issue licences to riders despite them not having met the legal requirements, or to pressure police not to enforce laws on, for example, helmet-wearing or carrying multiple passengers.

In return, the loyal riders cover their motorcycles and taxi stands in a political party's colours, ride around in convoys beeping their horns and drawing attention, and accompany their candidate on loud and colourful campaigns.

The Kenyan National Helmet Wearing Coalition distributed their letter through social media, and it was picked up by a number of national media outlets.



This is an example of a much-needed unified voice from road safety stakeholders standing up to politicians, telling them that lives are more important than votes.

FORMALISING AND SUPPORTING MOTORCYCLE-TAXI ASSOCIATIONS

Associations offer the potential to address the downsides of motorcycle-taxis – for example by improving safety, promoting electrification and reducing association with crime. They can also contribute to maximising the benefits, for example by improving working conditions for riders and coordinating with transportation and urban planning to improve accessibility.

Our recommendations on motorcycle-taxi associations are:

FORMALISE ASSOCIATIONS

Where feasible, governments should require, support or promote the creation of formalised motorcycle-taxi associations. It may be that this is feasible only in urban, not rural, areas.

Associations should have a hierarchy that ranges from the national level to the stage level. At the national level, they should be involved in development of government policy and regulation from the beginning of policy formulations, rather than simply co-opted for final approval, as is often the norm. At the stage level, they should be able to support and influence riders.

Riders should be required to be registered members of an association, and to meet certain standards – in terms of, for example, training, licensing, helmet use and display of identification – to maintain their membership. Associations should be given limited powers to self-regulate, for example by requiring members to meet certain criteria or attend training activities.

The formalisation of associations has the potential to generate revenue, through joining fees, membership fees and fines. This revenue should be put back into the associations, for example by funding training programmes or social support for members. Co-funding with government or international partners could support the construction of stage infrastructure or purchase of quality helmets and other protective equipment.



PROVIDE OVERSIGHT OF AND SUPPORT TO ASSOCIATIONS

Without adequate oversight and support, many of the benefits that can be achieved through associations may not be realised. Such oversight and support may be provided through local government authorities.

Oversight should ensure that associations are run fairly and in the best interest of members, with fair leadership elections and transparent use of funding.

Coordination between associations, local government authorities and other stakeholders offers the potential to provide rider training, savings schemes, rent-to-own schemes and social security, and to promote initiatives such as electric motorcycles.

STRENGTHENING ENFORCEMENT

Undoubtedly, in many countries minimising the downsides of commercial motorcycles will involve strengthening enforcement. Our recommendations on enforcement are:

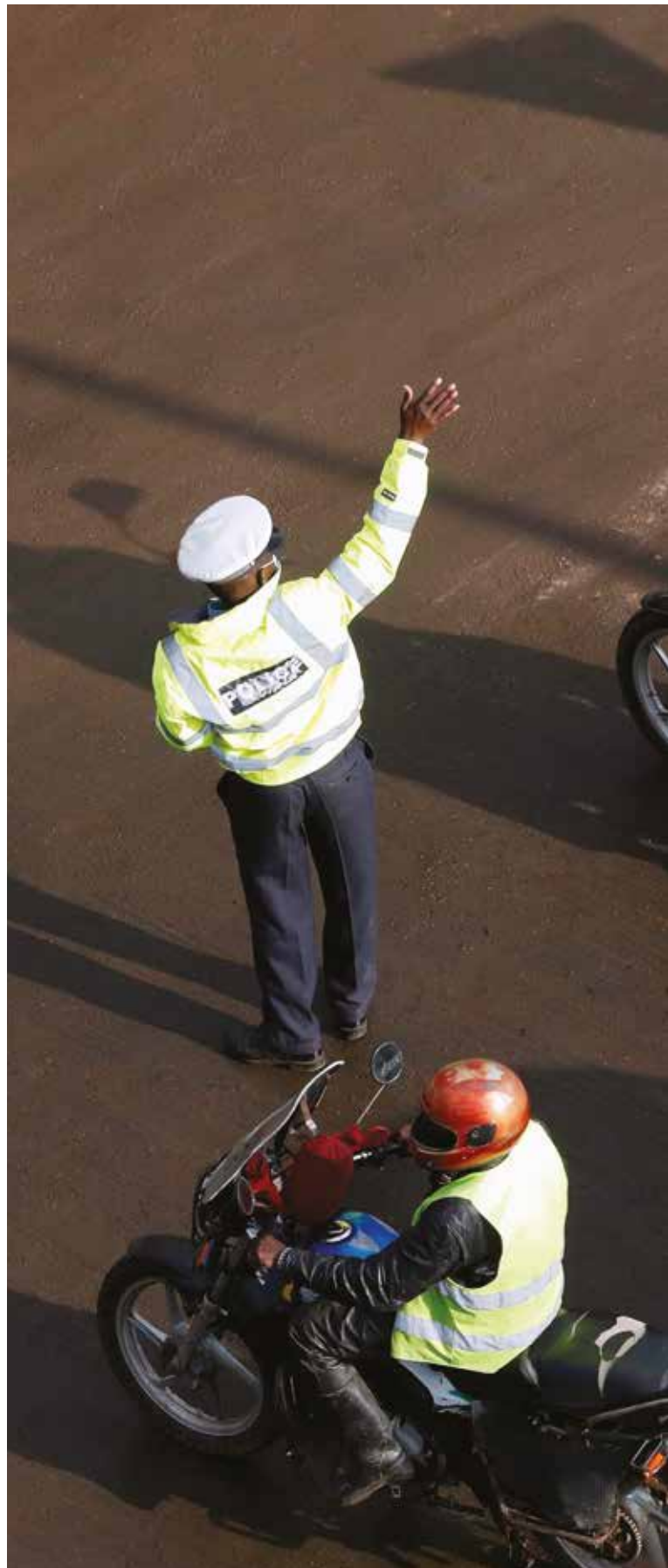
STRENGTHEN ENFORCEMENT GRADUALLY

Enforcement should be strengthened gradually, as opposed to the use of heavy-handed crackdowns. Heavy crackdowns create further animosity between commercial motorcycle riders and the authorities, reinforcing the impression of 'us and them'. Strengthening enforcement gradually is more likely to be met with understanding and acceptance.

As well as strengthening enforcement of laws related to motorcycles, authorities should also improve enforcement in general – the reckless behaviour of other drivers puts motorcycle riders at risk.

COMBINE STRENGTHENED ENFORCEMENT WITH EDUCATION AND AWARENESS CAMPAIGNS

Strengthening of enforcement should be combined with education and awareness campaigns, so that commercial motorcycle riders, passengers and other road users are aware of the coming changes.





WORK WITH ASSOCIATIONS AND APPS

Motorcycle-taxi associations, ride-hailing apps and delivery apps have the potential to improve their riders' compliance with laws, including those related to harassment and violence against women. Authorities should work with associations and app companies to maximise this potential.

PROVIDE TRAINING TO POLICE OFFICERS

In some countries, it has been identified that police officers do not fully understand the laws and regulations that apply to motorcycles. Police officers should be trained on the content of laws and regulations, and on realistic and effective methods for enforcing them. Training should also address issues of corruption.

INNOVATE WITH THE USE OF TECHNOLOGY

Innovative technology may play a role in improving compliance with laws. For example, the use of cameras or GPS may have a role to play in deterring motorcycle riders from jumping red lights or riding on pedestrian footpaths.

REGULATING THE RIDE-HAILING AND DELIVERY APP SECTOR

The ride-hailing and delivery app sector has an important role to play in improving motorcycle-taxi and delivery services. However, with ride-hailing companies operating on a for-profit model, regulation is required to ensure that riders, passengers and customers alike are benefitting. Our recommendations on regulating ride-hailing are:

DEVELOP STRONG RELATIONSHIPS BETWEEN THE REGULATOR AND APP COMPANIES

Where relationships are good, the potential exists to build a sector that benefits all, recognising that the app companies are typically for-profit but that they are providing a public service. Over-regulation, without allowing the companies to make a profit, will

drive the companies away, while no regulation or light regulation may result in exploitation of riders.

MAXIMISE THE ROAD SAFETY POTENTIAL OF APPS

App companies have the potential to influence the behaviour of their riders, for example by requiring use of helmets and other protective equipment (by both riders and passengers), restricting the number of passengers or dimensions of loads carried, requiring maintenance of motorcycles, and possibly even monitoring riding behaviour. App companies can provide safety training to riders, can gather feedback from passengers and can have their own enforcement mechanisms for riders who do not comply. They can also support the availability of affordable, quality insurance.

Rather than only penalising poor rider behaviour – which may push riders away from the app – incentivising good behaviour could attract more riders, as well as passengers.

Personal information – such as contact details, next of kin, blood group and insurance details – can be stored and made accessible through the app, in case the rider or passenger is involved in a crash.

MAXIMISE THE PERSONAL SAFETY POTENTIAL OF APPS

App companies have the potential to improve personal security, for both riders and passengers. Obtaining personal information upon registering for the app means that both riders and passengers can be identified in case of any incident of abuse or crime, and so can act as a deterrent. Requiring riders to display an identification code on their motorcycle, helmet and/or clothing can have a similar deterrent effect. Women's safety should be prioritised in particular.

Apps should be required to have adequate data protection systems to keep the personal data of riders and passengers secure.



GPS trackers can be installed in motorcycles, allowing them to be tracked if they are stolen.

REGULATE FARES AND COMMISSIONS

Regulators have the opportunity to influence fares and limit commissions taken by the apps, with the aim of balancing affordability for passengers, profits for riders and business viability for the app companies. The use of taximeters and other low-tech solutions should be encouraged.

PUT TAX REVENUE BACK INTO THE COMMERCIAL MOTORCYCLE SECTOR

Regulating ride-hailing and delivery apps has the potential to enable governments to increase the tax revenue collected. This tax revenue should be used to benefit the commercial motorcycle sector, for example through funding initiatives to support shared mobility or subsidising rider training.

SUPPORT OPPORTUNITIES FOR WOMEN RIDERS

Through their terms and conditions, apps have the opportunity to make working as a commercial motorcycle rider more accessible and attractive to women. For example, enabling women riders to choose to carry only female passengers, and vice-versa, could improve personal safety.

PROMOTE AND SUPPORT INNOVATION

By working with app companies, governments have the opportunity to promote and support innovation. The use of geofencing technology may have the potential to influence riders' behaviour in certain areas, for example by reducing speeds around schools and other areas of pedestrian activity. Real-time information could assist in crash response. And app companies could be involved in piloting new technologies, such as electric motorcycles.

SHARE ANONYMISED DATA WITH THE GOVERNMENT

App companies collect large amounts of data, which could be used to improve transportation planning and inform government policy. By understanding residents' travel patterns, planners can support a transportation system that works better for all. 'For



example, nighttime curfews for motorcycle-taxis can make it difficult for market women to get home after peak sales in the evening. If planners had access to better data on trip patterns, more responsive policy could better support residents' travel needs.

EDUCATING OTHER ROAD USERS

Improving training for motorcycle riders will go some way to improving their safety. But to have a greater impact, all areas of driver training must be strengthened, including for cars, trucks and public minibuses, and members of the public must be educated around motorcycle awareness.

Our recommendations on training and education of other road users are:

INCLUDE MOTORCYCLE AWARENESS IN TRAINING OF OTHER DRIVERS

The risks related to motorcycles should be covered in the training of drivers of other vehicles. Drivers should understand how to behave to reduce the chances of a collision with a motorcycle.

UNDERTAKE AWARENESS CAMPAIGNS FOR PASSENGERS AND OTHER ROAD USERS

Public awareness campaigns should be used to inform other road users of motorcycle-related risks, for example by explaining to passengers the risks of failing to wear a helmet or sitting side-saddle, and teaching pedestrians to be aware of motorcycles when crossing the road.

ENABLING THE SAFE TRANSITION TO ELECTRIC MOTORCYCLES

Electric motorcycles have the potential to benefit urban environments, people's health and the climate. Governments should support the transition to electric, but should balance the benefits with action to address the road safety risks. Our recommendations related to road safety and electric motorcycles are:

DEVELOP AND ADAPT ROAD SAFETY LEGISLATION TO COVER ELECTRIC MOTORCYCLES

Countries may need to adapt their road safety legislation – for example, the requirement for helmets, the carriage of passengers, etc. – to ensure that it covers electric motorcycles.

Legislation may be used to minimise some of the safety risks related to motorcycles, such as mandatory fitting of sound emitters to reduce the risk to pedestrians.

SUPPORT RESEARCH AROUND ELECTRIC MOTORCYCLES AND ROAD SAFETY

Further research is needed to understand the road safety risks associated with electric motorcycles. Research could look to learn lessons from other countries, including in Asia and Europe, where similar issues can be found.

Our other recommendations related to electrification are:

SET POLICIES TO PROMOTE ELECTRIC MOTORCYCLES

Governments have the ability to set a policy framework that supports and incentivises certain vehicles in their country, for example by using tax policies to incentivise a shift towards cleaner, safer vehicles.

There is currently significant international interest in supporting the transition to electric vehicles, including electric motorcycles. Governments should engage with initiatives such as UNEP's E-Mobility Programme and

the Global Fuel Efficiency Initiative to develop electric mobility policies. Policies may include, for example, tax breaks to incentivise the assembly, sale and use of electric motorcycles, and disincentives on the use of polluting vehicles.

Governments should plan for the phasing out of two-stroke engine motorcycles and introduce restrictions to prevent them from being used.



ENSURE STABLE ELECTRICITY SUPPLY

Electric motorcycles are completely dependent on the availability of electricity – primarily through national grids. Solar installations as backup are expensive. And fossil fuel-powered generators are both expensive and counterproductive. Lack of a stable electricity supply in many African countries is a key barrier to the commercial motorcycle sector transitioning to electric. Governments should focus on ensuring a stable supply of electricity to enable electric mobility to grow.

INCREASE USE OF CLEAN ELECTRICITY FROM RENEWABLE SOURCES

The environmental credentials of electric motorcycles depend heavily on how the electricity they use is being generated. The greater the proportion of electricity produced from renewable sources – solar, wind, geothermal and hydro – the greater the overall benefits of the transition to electric motorcycles will be.

Electricity from renewable sources is likely to be cheaper than that from fossil fuels,¹²⁴ and so would reduce the operating costs for motorcycle owners and riders.

SET LOWER ELECTRICITY TARIFFS FOR ELECTRIC MOTORCYCLES

To support the transition to electric mobility, specific reduced electricity tariffs for electric vehicles – such as those applied for streetlighting in several countries – would further strengthen the case for companies and consumers. It may be possible for tariffs to be negotiated and calculated between the regulatory authorities and involved companies, so that lost tax revenue is minimised and consumption of locally produced electricity is maximised.

STANDARDISE BATTERIES AND OTHER CHARGING INFRASTRUCTURE

The standardisation of batteries and charging infrastructure will catalyse the transition to electric motorcycles, ensuring the widest possible charging network.

Development partners and the private sector may be interested in cooperating on pilots to develop charging and battery-swapping infrastructure, especially when it can serve multiple vehicle models.



MINIMISE RISKS ASSOCIATED WITH BATTERIES

The safe disposal of motorcycle batteries is a critical issue that will require research and the strengthening of recycling supply chains. Used lithium-ion batteries could have a second life providing backup power on the grid or in homes, and the chemicals they contain will have significant value in a supply-constrained

world. Additionally, there should be a concerted push for battery chemistries with reduced harmful impacts. This would mean supporting LFP (lithium iron phosphate) batteries, which, unlike their competitor NMC (nickel, manganese and cobalt) batteries, do not require cobalt, a mineral associated with human rights abuses in the Democratic Republic of the Congo.¹²⁵ LFP batteries also have the advantage of having lower fire risk than NMC batteries, which have been associated with several fires in Asian countries.

DEVELOP A SKILLED WORKFORCE

A diverse workforce of engineers, designers, riders and technicians is needed to maximise the local benefits of the electric mobility sector. Governments and training institutions should support and provide training to boost skills in these areas, especially in maintenance. Training opportunities should be available to a cross-section of society – including women – to maximise the social benefits of the transition.

RUN AWARENESS CAMPAIGNS

For people to switch from petrol to electric, they must be made aware of the existence and benefits of electric motorcycles. Our survey found that while two-thirds of riders across the nine study cities had heard of electric motorcycles, there was significant variability between countries. For example, in both Kampala and Lomé, over 80% of commercial motorcycle riders knew about electric motorcycles, compared to less than 35% in both Douala and Lagos.

Awareness campaigns can be used to inform members of the public – including riders and owners – about the transition to electric and its benefits.

MEASURE AIR POLLUTION FROM EXISTING MOTORCYCLES

Monitoring levels of air pollution from existing motorcycles will help to understand the real-world emissions and to inform potential policy changes towards cleaner vehicles. For example, The Real Urban Emissions (TRUE) initiative undertakes real-world testing of emissions from vehicles.



CONCLUSION

We estimate that there are around 27 million motorcycles in Sub-Saharan Africa, with around 80% of these being used commercially as motorcycle-taxis or for deliveries. Taking into account riders, owners and those involved in servicing the commercial motorcycle industry, motorcycles directly support the livelihoods of over 100 million people across the continent. Motorcycles enable people to do business, get to work, and access goods and services, including schools and hospitals. In many countries – although certainly not all – motorcycles are key drivers of the economy and society.

However, it is conceivable that 100,000 motorcycle riders and passengers lose their lives across the continent each year in crashes, not to mention the other road users, including pedestrians and cyclists, who are struck and killed by motorcycles. As well as the fatalities, motorcycles cause millions of injuries each year, with devastating effects for individuals, families, communities, healthcare systems and economies. Hundreds of thousands of deaths are caused annually by ambient air pollution in Africa, with the carbon dioxide and other gases and particles emitted by motorcycles contributing to these. Communities are disturbed by the noise created by motorcycles' engines and horns. Motorcycle-related or motorcycle-enabled crime affects individuals, communities and – as in the Sahel – entire regions. And both riders and passengers are victims of exploitation.

African countries, just like all countries in the world, need transport systems that are safe, sustainable and equitable. All members of society should be able to move around safely, have clean air to breathe, and live free of crime and exploitation – and this includes the poor, the vulnerable and the under-represented, as well as the future generations who will inherit the systems we develop today.

Motorcycles are deeply embedded in many countries' transport systems, and the benefits that they bring, together with the current and projected economic and

social climates, mean that their use is likely to continue to grow and to spread to other countries. Governments and other stakeholders must find ways to integrate motorcycles into countries' transport systems in ways that are safe, sustainable and equitable.

A significant technological advance – the development of electric motorcycles – provides hope to address problems associated with air pollution. While several hurdles still exist, including around policy, technology and economic viability, it is possible that the next few years will see a rapid transition from petrol engines to electric, drastically reducing local and climate-altering emissions.

Opportunities to address the issues of safety, crime and equity must be prioritised alongside electrification. Real improvements in these areas are dependent on behaviour change, driven by policy. Policy-makers must recognise the breadth of the impact that their decisions have and develop a full understanding of the local issues and context. Policy must be effectively translated and developed into legislation, regulations, strategies, enforcement activities, manuals, programmes and campaigns.

To reduce the number of motorcycle-related deaths and injuries, the Safe System approach must be adopted, with trained riders, motorcycles and protective equipment that meet minimum safety standards, roads designed for motorcycles and other vulnerable road users, and a post-crash care system that maximises the chance of survival.

Peter Kizza was part of a generation that made a living and supported the wider economy using motorcycles, but risked life and limb doing so, and contributed to the development of chaotic, dangerous, polluted, noisy cities and towns. To avoid subsequent generations facing the same risks and compounding the problems, governments and other stakeholders must work to develop safe, sustainable and equitable transport and mobility systems, incorporating motorcycles into them.

ABOUT THE FIA FOUNDATION

The FIA Foundation is an independent UK-registered charity, working closely with grant partners to shape projects and advocate to secure change in policy and practice. Our objective is safe and healthy journeys for all, whether it is the daily walk to school or the final lap of a Grand Prix. Through partners with global reach, we are supporting safer vehicles and highways, clean air and electric cars, safe motor sport, and low-speed streets.



The Motorcycle Initiative has been established by the FIA Foundation to help address a growing fatality and injury burden amongst users of powered two wheelers around the world. The Initiative links stakeholders and interventions with international best practice and the Safe System approach through global and national advocacy, research, technical assistance and programmatic support.



Visit www.fiafoundation.org

ABOUT THE FÉDÉRATION INTERNATIONALE DE MOTOCYCLISME

The Fédération Internationale de Motocyclisme is the leading global advocate for motorcycling, as well as being the governing body for motorcycle sport. Founded in 1904 in Paris and currently based in Switzerland, the FIM is made up of 116 National Federations, grouped into six Continental Unions. It is engaged in aspects of motorcycling such as public affairs; technical, medical and judicial issues; tourism and leisure; and promoting women's involvement in motorcycling. Sustainability is a priority in both the sporting and non-sporting domains.



Visit www.fim-moto.com

ABOUT AMEND

Amend's vision is a future in which vulnerable road users in Sub-Saharan Africa are as safe as anywhere in the world. Our mission is to develop, implement and evaluate evidence-based interventions to reduce the incidence of road traffic injury among the most vulnerable road users in Africa today while working to help create an environment for long-term, sustainable injury reduction. Amend has offices in Ghana, Tanzania and Mozambique, and we work throughout Sub-Saharan Africa. Our wide-ranging road safety programmes all have two things in common: a clear focus on preventing road traffic injuries in Africa's highest-risk populations, and a scientific basis.



Visit www.amend.org

ABOUT THE AUTHORS

TOM BISHOP

Tom Bishop is Programme Director at the international road safety NGO Amend. Based in Tanzania from 2009 to 2021, he has led motorcycle-related studies and projects in more than ten countries in Sub-Saharan Africa. These included concurrent research projects that started in rural Tanzania in 2012 and led to the development of a training programme targeted at motorcycle-taxi riders, which is now being implemented in eight countries across the continent.

TOM COURTRIGHT

Tom Courtright is a motorcycle-taxi researcher and electric-mobility consultant based between Tanzania and Kenya. Currently, Tom provides technical assistance to e-mobility companies under the Powering Renewable Energy Opportunities programme and supports the African Electric Mobility Development Association. Tom's research and writing have been published at Rest of World, Africa Is a Country, African Arguments, the City Fix and Transportation Research Part D. He is currently working with research groups at TU-Berlin and Institut Polytechnique on trends in the boda boda industry in East African cities and on electric mobility. In his spare time, Tom co-authors Lubyanza, a blog on boda bodas, with Ugandan rider Geoffrey Ndhogezi.

APPENDIX A:

COUNTRY PROFILES AND CITY SNAPSHOTS

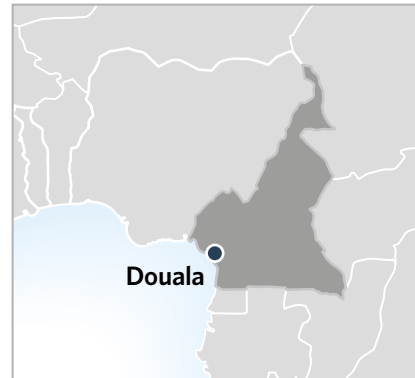
CAMEROON

Population: 26.55 million
 GNI per capita: US \$1,520
 Income group: Lower middle income
 Youth unemployment: 6.7%
 Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 265,500
 Source: Authors' calculations

Estimated percent of total vehicle fleet (2010): 50.8
 Source: World Health Organization, 2013



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
 Required to undergo training to obtain a licence? Yes
 If yes, does the training have a practical component? Yes
 Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
 Any geographical restrictions? Yes
 Any time restrictions (e.g., curfew)? No
 Are riders required by law to be members of associations? No
 Are riders required by law to wear reflector jackets? Yes
 Are riders required by law to wear identifying information? Yes

Helmet legislation

Are riders required by law to wear a helmet? Yes
 Are passengers required by law to wear a helmet? Yes
 Is there a national standard for motorcycle helmets? No

Electrification

Any electric motorcycle initiatives? No
 Any formal government support for electrification? No
 Average cost of electricity (households) (Dec. 2021): \$0.08 per kWh
 Average cost of petrol (Sep. 2022): \$0.97 per litre
 Average annual duration of electricity outages (2018): 790 hours
 Grid carbon intensity (2020): 254g CO₂/kWh
 Sources: globalpetrolprices.com, Farquharson et al., 2018, and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? Yes
 Any delivery apps? Yes
 Legislation regulating digital ride-hailing? No

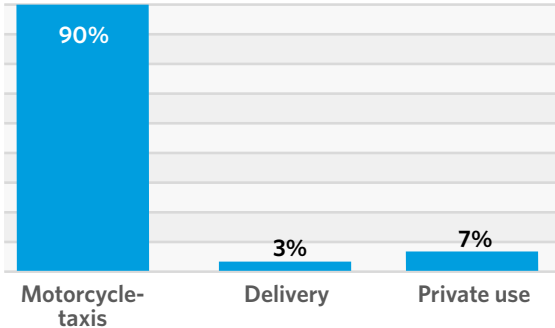
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths – official figures: Data unavailable
 2- & 3-wheeler rider deaths as a proportion of all deaths: Data unavailable

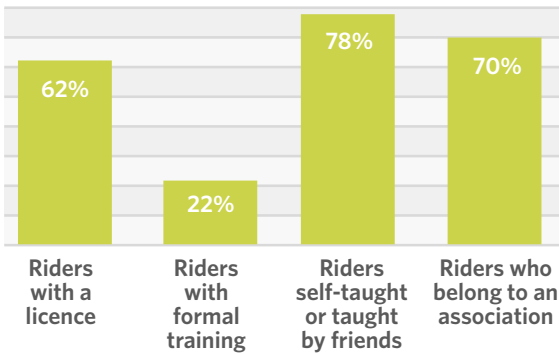
SNAPSHOT SURVEYS IN DOUALA

Population: 3.92 million
Source: World Population Review, 2022

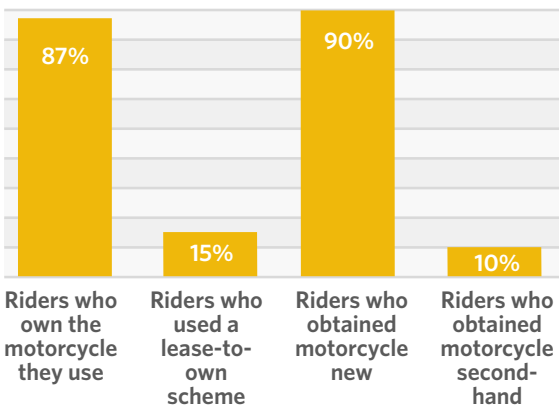
TYPES OF MOTORCYCLE USE



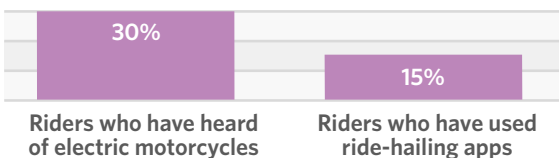
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



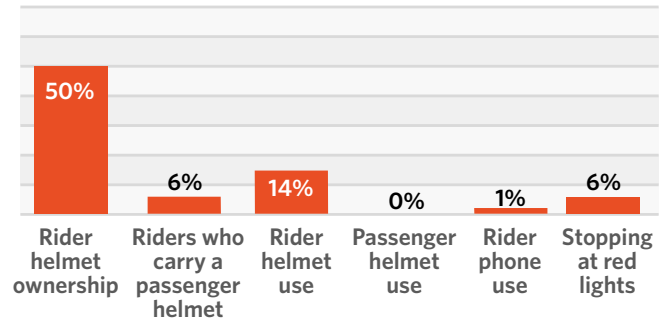
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	99%
Average age:	36 years
Average educational achievement:	Higher secondary
Average length of time of operation:	3.8 years

WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$70.54
Weekly net income - delivery:	Data unavailable
Average hours worked per day:	8.4
Average days worked per week:	5.5
Average cost of helmet:	US \$7.98
Percent of riders with insurance:	43%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS

- Police
- Government officials
- Passengers
- Other motorcyclists
- Other vehicle drivers
- Associations
- App companies
- Local businesses



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	44%
Average days missed from work after serious injury:	24
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	21%
Most common type of violent crime:	Robbery
Riders with negative health impacts from motorcycles:	63%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in January and February 2022.

GHANA

Population: 31.07 million
 GNI per capita: US \$2,340
 Income group: Lower middle income
 Youth unemployment: 9.5%
 Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 776,750
 Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 24.9
 Source: WHO Global Status Report for Road Safety, 2018



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle?
 Required to undergo training to obtain a licence?
 If yes, does the training have a practical component?
 Required to undertake practical test to obtain a licence?

Yes
 Yes
 Yes
 No

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi?
 Any geographical restrictions?
 Any time restrictions (e.g., curfew)?
 Are riders required by law to be members of associations?
 Are riders required by law to wear reflector jackets?
 Are riders required by law to wear identifying information?

No
 Yes - nationwide
 N/A
 N/A
 N/A
 N/A

Helmet legislation

Are riders required by law to wear a helmet?
 Are passengers required by law to wear a helmet?
 Is there a national standard for motorcycle helmets?

Yes
 Yes
 Yes

Electrification

Any electric motorcycle initiatives?
 Any formal government support for electrification?
 Average cost of electricity (households) (Dec. 2021):
 Average cost of petrol (Sep. 2022):
 Average annual duration of electricity outages (2018):
 Grid carbon intensity (2020):
 Sources: globalpetrolprices.com, Farquharson et al., 2018, and ourworldindata.org

Yes
 Yes
 \$0.04 per kWh
 \$1.18 per litre
 790 hours
 344g CO₂/kWh

Ride-hailing and deliveries

Any ride-hailing apps?
 Any delivery apps?
 Legislation regulating digital ride-hailing?

No
 Yes
 No

Deaths of 2- & 3-wheeler riders

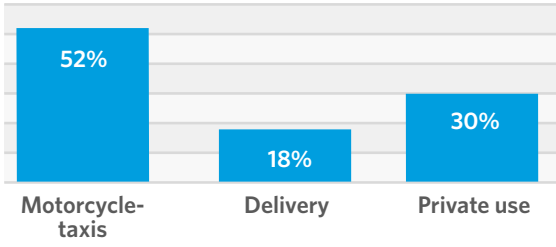
2- & 3-wheeler rider deaths – official figures:
 2- & 3-wheeler rider deaths as a proportion of all deaths:

437. Source: National Road Safety Commission
 18%. Source: National Road Safety Commission

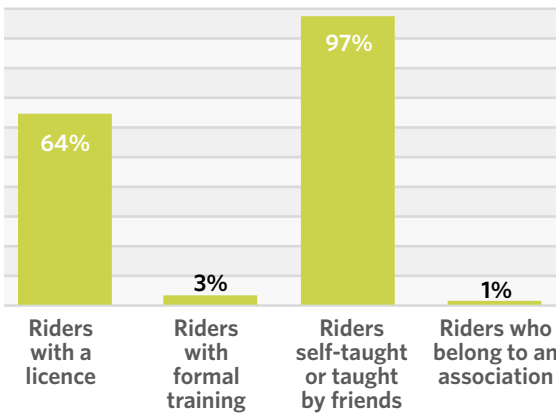
SNAPSHOT SURVEYS IN ACCRA

Population: 2.61 million
 Source: World Population Review, 2022

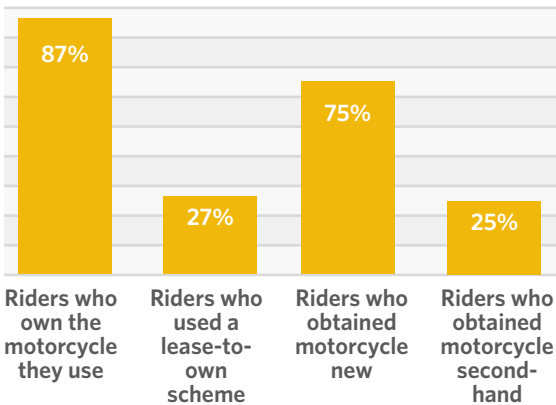
TYPES OF MOTORCYCLE USE



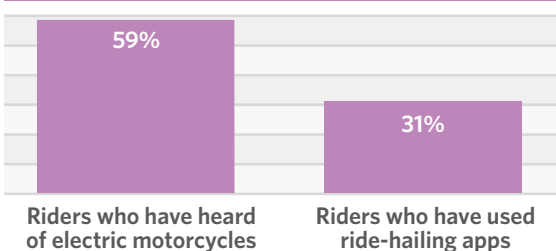
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



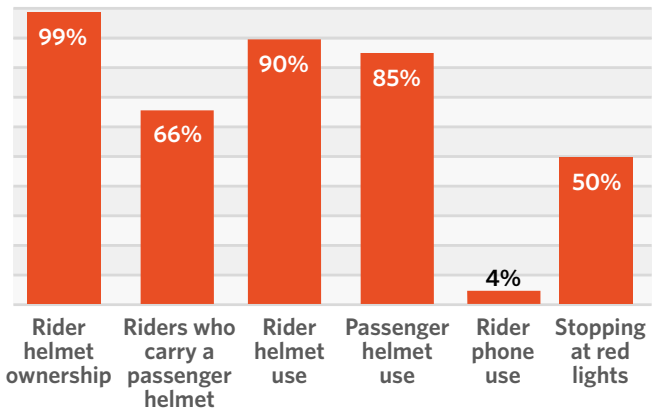
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	29 years
Average educational achievement:	Lower secondary
Average length of time of operation:	1.9 years

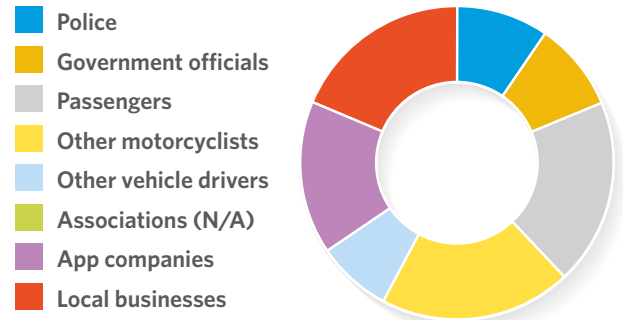
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$66.00
Weekly net income - delivery:	US \$96.29
Average hours worked per day:	9.3
Average days worked per week:	5.8
Average cost of helmet:	US \$17.23
Percent of riders with insurance:	74%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	71%
Average days missed from work after serious injury:	59
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	20%
Most common type of violent crime:	Theft & Robbery
Riders with negative health impacts from motorcycles:	37%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders in February 2022, and roadside observations of 300 motorcycles at three different locations, in December 2021.

GUINEA

Population: 13.13 million
 GNI per capita: US \$1,020
 Income group: Low income
 Youth unemployment: 8%
 Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 328,250
 Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 27.9
 Source: WHO Global Status Report for Road Safety, 2018

Recent growth: Motorcycles increased from 76,780 in 2012 to 114,951 in 2016.
 Source: Ministry of Transport, 2018



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
 Required to undergo training to obtain a licence? Yes
 If yes, does the training have a practical component? Yes
 Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
 Any geographical restrictions? Yes - in Conakry
 Any time restrictions (e.g., curfew)? No
 Are riders required by law to be members of associations? No
 Are riders required by law to wear reflector jackets? Yes, only in some areas
 Are riders required by law to wear identifying information? Yes, only in some areas

Helmet legislation

Are riders required by law to wear a helmet? Yes
 Are passengers required by law to wear a helmet? Yes
 Is there a national standard for motorcycle helmets? Yes

Electrification

Any electric motorcycle initiatives? Yes
 Any formal government support for electrification? No
 Average cost of electricity (households) (Dec. 2021): Data unavailable
 Average cost of petrol (Sep. 2022): \$1.36 per litre
 Average annual duration of electricity outages (2018): Data unavailable
 Grid carbon intensity (2020): 182g CO₂/KWh
 Sources: globalpetrolprices.com and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? No
 Any delivery apps? Yes
 Legislation regulating digital ride-hailing? No

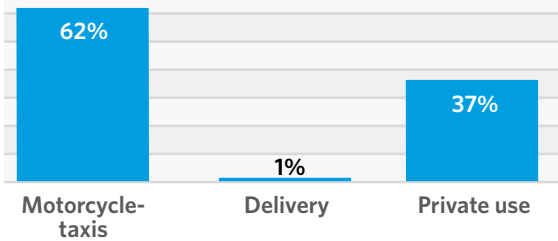
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths - official figures: Data unavailable
 2- & 3-wheeler rider deaths as a proportion of all deaths: Data unavailable

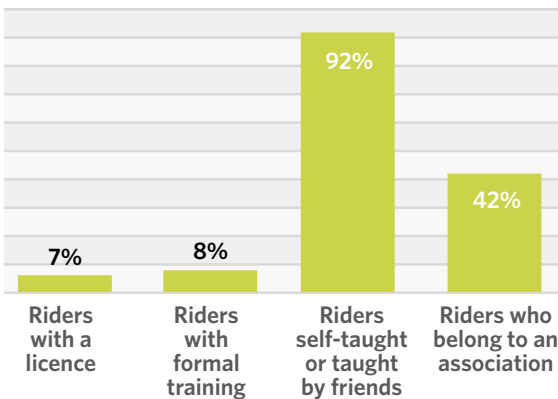
SNAPSHOT SURVEYS IN CONAKRY

Population: 2.05 million
Source: World Population Review, 2022

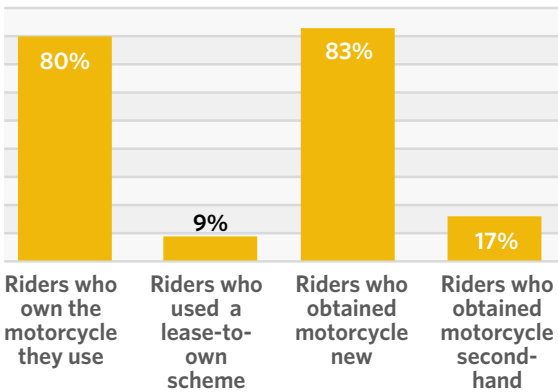
TYPES OF MOTORCYCLE USE



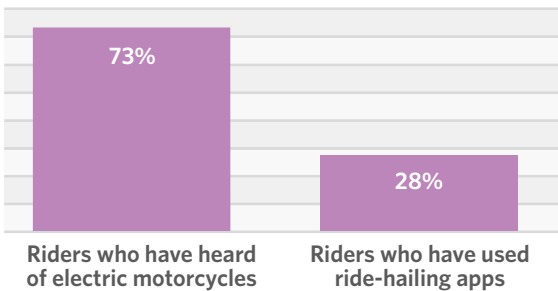
LICENSING, TRAINING AND ASSOCIATION zMEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



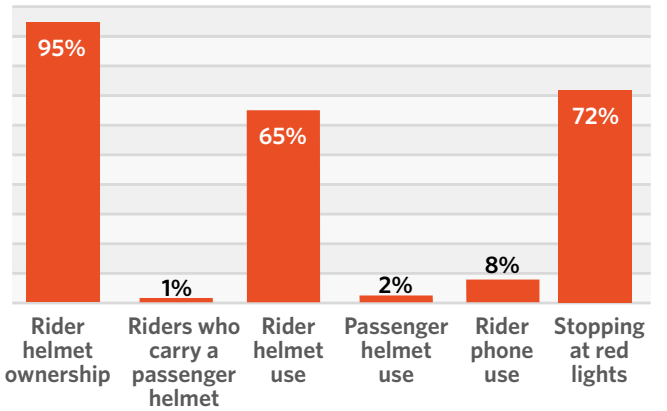
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	99%
Average age:	31 years
Average educational achievement:	Higher secondary
Average length of time of operation:	1.7 years

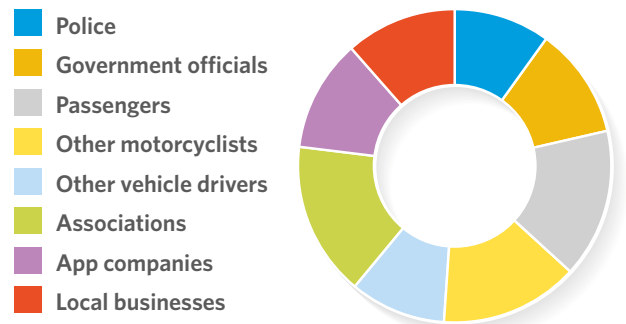
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$68.76
Weekly net income - delivery:	US \$90.76
Average hours worked per day:	11.5
Average days worked per week:	6.1
Average cost of helmet:	US \$10.99
Percent of riders with insurance:	95%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	52%
Average days missed from work after serious injury:	7
Most common factor in crashes:	Collision with motorcycle
Riders who have been victim of crime:	81%
Most common type of violent crime:	Assault
Riders with negative health impacts from motorcycles:	66%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in February 2022.

MOZAMBIQUE

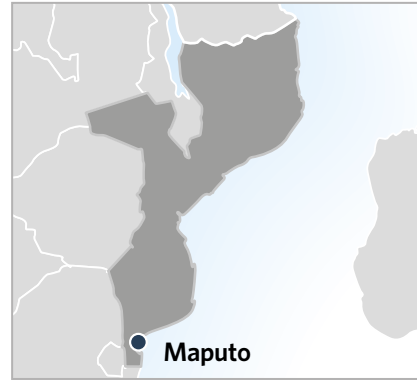
Population: 31.26 million
 GNI per capita: US \$460
 Income group: Low income
 Youth unemployment: 7.8%
 Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 312,600
 Source: Authors' calculations

Estimated percent of total vehicle fleet (2013): 12.0
 Source: WHO Global Status Reports for Road Safety, 2015

Recent growth: Growth is outside Maputo, largely in secondary cities and towns.



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
 Required to undergo training to obtain a licence? Yes
 If yes, does the training have a practical component? Yes
 Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
 Any geographical restrictions? Yes - permits are not issued in Maputo
 Any time restrictions (e.g., curfew)? No
 Are riders required by law to be members of associations? No
 Are riders required by law to wear reflector jackets? No
 Are riders required by law to wear identifying information? No

Helmet legislation

Are riders required by law to wear a helmet? Yes
 Are passengers required by law to wear a helmet? Yes
 Is there a national standard for motorcycle helmets? No

Electrification

Any electric motorcycle initiatives? No
 Any formal government support for electrification? No
 Average cost of electricity (households) (Dec. 2021): \$0.13 per kWh
 Average cost of petrol (Sep. 2022): \$1.36 per litre
 Average annual duration of electricity outages (2018): 80 hours
 Grid carbon intensity (2020): 134g CO₂/kWh
 Sources: globalpetrolprices.com, Farquharson et al., 2018, and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? No
 Any delivery apps? No
 Legislation regulating digital ride-hailing? No

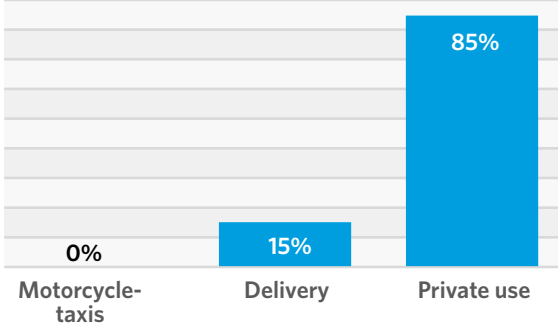
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths - official figures: Data unavailable
 2- & 3-wheeler rider deaths as a proportion of all deaths: Data unavailable

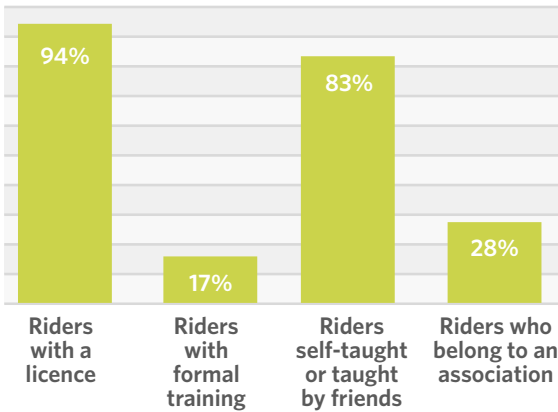
SNAPSHOT SURVEYS IN MAPUTO

Population: 1.14 million
Source: World Population Review, 2022

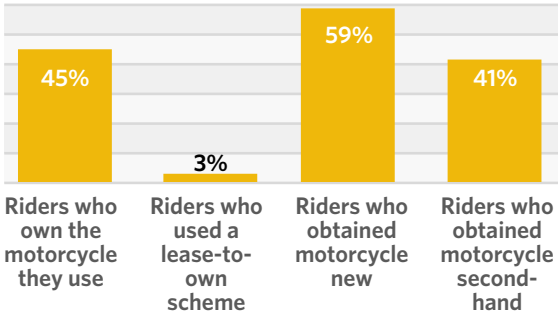
TYPES OF MOTORCYCLE USE



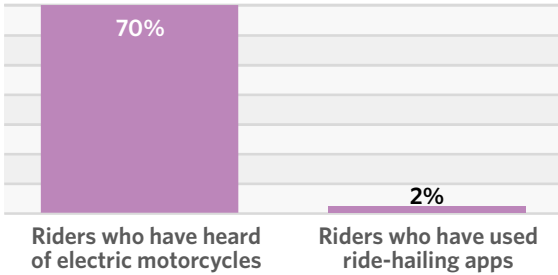
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



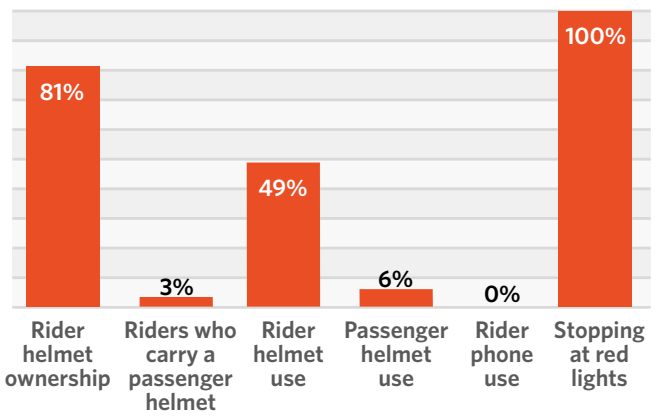
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	99%
Average age:	34 years
Average educational achievement:	Lower secondary
Average length of time of operation:	3.4 years

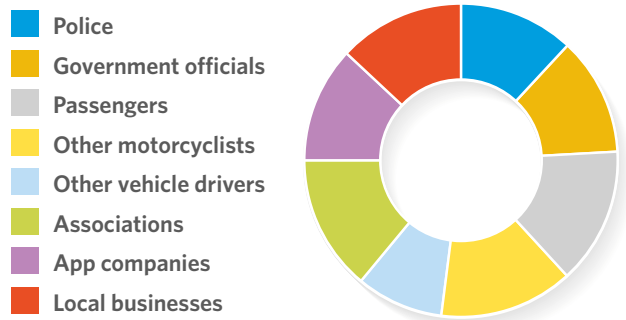
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	Data unavailable
Weekly net income - delivery:	Data unavailable
Average hours worked per day:	8.8
Average days worked per week:	5.3
Average cost of helmet:	US \$20.52
Percent of riders with insurance:	34%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	40%
Average days missed from work after serious injury:	23
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	13%
Most common type of violent crime:	None
Riders with negative health impacts from motorcycles:	18%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in January and February 2022.

NIGERIA

Population: 206.14 million
GNI per capita: US \$2,000
Income group: Lower middle income
Youth unemployment: 19.7%
Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 5,152,500
Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 11.1
Source: World Health Organization, 2018

Recent growth: 285,812 motorcycle licence plates produced in 2020.
Source: Federal Road Safety Corps, 2022



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
Required to undergo training to obtain a licence? Yes
If yes, does the training have a practical component? Yes
Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
Any geographical restrictions? Yes, bans in some cities and states
Any time restrictions (e.g., curfew)? Yes, curfews in some cities and states
Are riders required by law to be members of associations? Yes
Are riders required by law to wear reflector jackets? Yes
Are riders required by law to wear identifying information? Yes

Helmet legislation

Are riders required by law to wear a helmet? Yes
Are passengers required by law to wear a helmet? Yes
Is there a national standard for motorcycle helmets? Yes

Electrification

Any electric motorcycle initiatives? No
Any formal government support for electrification? No
Average cost of electricity (households) (Dec. 2021): \$0.06 per kWh
Average cost of petrol (Sep. 2022): \$0.44 per litre
Average annual duration of electricity outages (2018): 4,600 hours
Grid carbon intensity (2020): 402g CO₂/kWh
Sources: [globalpetrolprices.com](https://www.globalpetrolprices.com), [Statista](https://www.statista.com) and climate-transparency.org

Ride-hailing and deliveries

Any ride-hailing apps? Yes
Any delivery apps? Yes
Legislation regulating digital ride-hailing? Yes - only in Lagos State

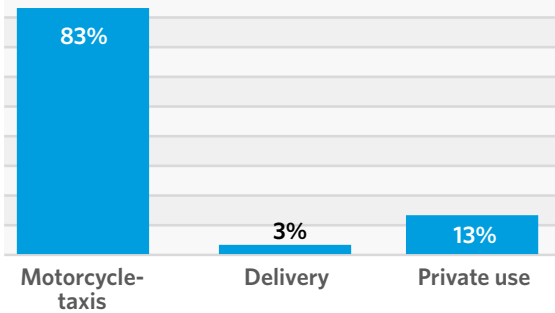
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths – official figures: Data unavailable
2- & 3-wheeler rider deaths as a proportion of all deaths: Data unavailable

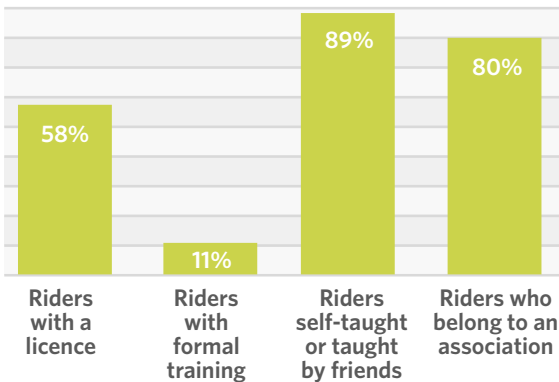
SNAPSHOT SURVEYS IN LAGOS

Population: 15.3 million
Source: World Population Review, 2022

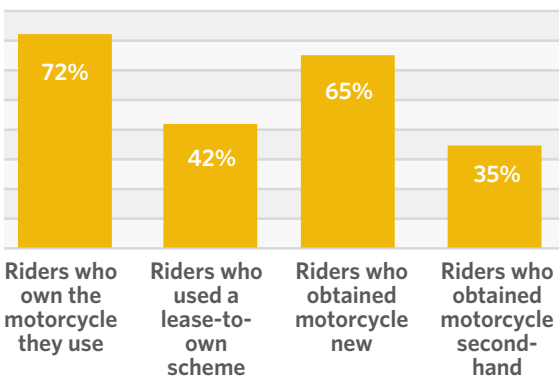
TYPES OF MOTORCYCLE USE



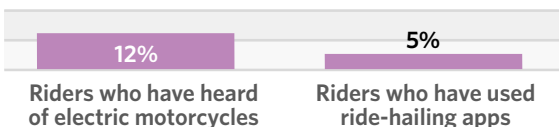
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



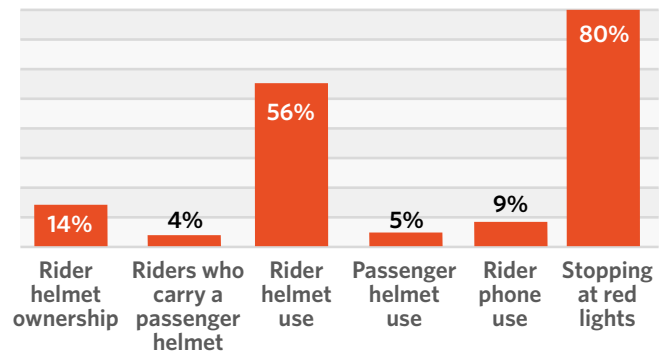
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	36 years
Average educational achievement:	Lower secondary
Average length of time of operation:	3.5 years

WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$48.95
Weekly net income - delivery:	Data unavailable
Average hours worked per day:	11.3
Average days worked per week:	6.5
Average cost of helmet:	US \$22.65
Percent of riders with insurance:	6%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS

- Police
- Government officials
- Passengers
- Other motorcyclists
- Other vehicle drivers
- Associations
- App companies
- Local businesses



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	55%
Average days missed from work after serious injury:	11
Most common factor in crashes:	Single-vehicle crash or fall
Riders who have been victim of crime:	21%
Most common type of violent crime:	Robbery
Riders with negative health impacts from motorcycles:	19%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in February 2022.

RWANDA

Population: 12.95 million
GNI per capita: US \$780
Income group: Low income
Youth unemployment: 2.6%
Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 129,500
Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 51
Source: WHO Global Status Report for Road Safety, 2018



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
Required to undergo training to obtain a licence? No
If yes, does the training have a practical component? No
Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
Any geographical restrictions? No
Any time restrictions (e.g., curfew)? No
Are riders required by law to be members of associations? Yes
Are riders required by law to wear reflector jackets? Yes
Are riders required by law to wear identifying information? Yes

Helmet legislation

Are riders required by law to wear a helmet? Yes
Are passengers required by law to wear a helmet? Yes
Is there a national standard for motorcycle helmets? No

Electrification

Any electric motorcycle initiatives? Yes
Any formal government support for electrification? Yes
Average cost of electricity (households) (Dec. 2021): \$0.25 per kWh
Average cost of petrol (Sep. 2022): \$1.55 per litre
Average annual duration of electricity outages (2018): Data unavailable
Grid carbon intensity (2020): 377g CO₂/kWh
Sources: globalpetrolprices.com and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? Yes
Any delivery apps? Yes
Legislation regulating digital ride-hailing? Yes

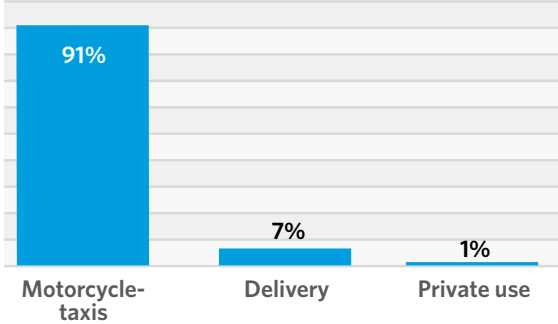
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths - official figures (2015/16): 128. Source: Rwanda Statistical Yearbook, 2017
2- & 3-wheeler rider deaths as a proportion of all deaths (2015/16): 22%. Source: Rwanda Statistical Yearbook, 2017

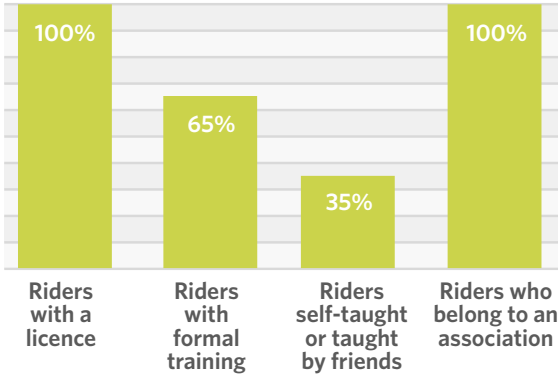
SNAPSHOT SURVEYS IN KIGALI

Population: 1.21 million
 Source: World Population Review, 2022

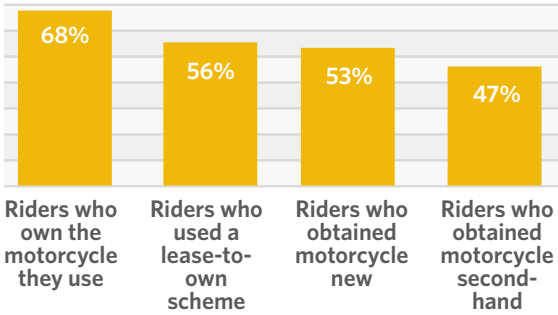
TYPES OF MOTORCYCLE USE



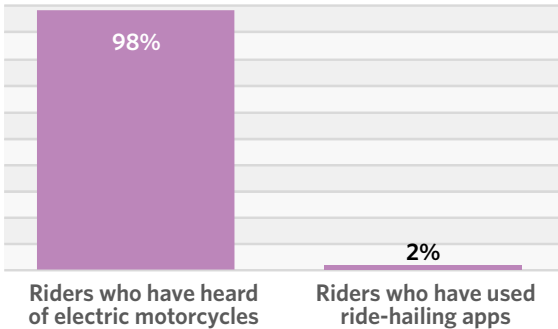
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



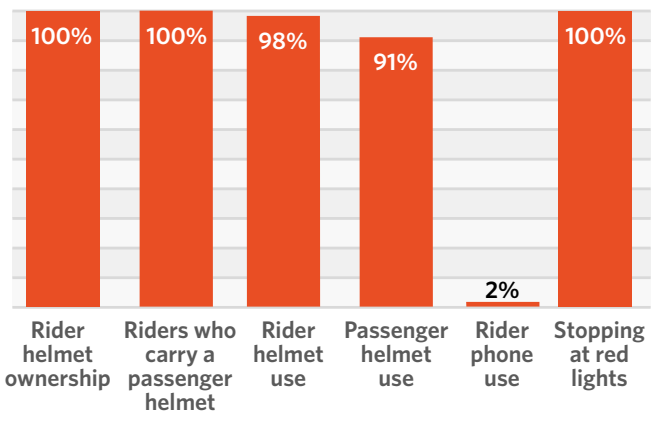
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	36 years
Average educational achievement:	Primary
Average length of time of operation:	2.4 years

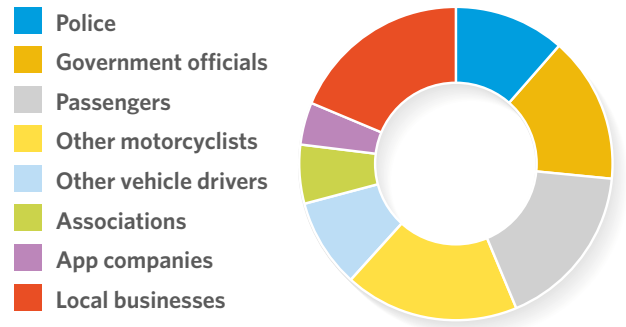
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$10.24
Weekly net income - delivery:	Data unavailable
Average hours worked per day:	9.3
Average days worked per week:	5.8
Average cost of helmet:	US \$16.99
Percent of riders with insurance:	99%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	49%
Average days missed from work after serious injury:	88
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	45%
Most common type of violent crime:	Theft
Riders with negative health impacts from motorcycles:	44%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in February 2022.

TANZANIA

Population: 59.73 million
 GNI per capita: US \$1,080
 Income group: Lower middle income
 Youth unemployment: 4.4%
 Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 1,493,250
 Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 59.3
 Source: WHO Global Status Report for Road Safety, 2018

Recent growth: Latest figures show 2,011,719 registered 2-wheelers and 143,019 3-wheelers.
 Source: Tanzania Revenue Authority, 2022



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
 Required to undergo training to obtain a licence? Yes
 If yes, does the training have a practical component? Yes
 Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
 Any geographical restrictions? No
 Any time restrictions (e.g., curfew)? No
 Are riders required by law to be members of associations? Yes, but rarely enforced
 Are riders required by law to wear reflector jackets? Yes, but rarely enforced
 Are riders required by law to wear identifying information? Yes, but rarely enforced

Helmet legislation

Are riders required by law to wear a helmet? Yes
 Are passengers required by law to wear a helmet? No
 Is there a national standard for motorcycle helmets? Yes

Electrification

Any electric motorcycle initiatives? Yes
 Any formal government support for electrification? No
 Average cost of electricity (households) (Dec. 2021): \$0.10 per KWh
 Average cost of petrol (Sep. 2022): \$1.31 per litre
 Average annual duration of electricity outages (2018): 670 hours
 Grid carbon intensity (2020): 387g CO₂/KWh
 Sources: globalpetrolprices.com, Farquharson et al., 2018, and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? Yes
 Any delivery apps? Yes
 Legislation regulating digital ride-hailing? Yes

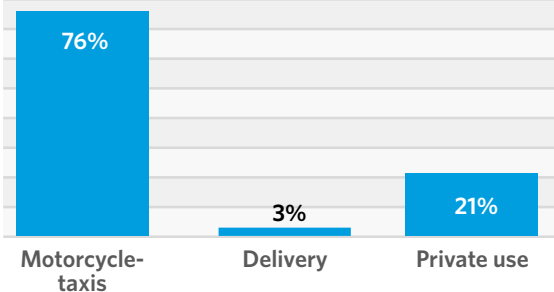
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths - official figures (2016): 890. Source: Tanzania Traffic Police
 2- & 3-wheeler rider deaths as a proportion of all deaths (2016): 23%. Source: Tanzania Traffic Police

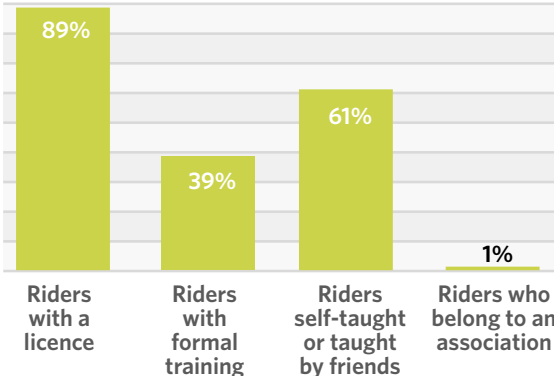
SNAPSHOT SURVEYS IN DAR ES SALAAM

Population: 7.4 million
Source: World Population Review, 2022

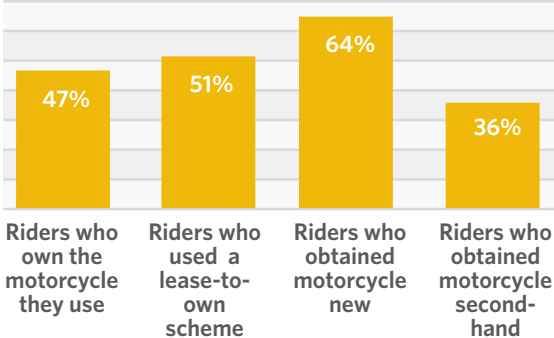
TYPES OF MOTORCYCLE USE



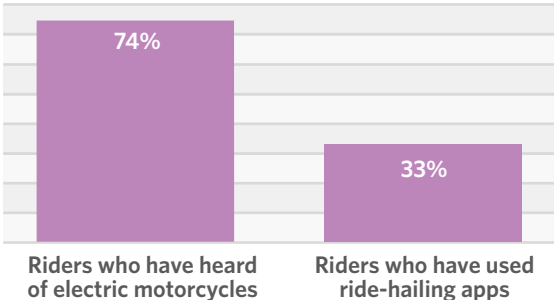
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



Source: This information was collected through face-to-face surveys with 100 motorcycle riders in February 2022, and roadside observations of 300 motorcycles at three different locations, in February 2021.

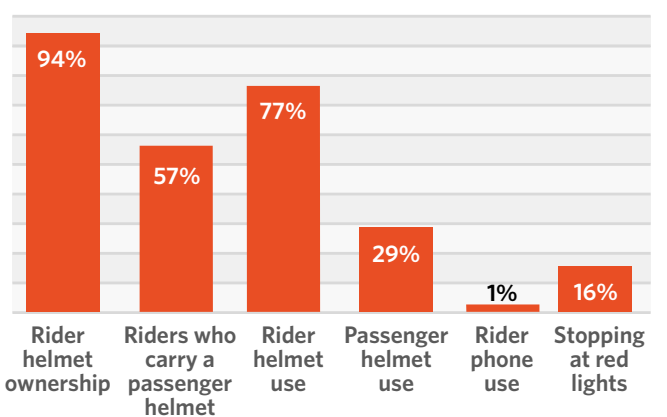
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	31 years
Average educational achievement:	Primary
Average length of time of operation:	3.2 years

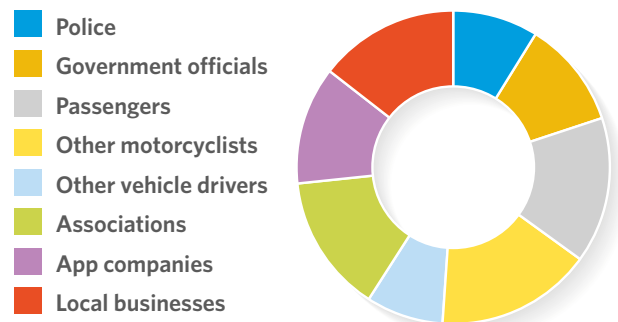
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$31.31
Weekly net income - delivery:	US \$11.45
Average hours worked per day:	10.1
Average days worked per week:	6.3
Average cost of helmet:	US \$10.28
Percent of riders with insurance:	97%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	64%
Average days missed from work after serious injury:	25
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	75%
Most common type of violent crime:	Robbery
Riders with negative health impacts from motorcycles:	39%

TOGO

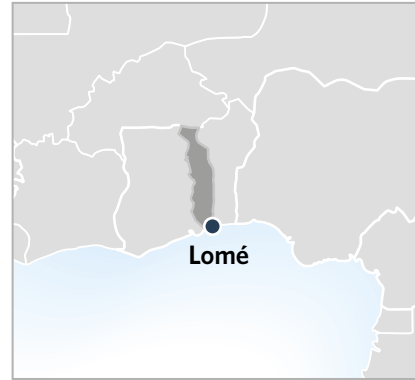
Population: 8.28 million
GNI per capita: US \$920
Income group: Low income
Youth unemployment: 9.6%
Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 331,160
Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 70.7
Source: WHO Global Status Report for Road Safety, 2018

Recent growth: Huge numbers imported since 2018, including over 300,000 in 2020.
Source: UN Comtrade Database



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle? Yes
Required to undergo training to obtain a licence? Yes
If yes, does the training have a practical component? Yes
Required to undertake practical test to obtain a licence? Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi? Yes
Any geographical restrictions? No
Any time restrictions (e.g., curfew)? No
Are riders required by law to be members of associations? No
Are riders required by law to wear reflector jackets? Yes
Are riders required by law to wear identifying information? No

Helmet legislation

Are riders required by law to wear a helmet? Yes
Are passengers required by law to wear a helmet? Yes
Is there a national standard for motorcycle helmets? No

Electrification

Any electric motorcycle initiatives? Yes
Any formal government support for electrification? No
Average cost of electricity (households) (Dec. 2021): \$0.18 per kWh
Average cost of petrol (Sep. 2022): \$1.08 per litre
Average annual duration of electricity outages (2018): Data unavailable
Grid carbon intensity (2020): 593g CO₂/kWh
Sources: globalpetrolprices.com and ourworldindata.org

Ride-hailing and deliveries

Any ride-hailing apps? Yes
Any delivery apps? Yes
Legislation regulating digital ride-hailing? No

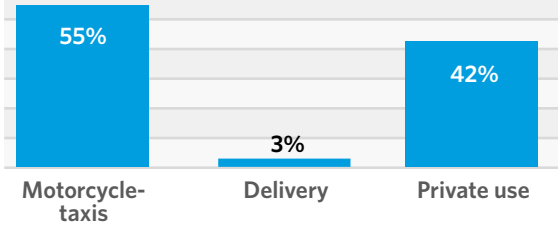
Deaths of 2- & 3-wheeler riders

2- & 3-wheeler rider deaths - official figures (2021): 680. Source: Ministry of Security & Civil Protection
2- & 3-wheeler rider deaths as a proportion of all deaths: 72%. Source: Ministry of Security & Civil Protection

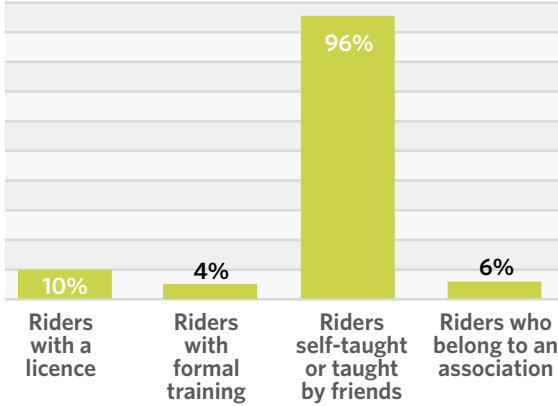
SNAPSHOT SURVEYS IN LOMÉ

Population: 1.93 million
Source: World Population Review, 2022

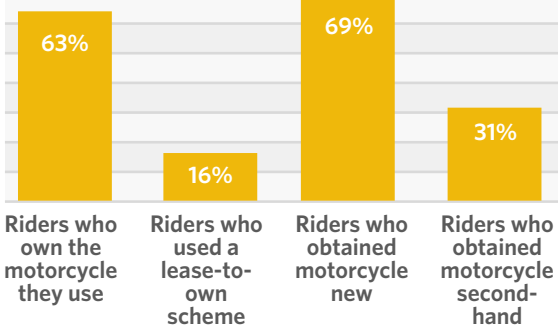
TYPES OF MOTORCYCLE USE



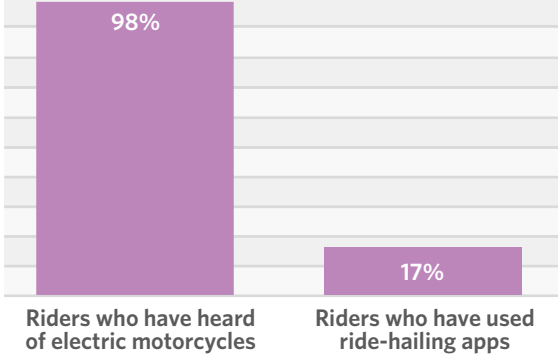
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



Source: This information was collected through face-to-face surveys with 100 motorcycle riders in February 2022, and roadside observations of 300 motorcycles at three different locations, in March 2021.

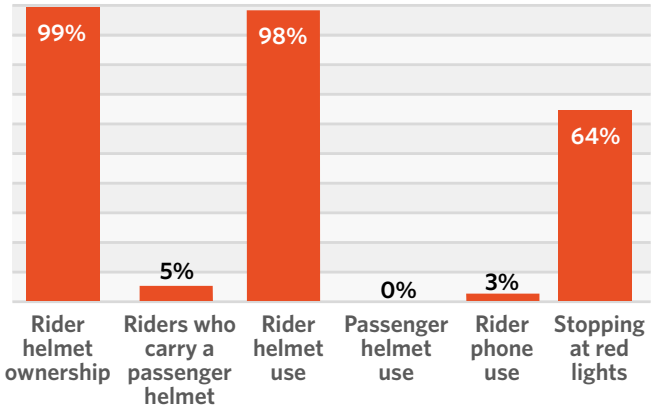
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	37 years
Average educational achievement:	Lower Secondary
Average length of time of operation:	9.7 years

WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$19.78
Weekly net income - delivery:	US \$22.84
Average hours worked per day:	8.1
Average days worked per week:	6.0
Average cost of helmet:	US \$10.89
Percent of riders with insurance:	46%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS

- Police
- Government officials
- Passengers
- Other motorcyclists
- Other vehicle drivers
- Associations
- App companies
- Local businesses



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	27%
Average days missed from work after serious injury:	61
Most common factor in crashes:	Collision with motorcycle
Riders who have been victim of crime:	52%
Most common type of violent crime:	Theft
Riders with negative health impacts from motorcycles:	87%

UGANDA

Population: 45.74 million
GNI per capita: US \$800
Income group: Low income
Youth unemployment: 4.0%
Source: World Bank, 2020

Number of 2- & 3-wheelers

Estimated total 2- & 3-wheelers (2020): 1,143,500
Source: Authors' calculations

Estimated percent of total vehicle fleet (2016): 59.3
Source: WHO Global Status Report for Road Safety, 2018



Legislation on motorcycle rider training and licensing

Required to have a licence to ride a motorcycle?
Required to undergo training to obtain a licence?
If yes, does the training have a practical component?
Required to undertake practical test to obtain a licence?

Yes
Yes
Yes
Yes

Legislation on motorcycle-taxi operations

Is it legal to operate a motorcycle-taxi?
Any geographical restrictions?
Any time restrictions (e.g., curfew)?
Are riders required by law to be members of associations?
Are riders required by law to wear reflector jackets?
Are riders required by law to wear identifying information?

Yes
Yes - Kampala has a 'Bodaboda-free zone'
No
Yes
Yes
Yes

Helmet legislation

Are riders required by law to wear a helmet?
Are passengers required by law to wear a helmet?
Is there a national standard for motorcycle helmets?

Yes
Yes
Yes

Electrification

Any electric motorcycle initiatives?
Any formal government support for electrification?
Average cost of electricity (households) (Dec. 2021):
Average cost of petrol (Sep. 2022):
Average annual duration of electricity outages (2018):
Grid carbon intensity (2020):
Sources: [globalpetrolprices.com](https://www.globalpetrolprices.com) and ourworldindata.org

Yes
Yes
\$0.18 per kWh
\$1.73 per litre
Data unavailable
77g CO₂/kWh

Ride-hailing and deliveries

Any ride-hailing apps?
Any delivery apps?
Legislation regulating digital ride-hailing?

Yes
Yes
Yes

Deaths of 2- & 3-wheeler riders

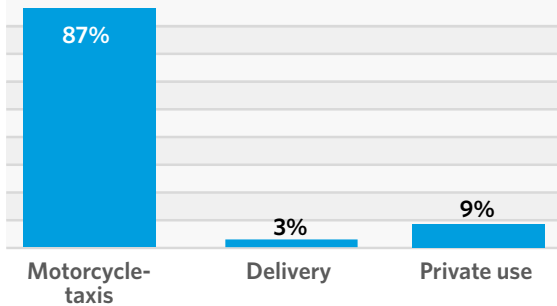
2- & 3-wheeler rider deaths - official figures (2016):
2- & 3-wheeler rider deaths as a proportion of all deaths (2016):

1,156. Source: Uganda Police Annual Report
33%. Source: Uganda Police Annual Report

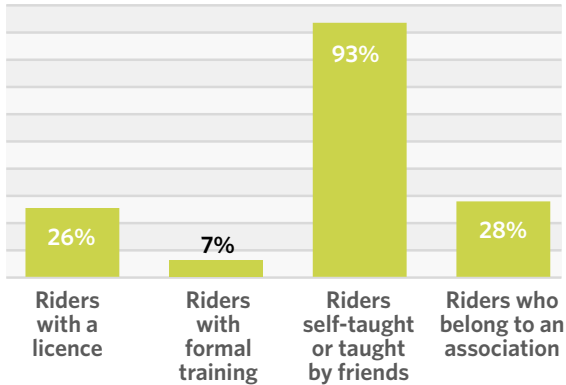
SNAPSHOT SURVEYS IN KAMPALA

Population: 3.65 million
Source: World Population Review, 2022

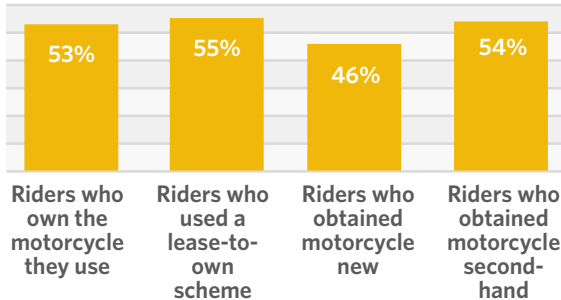
TYPES OF MOTORCYCLE USE



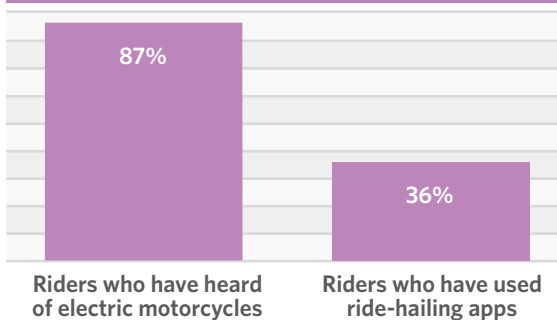
LICENSING, TRAINING AND ASSOCIATION MEMBERSHIP



OWNERSHIP OF MOTORCYCLES



INNOVATION



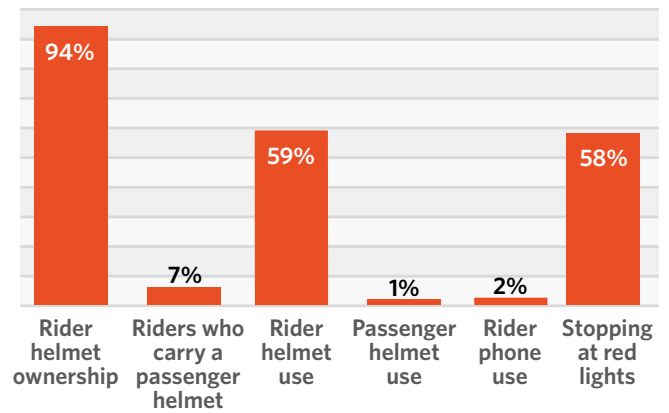
DEMOGRAPHICS OF MOTORCYCLE-TAXI AND DELIVERY RIDERS

Percent male:	100%
Average age:	33 years
Average educational achievement:	Lower Secondary
Average length of time of operation:	5.7 years

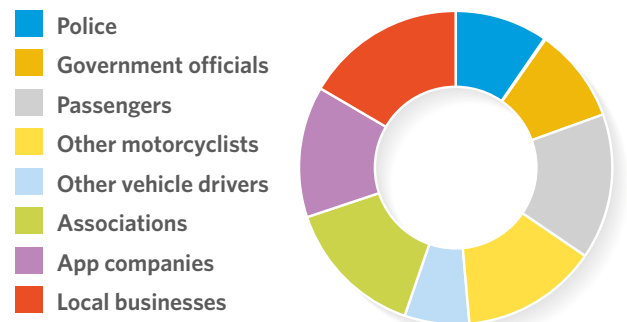
WORKING CONDITIONS

Weekly net income - motorcycle-taxi:	US \$20.90
Weekly net income - delivery:	US \$32.45
Average hours worked per day:	9.3
Average days worked per week:	6.2
Average cost of helmet:	US \$10.93
Percent of riders with insurance:	20%

COMPLIANCE WITH LAWS



RESPECT FELT BY RIDERS FROM OTHERS



The greater the size of the segment, the greater the respect felt

CRASHES AND CRIMES AND HEALTH

Riders who have suffered serious injury:	62%
Average days missed from work after serious injury:	38
Most common factor in crashes:	Collision with other vehicle
Riders who have been victim of crime:	56%
Most common type of violent crime:	Theft
Riders with negative health impacts from motorcycles:	45%

Source: This information was collected through face-to-face surveys with 100 motorcycle riders and roadside observations of 300 motorcycles at three different locations, in February 2022.

APPENDIX B:

ESTIMATED NUMBERS OF MOTORCYCLES PER COUNTRY, 2020

COUNTRY	LOW ESTIMATE	MID ESTIMATE	HIGH ESTIMATE
Angola	246,525	328,700	410,875
Benin	412,080	484,800	557,520
Botswana	4,998	5,880	6,762
Burkina Faso	1,567,500	2,090,000	2,612,500
Burundi	89,175	118,900	148,625
Cameroon	225,675	265,500	305,325
Cape Verde	10,425	13,900	17,375
Central African Republic	41,055	48,300	55,545
Chad	123,225	164,300	205,375
Comoros	1,630	2,174	2,717
Congo	10,346	13,795	17,244
Côte d'Ivoire	56,058	65,950	75,843
DR Congo	1,679,250	2,239,000	2,798,750
Djibouti	1,853	2,470	3,088
Equatorial Guinea	2,631	3,508	4,384
Eritrea	11,402	15,203	19,003
Eswatini	9,860	11,600	13,340
Ethiopia	862,500	1,150,000	1,437,500
Gabon	16,695	22,260	27,825
Gambia	18,128	24,170	30,213
Ghana	660,238	776,750	893,263
Guinea	279,013	328,250	377,488
Guinea-Bissau	36,900	49,200	61,500
Kenya	1,277,038	1,344,250	1,411,463
Lesotho	4,016	5,355	6,694

COUNTRY	LOW ESTIMATE	MID ESTIMATE	HIGH ESTIMATE
Liberia	107,483	126,450	145,418
Madagascar	519,188	692,250	865,313
Malawi	143,475	191,300	239,125
Mali	379,688	506,250	632,813
Mauritania	8,719	11,625	14,531
Mauritius	107,610	126,600	145,590
Mozambique	265,710	312,600	359,490
Namibia	4,764	6,353	7,941
Niger	51,446	60,525	69,604
Nigeria	3,864,375	5,152,500	6,440,625
Rwanda	110,075	129,500	148,925
São Tomé and Príncipe	1,644	2,192	2,740
Senegal	142,290	167,400	192,510
Seychelles	2,338	2,462	2,585
Sierra Leone	67,805	79,770	91,736
Somalia	119,175	158,900	198,625
South Africa	504,135	593,100	682,065
South Sudan	209,813	279,750	349,688
Sudan	82,219	109,625	137,031
Togo	248,370	331,160	413,950
Uganda	857,625	1,143,500	1,429,375
United Republic of Tanzania	1,269,263	1,493,250	1,717,238
Zambia	39,058	45,950	52,843
Zimbabwe	31,578	37,150	42,723
Totals	16,786,056	21,334,374	25,882,693

REFERENCES

- ¹ World Health Organization, *Global Status Report on Road Safety*, 2018.
- ² Poswayo et al., 'School Area Road Safety Assessment and Improvements (SARSAI) programme reduces road traffic injuries among children in Tanzania', *Inj Prev* 2018;0:1-7. doi:10.1136/injuryprev-2018-042786.
- ³ World Health Organization, *Global Status Report on Road Safety*, 2018.
- ⁴ Fisher et al., 'Air pollution and development in Africa: impacts on health, the economy, and human capital', *Lancet Planet Health* 2021; 5: e681-88.
- ⁵ BBC, Katsina: 'The motorcycle bandits terrorizing northern Nigeria', <https://www.bbc.co.uk/news/world-africa-53009704>, accessed 2nd May 2022.
- ⁶ Kenda Mutongi, *Matatu: A History of Popular Transportation in Nairobi* (Chicago, IL, US: University of Chicago Press, 2017), <http://ebookcentral.proquest.com/lib/umichigan/detail.action?docID=4865625>.
- ⁷ Ibid.
- ⁸ Lourdes Diaz Olvera, Didier Plat and Pascal Pochet, 'Looking for the Obvious: Motorcycle Taxi Services in Sub-Saharan African Cities', *Journal of Transport Geography* 88 (October 2020): 102476, <https://doi.org/10.1016/j.jtrangeo.2019.102476>.
- ⁹ Ajay Kumar, 'Understanding the Emerging Role of Motorcycles in African Cities', *Sub-Saharan Africa Transport Policy Program*, April 2011.
- ¹⁰ Ibid.
- ¹¹ Lourdes Diaz Olvera, Didier Plat and Pascal Pochet, 'Looking for the Obvious: Motorcycle Taxi Services in Sub-Saharan African Cities', *Journal of Transport Geography* 88 (October 2020): 102476, <https://doi.org/10.1016/j.jtrangeo.2019.102476>.
- ¹² Jean Bourdache, 'Africa: The Motorcyclists' Continent', *The Vintagent*, 3rd March 2018, <https://thevintagent.com/2018/03/05/africa-the-motorcyclists-continent/>.
- ¹³ UN Comtrade International Trade Statistics Database, <https://comtrade.un.org>.
- ¹⁴ World Health Organization, *Global Status Reports on Road Safety*, 2009, 2012, 2015 and 2018.
- ¹⁵ McKinsey & Company, 'Power to Move: Accelerating the Electric Transport Transition in Sub-Saharan Africa', <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/power-to-move-accelerating-the-electric-transport-transition-in-sub-saharan-africa>. Accessed 9th June 2022.
- ¹⁶ Tom Bishop et al., 'The Magnitude and Characteristics of Road Traffic Injury on Rural Roads in Kilolo District, Tanzania', AFCAP, 2015.
- ¹⁷ Author Tom Bishop's experience in Rwanda and Tanzania.
- ¹⁸ Caroline Barber and Victor Simfukwe, 'Transforming Rural Access: Motorcycles, Low-Cost Infrastructure and Appropriate Standards: Workshop Final Report', *Final Report*, n.d., 20.
- ¹⁹ Riders For Health website, accessed 27th April 2022, <http://https://www.riders.org/>.
- ²⁰ Tom Collins, "'People Would Chase Me": The Taxi Bike Rider Breaking Uganda's Taboos', *The Guardian*, 25th March 2022, sec. Global development, <https://www.theguardian.com/global-development/2022/mar/25/my-husband-refused-to-teach-me-the-taxi-bike-rider-breaking-ugandas-taboos>.
- ²¹ Tom Courtright, 'Moving in Growing Cities: Barriers to Accessibility in Fort Portal and Mbale', (University of Michigan, 2021).
- ²² William S. Kisaalita and Josephat Sentongo-Kibalama, 'Delivery of Urban Transport in Developing Countries: The Case for the Motorcycle Taxi Service (Boda-Boda) Operators of Kampala', *Development Southern Africa* 24, no. 2 (2007): 345-57.
- ²³ George Mark Onyango, 'Urban Public Transport in Informal Settlements: Experiences from Kisumu City, Kenya,' *Bulletin of Geography. Socio-Economic Series* 40, no. 40 (2018): 145-56, <http://dx.doi.org.proxy.lib.umich.edu/10.2478/bog-2018-0020>.
- ²⁴ Daniel Ehebrect, 'Motorcycle Taxis in East African Cities: Growth Dynamics, Regulation, Challenges and Potentials', 2020.
- ²⁵ Tom Courtright, 'Moving in Growing Cities: Barriers to Accessibility in Fort Portal and Mbale', (University of Michigan, 2021).
- ²⁶ Gina Porter and Jeff Turner, 'Meeting Young People's Mobility and Transport Needs: Review and Prospect', *Sustainability* 11, no. 22 (January 2019): 6193, <https://doi.org/10.3390/su11226193>.
- ²⁷ Vincent Were, Interview with Vincent Were, Head of Corporate Affairs, BAK, 22nd February 2022.
- ²⁸ Oladipo Olubomehin, 'The Development and Impact of Motorcycles as Means of Commercial Transportation in Nigeria', *Res. Humanit. Soc. Sci.* 2 (1st January 2012).
- ²⁹ Roger Behrens et al., 'TRANSITIONS - Informal Transport Compendium Report', *HVT (blog)*, June 2021, <https://transport-links.com/download/transitions-informal-transport-compendium-report/>.
- ³⁰ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ³¹ Paul Starkey, 'The Benefits and Challenges of Increasing Motorcycle Use for Rural Access', 2016.
- ³² Gina Porter, 'Mobility and Inequality in Rural Nigeria: The Case of Off-Road Communities', *Tijdschrift Voor Economische En Sociale Geografie* 88, no. 1 (1997): 65-76, <https://doi.org/10.1111/j.1467-9663.1997.tb01584.x>.
- ³³ Paul Starkey, John Hine and Robin Workman, 'Interactions between Improved Rural Access Infrastructure and Transport Services Provision', *Final Report*, n.d., 63.

- ³⁴ Jack Jenkins, Krijn Peters and Paul Richards, 'At the End of the Feeder Road: Upgrading Rural Footpaths to Motorcycle Taxi-Accessible Tracks in Liberia', *NJAS – Wageningen Journal of Life Sciences* 92 (December 2020): 100333, <https://doi.org/10.1016/j.njas.2020.100333>.
- ³⁵ Guy Augustin Kemtsop and Paul Starkey, 'Rural Transport Services Indicators: Report of the Pitoa-Djallou Road, Northern Region, Cameroon', 2013, 30.
- ³⁶ Starkey, 'The Benefits and Challenges of Increasing Motorcycle Use for Rural Access', 2016.
- ³⁷ Willy Turyahikayo and Justus Ayesigye, 'Determinants of Demand for None Agricultural Rural Employment (NARE) in Uganda: The Case of the Influx of Motor Cyclists (Bodaboda) in Ntungamo District', n.d., 9.
- ³⁸ Ibid.
- ³⁹ Frank van Steenberg et al., 'On Local Circular Growth: Creating 500,000 Jobs in Rural Transport in Ethiopia', *TheWaterChannel*, 21st August 2020, <https://thewaterchannel.tv/thewaterblog/on-local-circular-growth-creating-500000-jobs-in-rural-transport/>.
- ⁴⁰ Gina Porter and Jeff Turner, 'Meeting Young People's Mobility and Transport Needs: Review and Prospect', *Sustainability* 11, no. 22 (January 2019): 6193, <https://doi.org/10.3390/su11226193>.
- ⁴¹ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁴² Connecting Africa, 'Gozem, IFC partner on \$10m moto-taxi financing project', https://www.connectingafrica.com/document.asp?doc_id=778174. Accessed 16th June 2022.
- ⁴³ Peter Njenga, Shedrack Willilo and John Hine, 2015, 'First Mile Transport Challenges for Smallholder Tomato Farmers along Ihimbo-Itimbo Road, Kilolo District Tanzania', IFRTD/AFCAP.
- ⁴⁴ World Health Organization, *Global Status Report on Road Safety*, 2009.
- ⁴⁵ World Health Organization, *Global Status Report on Road Safety*, 2012.
- ⁴⁶ World Health Organization, *Global Status Report on Road Safety*, 2018.
- ⁴⁷ Ibid.
- ⁴⁸ Ibid.
- ⁴⁹ A. Tripodi et al., 'Motorcycle Safety in Africa', World Bank / African Development Bank, 2020.
- ⁵⁰ P. Agyekum-Boamah, 'The growing use of motorcycles for commercial transport and traffic safety in Ghana', *Injury Prevention* 2012;18:A190.
- ⁵¹ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁵² Oginni et al, 2006, 'Motorcycle Related Maxillofacial Injuries among Nigerian Intracity Road Users', *Journal of Oral and Maxillofacial Surgery*, 64, 56–62, <http://dx.doi.org/10.1016/j.joms.2005.09.027>.
- ⁵³ P. Perego and F. Biassoni, '5D.003 Regulating commercial motorcycle fleets – A survey in Tanzania', *Injury Prevention* 2021;27:A43-A44.
- ⁵⁴ Poswayo et al., 'School Area Road Safety Assessment and Improvements (SARSAI) programme reduces road traffic injuries among children in Tanzania', *Inj Prev* 2018;0:1-7, doi:10.1136/injuryprev-2018-042786.
- ⁵⁵ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁵⁶ Author Tom Bishop's personal experience.
- ⁵⁷ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁵⁸ Kipngetch Maritim Shadrack, *Factors Influencing Commercial Motorcycle Accidents In Kenya: A Case Of Bungoma South Sub County* (Nairobi: University of Nairobi, 2017).
- ⁵⁹ World Health Organization, *Helmets: A road safety manual for helmets and practitioners*, 2006 (Geneva: WHO).
- ⁶⁰ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁶¹ Williams Ackaah et al., 'The Use of Non-Standard Motorcycle Helmets in Low- and Middle-Income Countries: A Multicentre Study', *Injury Prevention* 19, no. 3 (1st June 2013): 158–63, <https://doi.org/10.1136/injuryprev-2012-040348>.
- ⁶² James Kakande and Tom Courtright, 2022, 'A Market Analysis on the Distribution of Safe Helmets in Uganda,'for Safe Way Right Way.
- ⁶³ Author Tom Bishop's experience in Ghana and Tanzania. Also, see "'No Money, No Justice": Police Corruption and Abuse in Liberia' (Human Rights Watch, 22nd August 2013), <https://www.hrw.org/report/2013/08/22/no-money-no-justice/police-corruption-and-abuse-liberia>.
- ⁶⁴ Author Tom Bishop's experience in Kenya and Tanzania.
- ⁶⁵ Franklin Draku, 'Uganda: Govt Suspends Ban On Boda Bodas in City', *The Monitor*, 28th July 2020, sec. News, <https://allafrica.com/stories/202007280403.html>. Also as reported by Ugandan boda boda rider Geoffrey Ndhogezi.
- ⁶⁶ Sally Hayden, 'As Sierra Leone Turns 60, Its Army of Bike Riders Call for End to Police Corruption', *The Irish Times*, 26th April 2021, <https://www.irishtimes.com/news/world/africa/as-sierra-leone-turns-60-its-army-of-bike-riders-call-for-end-to-police-corruption-1.4548379>; And Yomi Kazeem, "A Ban on Commercial Motorcycles by Lagos Puts a Spotlight on Its Inadequate Public Transit System," *Quartz*, accessed 27th April 2022, <https://qz.com/africa/1797369/lagos-okada-ban-sparks-protests-hits-bike-hailing-startups/>.

- ⁶⁷ Author Tom Bishop's experience in Tanzania. For Uganda, see Tom Goodfellow and Paul Isolo Mukwaya, 'The Political Economy of Public Transportation in Greater Kampala: Movers, Spoilers and Prospects for Reform', Just City: Friedrich Ebert Stiftung, March 2021).
- ⁶⁸ Kristof Titeca, 'The Commercialization of Uganda's 2011 Election in the Urban Informal Economy: Money, Boda-Bodas and Market Vendors', 2014, pp. 178-207, <https://doi.org/10.13140/2.1.1071.6967>.
- ⁶⁹ World Economic Forum, Global Competitiveness Index, 2019. Accessed via https://www.theglobaleconomy.com/rankings/roads_quality/.
- ⁷⁰ World Bank (2019), *Guide for Road Safety Opportunities and Challenges: Low- and Middle-Income Countries Country Profiles* (Washington, D.C., US: World Bank).
- ⁷¹ 'Motorcyclists Road Safety Toolkit', IRAP, accessed 27th April 2022, <https://toolkit.irap.org/road-users/motorcyclists/?frm-page-4080=1>.
- ⁷² Rizzi et al., 2015, 'Effectiveness of motorcycle antilock braking systems (ABS) in reducing crashes, the first cross-national study', *Traffic Injury Prevention*, 2015;16(2):177-83.
- ⁷³ A. Delamou et al., 'Motorcycle Accidents and Their Outcomes amongst Victims Admitted to Health Facilities in Guinea: A Cross-Sectional Study', *Adv Prev Med*. 2020;2020:1506148. Published 22nd June 2020. doi:10.1155/2020/1506148.
- ⁷⁴ Doherty, 2017, 'Life (and Limb) in the Fast-Lane: Disposable People as Infrastructure in Kampala's Boda Boda Industry', *Critical African Studies*, Vol. 9 Issue 2, 2017.
- ⁷⁵ Richard W. Atkinson et al., 'Fine Particle Components and Health – a Systematic Review and Meta-Analysis of Epidemiological Time Series Studies of Daily Mortality and Hospital Admissions', *Journal of Exposure Science & Environmental Epidemiology* 25, no. 2 (March 2015): 208-14, <https://doi.org/10.1038/jes.2014.63>.
- ⁷⁶ Ajit Singh, William R. Avis and Francis D. Pope, 'Visibility as a Proxy for Air Quality in East Africa', *Environmental Research Letters* 15, no. 8 (July 2020): 084002. <https://doi.org/10.1088/1748-9326/ab8b12>.
- ⁷⁷ Fisher et al., 'Air pollution and development in Africa: impacts on health, the economy, and human capital', *Lancet Planet Health* 2021; 5: e681-88.
- ⁷⁸ Heft-Neal et al., 'Robust relationship between air quality and infant mortality in Africa', *Nature* 559, 254-258 (2018).
- ⁷⁹ Fisher et al., 'Air pollution and development in Africa: impacts on health, the economy, and human capital', *Lancet Planet Health* 2021; 5: e681-88.
- ⁸⁰ Public Eye, 'Dirty Diesel: Dirty business with toxic fuels', <https://www.publiceye.ch/en/topics/commodities-trading/dirty-diesel>, accessed 2nd May 2022.
- ⁸¹ Gabriella Mulligan, 'Rwanda Goes Electric with Locally Made Motorbikes', BBC News, accessed 27th April 2022, <https://www.bbc.com/news/business-58820548>.
- ⁸² S. Platt, I. Haddad and S. Pieber et al., 'Two-stroke scooters are a dominant source of air pollution in many cities', *Nat Commun* 5, 3749 (2014), <https://doi.org/10.1038/ncomms4749>.
- ⁸³ Tsai, Jiun-Horng, Yung-Chen Yao, Pei-Hsiu Huang and Hung-Lung Chiang, 'Criteria Pollutants and Volatile Organic Compounds Emitted from Motorcycle Exhaust under Various Regulation Phases', *Aerosol and Air Quality Research* 17, no. 5 (2017):1214-23, <https://doi.org/10.4209/aaqr.2016.04.0155>.
- ⁸⁴ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ⁸⁵ United Nations, United Nations Fact Sheet on Climate Change – *Africa Is Particularly Vulnerable to the Expected Impacts of Global Warming*, 2006.
- ⁸⁶ Yung-Chen Yao et al., 'Comparison of Exhaust Emissions Resulting from Cold- and Hot-Start Motorcycle Driving Modes', *Journal of the Air & Waste Management Association* 59, no. 11 (1st November 2009):1339-46, <https://doi.org/10.3155/1047-3289.59.11.1339>.
- ⁸⁷ African Development Bank, 'Africa NDC Hub', Text, African Development Bank – Building today, a better Africa tomorrow (African Development Bank Group, 16th April 2019), <https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/africa-ndc-hub>.
- ⁸⁸ UNEP Electric Motorbikes Launch, 2021, <https://www.unep.org/events/unep-event/electric-motorbikes-launch>.
- ⁸⁹ R. Arku, 'Urban air and noise pollution in Sub-Saharan Africa: A study of prenatal exposures, birth outcomes and sleep disturbances in infants', Health Effects Institute, 2022, <https://www.healtheffects.org/research/ongoing-research/urban-air-and-noise-pollution-Sub-Saharan-africa-study-prenatal-exposures>.
- ⁹⁰ AutoJoshNG, 'Moment Thieves On Motorcycle Snatched A Phone From Traffic Police Officer', 2021, <https://www.youtube.com/watch?v=6VGbrXNzMoo>.
- ⁹¹ Save the Children, *Trailblazers: Empowering commercial motorcycle taxi drivers to be agents of change for girls' education and protection*, 2019.
- ⁹² Gina Porter and Jeff Turner, 'Meeting Young People's Mobility and Transport Needs: Review and Prospect', *Sustainability* 11, no. 22 (January 2019): 6193, <https://doi.org/10.3390/su11226193>.
- ⁹³ A. Tripodi et al., *Motorcycle Safety in Africa*, World Bank / African Development Bank, 2020.
- ⁹⁴ *Daily Nation*, 'Kenya: Police Probe 7 Deaths, 23 Motorcycles Thefts in Mavoko', <https://allafrica.com/stories/202110050425.html>. Accessed 2nd May 2022.
- ⁹⁵ Fred Wambede, 'Mbale Riders Appeal to IGP Over Police Brutality,' *Daily Monitor*, 16th February 2021, sec. News, <https://allafrica.com/stories/202102160503.html>; Mudangha Kolyangha, 'Boda Boda Rider Shot Dead for Defying Lockdown Rules', *Daily Monitor*, 20th April 2020, sec. News, <https://allafrica.com/stories/202004200437.html>.

- ⁹⁶ The Star, 'We Are Sorry - Boda Boda Riders Say Amid Crackdown', accessed 27th April 2022, <https://www.the-star.co.ke/news/2022-03-09-we-are-sorry-boda-boda-riders-say-amid-crackdown/>.
- ⁹⁷ J.B. MacLeod, J.C. DiGiacomo and G. Tinkoff, 2010, 'An evidence-based review: helmet efficacy to reduce head injury and mortality in motorcycle crashes: EAST practice management guidelines', *Journal of Trauma and Acute Care Surgery* 69(5):1101-1111.
- ⁹⁸ FIA Foundation and AIP Foundation, 'Head First: A Case Study of Vietnam's Motorcycle Helmet Campaign', 2017, https://www.fiafoundation.org/media/461104/aipf-10-year-helmet-law-report-final_r5_single.pdf.
- ⁹⁹ Transaid, Amend and TRL, 'Instructor's Manual for the competency-based curriculum for training motorcycle and tricycle riders', 2019. www.research4cap.org/index.php/regional-and-cross-regional-projects/motorcycle-safety.
- ¹⁰⁰ Riccardo Gangale, 'Rwanda's Road-Safety Transformation', *Bulletin of the World Health Organization*, 2007, 3.
- ¹⁰¹ Aurore Teta Ufitiwabo, 'Rwanda: Mandatory Use of Taxi Moto Smart Metres Begins Friday', *The New Times*, 7th January 2022, sec. News, <https://allafrica.com/stories/202201070016.html>.
- ¹⁰² Tom Goodfellow, 'The Institutionalisation of "Noise" and "Silence" in Urban Politics: Riots and Compliance in Uganda and Rwanda', *Oxford Development Studies* 41, no. 4 (December 2013): 436-54, <https://doi.org/10.1080/13600818.2013.807334>.
- ¹⁰³ Interview with Vincent Were, Head of Corporate Affairs, BAK.
- ¹⁰⁴ Transaid, Amend and TRL, 'A Manual for Motorcycle and Three-Wheeler Taxi Associations', 2019, www.research4cap.org/index.php/regional-and-cross-regional-projects/motorcycle-safety.
- ¹⁰⁵ World Bank, 2022, 'African Cities Facing the Urban Mobility Crisis: The Challenge of National Mobility Policies in Benin, Burkina Faso, Mali and Togo Confronted with the Proliferation of Motorized Two-Wheelers - Transnational Report', Washington, D.C., <https://openknowledge.worldbank.org/handle/10986/37084> License: CC BY 3.0 IGO.
- ¹⁰⁶ ITP, 'Motorcycle Safety and Last Mile Connections in Lusaka and Maputo', 2021.
- ¹⁰⁷ Jack Jenkins et al., 'Changing Women's Lives and Livelihoods: Motorcycle Taxis in Rural Liberia and Sierra Leone', *Proceedings of the Institution of Civil Engineers*. Transport 173, no. 2 (1st April 2020):132-43, <https://doi.org/10.1680/jtran.18.00162>.
- ¹⁰⁸ Sum4All, 'Global Roadmap of Action Toward Sustainable Mobility', accessed 27th April 2022, <https://www.sum4all.org/global-roadmap-action>.
- ¹⁰⁹ Ministry of Works, Transport and Communication, 'Low Volume Roads Manual', 2016, <https://www.roadfund.go.tz/uploads/publications/sw-1570520923-Tanzania%20LVR%20Manual%202016%20Part%20One-compressed.pdf>.
- ¹¹⁰ Tom Bishop, Amend, 'Advice for District Engineers: Motorcycle Safety on Low Volume Rural Roads', Cardno, 2016.
- ¹¹¹ Muni, Kennedy et al., 'Motorcycle Taxi Programme Is Associated with Reduced Risk of Road Traffic Crash among Motorcycle Taxi Drivers in Kampala, Uganda', *International Journal of Injury Control and Safety Promotion* 26, no. 3 (2019):294-301; And Blanshe Musunguzi and Tom Courtright, 'Uganda's SafeBoda Wants to Be a Super App, but Some Riders Are Abandoning It', *Rest of World*, 24th March 2022, <https://restofworld.org/2022/ugandas-safeboda-has-upset-its-riders-and-disappointed-its-customers/>.
- ¹¹² Elaine Moore and Dave Lee, 'Is Uber, Valued at \$91bn, on Verge of a Profitable Future after a Decade of Losses?', *The Irish Times*, accessed 27th April 2022, <https://www.irishtimes.com/business/technology/is-uber-valued-at-91bn-on-verge-of-a-profitable-future-after-a-decade-of-losses-1.4704534>.
- ¹¹³ Toukam Ngoufanke, Eva Stolz and Mia Koschitzky-Kimani, 'The opportunity for electric motorcycles in Sub-Saharan Africa', 2022. https://persistent.energy/wp-content/uploads/2022/02/Publication_The-opportunity-for-Two-Wheel-e-Mobility-in-Sub-Saharan-Africa.pdf. Accessed 5th July 2022.
- ¹¹⁴ 'The Future of Energy in Africa - Special Report', *African Business*, accessed 27th April 2022, <https://african.business/dossiers/energy-in-africa-special-report/>.
- ¹¹⁵ African Development Bank, 'Light Up and Power Africa - A New Deal on Energy for Africa', Text, African Development Bank - Building today, a better Africa tomorrow (African Development Bank Group, 7th June 2019), <https://www.afdb.org/en/the-high-5/light-up-and-power-africa-%E2%80%93-a-new-deal-on-energy-for-africa>.
- ¹¹⁶ Ministry of Infrastructure, 'Strategic Paper on Electric Mobility adaptation in Rwanda', 2021, https://www.mininfra.gov.rw/fileadmin/user_upload/Mininfra/Publications/Laws_Orders_and_Instructions/Transport/16062021_Strategic_Paper_for_e-mobility_adaptation_in_Rwanda-Final.pdf.
- ¹¹⁷ Author Tom Courtright's experience and interviews with Zembo, Uganda.
- ¹¹⁸ World Health Organization, *Helmets: A road safety manual for helmets and practitioners*, 2006. (Geneva: WHO).
- ¹¹⁹ Susan Wells et al., 'Motorcycle Rider Conspicuity and Crash Related Injury: Case-Control Study', *BMJ: British Medical Journal* 328, no. 7444 (10th April 2004):857, <https://doi.org/10.1136/bmj.37984.574757.EE>.
- ¹²⁰ Tom Bishop et al., 2018, 'Enhancing understanding on safe motorcycle and three-wheeler use for rural transport', Final Report, RAF2114A. London: ReCAP for DFID.
- ¹²¹ Ibid.
- ¹²² International Roads Assessment Programme, <https://toolkit.irap.org/road-users/motorcyclists/?frm-page-4080=3>. Accessed 2nd May 2022.
- ¹²³ Tom Bishop, Amend, *Advice for District Engineers: Motorcycle Safety on Low Volume Rural Roads*, Cardno, 2016.
- ¹²⁴ FIA Foundation, *Renewable Energy Pathways in Road Transport*, 2020.
- ¹²⁵ Jasper Jolly, 'Cutting battery industry's reliance on cobalt will be an uphill task', *The Guardian*, Accessed 4th May 2022.



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