

A Statistical Mechanics Approach to Describe Cell Reorientation Under Stretch

Original

A Statistical Mechanics Approach to Describe Cell Reorientation Under Stretch / Loy, N; Preziosi, L. - In: BULLETIN OF MATHEMATICAL BIOLOGY. - ISSN 0092-8240. - 85:7(2023), pp. 1-31. [10.1007/s11538-023-01161-4]

Availability:

This version is available at: 11583/2984052 since: 2023-11-23T17:59:07Z

Publisher:

Springer

Published

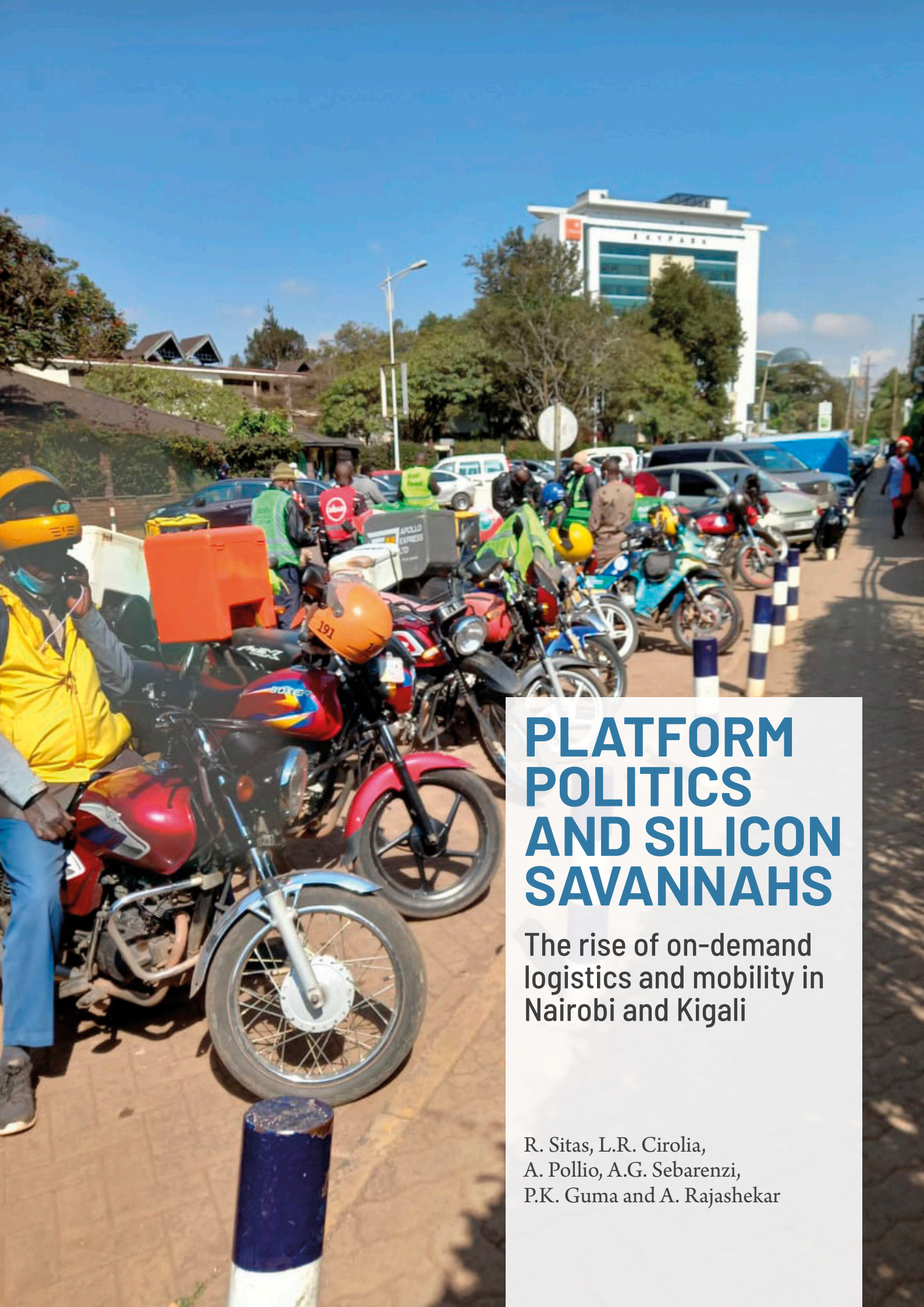
DOI:10.1007/s11538-023-01161-4

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)



PLATFORM POLITICS AND SILICON SAVANNAHS

The rise of on-demand
logistics and mobility in
Nairobi and Kigali

R. Sitas, L.R. Cirolia,
A. Pollio, A.G. Sebarenzi,
P.K. Guma and A. Rajashekar

Authors

Rike Sitas, University of Cape Town, African Centre for Cities

Liza Rose Cirolia, University of Cape Town, African Centre for Cities

Andrea Pollio, Marie Skłodowska-Curie Fellow, Polytechnic University of Turin

Alexis Gatoni Sebarenzi, University of Rwanda

Prince K. Guma, British Institute in Eastern Africa

Anirudh Rajashekar, Pegasys

Cover image

By Prince K. Guma

Citation

Sitas, R., Cirolia, L.R., Pollio, R., Sebarenzi, A.G., Guma, P.K. and Rajashekar, A. (2022). *Platform Politics and Silicon Savannahs: The rise of on-demand logistics and mobility in Nairobi and Kigali* (Cape Town: African Centre for Cities, University of Cape Town).

DOI: 10.25375/uct.19582621

Funding and acknowledgements

This research was funded by the Volvo Research and Education Foundation (VREF), under the Mobility and Access in African Cities Programme. Andrea Pollio is supported by the Horizon 2020 Marie Curie Fellowship grant no. 886772 (SURGE). Liza Cirolia is supported by PEAK Urban (GCRF). Additional thanks to Nancy Odendaal for her insights on the report. Jack Odeo and Rifquah Hendricks were instrumental in providing research support for the Nairobi case.



UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD



AFRICAN CENTRE FOR CITIES
urbanism from an african perspective

VREF
VOLVO RESEARCH & EDUCATIONAL FOUNDATIONS

Contents

Abbreviations	2		
List of Figures	3		
List of Tables	3		
1. Introduction	4		
2. The burning platform	5		
ICT investment and the rise of platform ecosystems	5		
Smart cities, platformed places	6		
Motorcycles and paratransit platforms	7		
3. Surfacing platform politics in silicon savannahs	8		
Taxonomies as tools	8		
Multi-city case studies	11		
4. Nairobi, Kenya	12		
Kenya National Scale	12		
<i>Boda boda</i> platform ecosystems	13		
Regulatory frame for Nairobi	19		
Nairobi deep dive	22		
<i>Uber</i>	23		
<i>Offering, actors and the Uber ecosystem</i>	23		
<i>Intervention and innovation</i>	24		
GoBEBA	25		
<i>Offering, actors and the GoBEBA ecosystem</i>	25		
<i>Intervention and innovation</i>	26		
Key points	27		
		5. Kigali, Rwanda	28
		Rwanda National Scale	28
		Regulatory frame for Kigali	33
		<i>Kigali deep dive</i>	38
		<i>Vuba Vuba</i>	38
		<i>Offering, actors and Vuba Vuba ecosystem</i>	38
		<i>Intervention and innovation</i>	38
		YegoMoto	40
		Offering, actors and YegoMoto ecosystem	40
		Intervention and innovation	42
		Key points	42
		COVID-19 and the rise of motorcycle platformisation	43
		Algorithmic and analogue adaptation	43
		6. Emerging themes and insights	43
		Super-apps	44
		Regulatory regimes and governance gaps	44
		Planning for reconfiguring business processes	44
		7. Conclusion	45
		Glossary	46
		References	47

Abbreviations

4IR	Fourth Industrial Revolution
ALU	African Leadership University
AU	African Union
B2B	Business-to-Business
B2C	Business-to-Customer
BNR	National Bank of Rwanda
BRT	Bus Rapid Transit
C2B	Customer-to-Business
C2C	Customer-to-Customer
CAK	Communication Authority of Kenya
CBD	Central Business District
CCK	Communications Commission of Kenya
CMU	Carnegie Mellon University
CoK	City of Kigali
CTSC	County Transport and Safety Committee
DRM	Digital Rights Management
ECC	E-commerce Centre
FERWACOTAMU	Motorcycle Cooperatives, Unions and Federation
FMCG	Fast-Moving Consumer Goods
GDP	Gross Domestic Product
GIZ	German Agency for International Cooperation
GPS	Global Positioning System
ICFM	Intelligent Connected Fare Meter
ICT	Information Communication Technology
ICT4D	Information and Communication Technologies for Development
IPO	Initial Public Offering
ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KIC	Kigali Innovation City
KRA	Kenya Revenue Authority
KRB	Kenya Roads Board
KSEZ	Kigali Special Economic Zones
KURA	Kenya Urban Roads Authority
LPWAN	Low Power Wide Area Network
MAAK	Motorcycle Assemblers Association of Kenya
MIIYA	Ministry of ICT Innovation and Youth Affairs
MINALOC	Ministry of Local Government

MINICOM	Ministry of Trade and Industry
MINICT	Ministry of ICT
MININFRA	Ministry of Infrastructure
MOU	Memorandum of Understanding
MRTS	Mass Rapid Transit System
NaMATA	Nairobi Metropolitan Area Transport Authority
NBS	National Broadband Strategy
NCC	Nairobi City Council Government
NICI	National Information and Communications Infrastructure
NISR	National Institute of Statistics Rwanda
NIUPLAN	Nairobi Integrated Urban Development Master Plan
NMA	Nairobi Metropolitan Area
NMS	Nairobi Metropolitan Services
NMT	Non-Motorised Transport
NST	National Strategy for Transformation
NTSA	National Transport and Safety Authority
PIDA	Programme for Infrastructure Development in Africa
PSF	Private Sector Federation
PSV	Passenger Service Vehicles
RCA	Rwanda Cooperatives Agency
RDB	Rwanda Development Board
RGB	Rwanda Governance Board
RISA	Rwanda Information Society Authority
RMF	Road Maintenance Fund
RNP	Rwanda National Police
RRA	Rwanda Revenue Authority
RTDA	Rwanda Transport Development Agency
RURA	Rwanda Utilities Regulatory Authority
Rwanda IECMS	Rwanda Integrated Electronic Case Management System
SACCO	Saving and Credit Cooperatives
SDG	Sustainable Development Goal
SMEs	Small and Medium Enterprises
SPIU	Single Project Implementation Unit
TIMS	Transport Integrated Management System
TLB	Transport Licensing Board
UN-HABITAT	United Nations Human Settlement Programme
VAT	Value Added Tax

List of Figures

Figure 1:	PIDA ICT projects
Figure 2:	Different platforms/applications and what they move
Figure 3:	The four digital-platform business models
Figure 4:	Nairobi skyline
Figure 5:	An example of a delivery platform logo and advertising
Figure 6:	Examples of 'dark stores' in Nairobi
Figure 7:	Nairobi's regulatory ecosystem for platform-enabled two-wheel services
Figure 8:	Sample loan programme information for uberBODA and Uber Eats riders
Figure 9:	Overview of the GoBEBA offering
Figure 10:	The Kigali car-free zone
Figure 11:	Examples of moto delivery vehicles for various platforms
Figure 12:	Number of registered e-commerce platforms in Kigali between 2019 and 2021
Figure 13:	Kigali's regulatory ecosystem for platform-enabled two-wheel e-hailing
Figure 14:	Kigali's regulatory ecosystem for platform-enabled two-wheel e-logistics
Figure 15:	Sample screenshots of the Vuba app
Figure 16:	Vuba moto and rider
Figure 17:	Installation of a YegoMoto ICFM
Figure 18:	Banner indicating the list of requirements for registering on the YegoMoto platform

List of Tables

Table 1:	Ranking of African cities
Table 2:	Overview of Nairobi platforms
Table 3:	Types of service available through Nairobi platforms
Table 4:	Nairobi platforms' business models
Table 5:	Key governance actors in Nairobi
Table 6:	Key ICT and transport policies
Table 7:	GoBEBA services and partners
Table 8:	Overview of Kigali platforms
Table 9:	Types of services available through Kigali platforms
Table 10:	Kigali platforms' business models
Table 11:	Key governance actors in Kigali
Table 12:	Key ICT and transport policies
Table 13:	ICFM timeline

Introduction

Kigali and Nairobi have been dubbed ‘silicon savannahs’, celebrated for their adoption of smart city programmes and projects (Rosenberg & Brent, 2020; Graham & Mann, 2013). Since 2019, these cities have seen a huge increase in the use of motorcycles – called *boda* in Kenya and *moto* in Rwanda – for commuting, deliveries, and micro-logistics linked to various digital platforms. This rise has been enabled primarily by the proliferation of mobile phone-based applications that allow motorcycle-taxi riders to join digital platforms and connect with businesses and customers. This trend intensified during the COVID-19 pandemic when regulations limited urban movement.

The growth of platform-enabled two-wheel logistics is having a dramatic effect on mobility systems in cities, shaping how people access goods and services in real time. Despite this, there is little academic research on the consequences of this phenomenon in African cities or the extent of its uptake. This gap, in part, stems from the difficulty of studying these rapidly evolving systems and practices. In response, the overarching objective of this research was to understand how urban mobility – particularly the use of motorcycles – is being reconfigured by the introduction of platform-based systems for two-wheel paratransit sectors in African cities. We focus specifically on the platforms and dynamics emerging around motorcycle mobility and logistics within Nairobi (Kenya) and Kigali (Rwanda). However, there is arguably wider applicability to paratransit in many African cities where motorcycle taxis play or will be playing a role in commuter movement and on-demand logistics. These cases provide valuable insights into the rise of the platformisation of motorcycle taxis in African cities, as well as the lack of coherent regulation at this important urban interface.

It is important to note that this report is primarily interested in what is taking place in African cities. While maintaining a critical eye on these dynamics, critique of the rise of urban platforms – and the associated financial and labour relations which are, in

part, driving it – is not the main function of this piece. Neither were we able to access quantitative data (e.g. transaction data) from the platforms. There remains ample scope to apply other lenses to these dynamics and to apply mixed methods. However, for this research, we focused on developing a rich and textured understanding of what is happening in Nairobi and Kigali. This orientation aligns with a commitment to a southern urban perspective of African cities, which calls for a fine-grained approach to urban phenomena without dissolving specificities and singularities into too broad categories of analysis developed theoretically or otherwise. The report is structured as follows:

Part 2: The burning platform situates the research within current debates and discourse around smart cities and platform urbanism, paying particular attention to urban Africa. This section also introduces the key terms and concepts that inform the research and the report, as well as the methodology we followed to undertake the research.

Part 3: Nairobi, Kenya introduces the research conducted in Nairobi, providing information on the mobility ecosystem, and introducing two case studies: Uber (UberBODA, Uber Lite, Uber Eats, Uber Connect) and GoBEBA.

Part 4: Kigali, Rwanda introduces the research conducted in Kigali, providing information on the mobility ecosystem, and introducing two case studies: Vuba and YegoMoto.

Part 5: Emerging themes and insights draws on findings from the two cases and focuses on: COVID-19 and the rise of platformisation of motorcycles; algorithmic and analogue adaptation; super-apps; regulatory regimes and governance gaps; and planning for reconfiguring business processes.

In **Part 6: Conclusion** we identify new areas of research for the study of platformed paratransit in African cities.

2.

The burning platform

Across the Global South, digital platforms have become increasingly present in the understanding, management, and operation of cities and their infrastructures.

~ Chambers (2019)

Motorcycle taxis are essential to the mobility ecosystem of African cities and are increasingly being brought into digital platforms for commuting and on-demand logistics. Our research on two-wheel platform mobility in Nairobi and Kigali fits within current and urgent academic debates on African platform urbanisms and smart cities. In this section, we situate the report within the context of emergent Information Communication Technology (ICT) investment and the rise of platform ecosystems, smart cities, and motorcycle paratransit.

ICT investment and the rise of platform ecosystems

Many African cities are experiencing rapid growth in ICT infrastructure and digital ecosystems. Investments in hardwired broadband (submarine and underground fibre-optic cables, copper cables, etc.), mobile broadband (3G, 4G, 5G wireless access to the Internet via mobile telephony networks), data-centre enabled Internet exchanges, cloud and colocation services, and digital ecosystems more broadly (private and public ICT-based innovations, programmes and software services), provide the context for the growth of platforms in cities (Pollio & Cirolia, 2021).

Particularly in the context of urban Africa, investments in ICT are increasingly framed as essential to ensuring just, sustainable and inclusive development in cities and beyond. For example, the United Nations Sustainable Development Goal (SDG) 9.c calls to 'Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020' (United Nations, 2015). The commitment to using ICT to drive development not only features in global goals, but also in Africa's own programmes. The African Union (AU) Agenda 2063, and the supporting Programme for Infrastructure Development in Africa (PIDA), includes key projects related to the development of a Pan African e-network and improvements in cybersecurity. PIDA currently has over 100 ICT projects (Figure 1). These global and African agendas and investment programmes dovetail with important concepts such as the Fourth Industrial Revolution (4IR), Information and Communication Technologies for Development (ICT4D), the Fintech Revolution, and Digital Rights – all of which emphasise the important role digital advancements will have in societal transformation.

PIDA Projects Dashboard

The PIDA projects dashboard allows the filtering and visualization PIDA projects data by sectors, latest stages, sub sectors, countries, programmes, regions, RECs, type, status and reference plan. To narrow the list of selected projects, click on charts. Projects can also be selected from the list at the bottom by clicking on the project rows and then clicking the filter link in the Projects tab. Use the download link above each chart and project list tab to export the charts and the list of selected projects.

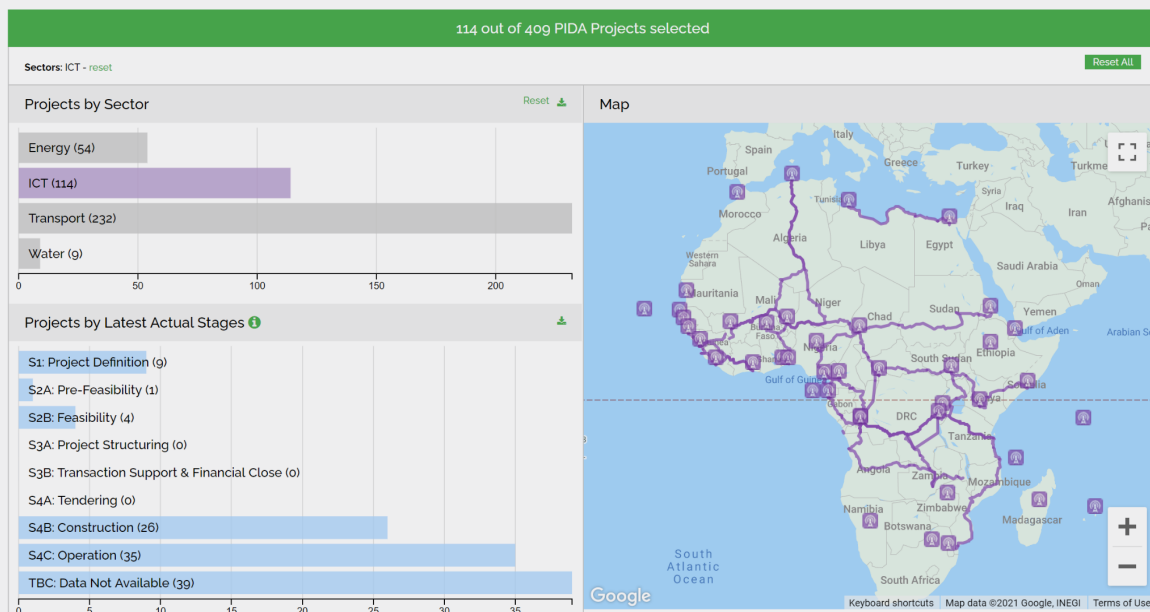


Figure 1: PIDA ICT projects (Virtual PIDA Information Centre, <https://www.au-pida.org/pida-projects/>)

Investment in ICT infrastructure has a profound effect on how cities function, and how platforms emerge and interact in different contexts. Notable for this report is that Kenya has a direct connection to deep-sea cables (via the Mombasa coast), whereas Rwanda has to negotiate terrestrial cables with the Kenya and Tanzania governments. Both countries have data-centre programmes aimed at addressing gaps in the regional ICT value chain. These investments have direct implications for the speed and cost of Internet access, providing the foundation for the development of digital service offerings that connect people (through phones and computers) to these large technical systems.

This infrastructure has supported the recent emergence of digital ecosystems in many African cities. Digital or platform ecosystems refer to an all-encompassing category that is used to capture the software component of ICT investment in Africa. It can include government-driven smart city projects and services; digitisation projects (e.g. in sectors such as public services and health); accelerator, incubator and similar digital business-development programmes; seed capital, venture capital and other forms of early- and later-stage investment programmes in digital companies; digital companies and technology start-ups, working in fields such as fintech, logistics, health-tech, e-commerce, civic-tech, or – as this report focuses on – digital mobility. It also includes the platforms and the regulatory frames within which platforms operate. For this report, the ecosystem captures the assemblages and arrangements of actors in the motorcycle-taxi sector.

These ecosystems are often informed by how cities have embraced technologies and notions of urban ‘smartness’. Thus, it also refers to the policy regimes that drive funding flows and public funding priorities, as well as the regulatory mechanisms attached to those. These ecosystems are never just technical nor financial; they encompass the governance landscape that frames such interventions.

Smart cities, platformed places

The idea of the smart city has created significant fanfare and excitement, leading many donors, lenders, national governments, and city administrations to pursue investments that aim to improve service-delivery systems through the use of ICT and digital innovations. Smart city narratives have been gaining momentum in African cities, and are being applied to everything from e-governance to remittance provision, to urban service delivery (Odendaal, 2006; Odendaal, 2015; Burns, 2021; Guma & Monstadt, 2021; Söderström et al, 2021).

For example, the Smart Africa Initiative was endorsed by all African heads of state in 2014 and now rallies 31 African heads of state as board members alongside international organisations and multinational companies such as Google, Huawei, and PricewaterhouseCoopers (Smart Africa, nd). The Initiative aims at putting ICT at the centre of African nations’ socio-economic transformation with a particular emphasis on improving broadband access. Smart Africa has multiple flagship projects, including promoting the digital economy in Kenya and smart cities in Rwanda. It also organises the Transform Africa

Summit, which brings together technologists, youth and leaders from across Africa to discuss how ICT can be leveraged for transformation. Furthermore, smart city discourses permeate new city ideas and has led to efforts to retrofit existing urban systems or add greenfield satellite cities to existing conurbations. Examples include Akon City outside Dakar (Senegal) and Konza Technopolis outside Nairobi, which promise to develop new towns that rely on novel and digitally enabled technology to deliver more sustainable infrastructure systems.

Nairobi and Kigali rank high on many lists of tech cities (e.g., StartupBlink, Startup Genome, Startup Heatmap, etc.). While these lists have ample room for critique (dubious metrics and assessment criteria abound), they indicate which cities are at least seen to be silicon savannahs among those in the start-up and venture-capital space.

Table 1: Ranking of African cities according to *The Global Startup Ecosystem Index Report 2021* (StartupBlink, 2021) as extracted by the authors

Rank in Africa	City (in global top 500)	Country	Global rank
1	Lagos	Nigeria	122
2	Nairobi	Kenya	136
3	Cape Town	South Africa	145
4	Johannesburg	South Africa	152
5	Cairo	Egypt	180
6	Kigali	Rwanda	265
7	Accra	Ghana	281
8	Tunis	Tunisia	341
9	Casablanca	Morocco	364
10	Kampala	Uganda	369
11	Pretoria	South Africa	490
12	Addis Ababa	Ethiopia	495

Research on smart cities and the concomitant digital technologies that have come to inform urban systems and infrastructures has contributed to a growing body of international scholarship on platform urbanism. The concept of platform urbanism captures a series of interlinked phenomena associated with technology companies that rely on platform business models and urban development. Platform urbanism scholars not only acknowledge the increasing political power that such companies wield on city spaces and urban authorities (Ferreri & Sanyal, 2018; McNeill, 2016; Sadowski, 2020; Söderström & Mermet, 2020), but also demonstrate how urban environments and city infrastructures come to be testbeds for platform business models (Mattern, 2016; Barns, 2020).

Although the most visible actors of platform urbanism are global corporations such as Uber and Airbnb, platform business models exist across various alternative urban economies (Scholtz, 2016) and are sometimes adopted by local governments to develop service and monitoring dashboards (Barns, 2020). Moreover, platform urbanism research points out the importance of understanding the ‘spatial bottlenecks’ of these economies: the urban spaces and interfaces through which digital platforms become embedded in cities (Graham, 2020; Odendaal, 2021; Pollio, 2021).

In the context of urban Africa, platform urbanism debates are vital for understanding key emerging trends. Sub-Saharan Africa is not only experiencing the most rapid urbanisation globally, but also has the fastest growth in mobile phone use. It is estimated that by 2025 there will be over 600-million unique mobile subscribers (GMSA, 2019). Combined with supply-side investment in ICT infrastructure such as broadband connectivity and data centres, the reduction in data costs (although still unaffordable for large sections of Africa’s population) has generated fertile terrain for experimenting with the platformisation of informal and other variously precarious economies, be it in the mobility sector or other kinds of gig work (Pollio & Cirolia, 2022; Anwar & Graham, 2021).

Motorcycles and paratransit platforms

Innovations in platform urbanism are particularly prevalent in the context of motorcycle taxis, which fall within the broader category of paratransit. Motorcycle taxis are used all over Africa to move people and goods, and have been an important part of city mobility systems (and politics) for a long-time (Goodfellow, 2015, 2017; Kumar, 2011; Wilkinson et al., 2011; Schalekamp & Behrens, 2013). However, the migration of motorcycle-taxi riders onto coordinated digital platforms is new. Existing research on the gig economy has thus far mostly focused on drivers and cars (Carmody & Fortuin, 2019; Pollio, 2019). There remains a lot to understand, for example, about how the flexible regimes of labour implied by platform mobility are received and managed at the level of infrastructural governance, specifically

for two-wheel mobility and logistics (cf. Attoh et al, 2019; Munn, 2017; Rosenblat, 2018, Pollio, 2021; Vallas & Schor, 2020; Van Doorn, 2017). Similarly, there is a lack of understanding of how public actors participate in the funding, design and implementation of platform mobility apps.

Motorcycle-taxi service operations are often framed as ‘filling the gaps’ in existing infrastructure networks in African cities. Dilapidated public bus systems, sprawling urban settlements, and under-maintained road networks create strong conditions for the agile, low-cost and distributed mobility option that motorcycles allow (Goodfellow 2015; Cervero and Golub 2007; Howe 2003). In addition to filling gaps in city networks, the sector creates a significant amount of direct and indirect employment (Nyassogbo, 2011). It is for this reason that the sector is often tightly linked to local politics and forms of regulation. For example, as Goodfellow (2015) explains, in Kampala (Uganda) motorcycle-taxi riders represented a major political client group in undermining attempts at regulation. In contrast, in Kigali they play an important role in securitising the city and complemented attempts to regulate the sector. Undeniably, this important and powerful sector is being changed through digital platforms. They are increasingly in high demand as residents opt to receive meals, groceries, fast-moving consumer goods (FMCGs) and other parcels direct to their households. Thus, motorcycle taxis have become a pre-eminent mode for providing door-to-door services. However, it is important not to universalise, romanticise or over-emphasise the impact. A deeper dive at the ‘actually existing platformisation’ and their interventions and innovations can highlight local ways in which platforms are changing urban landscapes.

Motorcycle-based food-delivery services became increasingly popular during the COVID-19 pandemic. This phenomenon is not expected to wane as Africa’s urban population and middle classes grow in size, and geolocation systems improve their capacity to map complex urban forms. The deep market penetration of smartphone products and applications has made the proliferation of digital mobility and delivery platforms a phenomenon across many African cities, shaping demand-responsive transit services in the process. The pandemic has created challenges for food companies and restaurants that could have lasting effects, particularly with customers resorting to mobile-based ordering and home-delivery services. Despite this proliferation, little is known about what is happening at the city scale amid rapid shifts and changes.



3.

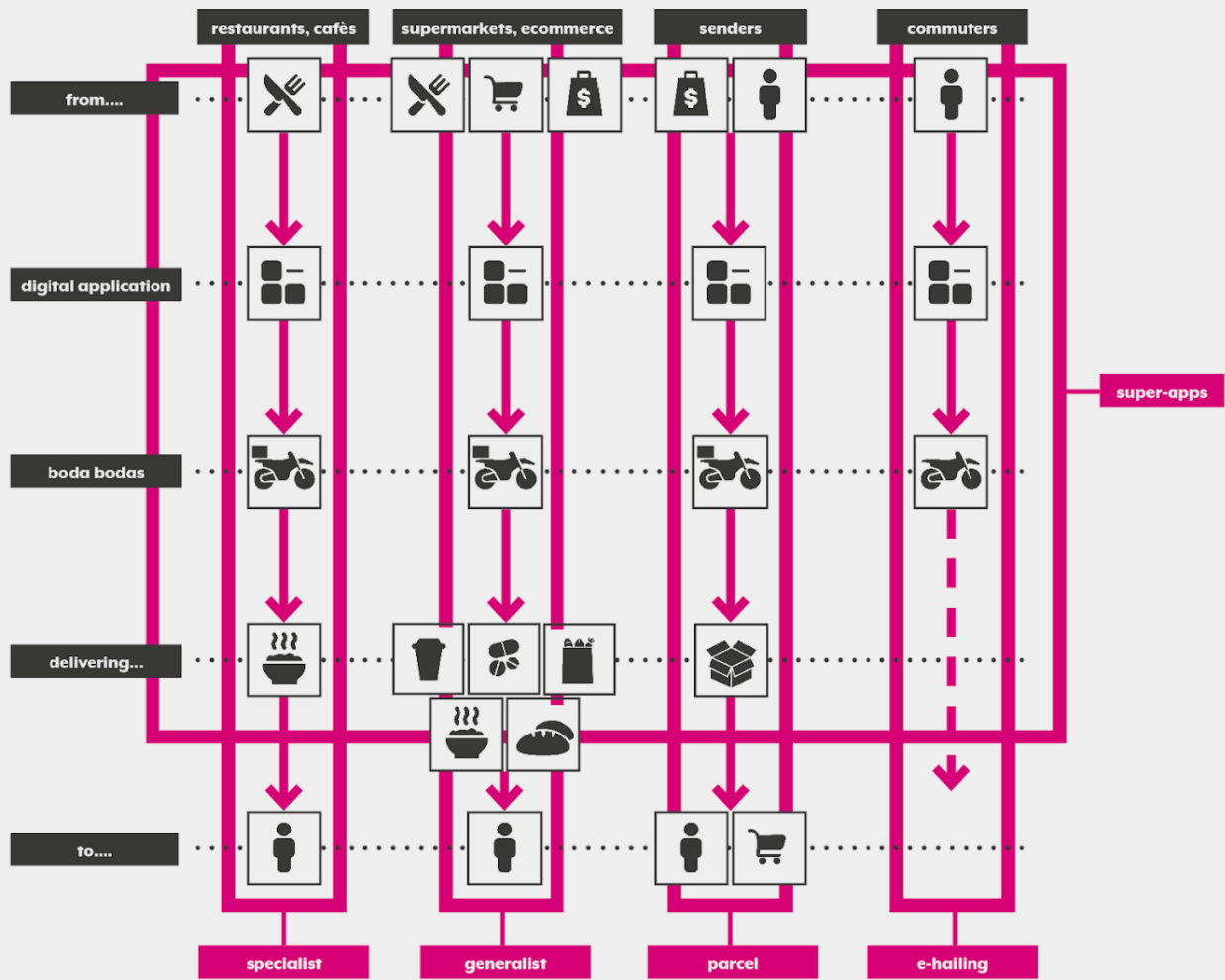
Surfacing platform politics in silicon savannahs

This study was motivated by an interest in addressing a lack of current research on the interface between digital platforms and the motorcycle-taxi sector. There is limited understanding of how platforms are shaping motorcycle-taxi operations, particularly in the wake of the COVID-19 pandemic. The research was designed to understand existing platformisation and the regulatory ecosystems within which they operate in Nairobi and Kigali. This section introduces the research methods employed to conduct the research.

Taxonomies as tools

For this study, we only looked at platforms that include motorcycle taxis directly in the platform or through some form of digital interaction (e.g. WhatsApp). To develop a meaningful picture of the platform landscape in each city, it is important to understand that these platforms are not all the same. As such, they entail different business models and, consequently, different labour regimes and governance arrangements. We found two taxonomies useful as entry points to illustrate and analyse the nuances within the motorcycle-taxi sector in African cities. Developing the taxonomies was helpful in the selection and analysis of the case studies within each city.

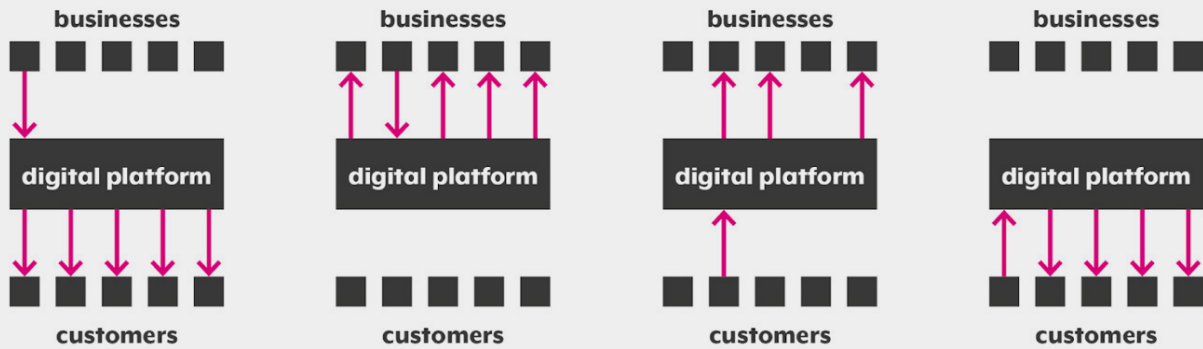
The first taxonomy looks at services through what is being moved around on motorcycle taxis, which indicates the different and diverse functions of these platforms.



specialist	A platform/application offering two-wheel delivery of a specific type of product (e.g. cooked food, medicines).
generalist	A platform/application offering two-wheel delivery of several types of products or a combination of products.
parcel	A platform/application offering parcel delivery services for customers or other businesses (e.g. last mile delivery services for e-commerce businesses), irrespective of the product category.
e-hailing/commuter	A platform/application that allows the e-hailing of motorcycle taxis.

Figure 2: Different platforms/applications and what they move

The second taxonomy is based on conventional business-science categories. This taxonomy is useful as it focuses inward, on how the services operate, but also on how businesses see themselves. For example, an object of debate and legal controversy has been whether platforms such as Uber fall in the customer-to-customer (C2C) category, or if they are service providers employing riders and therefore fall in the business-to-customer (B2C) category.



B2C Business-to-Customer	B2C businesses sell products and services directly to the end-user. This is the most common traditional business model. Most platform operations are mediators so they do not fall under the B2C category unless they have their own stocks/employees.
B2B Business-to-Business	In a B2B model, a business sells its product or service to another business. Sometimes the buyer is the end-user, but more often the buyer resells to other consumers in a B2C model.
C2B Customer-to-Business	The C2B model allows freelancers to sell goods and services to businesses. For example, a C2B e-commerce site might allow customers to post the work they want completed and have businesses bid for the opportunity to do it.
C2C Customer-to-Customer	The C2C model is one in which the platform connects two different types of customers (e.g. Uber connects drivers/riders and users). The platform makes money by charging a transaction fee or a subscription fee.

Figure 3: The four digital-platform business models. The majority of two-wheel platforms fall in either B2B or C2C. E-commerce usually falls within B2C or B2B unless it is a classified platform, in which case it is C2C.

While these taxonomies could not be seamlessly applied, as many platforms fall within more than one or between categories, they were useful analytical tools. They enabled us to get a sense of the complexity of the motorcycle paratransit landscape in a multi-layered way and aided in the selection of platforms to dig into a little deeper. In their inability to be definitive, they also allowed us to identify gaps, disruptions and innovation within the sector, and to notice the emergence of bigger platforms (super-apps) that use motorcycle taxis to operate across business models and delivery sectors.

Multi-city case studies

Strong case studies are crucial for understanding and explaining complex and intertwined urban phenomena in rapidly urbanising African cities. We chose to conduct case studies of Nairobi and Kigali for the following reasons:

First, both cities are well known for tech innovation at the city-scale. In both contexts, and under the auspices of local and national government, there are thriving clusters of technology start-ups working on software and hardware innovation. Nairobi's tech scene, for example, is at the forefront of the mobile phone-based payment innovation sector, with several start-ups building on the success of M-Pesa to expand mobile-based tech to other sectors of the economy, including the mobility industry. According to the *Global FinTech Hub Report 2021*, Nairobi is the city with the largest fintech ecosystem in Africa (CIFTS, 2021). Besides producing the first made-in-Africa smartphone, Kigali also hosts several incubator and accelerator programmes, particularly in the civic-tech sector (combining technology innovation with governance innovation), which has been acknowledged by the Rwandan government's proposed Startup Act.

Second, both cities exhibit the use of mobile-phone applications for paratransit operations. In Nairobi and Kigali, congestion issues and the relative affordability of two-wheeled vehicles make motorcycle taxis an effective means of paratransit. Both cities have tried to regulate motorcycle taxis with varying degrees of success. Third, both cities have researchers based there who are interested in exploring these issues and with whom the African Centre for Cities would like to strengthen its pan-African connections.

The case studies were built iteratively. We approached the study of each city differently, based on the material that could be accessed, and the skills and networks of the research team in each city. Key methods included:

Multi-sited case selection: Given the iterative nature of the research, the Nairobi and Kigali case studies are not intended to be read comparatively, but rather side-by side and in conversation with each other. The ways in which the case cities were approached and how the platforms were selected were based on the information that could be accessed. In Kigali, for example, the table of platforms (Table 8) was based on the list of currently registered e-commerce riders and contacting each company to confirm if they include motorcycle taxis on the platform. In contrast, in Nairobi, we were able to develop a list of all platforms since 2010 (including those unregistered and

many of which no longer existed). In both cities most contacted platforms indicated that they used motorcycle taxis, but it was difficult to get confirmation of the extent to which riders are fully integrated into the platform. The implication is that the tables are not perfectly comparable.

Actor mapping: The key actors in each city were identified and mapped in relation to each other in order to gain insight into the paratransit and regulatory ecosystems in each case.

Interviews: Interviews were undertaken with stakeholders from the public and private sectors. These included regulators, local government, tech companies, and experts in the field. Informal interviews were also undertaken with app users. As the authors have been involved in this sector for some time, insights drawn from interviews and site visits conducted as part of parallel projects were also drawn into the analysis.

Digital archives: Much of the documentation on the platforms explored in this study is documented by databases that specialise in news on start-ups, venture capital and other funding for start-ups, and accelerator programmes.

'Playing' with apps: To understand how the various platforms worked, we downloaded the apps, placed orders, and asked call-centre agents about the functionality of the platform. This allowed us to comprehend the processual algorithms from the user side and triangulate information found online with the actual features available on the different platforms.

Review of policy and legislation: To understand the governance ecosystems, we reviewed ICT and transport policy in both cities.

Embedded cases as illustrations: With there being so many platforms in each city, it was not possible to go into detail about all of them. To get more detailed information, we selected two platforms in each city – one that focused on e-hailing and another on the movement of goods.

4.

Nairobi, Kenya



Figure 4: Nairobi skyline in 2019 (© Liza Cirolia)

Kenya National Scale

Kenya leads the East Africa region in terms of broadband connectivity, ICT infrastructure and digital services (such as mobile money). The ICT sector is projected to account for up to 8% of Kenya's GDP. The national Digital Economy Blueprint (Republic of Kenya, 2019a) and the National Broadband Strategy (NBS) 2018–2023 (Republic of Kenya, 2019b) – both key policies aiming ensure that digital investments support economic growth – are fiscally supported by significant national budgetary allocations. For the 2021/2022 financial year, there was USD 210 million allocated to the ICT sector. There are currently four undersea fibre-optic cables that land off the coast of Kenya, making Mombasa (the second largest city in Kenya) one of the fastest sites for Internet on the continent. Across the ICT indicators there has been ongoing expansion. For example, the telecom sector expanded by 10.3% (from USD 3,870 million in 2018 to USD 4,270 million in 2019). There are currently four main mobile phone service providers, of which Safaricom is by far the largest with 71.2% of market share. Mobile cellular penetration increased by 7.9% to 114.70 per 100 inhabitants in 2019 which was a slower growth rate compared to the 12.3% growth registered in 2018. In 2019, total mobile telephone subscriptions increased by 10.2% to 54.6 million. Kenya has started 5G pilots in several urban centres.¹

¹ Adapted from ITA Kenya Country Commercial Guide (<https://www.trade.gov/country-commercial-guides/kenya-information-communications-and-technology-ict>)

Nairobi is Kenya's capital, a political and economic hub, and a major commercial, diplomatic, technological and cultural centre. Nairobi is one of the 47 county governments in Kenya provided by the 2010 Constitution of Kenya as the units of devolved government, and is one of the four counties within the wider Nairobi metropolitan region that covers approximately 32,000 square kilometres (Mundia, 2017). According to the 2019 Kenya Population and Housing Census (KNBS, 2019), Nairobi County has 4.4 million people. The metropolitan area, however, spans several counties and has a much larger population.

Digital technologies have become central to the operations of many service providers in their urge to improve service-delivery instruments and capacities to plan the splintered city (Guma, 2019; Guma and Monstadt, 2020). These technologies are increasingly allowing automated and self-service systems, downloading of bills, remote payments, querying applications for service providers, and other mobile small-scale processes and transactions that target low-income residents of the city, and informal settlements specifically (Ndemo, 2020). Many of these technologies provide baseline infrastructure for different services that offer innovative mobile phone-based applications and systems that rely on text and short code, and often fall within different categories, including M-Pesa, Airtel Money, and Orange Money. These technologies are leading to automation of government services, as well as operational efficiency and effectiveness in urban planning, billing, and the digitalisation of finance and service delivery. Consequently, Nairobi has become a growing hub of software developers, start-ups and a range of other actors in the city that have sought to transform infrastructure provision and services.

This can be seen at the intersections between new platforms and the motorcycle-taxi sector. In Kenya, motorcycle taxis are called *boda boda*, based on the English 'border-border', and originally referred to non-motorised bicycles. Their popularity grew due to the demand to move people and merchandise across borders without the need for customs' documentation and reporting. While the motorcycle gradually replaced non-motorised bicycles and grew in popularity for intra-urban travel and mobility, *boda boda* operated illegally as a means of public transport until they were authorised by a presidential decree in 1973. In recent years, there has been a rapid increase in *boda boda* ownership, in part due to import tax changes.² This, combined with the expansion of mobile phones and Internet access, has created the foundation for the upsurge in digital mobility apps.

Boda boda platform ecosystems

Nairobi has become a testbed for global and home-grown tech platforms in the mobility sector. Often supported by incubator programmes and venture capital, a plethora of services has been developed that aim to ease logistics and movement in the crowded and sprawling city. Many of these platforms have short lives, either transforming into other service offerings or simply disappearing. The only archives of these platforms are the Facebook pages they once marketed, or digital platforms that share information on start-ups (e.g. VC4A, Crunchbase).

Table 2 provides an overview of the mobility platforms in Nairobi. These include apps that can be downloaded to smartphones and some that can be used on select-feature phones. Also included are platforms that provide websites where orders can be placed directly or by sending a WhatsApp message to the business number. In all cases, motorcycle taxis are used for inner-city movement of goods or people, with riders either integrated directly into the platform, or connected through the ordering process, usually through WhatsApp.

Table 2 shows that there is a mix of locally developed and internationally developed platforms. For some international platforms, such as the various Uber offerings, Nairobi was among their first test-sites in Africa. *Boda boda* play a huge role, not only in the emerging e-hailing sector, but also in the food and FMCG sector. COVID-19 intensified this. With many companies, fast-food restaurants, grocery stores and chain cafés closing their doors, staff were expected to work remotely, if at all. Food companies and restaurants required quick adaptation, and took to competing fiercely in a crowded market by hiring platform workers and offering bonuses and incentives for delivery orders and transportation; making room for mobile phone-based options like calling and text messages; and launching new apps to enable customers to place orders directly with the restaurant or food company. Thus, e-commerce and take-out have become particularly convenient and prominent, providing critical continuity for service delivery to customers. While some companies have developed their own platforms there is increasing partnering with dominant digital platforms that combine e-commerce and ride-hailing to offer third-party services. While most riders prefer cash as this speeds up their access to funds, payment options often include credit cards or mobile money payments made to the host company. Notably, the extent to which these payment options are integrated into these platforms requires additional research.

² In 2008, government policy was implemented to scrap the import duty for motorcycles of up to 250cc. This led to a significant decrease in motorcycle prices with the net effect of an explosion of motorcycles into the economy (Nyachio, 2015). In 2016, the government abolished the excise tax on locally assembled motorcycles in a bid to spur the manufacturing sector. These moves led to a significant growth of motorcycle-taxis as a public mode of transport in Kenya.

Table 2: Overview of Nairobi platforms

Note: This table includes only platforms that are operational. It excludes the many platforms and apps that are now defunct (e.g. Bodacorp, GetBoda, Juu Boda, Mondo Ride, Savvy Riders). We have also excluded platforms that have not yet launched (e.g. Stimaboda). In terms of the payment systems, not all payment methods are integrated into the platforms.

Platform/App	Operational in Nairobi since...	Description	Digital payment options
Ayazona	2019	A mobile app and website that offers food delivery services, as well as household essentials, groceries and medical essentials. Focus on connecting farmers to customers. Through Ignite Labs, developed a complete week-long grocery and essentials kit working with a budget of as low as KES 1,000 per household.	Unclear
Bolt Boda (formerly Taxify)	2018	E-hailing app specifically for motorcycle taxis.	Debit card Credit card
Bolt Food	2021	A prepared-food delivery service. Bolt Food has partnered with over 200 restaurants in Nairobi.	Debit card Credit card
Busy Boda	2018	E-hailing and courier services. Additional services include picking up and banking cheques. The services provided to riders include loans, insurance, and safety training. A female ride programme was developed to support female entrepreneurs. Customers who do not own a smartphone can contact the call centre.	M-Pesa
Carrefour	Not known	Online shopping app. Delivery is undertaken by motorcycle.	M-Pesa
Dial a Delivery	2018	Created by Simbisa Brands as a delivery platform for the brand partners (Pizza Inn, Creamy Inn, Chicken Inn, Galito's, C-Store, and The Grill Shack). Delivery of prepared food within a 5 km or 10 km radius. Free delivery is offered on orders above KES 500. Customers without a smartphone can place orders through the Simbisa Brands website.	Visa Mastercard M-Pesa
Glovo	2018 (started in Spain in 2015)	E-courier service that purchases, picks up and delivers products ordered through its mobile app, including food, groceries, and pharmacy products. Packages should be under 9 kg and fit in a 40x40x30 cm box.	Visa Mastercard American Express
GoBEBA	2018	E-courier service that purchases, picks up and delivers products including groceries, gas cylinders and refills, and water refills. Also parcel delivery from point to point. Online orders are made through the GoBEBA website.	M-Pesa
Grocery Pik	Not known	Chandarana Foodplus supermarkets' mobile app for shopping and delivery. On Apple Store and Play Store.	Credit card Debit card M-Pesa
Haraka Deliveries	2019	E-courier service specifically for Nairobi CBD. Unclear if riders are integrated into the platform. No website or app available. Deliveries are arranged by phone call or via WhatsApp.	M-Pesa
Hava	2020	E-hailing app and delivery services. Only available for iOS and Android users.	Card M-Pesa
Jumia	2012 (founded in Germany in 2012)	Jumia is the largest online retail store in Kenya.	Credit card Debit card M-Pesa
Keekapu Grocers	2018	Web platform and app that connects farmers to customers and offers fruits, vegetables, meat and grains. The produce is sourced from farmers and farms who have partnered with Keekapu. Motorcycle riders make deliveries, but it is unclear whether they are integrated into the platform directly. No app available. Orders can be made via the website or by phone call.	Credit card
Little Cab	2016	E-hailing service. Food, drink, gas, Bidco products and parcel deliveries. One can also book doctor and ambulance services. Kamal Budhabatti partnered with Safaricom to fund the app, which can be downloaded from Apple Store, Play Store, and Microsoft Store.	Card M-Pesa

Platform/App	Operational in Nairobi since...	Description	Digital payment options
Maramoja	2015	E-hailing app and web platform for motor vehicles and motorcycle taxis. The app leverages social media networks to connect riders and customers (one can see the social media accounts of the riders before selecting). Download from Apple Store and Play Store.	Mobile money wallet
MYDAWA	2007	Online pharmaceutical store providing over-the-counter and prescription drugs, health and personal-care products, and medical devices and equipment. Provides access to medical practitioner for advice. Web-App and App.	M-Pesa Airtel Money Credit card Debit card Equity EazzyPay Umba Loan
M-Post	2015	E-courier service allows people to use their phone number and location as a place to receive post (rather than an address). Works on smartphones or with USSD. Customers pay KES 300 to register and KES 300 annual subscription. Recently partnered with Safaricom. Unclear if delivery riders are integrated into the platform directly. There is no app.	M-Pesa
Nopea Xpress	2021 (Nopea Ride was launched in Kenya in 2017 but only included cars)	E-courier service, exclusively using electric scooters and motorcycles.	M-Pesa
Petty Errands	1995	One of the oldest delivery services in Nairobi. Using the platform, clients can schedule errands and deliveries of almost anything. E-courier services include parcel delivery, mail collection and distribution, banking payments, and registering businesses on behalf of clients. Shipment can be tracked. Deliveries can be booked via a website or by phone call.	Unclear
Sendy	2015	E-logistics company specialising in full-range logistics operations including supply-chain management and freight operations, but popularly known for their location-to-location transport and delivery services, operating a fleet of motorcycles. Crowdsources riders and trains them on the platform. Sendy recently launched a partnership for digital insurance, but this is aimed at its regional logistics division.	M-Pesa Credit card
Sokowatch	2013	Informal retailers can order products at any time via SMS or mobile app and receive free same-day delivery. Delivery is by motorcycle, but it is unclear if riders are integrated into the platform.	Unclear
SpeedAF Express	2021 (established in China in 2019)	Cross-border, door-to-door logistics services between China and emerging markets such as Africa. For express and LTL (less than truckload) networks, it uses motorcycles for last mile delivery. It is unclear if riders are integrated into the platform.	Unclear
Tatu Deliveries	2020	E-courier and delivery web-app that primarily works with online businesses but also makes personal deliveries. Online businesses that use the service are mostly from Instagram and Facebook. No app available. Deliveries can be booked via WhatsApp.	Unclear
Taxiye	2020 (founded in Ethiopia in 2019)	E-hailing platform.	Unclear
uberBODA/Uber Lite	2018 (Uber Lite was launched in 2019 with a boda option)	E-hailing platform. App can be downloaded. Uber Lite excludes an integrated map function.	Card
Uber Connect	2020	E-courier service to deliver small packages.	Card
Uber Eats	2018	Prepared-food delivery service. Partners with restaurants and grocery stores.	Card
Yum Deliveries	2013	Prepared-food delivery service, partnering with restaurants. It also has a network of motorcycle riders who pick up food from restaurants and deliver it to their customers. Deliveries can be arranged via the website. No app available.	Credit card M-Pesa

We now turn to applying the first taxonomy in order to illustrate how these apps work, with a focus on the type of service. Table 3 shows us that there is a considerable mix of service typologies being offered in this space.

Table 3: Types of service available through Nairobi platforms

Platform	Specialist	Generalist	Parcel/Courier	Commuter/Taxi
Ayazona				
Bolt (Boda, Food)				
Busy Boda				
Carrefour				
Dial a Delivery				
Glovo				
GoBEBA				
Grocery Pik				
Haraka Deliveries				
Hava				
Jumia				
Keekapu Grocers				
Little Cab				
Maramoja				
MYDAWA				
M-Post				
Nopea Xpress				
Petty Errands				
Sendy				
Sokowatch				
SpeedAF Express				
Tatu Deliveries				
Taxiye				
Uber (BODA, Lite, Connect, Eats)				
Yum Deliveries				

Applying the second taxonomy offers insight into the use of different business models. Table 4 indicates that the majority of mobility platforms in Nairobi tend to operate in the C2C space, offering software/platforms that connect different types of users (riders and end-customers). What is sometimes confusing in this taxonomy is that motorcycle riders, as well as most shops and restaurants, are considered customers of the platform. For this reason, companies like Uber would be C2C, but this is a contested categorisation both in the public opinion and in the courts.

Table 4: Nairobi platforms' business models

Platform	B2C	B2B	C2B	C2C
Ayazona				
Bolt (Boda, Food)				
Busy Boda				
Carrefour				
Dial a Delivery				
Glovo				
GoBEBA				
Grocery Pik				
Haraka Deliveries				
Hava				
Jumia				
Keekapu Grocers				
Little Cab				
Maramoja				
MYDAWA				
M-Post				
Nopea Xpress				
Petty Errands				
Sendy				
Sokowatch				
SpeedAF Express				
Tatu Deliveries				
Taxiye				
Uber (BODA, Lite, Connect, Eats)				
Yum Deliveries				

Based on the information in Tables 2–4, supplemented by observations and interviews conducted in Nairobi, important insights about Nairobi platform ecosystems can be drawn:

First, despite an effort to make sense of the systems with taxonomies and tables, the functioning of these platforms is not always clear. For example, it is not always clear if riders are employed by or integrated into the platform. The interface between riders and companies is a blurry boundary. According to our informants, many platforms operate with hired riders who may or may not have a basic salary in addition to piecework wages, and a buffer of more casual, precarious riders. This not only plays out in the labour regime, but also in the ways in which digital connections are made between companies, riders and consumers. What appears clear is that there is a spectrum of integration between *boda* riders and platforms. Even with uberBODA fully integrated, end-users report having to manually call to secure rides. Similarly, when placing orders on e-commerce platforms, communication with riders often takes place through WhatsApp. This blurriness is also true for payment methods. It is generally not clear if payment is integrated into the system or done in cash or e-money outside of the system. Despite this confusion, a few platforms/apps are emerging that integrate everything, including riders, payment systems and real-time tracking. These super-apps include, for example, Uber, Bolt, Jumia, Glovo and GoBEBA, which offer services across the spectrum of platform-enabled two-wheel logistics and integrate multiple payment systems.

Second, emerging generalist platforms (e.g. GoBEBA, Jumia, Glovo) have interfaces with large distribution supermarkets (e.g. Carrefour, Naivas), local chains (e.g. Zucchini), and informal wet markets (*sokos*). Large Carrefour and Naivas supermarkets have a dedicated lane for e-deliveries. Other supermarkets, such as Chandarana Foodplus, use *boda bodas* through social media (WhatsApp) and a dedicated app (Grocery Pik). A few Chandarana Foodplus supermarkets also have dedicated desks for couriers. Generalist super-apps, such as Jumia, also have relationships with specialised land-mile delivery platforms, such as Sindy and SpeedAF Express, which are linked to the e-commerce boom. What is interesting about companies that do deliveries exclusively (i.e. they do not have their own marketplace) is that they are used by Jumia and other platforms to cover their deliveries at times of high demand.

Third, in the context of C2C platforms, there is considerable debate about what a fair business model is for all parties. For *boda boda* riders who join platforms as ‘customers’, the implication is that most are technically self-employed and their income is based on a piece-rate system. They have no safety net, wage protection or holidays. For motorcycle-taxi riders in most African cities, this is not considerably different to how they operate off-platform. However, off-platform they pay no fees, income tax is not monitored, and they can work within established social networks, reducing both costs and risk. Notably, these social networks are often legally registered as saving and credit cooperatives (SACCOs), which offer collective saving schemes for their members. For the platform, the implications of positioning riders as customers and relying on flexible labour regimes are that the business is low risk, only taking on a coordination role, with minimal upfront investment. Investments are generally limited to the establishment of the platform, some basic training/vetting, and digital marketing. What is clear is that the tax implications do not fall on the platform, but on the riders. This, combined with rising fuel costs, has led to rider strikes in recent years (Jazzolino, 2021). It is not only *boda boda* riders who are customers of these platforms, but also most food vendors. Restaurants become constitutive agents of these platforms and are therefore forced to accept their governance terms; they have limited rights to adapt their use and interaction with the technology. On a positive note, the platforms empower restaurants to adopt a home-delivery strategy, enabling them to expand their markets beyond dine-in patrons and diversify revenue strategies through the incremental sales that such platforms provide.

According to some of our informants, additional work is performed by operators that is not fully captured by the notion that they are simply ‘riders’. On some platforms riders are tasked with shopping on behalf of q-commerce apps like Glovo and Jumia. This entails being able to navigate stores, making sure that the products match the requests, and anticipating the sum the platform refunds only after a successful delivery. It also often requires additional WhatsApp calls to end-customers when product availability is an issue. Moreover riders report that, given the particular configuration of Nairobi lanes, where address numbers are often missing, deliveries also depend on filling the gaps in inexact geolocation algorithms. Then, once at the door of the end-customer, riders often need to navigate security access and the complexity of extended compounds. All of these additional



Figure 6: Examples of ‘dark stores’ in Nairobi (© Andrea Pollio)

operations – beyond riding from point A to point B – are often not captured and monetised by the standard fee-based reward model, and therefore constitute what could be termed ‘invisible labour’ or ‘ghost work’ (Graham & Woodcock, 2018; Gray & Suri, 2019).

Finally, while most platforms are C2C, the larger online platforms and emerging super-apps use a B2C business model similar to drop shipping. For example, Jumia will only buy products once an end-customer has placed an order, or keep minimal inventory or stock on hand. This is changing the nature of warehousing in and around Nairobi as it reduces storage time and shifts patterns of delivery. For Jumia and Glovo, the research indicates that the warehouses used for temporary storage and sorting are also used by e-commerce platforms, and they act as urban interfaces between different types of platforms and business models. Jumia is currently expanding its ‘dark stores’ strategy which, if expanded, has the potential to significantly shift logistics in the city. This potential has also been unlocked by recent transport and mobility investments, such as the highways linking Nairobi to surrounding peri-urban, areas. This has

allowed areas where land is cheaper to be directly linked to high-density residential areas via rapid road networks. These areas also provide intermediate holding areas for internally acquired goods.³ A few B2B platforms provide last-mile delivery for third parties, particularly e-commerce platforms that do not have their own riders. This illustrates a new co-dependence of platform-enabled logistics and platform-enabled e-commerce, and is likely the direction more companies will take as the market for delivery platforms and e-commuting becomes saturated.

Regulatory frame for Nairobi

While there has been a surge of excitement around the potential of platforming motorcycle taxis, especially among the start-up community, there remains significant confusion over the governance of platforms in Nairobi. Table 5 provides a high-level overview of the key actors involved in regulating this emergent space. The actors are grouped in three sections: urban management, ICT regulation, and *boda boda* regulation.

Table 5: Key governance actors in Nairobi

Note: This table offers a selective picture of the full regulatory ecosystem, with a focus on state actors. It excludes the platforms, which also play a role in governing the space through, for example, rules for joining and operating on the platform.

Actor	Role
Urban management	
Nairobi Metropolitan Services (NMS)	Tasked with the delivery of effective and efficient services on the four transferred functions to citizenry in Nairobi City County: health, transport, planning and management, and public works. This entity sits in the National Executive Office of the President.
Nairobi City County Government (NCC)	Local government level. Responsible for country roads, public transport, and the local regulation of <i>boda boda</i> . The county has the responsibility for traffic management (as per Schedule Four of the Constitution of Kenya (2010)), which includes the right to create legislation regarding where <i>boda boda</i> can operate. ⁴ The county government is also responsible for local police, who are often involved in formally and informally collecting fines.
Nairobi Metropolitan Area Transport Authority (NaMATA)	Responsible for developing coherent transport policy sensitive to development within the Nairobi Metropolitan Area (NMA) – i.e. improving the public transport system in the NMA through the introduction and implementation of Mass Rapid Transit System (MRTS) comprising the Bus Rapid Transit (BRT) System, the Commuter Rail System, and the Non-Motorized Transport (NMT) System.
ICT regulation	
Ministry of ICT Innovation and Youth Affairs (MIYA)	Responsible for formulating, administering, managing and developing the information, broadcasting and communication policy in Kenya (i.e. the National ICT policy). The function of the ministry is executed by the two state departments as outlined in Executive Order No.1/2016 1) ICT and Innovation 2) Broadcasting and Telecommunication.
ICT Authority	Responsible for rationalising and streamlining the management of all ICT functions – i.e. enforcing ICT standards in government and enhancing the supervision of its electronic communication; and promoting ICT literacy, capacity, innovation and enterprise.
Kenya Revenue Authority (KRA)	Determines tax rates and who must pay. The KRA VAT Act 2013 indicates that the provision of platform services for use by partner drivers is a taxable supply. KRA will also be responsible for the implementation of the Digital Services Tax. The regulations took effect in January 2021. ⁵
Communication Authority of Kenya (CAK)	Responsible for facilitating the development of information and communications sectors, including broadcasting, cybersecurity, multimedia, telecommunications, e-commerce, and postal and courier services. It replaced the previous Communications Commission of Kenya (CCK) and has expanded powers.

³ For cooked-meal platforms, it is not yet clear if platforms are using dark kitchens in addition to normal walk-in restaurants. New platforms are currently being developed that exclusively use dark kitchens to reduce costs. These have the potential to undercut services like Uber Eats. However, without brand recognition, this process will likely be slow. As this research did not look at specific restaurant’s online delivery services, it is not clear if well-known restaurants will use dark kitchens to reduce costs, but it is certainly something to pay attention to in the future.

⁴ <http://kenyalaw.org/caselaw/cases/view/127644>

⁵ <https://kra.go.ke/images/publications/Brochure-Digital-Service-Tax-Website.pdf>

Actor	Role
Boda boda regulation	
National Transport and Safety Authority (NTSA)	Responsible for developing and maintaining sustainable transport infrastructure, including enforcing motor vehicle inspection and licensing, regulations and standards, resource mobilisation, and building capacity. It is the official public repository of vehicle registration data and maintains a digital database of registered vehicles.
County Transport and Safety Committee (CTSC)	Under S.21 of the NTSA Act, 2012, this committee is responsible for overseeing management and regulation of the road transport system at county level, preparing audit reports, and advising the NTSA on road transport matters.
Road Authorities (KeNHA/KURA/KRB)	KeNHA/KURA is responsible for highways and urban roads. KRB is responsible for coordinating maintenance, rehabilitation and development of the road network. It also administers funds for road maintenance, and monitors implementation processes by other road agencies.
Motorcycle SACCOs and Unions	<i>Boda boda</i> riders register their own informal groups under SACCOs. This, combined with staging areas, are the basic organising structures for <i>boda boda</i> . SACCOs are involved in organising <i>boda boda</i> riders in particular areas. Several SACCOs were involved in petitioning a court case that restricted <i>boda boda</i> access to the central business district (CBD). ⁶ Unions for motorcycle taxis are the interlocutors of the ministries that deal with the motorcycle-taxi industry.
Kenya Police Traffic Department	Responsible for motor vehicle inspections and driver testing, ensuring the free flow of traffic, and enforcing laws, rules and regulations under S.24 of the National Police Service Act, 2011.
Motorcycle Assemblers Associations of Kenya (MAAK)	MAAK serves as a collective voice for its members and safeguards justified rights of motorcycle assemblers.

From an urban-governance perspective, it is important to reflect on how these actors fit within the levels of government in Kenya. According to national legislation, ICT is a national function, whereas transport is predominantly a county function. Despite this, there is significant confusion over who is responsible for what. While the Constitution of Kenya (2010) assigned transport as a concurrent function between the national and county governments, a series of shifts in recent years have recentralised this power, removing control from counties. Similarly, ICT is a national function, which firmly places it under the control of national ministries. However, much of the implementation of these policies must take place at the county scale, particularly in Nairobi, but the local government holds minimal actual power. This mirrors the wider trend toward the recentralisation of power following the 2010 devolution reforms, which has direct implications for the governance of this space.⁷

⁶ <https://allafrica.com/stories/201511251372.html>

⁷ These reforms are outlined in the Constitution of Kenya (2010) and were implemented in 2013.

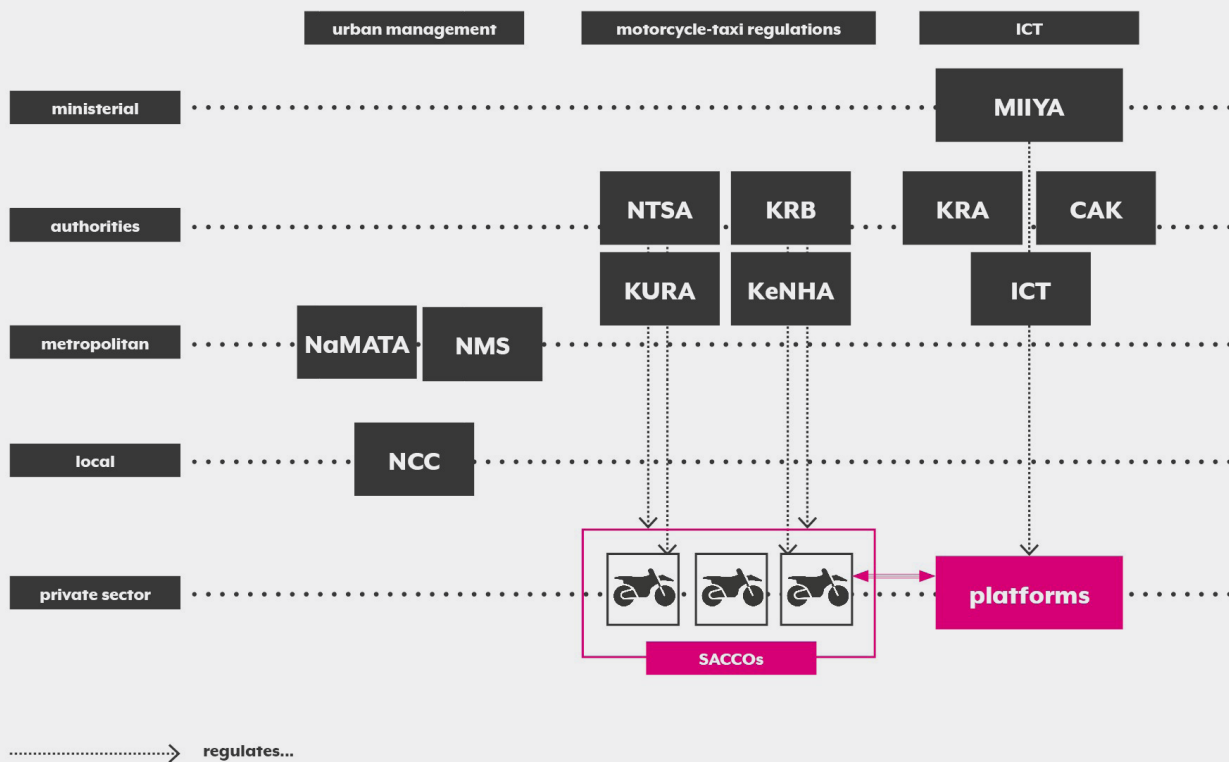


Figure 7: Nairobi’s regulatory ecosystem for platform-enabled two-wheel services

The use of motorcycle taxis for logistics and commuting is a grey area in existing policies. New policies are emerging to manage parts of the system. The NTSA is responsible for *boda boda* and new legislation is being written to include e-hailing businesses, but it does not have a specific code of regulations for delivery and logistics business, and thus does not regulate these. Regulation of these services is minimal and covered almost exclusively by the Digital Services Tax recently developed by the KRA. Notably, the shift towards digital payments enables more-effective income tracking, and ride-hailing platforms may be required to report this data for taxation purposes. New legislation for e-hailing is being developed (although it is unclear where this is at) and tax legislation is trying to capture the earnings of *boda boda* riders across all platforms. However, there remains considerable fragmentation in the roles and responsibilities related to governing these spaces. Key ICT and transport policies are outlined in Table 6.

Table 6: Key ICT and transport policies

Policy	Year	Objectives/goals/issues
ICT		
National ICT Policy	2016, 2019	Exhaustive policy covering many areas of ICT.
Digital Services Tax	2021	Aims to expand the tax bracket to capture untaxed digital-service and digital-marketplace providers, including non-resident digital-service providers. The application of digital tax on digital-hailing platforms has been in the offing for some time following recommendations by the Senate Committee on Labour and Social Welfare for the regulation of taxation and regulation policies, observing that a lack of clear regulation and taxation guidelines was leading to potential revenue loss for the state.
Finance Bill	2021	Proposes to expand the definition of digital services to include supplies made over the Internet or an electronic network, while at the same time expanding the meaning of digital marketplace to that of an online platform that enables users to sell or provide goods and services.
Transport		
Digital Hailing Operators Regulations	2020	The NTSA has been working on draft regulations for what is being referred to as 'digital vehicle hailing service rules, 2020'. These rules are currently not being implemented. They include: A platform commission cap of 15% The requirement that e-hailing companies aim to serve a different market segment to private or public transport services Drivers cannot work more than eight hours Service providers must have a physical address in Kenya Digital hailing service drivers/riders must have a special license.
Transport Integrated Management System (TIMS)	2016, relaunched in 2021	NTSA's TIMS - under the Eastern Africa Regional Transport, Trade and Development Facilitation Project funded by the World Bank -has made it easier and secure to access essential transport services digitally.
The Traffic Act	1953, revised 2014	Regulation of passenger service vehicles (PSVs), including limiting where they can operate.
NTSA Act	2012	The basis for the formation and operations of the NTSA.
Nairobi Integrated Urban Development Master Plan (NIUPLAN)	2014 (-2030)	Provides detailed planning of integrated transport systems and the Loop Line Project (monorail) supported by the Japan International Cooperation Agency (JICA). Overall transport aims include improvement of the road network, the diversion of through traffic, strengthening of the road development mechanism, applying an efficient and suitable transport system, and the harmonisation and coordination of existing plans.

Overall, the case of Nairobi is one of rapid proliferation and minimal regulation. New platforms are constantly being developed, many of which never gain traction in the market. The policy interventions under development do not see the platformisation of *boda boda* riders as a shared sector, isolating passenger service from other uses and functions. It is unclear who is responsible for developing policy in this space, but it is clear that the city authorities are not involved, despite being impacted by the changing urban economies of these logistics systems.

Nairobi deep dive

The wide ecosystem of platforms and their (non-)regulation provided the foundation for exploring two case studies in Nairobi: Uber and GoBEBA. These reflect two very different types of platforms, both of which use motorcycles for delivery. Whereas Uber was 'imported', GoBEBA is 'home-grown', which has implications for their respective adaptive capacity and scalability.

Uber

Uber launched its international offering in 2011, and its first African city launch took place in Johannesburg, South Africa, in 2013. Uber emerged in Nairobi as a ride-hailing platform in June 2015. Uber Kenya is a subsidiary of Uber BV, a private limited-liability corporation registered in the Netherlands, which started its global expansion powered by venture capital investors. In 2011, Uber raised USD 11 million Series A financing for its expansion into Europe. Further funding rounds enabled Uber to activate its services in Asia, the Middle East, South America and Africa, with different degrees of success (e.g. following significant losses, the Chinese business was sold to Didi Chuxing and the South East Asia business was sold to Grab). In May 2019, the company went public with an initial public offering (IPO) and started raising capital on the stock market.

Offering, actors and the Uber ecosystem

Uber's e-hailing application (the most used of the Uber services) offers several vehicle options, including *boda boda*. UberBODA was launched in late 2018, around the same time as a slew of other e-hailing platforms were being tested. It was Uber's first motorcycle-based commuter service in Africa (following trials in Asia). As it was launched, news sources reported that it was set to compete with Taxify, which had launched its *boda* service in March, Uganda-based SafeBoda, which had launched in Kenya three months earlier, as well as other services like GetBoda, Vutaride and BusyBoda.⁸

Also using motorcycles for mobility, the Uber Eats delivery platform for cooked meals and groceries was launched in Nairobi in July 2018, some two years after being launched globally by Uber. Nairobi was the fourth city in Africa to have this service (after three cities in South Africa). When first launched, Uber Eats only covered upper-income areas (Lavington, Muthangari, Kilimani, Kileleshwa, and Westlands) with a flat delivery rate of KES 150. It has since expanded to cover the whole city (including areas just outside the metro). In 2020, the Uber Connect parcel delivery service was launched.

Motorcycle-based parcel delivery is not a new practice in Nairobi, with companies and people using this mode of micro-logistics for intra-city movement. Bringing this service into the Uber offering was a natural development of the platform.

Although Uber provides a digital platform, it relies on demand by those who use it. This includes 'end-users' (riders, eaters, parcel senders), *boda boda* riders, and vendors (restaurants and more recently supermarkets). Everyone is considered a customer of the platform and, as such, it considered to be a C2C business.

All customers pay to use the platform.

End-users create the demand for Uber services and pay on a per-trip basis. The demand for Uber services has increased rapidly due to many factors, including perpetually bad traffic, increasing mobile phone penetration, falling data costs (in part due to a competitive telecom market), and constraints placed on physical movement by the COVID-19 pandemic. Although the middle- and upper-middle classes use Uber Eats and Uber Connect, most will not use uberBODA out of fear of issues around safety. They prefer to use drivers they know and trust (contacting them via WhatsApp), and organise rides and parcel deliveries directly. Those who do use uberBODA say they often choose it when there is too much traffic and they may be late. End-users also report that, even though the system is fully automatic and simple, they always call drivers after making a digital booking to ensure they are coming and know where they are going. This often results in fights between end-users and drivers (a common feature of e-hailing in Nairobi), but as end-users point out, one can just open a different platform and use that.

Another key actor in the Uber ecosystem are the motorcycle riders or 'partner drivers'. They register with the app and are connected to end-users for a flat-rate fee (in some areas) or for commission. Some riders own their own motorcycles, but many are rented. This can be done at a flat rate or on commission – in both instances eating into already minimal earnings. They may also take out small loans to purchase motorcycles.

Riders do not know where the end-user wants to send them when they are offered a trip. As some areas are less safe or less lucrative, riders will often call or text users to ask about the destination, and pressure them to cancel the trip if they do not want to go there. This may be met with resistance by end-users as they may be charged for cancellations, but it can also result in them changing platforms. Notably, uberBODA riders may work for several platforms simultaneously, depending on demand. Because riders are instrumental to making the service work, Uber has sought to ease entry into the market:

... bike couriers interested in delivering the food can register via the Uber Eats application by uploading a photo of themselves, their driving license and their insurance. After submitting a certificate of good conduct and a vehicle log book or a stamped letter from the bike owner, [boda boda riders] will undergo training and be ready to go in 24 hours.

~ Uber⁹

⁸ <https://www.genghis-capital.com/newsfeed/uber-rivals-taxify-with-own-nairobi-boda-boda-service/>
https://techcrunch.com/2018/03/30/uber-and-taxify-are-going-head-to-head-to-digitize-africas-two-wheeled-taxis/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xllmNvbS8&guce_referrer_sig=AQAAAGyrBqdh5oWoog127a_iTjXpFU231to1j-05Z1p0Z_r-YyBS-kr7ELfbpB5Ll8_ggZqilsdGBeShooF3RpfmJga21XB9iAvbiR9Dsrfv-503Gsmwb3sMcn0WvufGPbt-sRPEue44F5CbV0o_UutcbqZ6vSL4Z02_ofJkXgVs5Fp

⁹ <https://allafrica.com/stories/201805300174.html>

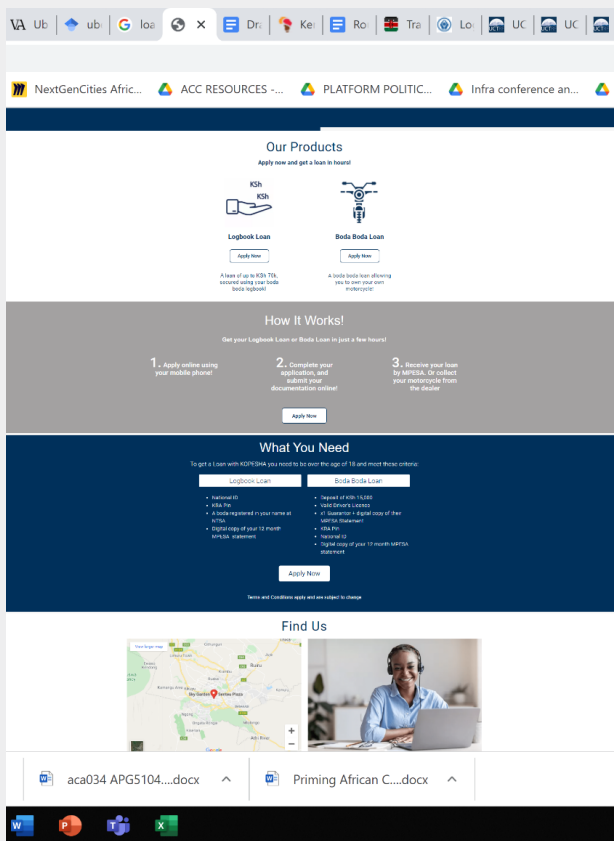


Figure 8: Sample loan programme information for uberBODA and Uber Eats rider¹⁰

Vendors are another important actor, such as restaurants and hotels that register on the Uber Eats app to sell their meals and drinks. Uber Eats grocery delivery is new and based on partnerships with retailers such as Zucchini (a well-known grocery line in Nairobi). While the specifics are not made public, restaurants typically pay 30% commission to Uber. For this reason, menu item prices are inflated to accommodate this cost, making it more expensive to order the same item through Uber than directly from the restaurant.

Regulating digital platforms and motorcycles is challenging. Many attempts have been made, for example, to bar *boda boda* from the city centre, which is often met with much resistance. The Uber platform does not stop riders from entering the CBD, but most are unwilling to take the risk. Much more attention has been placed on regulating passenger service vehicles (e.g. *boda boda* commuter services) than on Uber Eats or the delivery of small parcels.

Intervention and innovation

Disruption and innovation have been central to the evolution of Uber service offerings. While the market for platformed motorcycle taxis is highly competitive, Uber has been at its forefront in Kenya. To achieve this, they have continued to lower

fares despite escalating operational costs for riders (taxation, fuel, etc.). While this has made sense for Uber and end-users, it has had negative impacts on riders. As noted earlier, especially with services like Uber Eats, riders are often required to do much more than simply connect point A to point B. Their work might include shopping, waiting for meals to be ready (idle time), figuring out addresses and security access to compounds, and calling end-customers about product availability.

Uber Lite is another innovation introduced to reduce end-user costs. It is a simpler version of the Uber app that works on any Android phone, saves on storage space and data, and allows e-hailing of cars and motorcycles. It is targeted at users in areas with poor broadband availability. The app has a much simpler interface, map integration has been removed, and it is only for commuting (i.e. it does not include Uber Eats or Uber Connect).

Uber has also sought to expand its vendors – particularly restaurants on the Uber Eats platform. To increase market share during the pandemic, Uber waived activation fees and made it quicker and easier for new restaurants to join Uber Eats. It reduced wait times for new sign-ups to less than 24 hours; launched a new feature that gave restaurants the option to receive daily (rather than weekly) pay-outs, to help with cash flow; and partnered with various stores to offer customers over-the-counter medicines, toiletries, and essential household items (Scheepers & Bogie, 2020).

Uber has also responded to concerns over carbon emissions in the transport sector. In March 2021, it announced the launch of electric motorcycles for uberBODA, Uber Connect and Uber Eats in Kenya. This launch, the first in Africa, allows riders to select zero-emissions rides. Using an electric vehicle costs the same as a regular journey for end-users. The launch of Uber Technologies' 'electric *boda*' potentially presents a 45% reduction in overall costs for uberBODA and Uber Connect riders, for whom fuel is the highest operating cost.

In terms of integration with other digital services and platforms, Uber, with its sight set of being the super-app of Kenya, has always provided integrated payment options. In addition to the major credit cards and cash (which is preferred by drivers), one can also pay with M-Pesa, although this option is not integrated into the platform directly. When hailing, the end-user must select the cash option and then pay with M-Pesa. Alternatively, the user can move money from an M-Pesa e-wallet to the Uber wallet and pay in this way. In contrast, Little Cab offers a push function to use M-Pesa through its platform. This is attributed to the fact that Little Cab and M-Pesa are both part of Safaricom, Kenya's leading telecommunications company.

Uber, through its various offerings, has sought to coordinate the ways in which people and motorcycle-taxis operate in Nairobi, and has attempted to learn about how to adapt locally from other contexts in Asia and Africa (particularly South Africa). Despite aiming to offer a high-tech and fully integrated option, Uber has had to backtrack to providing 'cash' and 'lite' options for users who required more entry-level engagement. In addition, riders and users have had to develop their own system 'work arounds',

¹⁰ <https://kopesha.co/ubereats/#features>

given the complexity of the city and the regular issues that are faced in using the platform.

GoBEBEBA

GoBEBEBA, registered as GoBEBEBA Everything Ltd, was launched in October 2018. The founders, Peter Ndiang’ui and Leslie Mbogo, conceptualised the platform to respond to the need to localise and consolidate e-commerce/logistic transactions (bringing smaller retail outlets onto the platform), the challenges of Nairobi traffic (resulting in the use of motorcycles for delivery), and young people’s interest in purchasing online for convenience. Their aim was to ‘solve the logistical nightmares of distribution and fragmented retail in developing urban cities’, and their vision was ‘to be a part of the growth of a digitally-enabled industry and drive e-commerce to between 5% and 10% market share in 30 cities in Kenya and sub-Saharan Africa’¹¹.

GoBEBEBA’s co-founders have experience in the tech economy: Peter Ndiang’ui was previously the OLX Country Manager and Lesley Mbogo was the former head of product at Amazon.¹² The two developed the concept and solely financed the platform’s initial operations. They advertised using Facebook and placing posters at petrol stations. By December 2018, the platform was merchandising KES 300,000 worth of goods per month, and by mid-2019 this had grown to KES 5 million. In 2019, the founders reported having KES 10 million in investments, of which half had been used to develop the business. In 2021, in pre-seed

funding, the founders raised KES 2.8 million (USD 25,000) from DFS Lab, a fintech incubator that empowers communities through mentorship and strategic advice to early-stage start-ups. The company itself has a lean staff, deploying hundreds of crowdsourced motorcycle riders to deliver goods.

Offering, actors and the GoBEBEBA ecosystem

The platform connects local businesses, small and large, to customers who want a one-stop shop to purchase diverse goods. Using the platform, customers can order and have products delivered quickly. The app aimed to have an integrated user interface, allowing all purchases to be made centrally. This compares, for example, to platforms like Jumia where general purchases and food require separate apps. To keep costs down, the platform does not have an ‘app’ or real-time tracking of drivers. Instead, once an order is placed and a rider is allocated, the customer is given the rider’s contact details.

The backend of GoBEBEBA works as follows: GoBEBEBA receives customers’ orders (or shopping lists) and delivers them to the customer’s location using motorcycle riders called ‘champs’. Champs shop on behalf of their customers and then deliver their items. Shopping lists can be sent via the website or customers can call directly and speak to an operator (for users who do not have smartphones). GoBEBEBA promises to handle the buying from enterprises specified by the client and to deliver within two hours.

Table 7: GoBEBEBA services and partners

Services	Partners
Gas	Official LPG distributors (Shell Afrigas, Total, Kenol K-Gas, Mpishi)
Water refills	Bottled-water distributors
Groceries, cleaning products, utensils, health and beauty products	Wholesalers (Twiga Foods), supermarkets, stores, sokos
Spirits	Information not available on website
Parcels	Information not available on website
Other services (e.g. laundry)	Information not available on website

Figure 9 indicates that the GoBEBEBA platform connects customers to products from wholesalers, retailers and small shops, as well as service providers such as cleaning services.

¹¹ <https://www.standardmedia.co.ke/business/enterprise/article/2001330422/gobeba-why-ex-olx-ceo-is-still-betting-on-ecommerce>

¹² OLX is an online exchange marketplace that was bought by Nigeria’s Jiji (now popular, based on mainstream and social media advertising).

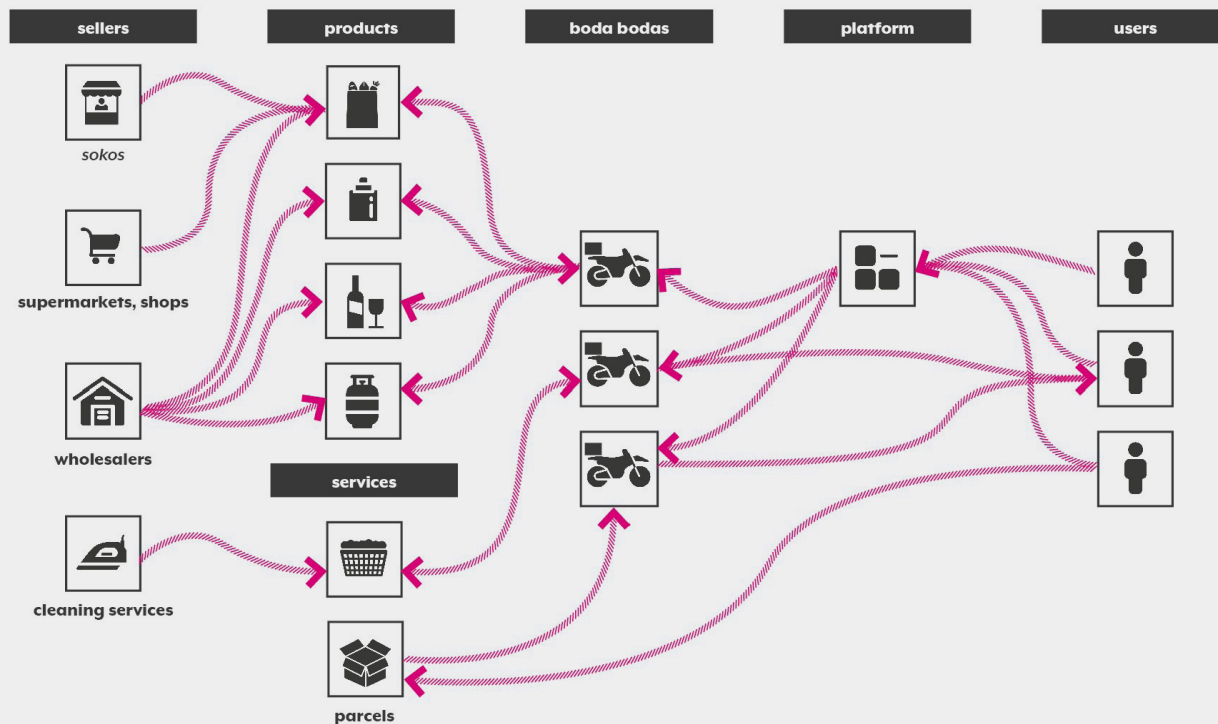


Figure 9: Overview of the GoBEBA offering

Intervention and innovation

GoBEBA's disruptive and innovative capacity is premised on its commitment to being locally responsive and adaptive. GoBEBA is very clear about its target market, which includes mostly urban residents in Nairobi and surrounding areas, such as Thika, who struggle to purchase items in the crowded and often traffic-laden city. It also targets young people who are more comfortable with e-commerce. The fact that it relies on a website rather than an app showcases a particular adaptability to the local context. Affordable phones have limited memory, so many users reportedly prefer to access platform services via a web browser rather than downloading an app (although this is rapidly changing).

While GoBEBA is an important home-grown effort and addition to the platform economy in Nairobi, it is still in its early stages. It is yet to become well known in the market and have large-scale reach, but it is growing quickly and attracting customers with

new offerings. In partnership with Twiga Foods – an established tech start-up – customers can order a produce bundle of basic vegetables, which provides a connection between farmers and urban food systems (as well as data analytics).

Another important innovation, and localised response, that the platform provides is the option to order digitally or by making a conventional voice call. As the founders explain:

GoBEBA has both the digital and voice option for customers to process their orders. What informed this decision? In Kenya, and most of Africa, consumers still want to hear a human being on the other side of the call ... Even after a customer places an order online, they'll call to ensure their order is being processed. This is likely born from distrust because of systems that haven't served our customers well.

~ GoBEBA¹

¹³ <https://www.standardmedia.co.ke/business/enterprise/article/2001330422/gobeba-why-ex-olx-ceo-is-still-betting-on-ecommerce>

In terms of integration with other digital services and platforms, GoBEBA has no option for direct payment. On delivery, payment is made to a GoBEBA till number using M-Pesa – not directly to the *boda boda* rider. Previously there was an integrated option to place orders through a WhatsApp link, but this has been disabled and customers are pushed to use the website or make a call.

In contrast to Uber, GoBEBA is a home-grown platform developed with minimal budget and only local expertise. It

entered an already crowded marketplace and, to be competitive, the platform aimed to bridge the gap between tech-savvy users and late(r) adopters by creating interim, partially analogue, options. These innovations reflect attention paid to the local context from the design phase, contrasting with platforms that have had to add these features later, after it becomes clear that the market (and associated ecosystems), are not ready for fully automated and digitised options.

KEY POINTS

Boda boda are a huge part of mobility in Nairobi. The move towards platforms builds on the existing dependence on *boda boda* for mobility in the city. The COVID-19 pandemic ramped up this trend.

Nairobi has a mix of local and international platforms in this space. The market is now full of offerings, many of which do not survive.

These platforms are changing company business models, with implications for the urban movement of goods and people. At the same time, users (particularly riders) are shaping the use of these systems, tailoring them to better suit their needs.

From a governance perspective, Nairobi (and Kenya more widely) is not engaging directly with the implications of these emergent platforms. There is no regulation at the interface between mobility and platforms in Nairobi.

5.

Kigali, Rwanda



Figure 10: The Kigali car-free zone (© Sebarenzi Alexis)

Rwanda National Scale

ICT was identified as a tool for development early on and Rwanda's government invested in the provision of necessary infrastructure, notably the 4,000 km fibre-optic backbone that strands across Kigali, districts, and border posts. As a result, Rwanda has realised a number of achievements, albeit from a low base. The ICT sector's gross value addition grew at a rate of 21.1% annually over the period 2000–2015 – faster than any other sector of the economy. Internet penetration has significantly grown from 5% in 2010 to 60.4% in 2019 (MINICT, 2019). Individual active mobile phone subscribers have also grown steadily from 8,884,784 in August 2016 to 11,087,928 in August 2021 – a 24.8% increment in a period of five years (RURA, 2021). The rise of mobile phone subscriptions has had ripple effects in other sectors, most notably the financial sector with the advent of mobile money. The equivalent of approximately USD 1.8 billion was transacted in Rwanda in 2019 and mobile phones are at the centre of government services. Some 98 government services are accessed and paid online through Irembo – a portal for government services and information – while another 165 services are accessed through other online platforms (MINICT, 2019). Examples include Umucyo, an online public procurement platform, and Rwanda Integrated Electronic Case Management System (Rwanda IECMS), a digital platform that integrates operations of the various justice subsectors. Leveraging these advances in digitalisation, the Ministry of Trade and Industry (MINICOM), in conjunction with multilateral actors, notably the German Agency for International Cooperation (GIZ), is active in promoting e-commerce by sensitising and training existing businesses and even setting up a dedicated e-commerce service centre (ECC) to assist in digitalising commerce in Rwanda. Rwanda currently aspires to become a tech hub that exports ICT products and skills, evident in the country's long-term plan (Vision 2050) and mid-term plan (National Strategy for Transformation (NST 1)). These ambitions are reflected in Rwanda's impressive ranking in the World Bank Group's Ease of Doing Business (EDB) Index, where it was ranked 38th worldwide and 2nd in Africa, and particularly in the ease of starting a business where the country scored the highest (World Bank, 2020).

Kigali, the capital and largest city in Rwanda, accounts for approximately 60% of the urban population – approximately 1,631,000 people (NISR, 2018). The city, which is also one of Rwanda’s five provinces, is projected to grow at a rate of 3.8% each year, driven in part by rural-to-urban migration in search of jobs and a higher quality of life (Surbana Jurong, 2020a; World Bank 2020). It is also the country’s economic centre, and accounts for approximately 40% of national GDP (Bundervoet et al., 2015). It is expected that Kigali will continue to grow, despite continued efforts by the Rwanda government to strengthen secondary and satellite cities (Rajashekar et al, 2019).

Kigali has established itself as a tech hub and fertile ground for start-ups. This is evidenced by the growing prevalence of various start-ups in different sector such as fintech, healthtech, agritech and smart logistics. Kigali is also home to almost 40 accelerators, incubators, and co-working spaces, some of which are the result of local initiatives such as FabLab Rwanda and KLab, and others that are internationally connected such as Impact Hub, DigiCenter, and Norrsken. These are spaces for young entrepreneurs to upskill, prototype innovative solutions, and connect with potential investors. The government encourages innovative technology by organising competitions such Hanga Pitchfest, in which prizes are awarded by Rwanda’s president. At the 2017 Transform Africa Summit in Kigali, Inmarsat, a leading global satellite organisation, signed a memorandum of understanding (MOU) with the Rwanda National Government and the Smart City Alliance in a pledge to transform Kigali into a ‘smart city’. To do this, Inmarsat, in partnership with Actility, created a Low Power Wide Area Network (LPWAN) using the LoRaWAN™ protocol, covering the entire city. They also launched the Smart Cities Education Programme, aiming to develop skills in coding and digital literacy.

The promotion of Kigali as a start-up, innovative and smart city is encapsulated by the Kigali Innovation City (KIC) project – a flagship start-up initiative that has been allocated 61 ha in the Kigali Special Economic Zones (KSEZ). KIC will accommodate universities, incubators, technology companies and start-ups, together with commercial and retail complexes, which has led to it being dubbed ‘the Silicon Valley of Rwanda.’ The project is projected to cost USD 2 billion, but some infrastructure and universities are already on-site, including Carnegie Mellon University (CMU), the African Leadership University (ALU), and the African Institute for Mathematical Sciences (AIMS). The project is projected to generate USD 150 million of ICT exports annually and create 50,000 jobs.

Beyond being a tech hub for ICT investment and smart initiatives, Kigali has also established itself as one of the leading cities for motorcycle taxis or *motos* as they are colloquially known. Several scholars have pointed to the importance of *motos* in the operation of the city and the politics of urban management (Goodfellow, 2015). It is therefore not surprising that the move to platform motorcycle-taxis has accelerated in the city.

Moto platform ecosystem

Motorcycle-based platforms in Kigali are burgeoning. The ecosystem generally comprises home-grown platforms, with technical or financial assistance from international actors in some cases (e.g. Kasha, YegoMoto). Some platforms are endowed with mobile apps with WhatsApp integration, requiring smartphones for their use (e.g. Vuba Vuba, Pozo Delivery), while others are website-based where orders can be placed directly (e.g. GamiExpress, SokoMall). In all cases, motorcycle-taxis are used for movement or delivery and the riders are ‘part’ of the platforms. The platforms generally have strong social media presence and brands are visible on the streets.



Figure 11: Examples of moto delivery vehicles for various platforms (© Sebarenzi Alexis)

Table 8 offers an overview of the platforms in Kigali. These are either app-based, requiring smartphones, or website-based. While there are platforms with international connections, Kigali is dominated by local platforms. In all instances mobile money is provided as a digital payment method.

The majority of platforms make deliveries despite only a handful being in the transport sector. This is due to regulatory differences between the two sectors. Furthermore, the majority of platforms are relatively new and do not offer radically different services – a fact that shows the Kigali market is upcoming and vibrant, but foreshadows the transitory nature of some platforms. This recent growth in platforms was accelerated by the COVID-19 pandemic, when digital platforms became a necessity for delivery, especially during lockdowns.

Table 8: Overview of Kigali platforms

Note: This table only includes platforms registered with MINICOM as of May 2021 which are still active and use branded motorcycles. It excludes platforms that are no longer in operation in Kigali or that occasionally use non-branded motorcycles.

Platform/App	Operational in Kigali since...	Description	Digital payment options
A2B Delivery	2021	Generalist e-commerce and delivery app for food, groceries, etc.	MTN Mobile Money Airtel Money
AC Group	2017	A mobility solution famous for Tap & Go smart cards and that provide ICFMs for motorcycles.	Tap & Go Smart Card Mobile Money
Afia Pharma	2021	Specialist platform that operates as an online pharmacy, offering medicines based on digital presentation of prescription via WhatsApp.	MTN Mobile Money
E-Gura Solution	2019	Generalist e-commerce with a website and Android app platforms.	Airtel Money MTN Mobile Money
GamiExpress	2020	Generalist e-commerce platform with an emphasis on construction materials.	Airtel Money MTN Mobile Money Credit cards
Iwacu Online	2020	Generalist e-commerce with a website and Android app platforms.	Airtel Money MTN Mobile Money Credit cards
Kasha	2017	Online store that specialises in hygiene and pharmaceutical products.	Airtel Money MTN Mobile Money Credit cards
Pascal Technology	2016	A mobility solution platform that provides ICFM.	Mobile Money
Pozo Delivery	2020	Connects restaurants with customers.	MTN Mobile Money
Rush	2019	A multipurpose delivery/logistic app-based platform for food delivery, parcel delivery, and taxicabs. So far only the food delivery is working. It has its own riders.	Airtel Money MTN Mobile Money SPENN Credit cards
RwandaMart	2021	A government (MINICOM) online platform that help small and medium enterprises (SMEs) to sell their products online, and trains them on e-commerce value chains.	Airtel Money MTN Mobile Money Visa card
Sina Gerard/Ese Urwibutso	2019	An established agribusiness company that has operated in Rwanda for more than 30 years. It joined the online sphere in 2019 to sell its products.	Airtel Money MTN Mobile Money Credit cards
SokoMall	2020	Generalist e-commerce platform with a website that is integrated with WhatsApp messaging.	Airtel Money MTN Mobile Money Credit cards
Store2Door	2019	Online grocery store with delivery riders.	MTN Mobile Money
Tuma Rwa	2019	E-commerce delivery platform specialising in electronics and office equipment.	Airtel Money MTN Mobile Money SPENN
Tuma250	2014	Online platform dealing in groceries, home products and electronics.	MTN Mobile Money Credit cards

Platform/App	Operational in Kigali since...	Description	Digital payment options
Twoherze Company	2020	Generalist delivery platform with a strong emphasis on social-media presence.	MTN Mobile Money
ValWallet Rwanda	2021	E-commerce platform with mobile money integration for clients.	Airtel Money MTN Mobile Money Credit cards
Vuba Vuba	2020	Vuba Vuba hires riders on a contract basis. It was started by local entrepreneurs who took over the Jumia network and its staff after it left Kigali.	Airtel Money MTN Mobile Money SPENN Credit cards
YegoMoto	2017	Singapore-based initiator of the moto-hailing app business, currently in the taxicab business, with plans to include other offerings such as food and parcels.	MTN Mobile Money MTN Tap & Pay YegoMoto Ride-Tap-Pay cards SPENN

We now turn to applying the first taxonomy in order to illustrate how these platforms work, with a focus on the type of service. Table 9 shows that there is a mix of service typologies being offered in this space. Generalists make up the majority, the specialist model is the exception, and parcel and commuter businesses are limited by regulatory issues. Some platforms have plans to further develop, usually by adding another type of delivery, which is indicated here as ‘to be decided’ (TBD).

Table 9: Types of services available through Kigali platforms

Platform	Specialist	Generalist	Parcel	Commuter/Taxi
A2B Delivery				
AC Group ¹⁴				
Afia Pharma				
E-Gura Solution				
GamiExpress				
Iwacu Online				
Kasha				
Pascal Technology				
Pozo Delivery				
Rush			TBD	TBD
RwandaMart				
Sina Gerard/Ese Urwibutso				
SokoMall				
Store2Door				
Tuma Rwa				
Tuma250				
Twoherze Company				
ValWallet Rwanda				
Vuba Vuba				
YegoMoto		TBD		

¹⁴ As of January 2022, Pascal Technology and AC Group had halted operations in the transport sector, leaving YegoMoto as a sole operator. Nonetheless, YegoMoto was also met with resistance as *moto* operators and their operations were halted.

Applying the second taxonomy offers insight into how the business models operate. Table 10 indicates that most of the platforms run on a C2C model, having no store of their own, while others run a B2C model with their own stores or products. In contrast to Nairobi, the Kigali market does not have a platform on a B2B model, which is generally indicative of a collaboration between platforms, or a C2C platform.

Table 10: Kigali platforms' business models

Platform	B2C	B2B	C2B	C2C
A2B Delivery				
AC Group				
Afia Pharma				
E-Gura Solution				
GamiExpress				
Iwacu Online				
Kasha				
Pascal Technology				
Pozo Delivery				
Rush				
Sina Gerard/Ese Urwibutso				
SokoMall				
Store2Door				
Tuma Rwa				
Tuma250				
Twohereze Company				
ValWallet Rwanda				
Vuba Vuba				
YegoMoto				

Based on the information in Tables 8–10, supplemented by observations and interviews, several important insights about Kigali platform ecosystems can be drawn:

First, the fact that most platforms are generalists wanting to take full advantage of an array of deliverable products is reflective of the relatively small size of Kigali's market (compared, for instance, to Nairobi). Specialist platforms are the exception and usually due to special circumstances. For example, the platform might be an extension of an existing business delivering only its specialised products (e.g. Sina Gerard/Ese Urwibutso, Tuma Rwa). Specialisation may be possible because the platform has a specific mission that results in specialised deliveries, as in the case of Kasha App whose central mission is women's health and related products. Commuter platforms are limited because of the more stringent regulations they have to follow. Two platforms – YegoMoto and Rush – expressed ambitions to offer more

integrated delivery types and services, expanding the role of *moto* riders in the process. This can be seen in their aspirations to become super-apps.

Second, from a business model perspective, the lack of B2B platforms in Kigali is interesting. It indicates that various platforms have not seen any need to collaborate so far. On the one hand it is reflective of the small size of the Kigali market, but is reinforced by the physical situation of Kigali – a relatively small city of 730 square kilometres, of which the effectively urbanised parts account for approximately 25.2% (MININFRA, 2021). This means that it is somewhat easy in terms of time and distance for a small platform with few resources (i.e. riders) to deliver from point to point. On the other hand, the Kigali context presents no insurmountable logistical or regulatory challenges for delivery platforms. At the logistical level, platforms have no difficulty hiring licensed riders on a contractual basis, where

they are paid per delivery (ranging from USD 0.8–1.5 per trip). Using this arrangement, platforms do not incur any extra costs such as social security. Even on commuter platforms, which have more rigorous rider requirements, the regulatory onus falls mainly on riders and users themselves. Furthermore, the adoption of mobile money payment, the most common digital payment system in the country, is also relatively easy for any platform. For instance, registering a merchant (platform) mobile money account simply requires ID, a certificate of incorporation, and capital of at least USD 200. The combination of Kigali’s geography, low-cost logistics and digital payment has meant that every platform can survive on its own, effectively rendering the B2B model non-existent.

Third, most platforms are recent (i.e. established from 2019 onward). This is interesting because it is indicative of how

government investment in ICT infrastructure and e-commerce sensitisation is bearing fruit. However, few established businesses have embraced whole-range digitalisation, especially last-mile delivery businesses, which generally limit their digital efforts to a website and perhaps a social media presence. It tends to be the more recently established businesses that have platforms as inextricable parts of their offering. Furthermore, the COVID-19 pandemic, with its ensuing lockdowns and general reduction of physical contact, had a considerable impact on the proliferation of e-commerce platforms. Prior to the pandemic only eight e-commerce platforms were registered by the Rwandan Ministry of Trade and Industry (MINICOM), but as of January 2021, 62 platforms are registered. This was also due to the government encouraging the delivery of cooked food and essential items during lockdowns, and specifically mentioning registered platforms that were allowed to make deliveries.

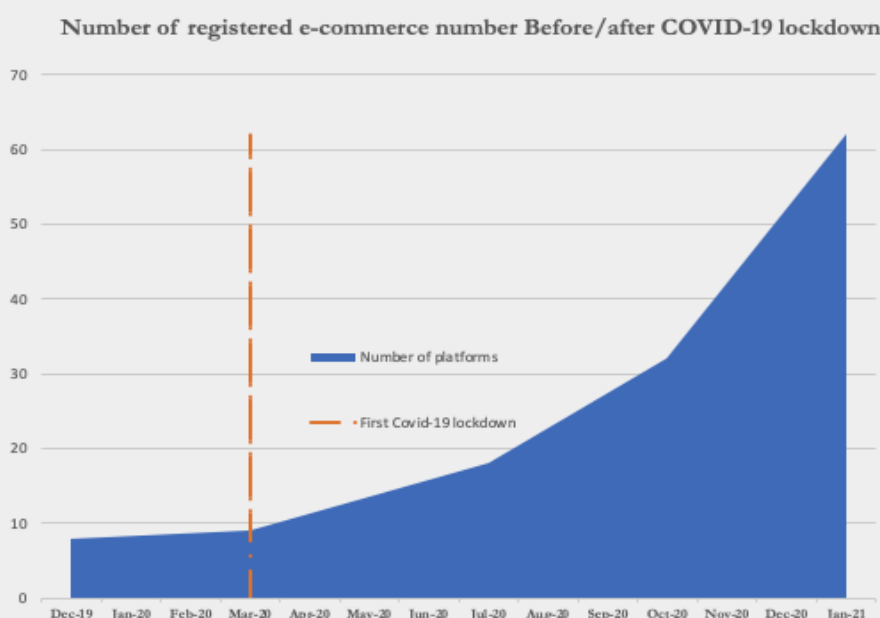


Figure 12: Number of registered e-commerce platforms in Kigali between 2019 and 2021 (MINICOM, 2021)

Regulatory frame for Kigali

The digital ecosystem in Rwanda is heavily steered by government institutions and government-led initiatives. Ministries and their affiliated national-level entities are at the forefront of the regulatory frame, with a conspicuous absence of city authority in regulating paratransit-related digital platforms. For example, while the law establishing the city of Kigali gives it the broad mandate to ‘develop and implement the plan of action for the transport of persons and goods in the City of Kigali’ (GoR, 2019), in practice, this role has been more effective in public bus transport. The city also coordinates with the Ministry of Local Government (MINALOC) on key governance issues.

These national-level entities include the Rwanda Utilities Regulatory Authority (RURA), the Rwanda Information Society Authority (RISA), the Ministry of ICT (MINICT), and the Ministry of Trade and Industry (MINICOM). They are not only in charge of providing the policy and regulatory framework for ICT and the country’s digital transformation, but are also tasked with delivering services using apps and technologies across different sectors, including setting up platforms where necessary. A stark example of this government interventionism is RwandaMart, an e-commerce platform established at the initiative of MINICOM (jointly with GIZ). RwandaMart is part of the ECC, which offers e-commerce training for SMEs. RwandaMart currently hosts 140 businesses as clients and offers them the platform to digitally sell their products. It is targeting serving 600 businesses and eventually become self-sustaining.

Table 11 provides a high-level overview of the key actors involved in regulating this emergent space. The actors are grouped in three sections: urban management, ICT regulation, and motorcycle-taxi regulation.

Table 11: Key governance actors in Kigali

Note: This table only includes governance actors that play a direct regulatory role in the ICT and motorcycle-taxi sectors. There are, however, other actors whose actions indirectly affect both sectors (especially from a financial perspective). The platforms also play a role in governance by being an extension of the regulator (e.g. e-hailing platforms require a range of regulatory documents from moto operators before registering them on the platform).

Actor	Role
Urban management	
City of Kigali (CoK)	The CoK is in charge of providing transport infrastructure and developing transport action plans within Kigali.
Rwanda National Police (RNP)	The RNP, through the traffic department, is in charge of the inspection and safety of roads. It thus regularly interacts with motorcyclists.
ICT regulation	
MINICOM	The ministry is in charge of promoting trade and investment in Rwanda, including e-commerce, and is tasked with drafting e-commerce policy and strategies. The ministry has also implemented e-commerce projects through its Single Project Implementation Unit (SPIU).
Ministry of ICT (MINICT)	MINICT is in charge of policy formulation and coordination for the ICT and Innovation sector.
Rwanda Information Society Authority (RISA)	RISA is in charge of promoting digitisation of the economy, with particular emphasis on government services.
Rwanda Development Board (RDB)	RDB registers businesses in general, including e-commerce and delivery platforms.
Telecom Companies (MTN and Airtel)	Telecom companies provide a network for ICFM devices and enable digital payments through mobile money. Notably, they are connected to the Motorcycle Federation and have an agreement to advertise telecoms on riders' jackets.
Motorcycle-taxi regulation	
Rwanda Utilities Regulatory Authority (RURA)	RURA is in charge of enacting regulations and providing the necessary authorisation/licenses for transport businesses and individuals. It has a broad mandate to regulate utilities, including transport where motorcyclists are incorporated and electronic telecommunications where digital platforms are incorporated.
Rwanda Transport Development Agency (RTDA)	RTDA provides transport infrastructure countrywide and on the national roads within Kigali.
Rwanda Governance Board (RGB)	RGB oversees and inspects the Motorcycle Federation.
Rwanda Cooperative Agency (RCA)	RCA inspects and advises on the governance and financial status of motorcyclist cooperatives.
Motorcycle Cooperatives, Unions and Federation (FERWACOTAMU)	Cooperatives are the basic units in charge of motorcyclists' welfare, advocacy and mobilisation. Cooperatives at a district level form a union, and unions form the federation. The federation is in charge of representation, advocacy, and the identification of motorcyclists.
Rwanda Revenue Authority (RRA)	RRA collects taxes from businesses and individual motorcyclists.

RURA dominates the regulatory framework, while various ministries have the responsibility for broad policy formulation and orientation. It is usually the affiliated agencies and authorities that are involved in the actual regulation. In the e-commerce sector, where e-commerce policy and strategies (from MINICOM) are pending, RURA has had to issue various regulations to deal with emerging issues. RURA regulates individual motorcycle riders and the platforms, and is a self-sustaining institution (receiving no budget from state finance). It is endowed with the power to levy fees from regulated services and judicial police powers to enforce those levies. E-hailing businesses are charged 1% of their annual turnover (RURA, 2016), while individual motorcyclists are charged approximately USD 23 per year for license renewal amongst other charges.

Commuter motorcycle riders in Kigali are elaborately regulated from different institutional layers and perspectives, and are required to join a cooperative of their choice. The cooperatives serve as socio-economic peer groups, assisting in matters such as motorcycle operator pension savings. The cooperatives are regularly monitored by the RCA and are part of the union that operates per district. In turn, the unions are part of the national federation (FERWACOTAMU), which is regulated by the RGB. Motorcycle riders are required to pay value-added tax (VAT) to the RRA. VAT has been fixed at RWF 6,000 (USD 6) per month, paid every three months, beyond any offence fees from RURA and the RNP. License renewal (by RURA) is subject to motorcycle riders having paid all taxes in the previous license term. The RTDA and the Road Maintenance Fund (RMF), which are both affiliated to the Ministry of Infrastructure (MININFRA), currently play a limited role in the regulations, but have an official mandate to provide, maintain and issue use guidelines for necessary infrastructure for motorcycles countrywide.

RURA also regulates e-hailing platforms as part of the electronic communications sector. This includes the technical specifications of the Intelligent Connected Fare Meter (ICFM) devices installed on *motos*. It also sets the actual fare calculation parameters, including the price per kilometre, waiting times, and the percentage of fares to be allocated to different stakeholders (telecom companies, platform charges, and the device fee).

There has been long-term concern over safety issues in the motorcycle sector, with RURA contending that the main source is unlicensed riders who operate in the city and are therefore able to escape the regulatory framework. Platformisation of the sector is seen as a solution to safety and tax-avoidance issues as the registration of the motorcyclist into the platform is subject to the presentation of all regulatory documents (license, tax invoice, cooperative membership, etc.), and the installation of ICFM devices means that authorities can monitor individual riders in real time.

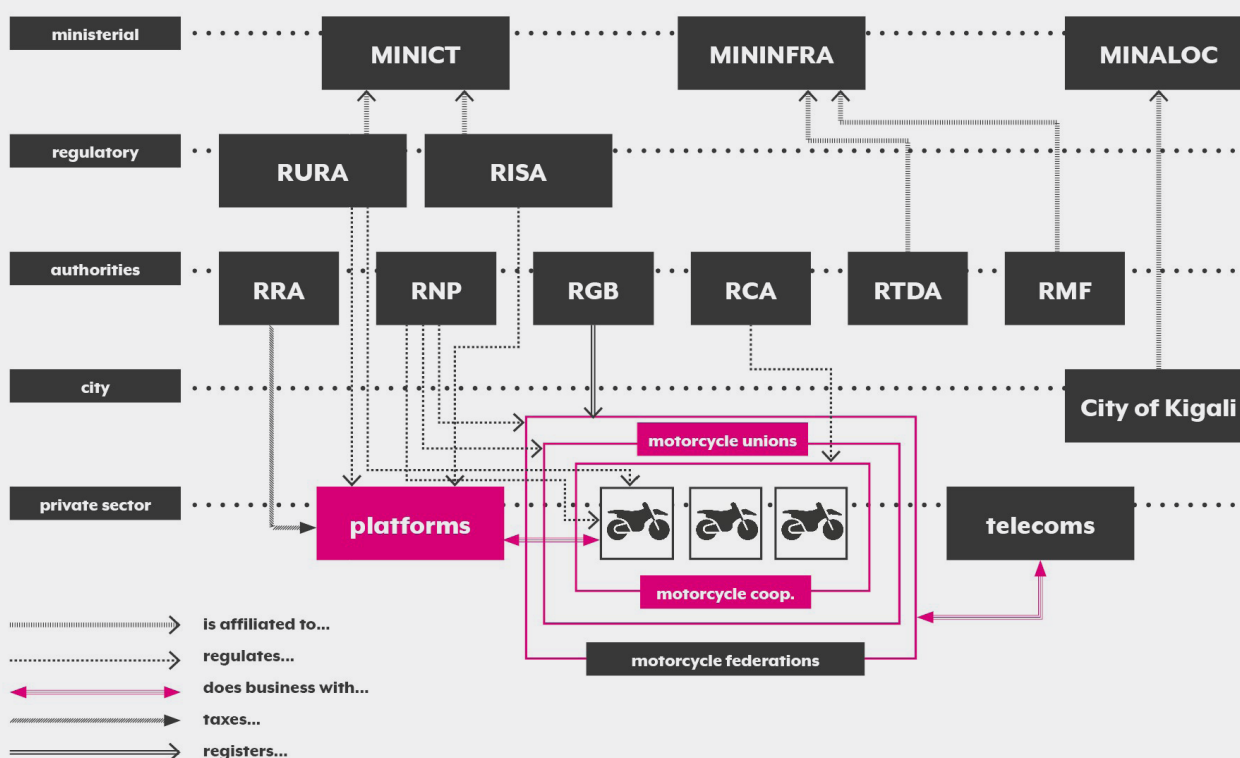


Figure 13: Kigali's regulatory ecosystem for platform-enabled two-wheel e-hailing

Compared to commuter platforms, delivery platforms are less regulated. There was an attempt by RURA to regulate them by issuing draft regulations for consultative purposes in February 2021. The regulations covered postal, courier and e-commerce services delivering packages under 100 kg. They required e-commerce platforms to have logistic facilities and for motorcycles, car or vans to be branded. The license fee for e-commerce platforms was set at USD 3,300, renewable every five years, and the regulatory levy at 0.5% of annual turnover. These regulations were contested by e-commerce platform operators who specifically pinpointed the exorbitant license fee, and resulted in the consultation being put on hold pending feedback and revisions from the regulator. In the meantime, delivery platforms are not specifically regulated and are only subject to general business regulations. However, they benefit from start-up incubation programmes that are part of the Rwanda IT ecosystem, most notably the Private Sector Federation (PSF) ICT Chamber incubation and advisory programme for ICT start-ups and SMEs.

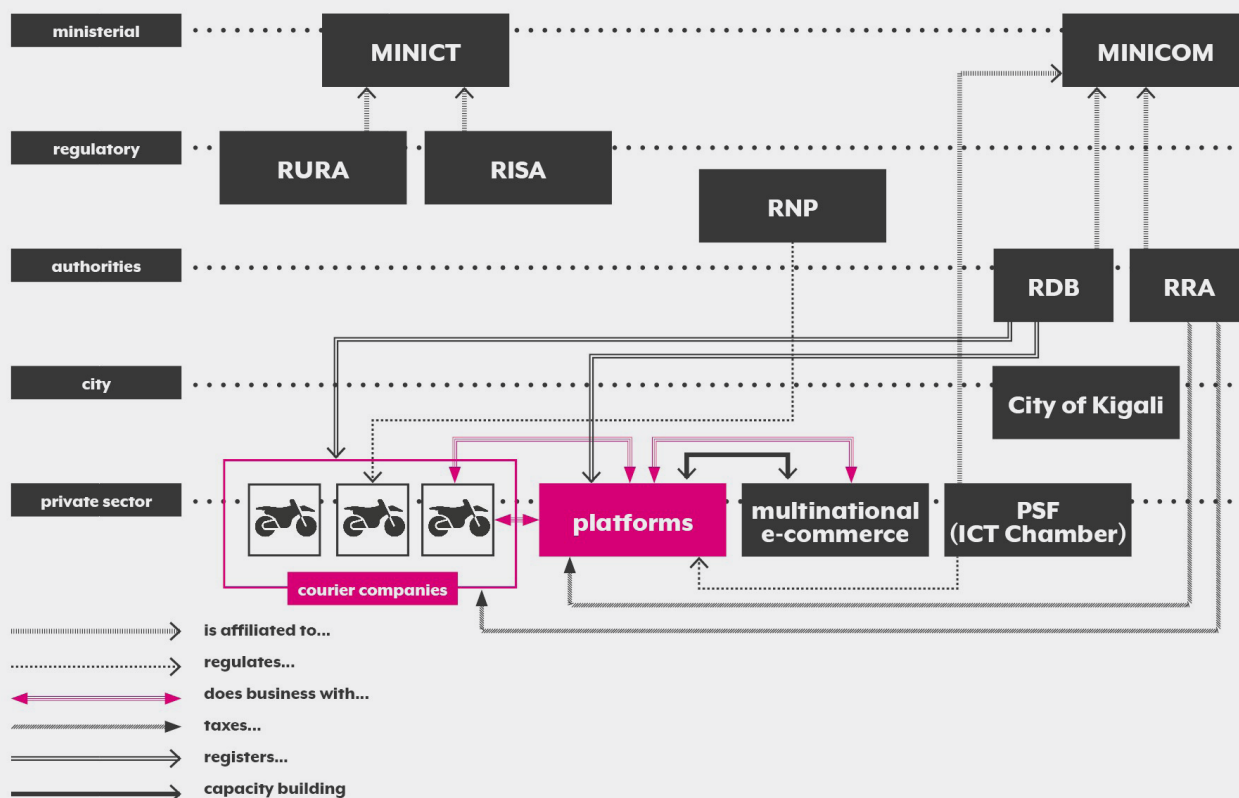


Figure 14: Kigali’s regulatory ecosystem for platform-enabled two-wheel e-logistics

Digital paratransit platforms in Kigali are regulated through the policies summarised in Table 12.

Table 12: Key ICT and transport policies

Policy	Year	Objectives/goals/issues
ICT		
National Information and Communication Infrastructure (NICI) I, II, III	2000, 2005, 2010	A series of five-year plans for the ICT sector. NICI I focused on establishing the groundwork for the sector, developing legal and institutional structures to support investment. NICI II focused on developing national data-centres. NICI III steered the roll out of the fibre-optic network.
Smart City Rwanda Masterplan	2020	The plan developed by UN-HABITAT lists 27 initiatives to make Rwanda’s urban life smarter. It proposes an initiative to promote smart-data led door-to-door mobility solutions, and an app to provide integrated mobility solutions.
ICT Sector Strategic Plan (2018-2024) of the Ministry of Information Technology and Communications	2017	The ICT sector strategic plan (SSP) localises the ambitions of the National Strategy for Transformation (NST-1). The SSP aims to promote smart cities, national digital transformation across all sectors, and ICT capacity building.
ICT for Governance Cluster Strategy 2020-2024	2019	The strategy focuses on cementing the established e-governance sector in Rwanda. It identifies key areas of focus such as building a transparent and data-driven government and improving digital skills among Rwandans. It further promotes the integration and interoperability of various government and private-sector systems.

ICT Hub Strategy: Rwanda's roadmap to becoming a leading ICT Hub in Africa	2018-2024	The strategy aims to transform Rwanda into an ICT hub that attracts foreign companies and exports ICT skills. It has identified education, innovation, and advanced technological capabilities as areas of particular. The strategy's flagship project is the Kigali Innovation City (KIC), a USD 2 billion innovation park that aims to assemble universities, research and development, technology companies and start-ups to springboard innovation in Rwanda.
Board decision No. 07/BD/LER/RURA/2016 of 13/12/2016 determining the contribution levied on annual turnover of the regulated services	2016	This board decision refers to determining the contribution levied on annual turnover of regulated services.
Rwanda Payment System Strategy: Towards a cashless Rwanda 2018-2024	2018-2024	The National Bank of Rwanda (BNR) is a custodian of this strategy, which aims to encourage electronic payment to the point of making it the default mode of payment in the country (thus the term 'cashless economy').
Transport		
Public Transport Policy and Strategy for Rwanda	2012	The policy highlighted issues in the public transport motorcycle sector, namely that many <i>moto</i> were not licensed, and that they did not adhere to 'lane discipline'. It further proposed that <i>moto</i> be given identified locations to work from as extensions of other transport, and eventually be phased-out as a mode of transport.
Regulation No. 008/TRANS/RT/RURA/2018 of 21/12/2018 governing motorcycle public transport services in Rwanda	2018	Issued by RURA, this regulation sets up the requirement for individual and cooperative authorisation to operate a <i>moto</i> business, including: <ul style="list-style-type: none"> • having a commercial insurance certificate • payment of an application fee (approx. USD 23 for an individual) • membership of a motorcycle cooperative • the use of an ICFM. The regulation also prescribes <i>moto</i> rider professional conduct: <ul style="list-style-type: none"> • To have two helmets – one for the rider and another for the passenger • To always wear a reflective gilet • To not carry oversized luggage • To always use a taxi meter (ICFM). It also set fines and penalties for non-compliance with operational and professional conduct requirements.
Board decision No. 03/BD/RD-TRP/2021 of 27th September, 2021 reviewing the fare for motorcycle public transport services in Rwanda	2021	The RURA board decision clarifies and updates the fare for motorcycles which is programmed into ICFM for automatic fare calculation: <ul style="list-style-type: none"> • RWF 300 (USD 0.3) for the first 2 km • RWF 107 (USD 0.1) per km up to 40 km • RWF 187 (USD 0.2) per km after 40 km. It is also sets a non-paid waiting time of up to 10 minutes, after which a fee of RWF 21 (USD 0.02) per minute is paid. It also sets the ICFM total charge at 9.8% of the fare trip (down from 10.5% in 2018).
Regulation No. 15/R/CR-CSI/RURA/2021 of 27 September 2021 governing the operation of Intelligent Connected Fare Meters (ICFM)	2021	The regulation defines what an ICFM entails: that it must be a system composed of the electronic device for fare calculation, a GPS tracking unit device, and the backend system for data management. It furthermore requires licensees (ICFM providers) to have a dashboard and provide dashboard access to RURA. It more precisely sets the technical specification for ICFMs and the applicable sanctions for various faults related to ICFM operations.

The existing institutional set-up, investment and policies have led the International Telecommunication Union (ITU) to classify Rwanda's ICT regulatory as 'third generation', meaning it is at the stage where there has been enabling investment on the part of the public sector and a dual focus on stimulating coemption and consumer protection. The most advanced regulated economies are in the 'fifth generation' and Kenya is the only African country in this category (ITU, 2020).

Overall, in contrast to Nairobi, the case of Kigali is one of rapid expansion and adaptation of existing platforms. While elaborate regulatory frames exist, governance tends to occur at a national level and focuses more on e-hailing than e-logistics.

Kigali deep dive

The wider ecosystem of platforms and their place in regulatory arrangements provided a foundation for us to explore two cases in Kigali. Vuba Vuba and YegoMoto were selected as key actors and reflect the platform ecosystem in terms of origin and type. While Vuba Vuba is a delivery platform that is fully indigenous in its origin, YegoMoto is a commuter platform whose initiators are international technologists. Both platforms are pioneers and leaders in their respective sector niches.

Vuba Vuba

In 2014, Hello Food pioneered the food delivery business in Kigali. It rolled-out on a small scale offering prepared-food delivery from restaurants to customers. Prior to Hello Foods, most food delivery was managed by restaurants that used motorcycles to get food to customers who dialled in their orders.

In 2017, Hello Food was acquired by Jumia, a Nigerian firm that had been operating a similar app-based delivery business since 2016. Jumia, for all intents and purposes, created the market for food and grocery delivery in Kigali, and pioneered the technologies and systems still in use today. The company rolled-out an online C2C marketplace where customers could scroll through restaurants, supermarkets, and smaller stores (e.g. electronics stores, florists, shoe stores and pharmacies) and have products delivered to their homes. The app used GPS coordinates to relay delivery locations to riders; enabled payments using credit cards, cash or mobile money; and set up a comprehensive customer-service centre to deal with problematic orders. The company largely made its money from delivery fees charged to customers and commissions charged to restaurants and businesses. Although it primarily operated in Kigali, by 2019 it was operating in smaller cities such as Musanze.

In late 2019, Jumia abruptly exited the food delivery market having decided that Kigali – and Rwanda – was too small and did not offer much in the way of prospects for growth. The void opened the doors for Vuba Vuba, whose CEO had worked for Jumia, to fill the gap in the market. Hiring former Jumia employees and drivers, Vuba Vuba was created in January 2020, just prior to the onset of COVID-19 in Rwanda.

Offering, actors and Vuba Vuba ecosystem

Vuba Vuba's co-founders insist that the app's success reflects how well it suits the local market. First, the app does not have a web interface, a feature they realised was unnecessary based on focus-

group discussions, given that a significant portion of the local delivery market centred on mobile app usage. Second, the app is hosted locally and was built with a local technology team, giving the team flexibility and the chance to quickly respond to changes in tastes. Third, the app concept was funded through a business loan from a local bank and not a product of international capital that would have placed enormous pressure on the co-founders to deliver results and profits. Fourth, Vuba Vuba piggybacked on existing arrangements built by Jumia by subcontracting riders who were already licensed motorcyclists.

Despite these claims, the Vuba Vuba platform is very similar to its Jumia predecessor. It can be installed on Android and iOS, with users providing their name, location, and telephone number. When an order is placed by a customer, the platform links to the store or restaurant that accepts and processes the order or rejects it. When the order is ready, a Vuba Vuba rider is notified through the app on the routing of the order from the vendor (store or restaurant) to the customer. The platform offers a tracking system where the client can follow-up on the order and the system is embedded with WhatsApp for any enquiries. The platform automatically sends a USSD alert for mobile money or SPENN payment if the client chooses to prepay digitally.

Currently the Vuba Vuba platform, like other apps, is managed and regulated as a standard domestic business. The company is locally registered by the RDB and pays local taxes to the RRA. RURA tried to impose new surcharges on e-commerce operators, amounting to a surcharge of USD 3,000, but this was quickly repealed after complaints and protests, and the regulation is undergoing further consultations and revisions. MINICOM, the line ministry directly responsible for e-commerce laws and policies, organises training for local businesses, facilitated by global e-commerce platforms such as Alibaba.

Vuba Vuba users tend to be high-income Rwandese and expatriates. This is partly due to the prices charged for prepared foods, as well as the types of restaurants that agree to sell their products using the system. However, the company has started a scheme that encourages ordering in groups, effectively sharing the delivery cost, in a bid to encourage middle-income individuals to use the platform.

Intervention and innovation

While Vuba Vuba is not the first app-based delivery platform in Kigali/Rwanda, it was the first to have a sizeable and relatively stable customer base. This was due in part to the outbreak of COVID-19. Frequent government lockdown regulations and official communiques encouraging the use of home deliveries of food and pharmaceuticals gave the company a sound platform on which to expand their operations. Vuba Vuba quickly cementing its place as the premier delivery app in two of Rwanda's key cities: Kigali and Musanze. Vuba Vuba experienced 200% growth during lockdown and, although this has now plateaued, it remains positive. The platform is also shaping e-commerce sector regulations and policy through consultations organised by RURA and MINICOM.

Vuba Vuba's success is, in many ways, an example of decades-long efforts by the government to digitise the economy. The company has managed to leverage increased awareness and openness to digitalisation, improved digital infrastructure (e.g.

4G Internet, mobile penetration) and fintech solutions like Mobile Money and SPENN, to gain a formidable market share. Vuba Vuba has been digitally disrupting the economy and its success is partly due to its ability to leverage existing low-tech and non-digital traits in the ecosystem. For instance, contending with incomplete street addressing in Kigali, the rider's familiarity with a particular part of the city is capital for the delivery, and although a tracking system is available on the app, oftentimes urgent enquiries between the platform, the riders, stores and customers are dealt with through phone calls. This illustrates the need for smart solutions that understand and build on existing non-digital features of city life. Going forward, however, the company believes that the e-commerce regulatory framework will need to make incremental changes, taking into account the current state of Rwanda's digital literacy, to ensure stable, consistent and iterative improvements over time.

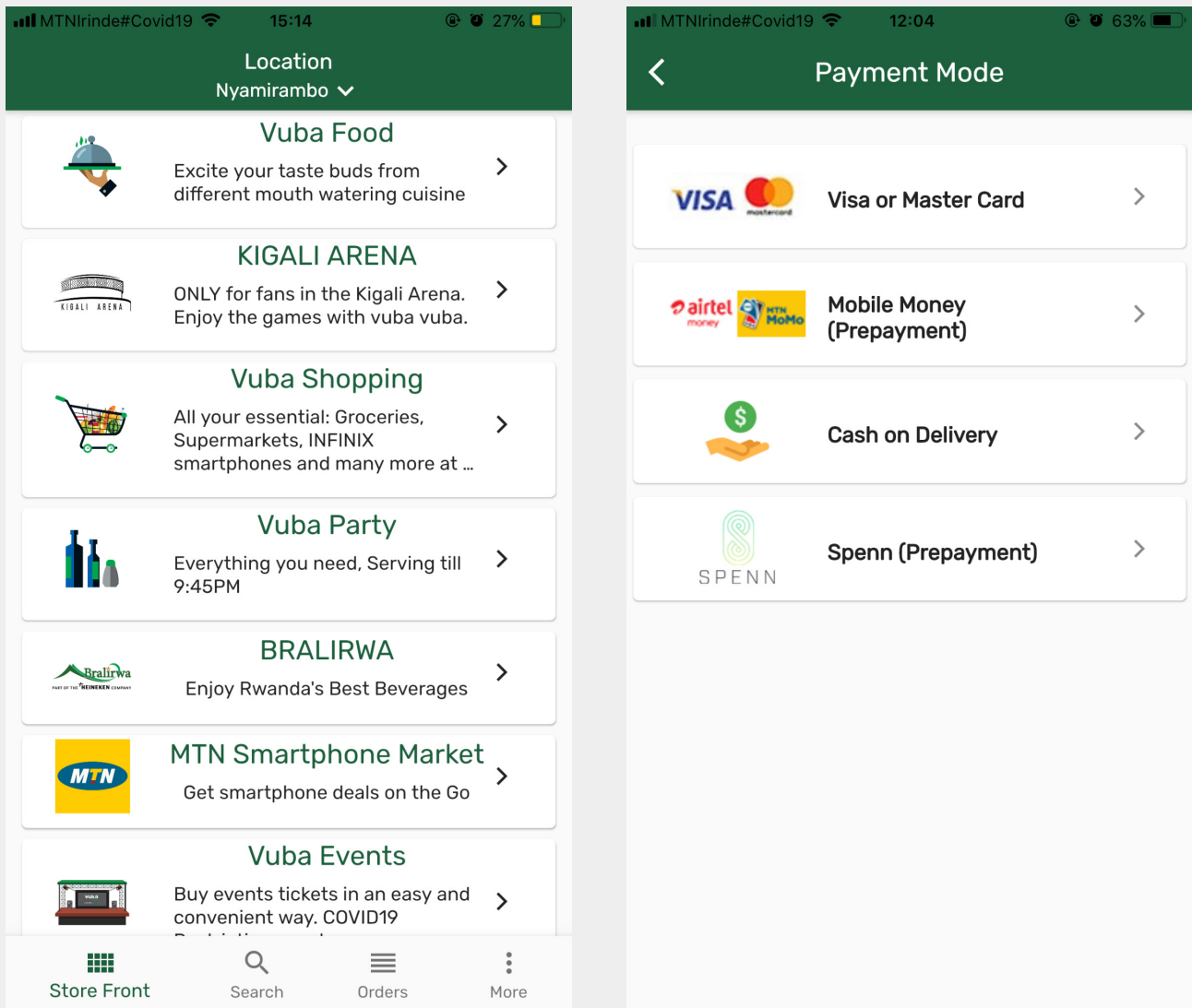


Figure 15: Sample screenshots taken from the Vuba Vuba app



Figure 16: Vuba Vuba *moto* and rider



Figure 17: Installation of a YegoMoto ICFM (© Sebarenzi Alexis)

YegoMoto

YegoMoto is a digital platform for motorcycle commuting and pioneer of ICFM in Rwanda. It is the initial product of Yego Innovision, which also offers the Yego Cab platform for taxi cabs. Yego Innovision is a subsidiary of the Singapore-based software company Kommlabs.

The idea of a digitised motorcycle-taxi metering system originated at the 2015 Transform Africa Summit. Here, Rwanda's government authorities expressed the need for a tool to better monitor and visualise the motorcycle industry. Its intended use was to supplement the existing regulatory oversight of motorcyclist self-organising structures (cooperatives, district unions, and the national motorcycle federation). In particular, the government insisted that a technology-enabled system was critical to monitor and regulate issues such as motorcyclist behaviour, speed, motorcycle theft, and adherence to the regulatory framework. The initiators of YegoMoto – also attendees of the summit – took this to heart and developed Yego Innovision's first product, conceptualised by its in-house engineers.

Offering, actors and YegoMoto ecosystem

The YegoMoto platform is a combination of an ICFM, the Yego app, and a backend system. An ICFM is basically a smartphone and a GPS tracking device installed on a motorcycle. The ICFM calculates the trip fare and is integrated with digital payments such as Mobile Money and Yego's Tap and Pay cards. The Yego app was a later addition to the platform and not a particularly active one. This is because motorcycles are ever-present in Kigali and most passengers get them by simply calling them on the road. The app produces an e-receipt at the end of the ride, which is sent to the passenger's phone if the payment is being made digitally. The receipt shows the trip mileage and time, the name of the rider, and the motorcycle plate number. E-receipts provide sufficient details of both passenger and rider, ensuring easy follow-up on any incidents as well as

safety, which was one of the initial justifications for YegoMoto. The backend system allows RURA to monitor YegoMoto activities and to set trip fare modalities according to the regulations. The backend programs the deductions and rerouting of 9.8% of the trip fare, of which 1.5% is for digital payment and interoperability service fees (telecom network and mobile money charges) and 8.3% is for ICFM service fees (platform fess and ICFM repayment fees). ICFM devices are given to riders on a loan basis for two years and the repayment fee is accounted for in the deductions made from a trip fare. After two years the ICFM device can be unlocked and serve as an ordinary smartphone. At the end of 2021, the YegoMoto platform had been installed on 9,000 vehicles in Kigali, and had recorded 3.8 million trips and 22.7 million kilometres.

The YegoMoto platform has been praised by authorities, who see it as an extra tool to monitor and enforce regulations. These include RURA, the regulator, but also FERWACOTAMU. First, through the YegoMoto Platform backend system, RURA has gained the ability to monitor individual riders at any given time. Second, registration is subject to the rider showing the required regulatory documents and registration to the platform, as mandated by motorcycle regulations. This means that RURA is able to tell a fully compliant rider from a non-compliant one simply by checking if they have an ICFM installed.

Riders and passengers are less enthused by the platform. For riders, the platform has been seen as raising the trip fare (through deductions for ICFM services), which passengers are unwilling to pay as they see no added value. As one rider said:

We will fully use the meter [ICFM] when everyone has got it and it is fully mandatory. At the moment nobody uses it because it makes you uncompetitive. You end up charging more money [trip fare] than the rest of motorcyclists who don't have it. Passengers are not happy with that.

~ Motorcycle-taxi rider

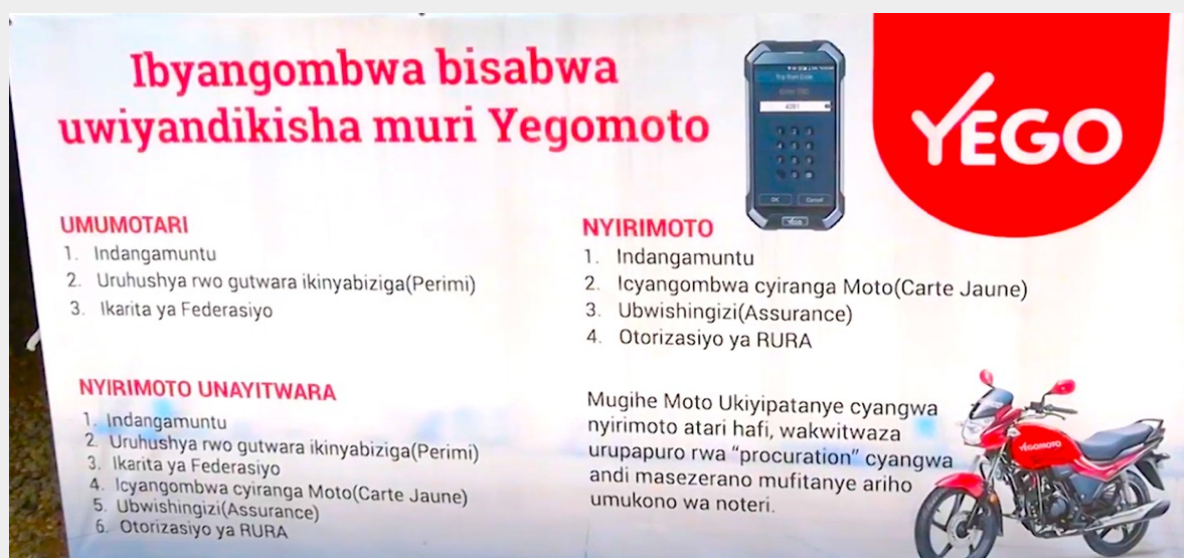


Figure 18: Banner indicating the list of requirements for registering on the YegoMoto platform (© Sebarenzi Alexis)

The authorities interviewed contended that the ICFM will present more value for passengers, beyond the fare, especially in terms of safety. As far as the fare is concerned, they explained that the ICFM will be fairer by considering the waiting time once the trip has started and that it will be regularly revised to reflect the reality. In December 2021, the fare was revised down for trips below 40 km (which comprise the majority of trips made) at the same time the new date for full enforcement of ICFM was set.¹⁵

The initial unenthusiastic reaction of riders and passengers to ICFM, logistical preparations on the part of platforms (purchasing and installing enough ICFMs), and regulatory issues (setting up the right fare), have caused the ICFM roll-out to go through different junctures as indicated in Table 13.

Table 13: ICFM timeline

Policy action	Year	Outcome
Introduction of ICFMs	2017	YegoMoto developed a proposal with the biggest motorcyclist cooperative (ASSETAMORWA) in Kigali, which was presented to RURA. RURA calculated that the overall charge of 10.5% was accurate, which included tax, a provider's fee, airtime, and a RURA levy.
Decision to reject the monopoly of Yego Innovation on e-hailing platforms	2018	To prevent YegoMoto being a monopoly operator, RURA approached other operators (Pascal Technology and AC Group) to enter the space.
Proclamation of Regulation No 008/Trans/RT/Rura/2018 of 21/12/2018 governing motorcycle public transport services in Rwanda	2018	The regulation made the use of an ICFM a requirement for annual authorisation and licensing. It also set a fee of RWF 30,000 (USD 29) for individual motorcyclists and USD 100 for motorcyclist companies in the event they were found not to have or were misusing an ICFM. The regulation also set the implementation starting period according to when RURA 'declares so'.
Public resistance to ICFM	2019	A trial implementation period was given to ICFM providers. They were distributed in different districts as monopolies, with competition only in Kigali. Some providers were not ready, which meant that not all motorcyclists had an ICFM. It was observed that passengers preferred using motorcyclists without an ICFM, therefore their use significantly reduced what RURA could see in their dashboards. The roll-out was put on hold at the same time COVID-19 began to appear.
Resumption of the installation of ICFM	October 2021	RURA identified three companies - YegoMoto, Pascal Technology, and AC Group - to install ICFMs. It provided a deadline by which all motorcyclists had to have an ICFM.

¹⁵ <https://www.newtimes.co.rw/news/regulator-reintroduces-smart-metres-taxi-motos>

Policy action	Year	Outcome
Enacting of Regulation No, 15/R/CR-CSI/RURA/2021 of 27 September 2021 governing the operation of Intelligent Connected Fare Meters (ICFM)	September 2021	The regulation defines what an ICFM entails (a system comprising an electronic device for fare calculation, a GPS tracking unit, and a backend system for data management). It further requires licensees (e-hailing platforms) to have a dashboard and to provide RURA access to it. It more precisely sets the technical specifications for an ICFM and the applicable sanctions for various faults related to ICFM operations.
Resumption of the installation of ICFM	October 2021	RURA identified three companies – YegoMoto, Pascal Technology, and AC Group – to install ICFMs. It provided a deadline by which all motorcyclists had to have an ICFM.
Re-issue of the deadline and reinstatement of YegoMoto as the sole e-hailing platform	December 2021	After a three-month period, the regulator found that only YegoMoto was meeting ICFM requirements and the decision was made to make it the sole provider of ICFMs. The effective date for full ICFM enforcement was set as 7 January 2022.

Intervention and innovation

YegoMoto has had a considerable impact on the motorcycle-taxi sector landscape. The platform was the first to propose and implement the digitisation of motorcycle taxis and, in doing so, became a prototype for e-hailing platforms in Rwanda. Its technical specifications and operational details were later codified in ICFM regulations from RURA.

The platform has also been able to understand the Kigali motorcycle-taxi market far better than its predecessors. Its early de-emphasis on a mobile app is reflective of the local realities of the sector where, because of the easy availability of motorcycles in the city, ordering one through an app was not a necessity.

The relative success of YegoMoto is in spite of the convoluted process the platform has been through. Initially the project was projected to cost approximately USD 14 million, with YegoMoto servicing all the *moto* in the country (around 70,000). However, under RURA's guidance, the country was divided into different regions and allocated to different operators, with only Kigali being an open area for competition, thus reducing the share initially allocated to YegoMoto.

YegoMoto has laid a foundation for more advanced and policy-informing urban analytics. The platform collects daily real-time data on mileage, origin and destination, and timestamps *moto* trips. These are indicative of the commuting patterns of *moto*, which are an important part of public transport in Kigali. The ICFM also collects data on *moto* rider behaviours, such as speed and the time they spend looking for passengers. This data can be useful in transport planning and policy formulation, and city planning at large.

Yego Innovation has partnered with the Bank of Kigali to provide loans for YegoCab cab drivers, with transaction statements serving to prove their creditworthiness. This initiative will also be extended to *moto* riders. Partnering with financial institutions forms part of YegoMoto's intention to integrate and expand its services (YegoMoto, YegoCab, YegoDelivery), resulting in a super-app platform that will be able to put together sellers and buyers of various products, with *moto* riders undertaking delivery tasks. As such, the company projects that only 10% of its revenue will come from the e-hailing platform.

YegoMoto is illustrative of the potential for digitisation, both in terms of how it can regulate and tax a previously leniently regulated sector, and how it can assist in better data-driven planning. YegoMoto is also helping to set the foundation in formalising the *moto* sector and improving the access to finance. However, it also demonstrates difficulty in automating a complex sector that is replete with subtle and informal realities, which has partly led to its contestation among *moto* riders. For example, when the riders are homebound, they often charge less if the passenger is heading in the same direction. Riders also charge less if the destination is a more central/dense area because they anticipate picking up more passengers at the destination. The YegoMoto platform, through using ICFM, has had difficulty automating such subtle practices which are crucial in the daily work of *moto* riders.

KEY POINTS

Kigali's motorcycle-based platforms are at a nascent stage and growing. This growth was reinforced by the outbreak of COVID-19.

Successful platforms in Kigali have leveraged and adapted analogue operations, such as *moto* rider practices and city knowledge.

Some platforms in Kigali manifest aspirations to become super-apps, offering multiple services and participating in city planning.

The regulatory framework in Kigali still focuses on e-hailing platforms. Delivery platforms are not specifically regulated.

6.

Emerging themes and insights

In Nairobi and Kigali motorcycles are a key mode of urban mobility, and tech has been a central focus of urban-development discourse. As we have shown, the Nairobi case is one of incredible variety and testing. There are many and varied platforms, some of which have short lives and regularly reformat. These platforms are increasingly diversifying to reach new market segments and affordability levels. The ecosystem reflects a combination of local and international innovation, and has yet to see any real regulation by the state. In contrast, the Kigali case is an example of an ecosystem that is encouraged and sometimes funded by the government. While the market has grown quickly, especially during the pandemic, it is still relatively small, with one dominant company and several smaller competitors involved in both freight and passenger transport. These platforms cater to a very small elite population.

COVID-19 and the rise of motorcycle platformisation

The COVID-19 pandemic has shifted urban logics, life and logistics in profound ways. Being recent and current has meant that mobility research – particularly around micro-/e-logistics – has involved tracking an ever-evolving phenomenon in real time. COVID-19 has accelerated certain shifts, particularly in relation to demand. Even without a pandemic, platforms are constantly in flux: changing, adapting, testing new functionalities, branching into new markets and retracting from others. This can be seen in Nairobi and Kigali, with a proliferation of new platforms entering the market (e.g. Taxiye and Bolt Foods in Nairobi, and Pozo Delivery and SokoMall in Kigali). Motorcycles have had an important role in the platformisation of mobility. The rapid acceleration of the sector may slow as the pandemic is tamed, but growth is set to continue. An interesting mix of global and local platforms, as well as various business models, are emerging.

Algorithmic and analogue adaptation

Local and global platforms are adapting creatively in response to the places in which they operate. There are technical variables such as broadband access, data costs, and mobile phone types, as well as human considerations: what people need, which platforms they like to use, and how they communicate. For example, many people do not have smartphones with ample space and data to download apps, and many prefer to use WhatsApp than in-app messaging. While there has been a tendency to view international and home-grown platforms

as different, in some instances romanticising the latter and maligning the former, the distinction is not as clear as it may appear at first glance. Local platforms are often set up to be responsive and this may be the case initially as they emerge to fulfil specific needs.

Global platforms tend to come into the market with established and slick digital processes and procedures. Local platforms appear to be more tailored, but limited access to global finance and state-of-the-art tech can limit their traction. Global platforms tend to be slower, but can have wider reach. Local platforms may have hybridity built in, but although global platforms may take a little longer to recognise what is needed, they generally have more resources to adapt quickly, often replicating and copycatting the successful experimentations of local platforms. Where they converge is in their adaptability – particularly how they respond to algorithmic and analogue interfaces. The iterative nature of these human-technical interactions demonstrates how dexterous these platforms need to be in local contexts. Local and global platforms need to adjust how they interact with riders and users, and how they connect through the platform in multiple ways that are not only app-based (e.g. calling or messaging to follow up on WhatsApp). Manual workarounds are common, with people extending usability and adapting the system to serve their needs. What is potentially less visible, and often falls outside the scope of mobility research, are the hidden labour relations and activities of riders required to make these hybrid systems work well for businesses and users.

While the concept of seamless services and payments through a single app is attractive, the reality we have seen in our research is quite different. One of the reasons GoBEBBA, Vuba Vuba and YegoMoto have been so successful is because they do not rely on purely digital solutions. Uber had to change its operations to adapt to the local context. Many people distrust apps and do not have data or smartphones. Some platforms do not have apps and work with a combination of digital and analogue engagements. There are follow-up calls, chats on WhatsApp, and calls to call-centres. Sometimes there are heated arguments and stand-offs between riders and users to see who will cancel an order first. Riders may also be reluctant to use platforms as they can still operate without them, without the additional tech hassle, and can charge more (or are commissioned less). This has interesting implications for thinking about the notion of a super-app and digital-analogue low-tech arrangements in commuter logistics and e-logistics.

Super-apps

The idea of the super-app first gained popularity in China with WeChat, the messaging app that essentially acts as a platform for facilitating life online in the world's most populous country. WeChat doesn't just let you message your friends and see their updates in a feed; it can also be used to take out a loan to buy your next car. Commerce done through mini-apps that WeChat lets other developers build on its platform reached a staggering \$240 billion last year alone, more than double from the previous year.

~ Heath (2021)

Super-apps fundamentally act as a single portal to multiple services, ranging from delivery to e-hailing, to communication, to social media. One feature of this trend, especially the incorporation of existing mobile payments + e-commerce + two-wheel logistics, is the disintermediation of banks and legacy financial institutions. While cash still dominates, there is a rapid rise in mobile money, and platforms are working to integrate this in multiple ways.

A few ecosystems now combine multiple options, often linking to existing fintech (e.g. mobile payments such as M-Pesa). Uber, for example, features a car-hailing service, a *boda*-hailing app, a parcel service, and a cooked-food delivery app. We can observe the same with Jumia and other e-commerce platforms. These apps are not technically (yet) logistics apps, but they are growing ecosystems that currently outsource the last mile to two-wheelers. E-commerce super-apps are therefore of increasing importance in understanding the sector as both domestic and international companies, whether B2B or B2C, rely on some form of platform-enabled two-wheel logistics. In terms of existing large-scale retail (e.g. Carrefour), these companies seem to have transformed themselves (even physically) to actually embed platform-enabled distribution to their last mile.

Given the hybridity of algorithmic and analogue workarounds, the notion of the super-app in African cities is something to keep an eye on. If the seamlessness of the aspiration of a super-app is not a contextual reality, how could we conceive of a super-app that suits the continent? And what does this mean for the array of actors in the arrangement that includes businesses, riders, users, platforms, and mobile money? We found the interaction with fintech both intriguing and elusive, and in need of further research in order to understand how people, goods and money flow within mobility ecosystems.

Regulatory regimes and governance gaps

Given the rapid changes in the sector, especially since 2020, the state and its policy has not had time to keep up. In Kigali, for example, the centralised nature of governance means that there are mechanisms to react, but these sit in day-to-day regulations rather than overarching and integrated policy plans. This is a gap in the state's focus, which is clearly seen in Nairobi. In both cities, and from what we have seen in a cursory look elsewhere, policy and governance tend to be located nationally, and there is not much power at a sub-national level to engage with the textured

and contextual realities happening on a daily basis. Policies still tend to sit in separate categories (e.g. they are linked to ICT, transport, or urban governance). Although there are some cross-cutting attempts emerging, these tend to focus more on commuter mobility and less on e-logistics.

While both e-hailing and e-logistics rely on a motorcycle, operator, user and smartphone, regulatory regimes and governance of platforms are often dealt with separately. This may reflect a sense that the former is the domain of transport (public services/movement of people) and the latter the domain of ICT services (business community/movement of goods). While the motorcycle-taxi operator exists in both situations, the focus of regulation and governance seems to recognise this more clearly in relation to e-hailing. This has implications for how riders are conceived of in and protected by policy objectives. The lack of coherence in governance arrangements in relation to the motorcycle-taxi ecosystem and different scales of regulatory regimes has implications for local places and global flows that need further attention.

Planning for reconfiguring business processes

City planning is meant to plan for the future growth and socio-spatial and economic wellbeing of cities. Given the rapidly changing nature of the motorcycle-taxi sector, the spatial implications of these platforms are only starting to be seen. Shifting business models are resulting in infrastructural effects. For example, drop shipping, dark kitchens, and other 'dark' services (such as laundry), and new constellations of the temporary storage of goods, is already shifting the material landscape of cities and will ultimately impact on planning. While the research surfaced some of these emergent responses, the implications of digital transformations on cities and their policy processes need to be watched closely.

Shifting business models also have implications for labour arrangements. The motorcycle-taxi sector involves crowdsourced, freelance, and precarious work, with some riders more independent or more integrated than others. Riders work for different platforms and there is a constant hustle for the best way of working with and between them. Not enough is known about these labour configurations and arrangements and, as mentioned previously, there are multiple forms of work that currently remain invisible. The social infrastructure of the sector is underexplored and a field of research requiring further attention. The rapidly changing nature of both material and social infrastructure is currently a blind spot in urban policy discussions in many African cities.

7.

Conclusion

Given that the digital space is rapidly changing, this report can only provide a snapshot of the digital offerings in Kigali and Nairobi's motorcycle-taxi space. This report, therefore, does not intend to provide a complete and irrefutable picture. It rather aims to show some important trends – and raise critical concerns – evident in these two cities, with application to how we understand and intervene in this space moving forward.

There is a clear need to get ahead of the curve in terms of how the proliferation of platforms takes hold in African cities. This process creates new systems of public transport and logistics, worthy of deep interrogation and propositional debates. We hope that the rich empirical details provided, as well as the conceptual reflections on regulation, urban planning, adaption, and finance, will form part of new research agendas and proposals moving forward.



Glossary

accelerator programme: an intensive programme providing support for clusters of start-ups aimed at fast-tracking them for early-stage investment

civic-tech: the purpose of civic-tech is to strengthen the relationship between residents and governments through technologically driven communications, service delivery, and access to political processes and decision-making

dark store: a retail distribution centre that services online shopping systems; a dark store provides warehousing or temporary storage space for goods ordered through 'click and collect' platforms

digital ecosystems: an all-encompassing category used to capture the software component of ICT investment, including government-driven smart-city projects and services; digitisation projects; accelerator, incubator and similar digital business-development programmes; capital investment in digital companies; digital companies and technology start-ups; and regulatory frames within which they operate

digital infrastructure: includes ICT infrastructure such as hardwired broadband (submarine and underground fibre-optic cables, copper cables, etc.), mobile broadband (3G, 4G, 5G wireless access to the Internet via mobile telephony networks), data-centre enabled Internet exchanges, cloud and colocation services

digital platform: a tech-enabled system connecting businesses, users and service providers through a software application

drop shipping: involves a business that does not require a store holding products in stock, but rather connects to third-party manufacturers or retailers that ship the product directly to customers

e-commerce: electronic commerce refers to the buying and selling of goods and services via the Internet

e-governance: electronic governance refers to the use of ICT by governments to provide communication, services, and exchange of information to enhance the transactions between society and the State

e-hailing: a service that enables booking and paying for transport through electronic platforms and applications

fintech: the word 'fintech' captures a diverse array of technologies that innovate the delivery, management and outreach of financial services such as credit and insurance

gig economy: coming from musicians being paid for short-term gigs, the gig economy now also refers to a free-market system that hires independent workers for short-term work

incubator programme: a programme for start-ups that generally involves providing support in the form of work space, mentoring, training, seed funding, and networking

last mile: the last leg of a supply-chain process; often used to indicate the final stage of movement of goods in a retail transaction

mobile money: (also referred to as a mobile- or e-wallet) a platform, application or technology that allows people to store, move or spend money via digital means – usually a mobile phone

motorcycle-taxi riders: people who earn a living by moving goods and people on their motorcycles

on-demand logistics: delivery services that are flexible in terms of demand and provide rapid last-mile solutions to reach end customers

paratransit: a transportation system or service that supplements fixed-route mass-transport services and often does not involve set routes or timetables

platform urbanism: a term used by scholars to describe the use of digital technologies in shaping social, spatial and economic processes within cities

q-commerce: quick commerce refers to rapid or on-demand delivery such as under-an-hour grocery deliveries

regulatory ecosystem: all the actors in a regulatory arrangement, including international, national, regional and local government actors and bodies involved in implementing regulations

smart city: generally refers to a city that seeks to optimise its operational efficiency, share information with the public, and improve the quality of government services, citizen wellbeing, and ecological sustainability through information and communication technologies

southern urban perspective: involves re-orienting the focus of knowledge production, analysis and thinking from the Global North and centralising the experience of and in the Global South within international academic and practitioner debates, theories and solutions

start-up: usually refers to a company in its infancy, where one or more entrepreneurs are developing a product or service in response to a need identified in the market

super-app: a platform that integrates multiple uses and services within a single software ecosystem to reduce the need to engage with multiple applications to complete a transaction (e.g. ordering, communication, financial exchanges)

tech hub: a cluster of start-ups, incubators, accelerators and other tech companies in a region, forming a place of important economic, spatial or social infrastructure

venture capital: a type of high-risk equity financing where capital is invested into a company that appears to be well placed to grow significantly

References

- Anwar, M.A. and Graham, M. (2021). Between a Rock and a Hard Place: Freedom, flexibility, precarity and vulnerability in the gig economy in Africa. *Competition & Change*, 25(2), 237–258.
- Attoh, K., Wells, K., and Cullen, D. (2019). ‘We’re building their data’: Labor, alienation, and idiocy in the smart city. *Environment and Planning D: Society and Space*, 37(6), 1007–1024.
- Barns, S. (2020). Re-engineering the City: Platform ecosystems and the capture of urban big data. *Frontiers in Sustainable Cities*, 2(32).
- Bundervoet, T., Maiyo, L., Sanghi, A. (2015). Bright Lights, Big Cities: Measuring national and subnational economic growth in Africa from outer space, with an application to Kenya and Rwanda. World Bank Policy Report Research Working Paper No 7461.
- Burns, H. (2021). A Smart City Masterplan, Kigali. In Douay, N. and Minja, M. (eds) *Urban Planning for Transitions*, London: ISTE and John Wiley, pp. 153–169.
- Carmody, P. and Fortuin, A. (2019). ‘Ride-sharing’, virtual capital and impacts on labor in Cape Town, South Africa. *African Geographical Review*, 38(3), 196–208.
- Cervero, R. and Golub, A. (2007). Informal Transport: A global perspective. *Transport Policy*, 14(6), 445–457.
- CIFTS. (2021). Global Fintech Hub Report 2021. China International Fair for Trade in Services.
- Chambers, J. (2019). Fluidities and Fixities: Examining the alignment of digital platforms within Nairobi’s heterogeneous infrastructural configurations. *Frontiers in Sustainable Cities: Innovation and Governance*. <https://www.frontiersin.org/articles/10.3389/frsc.2019.00008/full>
- Collier, R.B., Dubal, V.B. and Carter, C.L. (2018). Disrupting Regulation, Regulating Disruption: The politics of Uber in the United States. *Perspectives on Politics*, 16(4), 919–937.
- Ferreri, M. and Sanyal, R. (2018). Platform Economies and Urban Planning: Airbnb and regulated deregulation in London. *Urban Studies*, 155(15), 3353–3368.
- GSMA. (2019). *5G in sub-Saharan Africa: Laying the foundations*. London: GSMA.
- Goodfellow, T. (2015). Taming the ‘rogue’ sector: Studying state effectiveness in Africa through informal transport politics. *Comparative Politics*, 47(2), 127–147.
- Goodfellow, T. (2017). ‘Double Capture’ and De-Democratisation: Interest group politics and Uganda’s ‘transport mafia’. *Journal of Development Studies*, 53(10), 1568–1583.
- Government of Rwanda. (2019). Law NO 22/2019 of 29/07/2019 Governing the City of Kigali. Rwanda
- Graham, M. (2020). Regulate, Replicate and Resist: The conjunctural geographies of platform urbanism. *Urban Geography*, 41(3), 453–457.
- Graham, M. and Mann, L. (2013). Imagining a Silicon Savannah? Technological and conceptual connectivity in Kenya’s BPO and software development sectors. *Electronic Journal of Information Systems in Developing Countries*, 56(1), 1–19.
- Graham, M. and Woodcock, J. (2018). Towards a Fairer Platform Economy: Introducing the Fairwork Foundation. *Alternate Routes*, 29, 242–253.
- Gray, M.L. and Suri, S. (2019). *Ghost Work: How to stop Silicon Valley from building a new global underclass*. New York: Harper Business.
- Guma, P.K. (2019). Smart Urbanism? ICTs for water and electricity supply in Nairobi. *Urban Studies*, 56(11), 2333–2352.
- Guma, P.K. and Monstadt, J. (2021). Smart City Making? The spread of ICT-driven plans and infrastructures in Nairobi. *Urban Geography*, 42(3), 360–381.
- Heath, A. (2021). Rise of the Super App. Social media companies are increasingly super apps that encompass more of what we do online, for better or worse. *The Verge*. <https://www.theverge.com/22738395/social-media-super-app-facebook-wechat-shopping>
- Howe, J. (2003). ‘Filling the Middle’: Uganda’s appropriate transport services. *Transport Reviews*, 23(2), 161–176.
- Iazzolino, G. (2021). ‘Going Karura’: Colliding subjectivities and labour struggle in Nairobi’s gig economy. *Environment and Planning A: Economy and Space*. <https://journals.sagepub.com/doi/abs/10.1177/0308518X211031916>.
- ITA. (2021). Kenya Country Commercial Guide. <https://www.trade.gov/country-commercial-guides/kenya-information-communications-and-technology-ict>
- ITU. (2020). Global ICT Regulatory Outlook 2020: Pointing the way forward to collaborative regulation. Geneva, Switzerland.
- Kenya National Bureau of Statistics. (2019). *2019 Kenya Population and Housing Census Volume I: Population by County and Sub-County*. <https://www.knbs.or.ke/?wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county/>
- Kumar, A. (2011). *Understanding the Emerging Role of Motorcycles in African Cities: A political economy perspective*. Washington DC: The World Bank.

- Mattern, S. (2016). Instrumental City: The view from Hudson Yards, circa 2019. *Places Journal*, April 2016. <https://placesjournal.org/article/instrumental-city-new-york-hudson-yards/?cn-reloaded=1>
- McNeill, D. (2016). Governing a City of Unicorns: Technology capital and the urban politics of San Francisco. *Urban Geography*, 37(4), 494–513.
- MINICOM. (2021). State of E-commerce in Rwanda.
- MINICT (Republic of Rwanda). (2017). *ICT Sector Strategic Plan 2018–2024*. https://www.risa.rw/fileadmin/user_upload/Others%20documents/ICT%20SECTOR%20STRATEGIC%20PLAN%202018-2024.pdf.
- MINICT (Republic of Rwanda). (2019). *Rwanda ICT Sector Profile – 2019*. https://www.minict.gov.rw/fileadmin/user_upload/minict_user_upload/Documents/ICT_Sector_Profile/ICT_sector_profile_2019.pdf
- MININFRA (Republic of Rwanda). (2021). Consultancy of baseline survey to inform reporting mechanism on average share of built up area of cities that is open and public.
- Mundia C.N. (2017). Nairobi Metropolitan Area. In Murayama Y., Kamusoko C., Yamashita A. and Estoque R. (eds) *Urban Development in Asia and Africa*. Singapore: Springer.
- Munn, L. (2017). I am a Driver-Partner. *Work Organisation, Labour and Globalisation*, 11(2), 7–20.
- Ndemo, B. (2020). Slum digitisation, its opponents and allies in developing smart cities: The case of Kibera, Nairobi. In Hawken, S., Han, H. and Pettit, C. (eds) *Open Cities| Open Data*. Singapore: Palgrave Macmillan, pp. 129–148.
- NISR. (2018). *Integrated Household Living Conditions Survey (EICVS) – Main Indicators Report*. Kigali: National Institute of Statistics of Rwanda.
- Nyachio, G.M.M. (2015). Socio-cultural and economic determinants of *boda boda* motorcycle transport safety in Kisumu County, Kenya. Unpublished PhD thesis, Kenyatta University.
- Nyassogbo, G.K. (2011). Les activités informelles et l'occupation des espaces publics. Les trottoirs de Lomé au Togo. *Revue de Géographie Tropicale et d'environnement*, 2, 22–34.
- Odendaal, N. (2006). Towards the Digital City in South Africa: Issues and constraints. *Journal of Urban Technology*, 13(3), 29–48.
- Odendaal, N. (2015). Getting smart about smart cities in Cape Town: Beyond the rhetoric. In Marvin, S., Luque-Ayala, A. and McFarlane C. (eds) *Smart Urbanism*. London: Routledge, pp. 71–87.
- Odendaal, N. (2021). Platform urbanism and hybrid places in African cities. In Aurigi, A. and Odendaal, N. (eds) *Shaping Smart for Better Cities*. London: Academic Press, pp. 203–219.
- Pollio, A. (2019). Forefronts of the Sharing Economy: Uber in Cape Town. *International Journal of Urban and Regional Research*, 43(4), 760–775.
- Pollio, A. (2021). Uber, airports, and labour at the infrastructural interfaces of platform urbanism. *Geoforum*, 118, 47–55.
- Pollio, A. and Cirolia, L.R. (2021). *Financing ICT and Digitalisation in Africa: Current trends and key sustainability issues*. Cape Town: African Centre for Cities & Alfred Herrhausen Gesellschaft.
- Pollio, A. and Cirolia, L.R. (2022). Fintech Urbanism in the startup capital of Africa (forthcoming: *Journal of Cultural Economy*).
- Rajashekar, A., Richard, M. and Stoelinga, D. (2019). *The economic geography of Rwanda*. London: IGC. Ref. C-38415-RWA-1. <https://www.theigc.org/wp-content/uploads/2019/08/Rajashekar-2019-Final-report.pdf>
- Republic of Kenya. (2010). The Constitution of Kenya. <https://www.klcr.go.ke/index.php/constitution-of-kenya>
- Republic of Kenya. (2019a). Digital Economy Blueprint: Powering Kenya's Transformation. <https://www.ict.go.ke/wp-content/uploads/2019/05/Kenya-Digital-Economy-2019.pdf>
- Republic of Kenya. (2019b) National Broadband Strategy 2018–2023. <https://www.ict.go.ke/wp-content/uploads/2019/05/National-Broadband-Strategy-2023-FINAL.pdf>
- Rosenberg, L. and Brent, A. (2020). Infrastructure Disruption in 'Silicon Savannah': Exploring the idea of the creative class and their relation to quality of place in Nairobi, Kenya. *International Journal of Urban and Regional Research*, 44(5), 809–820.
- Rosenblat, A. (2018). *Uberland*. Berkeley: University of California Press.
- RURA. (2016). Board decision No 07/BD/LER/ RURA/2016 OF 13/12/2016 determining the contribution levied on annual turnover of the regulated services. https://rura.rw/fileadmin/Documents/board_decision/BOARD_DECISION__DETERMINING_THE_CONTRIBUTION_LEVIED_ON_ANNUAL_TURNOVER_OF_THE_REGULATED_SERVICES.pdf.
- RURA. (2021). Active Mobile-Cellular Telephone Subscriptions as of June 2021. https://www.rura.rw/fileadmin/Documents/ICT/statistics/Mobile_telephone_for_Telecom_Statistics_report_as_of_July_2021.pdf
- Sadowski, J. (2020). The Internet of Landlords: Digital platforms and new mechanisms of rentier capitalism. *Antipode*, 52(2), 562–580.
- Schalekamp, H. and Behrens, R. (2013). Engaging the paratransit sector in Cape Town on public transport reform: Progress, process and risks. *Research in Transportation Economics*, 39(1), 185–190.
- Scheepers, C.B. and Bogie, J. (2020). Uber sub-Saharan Africa: Contextual leadership for sustainable business model innovation during COVID-19. Emerging Market Case Studies. <https://www.emerald.com/insight/content/doi/10.1108/EEMCS-05-2020-0165/full/html>

- Scholz, T. (2016). *Platform Cooperativism. Challenging the corporate sharing economy*. New York: Rosa Luxemburg Foundation.
- Smart Africa. (nd). Who We Are. <https://smartafrica.org/who-we-are/>
- Söderström, O. and Mermet, A.C. (2020). When Airbnb sits in the Control Room: Platform urbanism as actually existing smart urbanism in Reykjavik. *Frontiers in Sustainable Cities*, 2(15).
- Söderström, O., Blake, E. and Odendaal, N. (2021). More-than-Local, More-than-Mobile: The smart city effect in South Africa. *Geoforum*, 122, 103–117.
- Surbana Jurong. (2020a). Kigali Master Plan 2050: Master Plan Report.
- Surbana Jurong. (2020b). Kigali Master Plan 2050: Traffic Report.
- United Nations. (2015). Sustainable Development Goals: 17 Goals to transform our world. <https://www.un.org/en/exhibits/page/sdgs-17-goals-transform-world>
- Vallas, S. and Schor, J.B. (2020). What do platforms do? Understanding the gig economy. *Annual Review of Sociology*, 46, 273–294.
- Van Doorn, N. (2017). Platform Labor: On the gendered and racialized exploitation of low-income service work in the ‘on-demand’ economy. *Information, Communication & Society*. 20(6), 898–914.
- Wilkinson, P., Golub, A., Behrens, R., Ferro, P.S. and Schalekamp, H. (2011). Transformation of urban public transport systems in the global south. In Geyer, H.S. (ed.). *International Handbook of Urban Policy. Issues in the Developing World, Volume 3*, pp. 146–175.
- World Bank. (2020). *Bolstering Poverty Reduction in Rwanda: A poverty assessment*. <https://openknowledge.worldbank.org/bitstream/handle/10986/34753/Bolstering-Poverty-Reduction-in-Rwanda-A-Poverty-Assessment.pdf?sequence=1&isAllowed=y%20-%20pp%2043>



AFRICAN CENTRE FOR CITIES
urbanism from an african perspective

VREF
VOLVO RESEARCH & EDUCATIONAL FOUNDATIONS