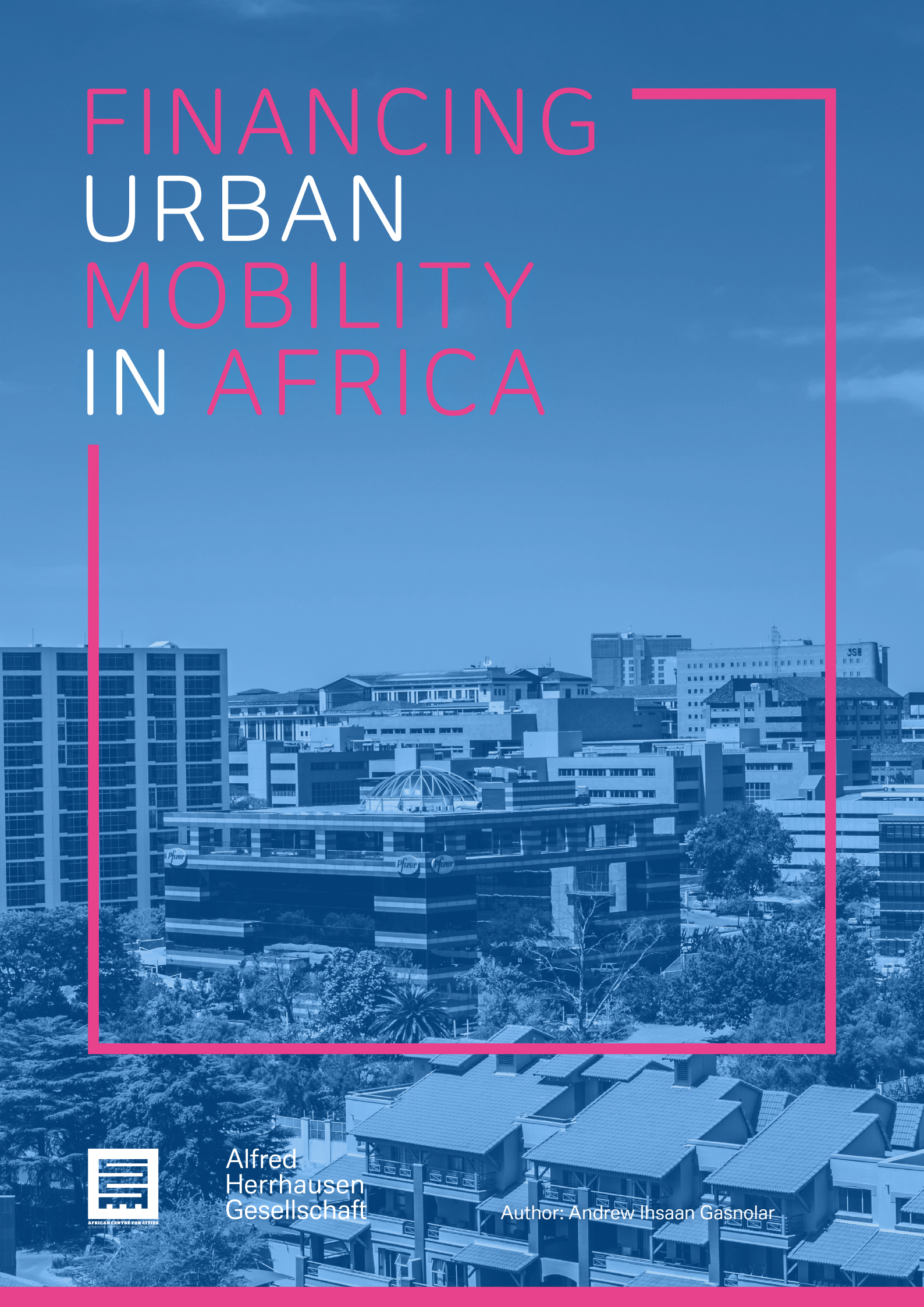
FINANCING URBAN MOBILITY IN AFRICA



AFRICAN CENTRE FOR CITIES

Alfred Herrhausen Gesellschaft

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About the African Centre for Cities

The ACC, which is based at the University of Cape Town, is a leading knowledge centre conducting meaningful research on how to understand, recast and address pressing urban crises, particularly on the African continent. As most urban challenges, for example, food security, climate change adaptation, economic inclusion, cultural vitality and tolerance, are inherently interdisciplinary and spatially layered, the ACC nurtures the co-production of knowledge favouring and cultivating critical Southern perspectives. Through its research, the ACC aims to develop imaginative policy discourses and practices to promote vibrant, just and sustainable cities. This purpose has become all the more pertinent with the adoption of Agenda 2063 at a pan-African level, which aligns with the 2030 Agenda for Sustainable Development.

About the Alfred Herrhausen Gesellschaft

The Alfred Herrhausen Gesellschaft promotes a free and open society and its cohesion. Democracy, the social market economy and sustainability are the foundations of such a society. Our work is based on the values of Alfred Herrhausen: on freedom and responsibility, on competition and compassion. Alfred Herrhausen thought and acted with the aim of crossing and overcoming boundaries. In his memory, the Alfred Herrhausen Gesellschaft creates platforms for discussions to enrich relevant discourses during selected events, and in publications and other media.

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EXECUTIVE SUMMARY

This report is focussed on financing urban mobility in Africa, specifically on developing a robust understanding of the urban mobility context in Africa, a high-level picture of the mobility needs and challenges on the continent, and a framework for considering how investment in mobility can contribute to sustainable development.

Section 1 outlines the vital importance of urban mobility investments for the future of Africa. Transport systems undeniably form the backbone of Africa's socio-economic activities by enabling the movement of people, goods, services and products. However, there are acute tensions between the prioritisation of mobility infrastructure that primarily serves the global economy, for example, ports, compared with that which primarily supports local and everyday movement needs, for example, public buses. To overcome this, integration between scales of investments and modalities is key. Large and small cities are a key entry point for driving this integration agenda. Functioning, integrated and connected cities are essential to achieving economic growth, addressing key climate risks, and intervening in the entrenched systems of societal inequality evident on the continent. Section 1 addresses the questions of what makes mobility projects sustainable and inclusive. Infrastructure investments in the mobility sector that aim to be sustainable should strive to be low carbon, resilient to climate change and environmental uncertainty, socially inclusive, job-producing and in service of Africa's equitable development in global economies.

As mobility in Africa is generally considered to be national or international in scale, Section 2 provides a framework in order to understand urban mobility. It presents the types of mobility investments on which the report focusses, such as roads and highways, rail networks, ports, and urban public transport systems, and the purposes of mobility, namely passage movement and freight. Building on this initial scope, it is argued that international leaders and donors need to consider urban mobility through three key scales. First, movement within cities is central to the effective development of these cities. Secondly, movement that connects large cities with smaller urban centres within countries is central to urban–rural integration. Lastly, ensuring that African cities form part of systems of cities in Africa and are connected to the world is essential for repositioning Africa within global economies and building strong corridors to support economic development.

Section 3 presents the state of urban mobility infrastructure. It explains that roads and highways have dominated investment in Africa in the past and the present. Notably, despite fundamentally impacting cities, investors have often not considered these projects urban, instead opting to safeguard road corridors by creating bypass roads to reduce interference, resulting in lost opportunities for spatial integration. Rail has a long history in Africa and is linked to colonial extraction; however, there are many gaps in rail systems at the city and regional scales. Very few cities across the continent have functional and operational rail systems. While many ambitious plans connect and improve regional rail for freight and passenger mobility, particularly to address logistics integration, the capital cost of new rail is prohibitive, especially on non-lucrative lines. Ports have shaped Africa's development for decades. While many port upgrades are currently being undertaken, less attention has been paid to the urban integration of these ports with rural, peri-urban and landlocked regions across the continent. In this section, it is crucial to note that large-scale port investment cannot resolve regional or urban challenges, but rather that port developments and operations must function within a broader urban ecosystem. Finally, the role that urban buses have played across African cities, including their neglect, is considered. It is argued that, despite efforts to build bus rapid transits, paratransit still dominates urban service delivery. Lastly, the key urban governance challenges across these modes and the overarching outcomes of the status-quo of investment are considered, including (a) fossil fuel dependency and pollution; (b) limited affordability and access; (c) road safety; and (d) economic losses.

Section 4 provides high-level and detailed breakdowns of financing quantities by sector and by lender. It shows that African states invest directly in African mobility infrastructure. These investments are supported by loans directly to national governments, with the World Bank being the largest multilateral lender in the mobility space and the Chinese government being the largest bilateral lender. The financing options used for mobility investments in Africa are also explored in this section. Overall, it is shown that the focus of mobility investment has been on highway and road investment, which is supported by rail and ports. Comparatively, small investments are made in transport, specifically to support the urban commuter movement of economies.

Section 5 outlines the key sustainability challenges that the sector faces. These include low carbon transitions, resilient and adaptive systems, socially inclusive and just value chains. First, African cities face the challenge of extending infrastructure, without contributing to carbon emissions. It is argued that it is as much a technical issue, as it is about planning and governance. Secondly, investments need to be resilient to uncertainty and risk. This means making hard trade-offs between large-scale investments and smaller, more incremental changes. Thirdly, it is important that infrastructures have a positive effect on the lives of people and the economies they serve. This means, wherever possible, to reduce travel time, costs and distances; and costs that are directly or indirectly felt by those who rely on these infrastructures for life and livelihoods. Just value chains are, therefore, needed for job creation in the mobility sector, such as operations and manufacturing, and to reposition African cities within global geopolitical international systems.

Section 6 outlines emerging policy directions that are beginning to emerge in the urban mobility and transport sector. It argues that if investments in corridors for regional economic development are driving investment, those concerned with urban sustainability must engage directly with these projects. The scale of these projects means that even slight shifts in how these projects are designed and implemented could have profound sustainability implications for urban areas and city systems.

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ABBREVIATIONS AND ACRONYMS

ABS: Aayalolo Bus Service
AfDB: African Development Bank
AfCFTA: African Continental Free Trade Area
AfD: Agence Française de Développement
ARTIN: African Regional Transport Infrastructure Network
AU: African Union
BOAD: Banque Ouest Africaine de Développement
BOT: Build, operate and transfer
BRT: Bus rapid transit
CBD: Central business district
DART: Dar rapid transit
DBSA: Development Bank of South Africa
EBID: Ecowas Bank for Investment and Development
EIB: European Investment Bank
FDI: Foreign Direct Investment
GAPTE: Greater Accra Passenger Transport Executive
GDP: Gross domestic product
GFTD: Global Facility for Transport Decarbonisation
ICA: Infrastructure Consortium for Africa
IFC: International Finance Corporation
JICA: Japan International Cooperation Agency
LAMATA: Lagos Area Metropolitan Transport Authority
LAPSSET: Lamu Port South Sudan Ethiopia Transport
LRT: Light rail transit
NaMATA: Nairobi Metropolitan Area Transport Authority
NMT: Non-motorised transport
O&M: Operate and maintain
PIDA: Programme for Infrastructure Development in Africa
PSE: Plan Senegal Emergent
PTISG: Public Transport Infrastructure and Systems Grant
RRT: Rapid rail transit
SDG: Sustainable development goal
SEforall: Sustainable Energy for All
SEZ: Special economic zone
SPV: Special purpose vehicle
SSA: Sub-Saharan Africa
TAH: Trans-African Highway
TOD: Transit oriented development
UDA-RT: Usafiri salama Dar es Salaam rapid transit
US: United States
WBG: World Bank Group

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1 INTRODUCTION

Inadequate infrastructure may be the single biggest threat to Africa's long-term growth. Unmet demand for infrastructure and services represents a significant opportunity for lenders, donors and African states. Issues of energy, water, sanitation, telecom and transport have long been standing agenda items for policymakers and government, and contribute to being key areas where multilateral collaboration is necessary. Coordinated investments in infrastructure promise to support economic growth for African economies and improvements in the well-being of communities and people (Narayan et al., 2000; Prud'Homme et al., 2014). In reality, hard trade-offs are being made between investment in GDP enhancing infrastructure and investments in infrastructure primarily aimed at service delivery and poverty reduction. While Africa's economic growth has more than doubled since 2005, with GDP rising to more than US$2.6 trillion, this growth has often exacerbated inequality and failed to create shared value and opportunities (AfDB, 2021; Goetz, 2011). Investments such as SEZs and logistics corridors have integrated African countries into global supply chains, but have often ignored more holistic investments that would enable this growth to have lasting, just and inclusive benefits for African people.

Cities are key sites where these infrastructural tensions play out. Africa's growth can more likely be translated into shared gains and distributed value in cities. For Africa, the most viable opportunities for economic diversification, poverty alleviation and ultimately sustainable growth will be found in cities and urban centres. For urbanisation to yield real value for the continent and the people who live and work in cities, it requires effective and connected cities that function properly. The strength and coordination of cities (in relationship to rural areas and to global supply chains) will determine how African regions fare in regional and global economies, and the quality of social, cultural and political life in urban areas.

1.1 Importance of urban mobility for the development of African cities

One of the most critical investments in the context of African cities is in the area of mobility and connectivity. Coherent and integrated transport and mobility infrastructure is critical to the development of African cities. Transport systems undeniably form the backbone of Africa's socio-economic activities by enabling the movement of people, goods, services and products. Mobility links people to economies, job opportunities, and social and cultural activities, among others. From ports to highways, to public transport systems, development partners have celebrated the important role that connectivity, access and movement play in supporting urban, regional and global economies.

Notably, the current excitement for Africa's transport infrastructure cannot be disentangled from its longer history of largely extractive investment. It is impossible to discuss transportation and mobility infrastructure in Africa without engaging with the history of colonial infrastructure investments. Underpinning investments in regional megaprojects was the drive to collect and extract key natural resources, which primarily drove the scale, geographical focus, and technological choices during the colonial era. This was coupled with only modest investment in urban areas, often focussed on securing access to settler locations. While decolonial struggles yielded new political leadership across African regions, such transformations were unable to radically reconfigure the geopolitical order within which African states continued to be disenfranchised. Emerging African states inherited fragmented material networks, dysfunctional state enterprises, overlapping governance systems, and deeply unequal cityscapes (Gwilliam, 2011).

While there is now considerable investment from national states, development financing institutions, venture capitalists and sovereign wealth/pension funds, in African cities, there remain critical mobility challenges. The appetite from the investor community tends toward continuity, with ongoing support for large-scale logistics investments, linking rail and highways to ports for import and export. This focus mirrors and builds on the extractive colonial legacy of mobility and logistics investment, rather than working to reposition Africa in the global economy. At the same time, cities and the everyday needs of people living in rural areas are rarely centred in these programmes. While having direct implications for the bisecting and surrounding

urban areas, flagship investments are often conceptualised with little attention to the relationship to cities. These challenges stem from critical questions of integration in terms of material modality and institutional arrangements.

1.2 Key agendas and goals

Transport and mobility feature heavily in global and regional agendas. Agenda 2030 outlines the importance and interconnectedness of transport systems. Agenda 2030 stresses that sustainable transport systems are necessary for building strong economic foundations. Moreover, Agenda 2030 stresses the links between mobility, energy and productive capacity. The SDGs directly and indirectly feature transport and mobility in several goals and targets, with specific indicators related to road safety, reduced emissions and urban public transport.

Transport does not only feature heavily in global goals, but also in Africa's own agendas. The AU's Agenda 2063 is the continent's strategic framework that aims to deliver on its goal for inclusive and sustainable development. The flagship projects of Agenda 2063 include several important mobility and transport objectives, including the following:

- Finalisation of the operational framework for the establishment of the Single African Air Transport Market: The liberalisation of air transport in Africa has been identified as a flagship project under the AU's Agenda 2063 with a focus on improving air connectivity on the continent, contributing to economic growth, reducing the cost of travel, job creation and enabling integration across Africa. Benin, Capo Verde, the Republic of Congo, Côte d'Ivoire, Egypt, Ethiopia, Kenya, Nigeria, Rwanda, South Africa and Zimbabwe committed to the flagship project, with an opportunity for other states to also commit to it.
- Implementation of the African Maritime Transport Charter: This charter is aimed at enabling integration, supporting economic growth and development, and enabling job creation, but also to form the basis for the harmonisation of common interest and shared issues within the marine transport sector.
- Launching the High-Speed Train Project and strengthening regional railway training institutions: In adopting the railway programme, the AU considered the existing typologies of rail across the country, as well as its penetration across the continent. The railway systems across the continent largely consist of single lines moving from coastal towns and cities inland with very sporadic interconnection, with the exception of parts of North Africa and Southern Africa. At the time of adopting the programme, the AU noted that 16 African countries had no railway lines or sections of international lines with very little integration or interconnectedness. The AU identified the railway regional agenda as a key programme under its PIDA, supported by a number of multilateral organisations.
- Development of Transport Corridors: The AU, as well as its PIDA, has identified the need for supporting transport corridors across the country to support broader objectives of job creation, enabling integration across Africa, economic growth, boosting trade within the region, and enabling improved supply chains. The key objective of the AU's transport programme is to facilitate the investment and commitment to building a continent-wide network of all-weather and integrated infrastructure.
- Implementation of the African Road Safety Charter: The AU adopted this charter in 2016 in order to stem the high rate of road accidents in Africa and to develop a programme that could provide improved road safety for users across the continent.
- Intergovernmental Agreement on TAH Norms and Standards and the development of the TAH Maintenance Management Policy: In adopting the TAH arrangement, the AU was committed to social integration and cohesion in Africa. The intergovernmental agreement also provided the basis for outlining specific corridors, scoping the network, providing for a secretariat function, as well as a mechanism to create consistently and the ability for meaningful integration through norms and standards.

Agenda 2063 is linked to the PIDA led by the AU Commission, NEPAD Secretariat and the African Development Bank. The transport vision of PIDA is an "Africa where transportation services enable the free movement of goods and people through efficient, safe, affordable and reliable transportation services through: Connecting cities through modern roads and railways [and d]eveloping modern African Regional Transport Infrastructure Network (ARTIN) corridors, through the development of world-class ports and air transport services" (PIDA, 2012). PIDA has funded more than 200 transport projects in Africa.

1.3 Sustainable urban investment in mobility and transport

There is a clear need for investment in mobility and transport to build sustainable and just cities and regions (SEforall, 2020). While creating significant opportunities for economic development (with important knock-on effects for jobs and fiscal stability, as an example), current investments require more attention to questions of social and environmental sustainability. The relationship/impact on urban development will also be discussed in this paper. Many investments cut off cities or impose new forms on them. Sustainable investment ensures that the urban fabric is connected in diverse and resilient ways, underpinned by a combatting of land use and sprawl, building a mutually supporting interface between cities and regional/international networks, underpinned by strong urban governance, especially where transport and planning functions are devolved. The nuance of sustainable (urban) transport infrastructure is distinct for commuter-/passenger-focussed projects and larger-scale regional and commerce-driven projects. However, it is possible to develop key principles and themes between mobility for commuters and mobility for logistics. Sustainability within the mobility and transport infrastructure context is framed within the AU's Agenda 2063, as well as the UN's SDGs, and must be –

- low-carbon and efficient. Minimise carbon dioxide emissions at all levels of the value chain. If possible, mobility systems should seek to reduce reliance on fossil fuels and non-renewable energy. Key to being productive is to leverage new technologies, such as fuel-efficient engines that reduce emissions or digitisation programmes that improve usability and planning.
- resilient and adaptive. Mobility systems are often vulnerable to environmental hazards and risks, such as sea level rise. Central to this is being flexible and adaptive. Transport and mobility should be developed incrementally, so that it can be adapted and changed in contexts of uncertainty.
- socially inclusive. Mobility systems should respond to the needs of the people. They must contribute to improving the quality of life, enabling social cohesion and ensuring human rights. Affordability is key to ensuring inclusiveness, as well as dependability and consistency. It is important that transport and mobility systems offer a high degree of predictability to users. This is essential for firms and people to plan.
- just value chains and localisation. Africa's cities need work. Mobility infrastructure, which creates jobs throughout the value chain, will be more sustainable with less socio-political risks and more value-add to communities. At the same time, there is an intense need for urban mobility investment to reposition African cities within global value chains, inverting the supply chains to rework geopolitical power dynamics.

These sustainability criteria provide a foundation for thinking about transport and mobility investments in cities. However, they apply differently to different infrastructures, types of urban areas and country contexts. Moreover, there are important trade-offs, for example, between labour intensity and efficiency, or between flexibility and predictability, that need to be managed on a context-by-context basis.

2 FRAMING THE SECTOR: WHAT IS MEANT BY MOBILITY INFRASTRUCTURE IN AFRICAN CITIES?

This section provides the scaffold for understanding what is meant by urban mobility finance in Africa. An overview is provided of the key components of urban mobility, differentiating between passenger and freight mobility, and discussing the key mobility issues at different urban scales.

2.1 Key components of urban mobility infrastructure

To systematically discuss the status quo of mobility and transport investment, as well as the financing issues related to various components of these systems, this section groups the infrastructure into several areas, as follows:

- Urban roads and highways: An in-depth exploration of private car ownership or the policies and investment patterns that shape it, such as import duties and petrol prices, have not been included in this section.
- Rail networks: This includes both rail infrastructure and rolling stock, which this paper covers in less detail. This paper also includes rail for commuters, which is also covered under public transport systems.
- Ports: While ports, airports and inland logistics centres are commonly regarded as infrastructures that shape transnational movement, in this paper, such mega infrastructures are recognised as central to city development. This paper specifically focuses on the relationship between ports and city development.
- Urban public transport systems: This includes looking at various forms of shared commuter services, including urban trains and public buses. It also includes paratransit, such as minibuses and motorcycle taxis, both of which are prevalent in African cities. Public transport interchanges are also addressed in this section.

Urban mobility is generally organised into three broad categories, namely collective, individual and freight transportation. As, in African cities, there is considerable slippage between collective and individual movements (largely owing to paratransit being an omnipresent and blurry category), two groupings have been created, namely passenger mobility and freight. The movement of passengers and freight could be complementary, with different priorities and interlocking investments across scale and geography; however, in practice, this is often not the case.

2.2 Drivers of mobility demand

The mobility of passengers is the outcome of individual decisions based on available modes of transport. Beyond larger public transport or mass transit solutions, mobility for passengers may extend to walking, cycling, or driving motorcycles or private vehicles. Notably, demands for passenger mobility are driven by the need to access services, amenities and opportunities. These demands are rapidly shifting due to the rise of cellular phones and the Internet. The Internet is changing how services are delivered, how people work, and social interaction. This is already shaping mobility systems in African cities and will have increasing impacts on mobility systems into the future. Freight mobility refers to the movement of goods both large and small. Freight, in contrast, focusses on the movement of goods driven by the supply and demand of these goods across space and time. This includes the international movement of goods, as well as local movement, for example, within cities. Digitisation, widespread Internet access and the rise of e-commerce are also changing freight systems, shifting urban logistics and mobility patterns in profound ways.

2.3 Unpacking the scale of urban mobility

Since cities are both shaped by and shape global and regional systems, urban mobility is not just about movement within municipal urban boundaries. This section provides a scheme for understanding critical urban mobility 'scales'. The focus is on movement within cities, movement among cities within a particular country and transnational urban connectivity.

2.3.1 Movement within cities

People and goods are in constant circulation within cities, using a variety of pathways and modes (Gwilliam, 2011). The circulation of people is driven by the demand to access urban amenities and opportunities. Work or jobs is a key driver of urban passenger mobility patterns, creating peaks and troughs in the daily demand for mobility infrastructures, such as road use and public transport. However, people do not only travel within cities for work. They also move through cities to access educational facilities, government services, amenities, places of worship, shopping spots and all activities that shape and support urban life. As the paper shows in the following sections, intra-urban movement is dominated by paratransit and NMT, with only a few cities having commuter trains.

In many African cities such as Dakar, Abidjan, Lagos, Accra, Cotonou and Douala, more than 70% of the population walk when having to travel short distances. Despite this, local governments infrequently cater to pedestrians. "Around 65 percent of the road network lacks sidewalks, and those that do exist are poorly maintained, have open drains, and are susceptible to takeover by the expansion of adjoining properties. Pedestrian crosswalks and bridges are not found outside of the city centre [of African cities]" (Gwilliam, 2011: 230).

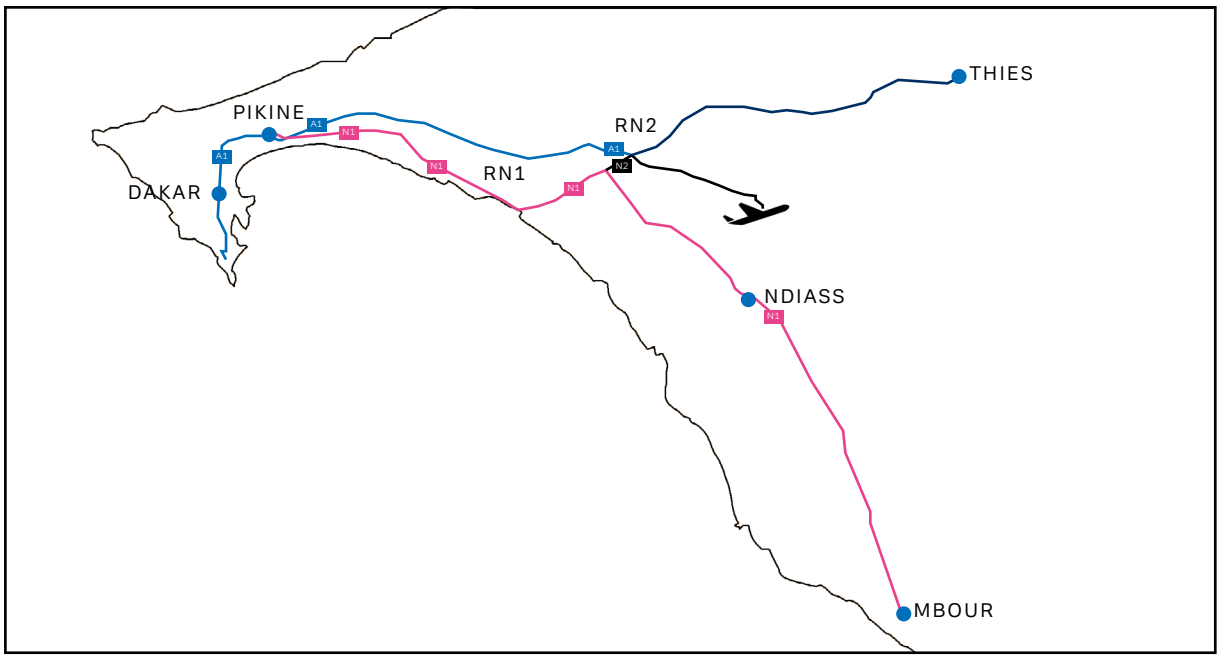
Urban logistics is also a critical part of city economies. Intra-urban goods movement is a vital component of the sustainability question. As Gota (2015:5) points out: "The urban freight link is the most polluting in the entire supply chain. Final products are delivered in low volumes and at high frequencies in congested traffic conditions". This is exacerbated by the characteristics of African cities, including the following:

- Spatial sprawl and traffic congestion, which creates long distances between areas, thereby increasing emissions and travel times;
- The large share of small retail shops with limited shelf space, necessitating frequent deliveries;
- Road quality issues, which slow travel times, increase the wear and tear on vehicles, and increases the likelihood of accidents;
- Power cuts, which harm cold chains and reduce the ability to buy in bulk due to issues with storage, particularly for food systems; and
- Weak planning related to industrial and warehousing, thereby reducing efficiencies related to spatial location.

2.3.2 Inter-urban movement

African cities have a tight and reciprocal relationship with their surrounding regions. This is particularly true for large metropolitan port cities such as Durban, Maputo, Dakar and Luanda. These linkages apply not only to the movement of goods from major urban centres to smaller towns and villages, but also to the movement of people and the extended social networks that support urban life. In terms of passenger mobility, due to the challenge of affordability, people often live far from employment opportunities. The outcome is that people often travel from smaller to larger urban centres or from surrounding rural areas where they live to the urban areas where they work. Passenger movement within regions is often by minibus taxi (16-seaters, which is discussed in the section on paratransit) or medium-distance private buses. Similar to the movement of people, most of the movement of freight is also undertaken by road-based transport. This is largely due to the limited investment in freight rail networks and infrastructure, and limited connectivity between cities and towns (Jennings, 2017). In many countries, mobility investments that link urban areas are central parts of development strategies.

DIAGRAM 1: INTRA-URBAN LINKAGES BETWEEN DAKAR AND SECONDARY CITIES (ADAPTED FROM: AFDB, 2014:2)

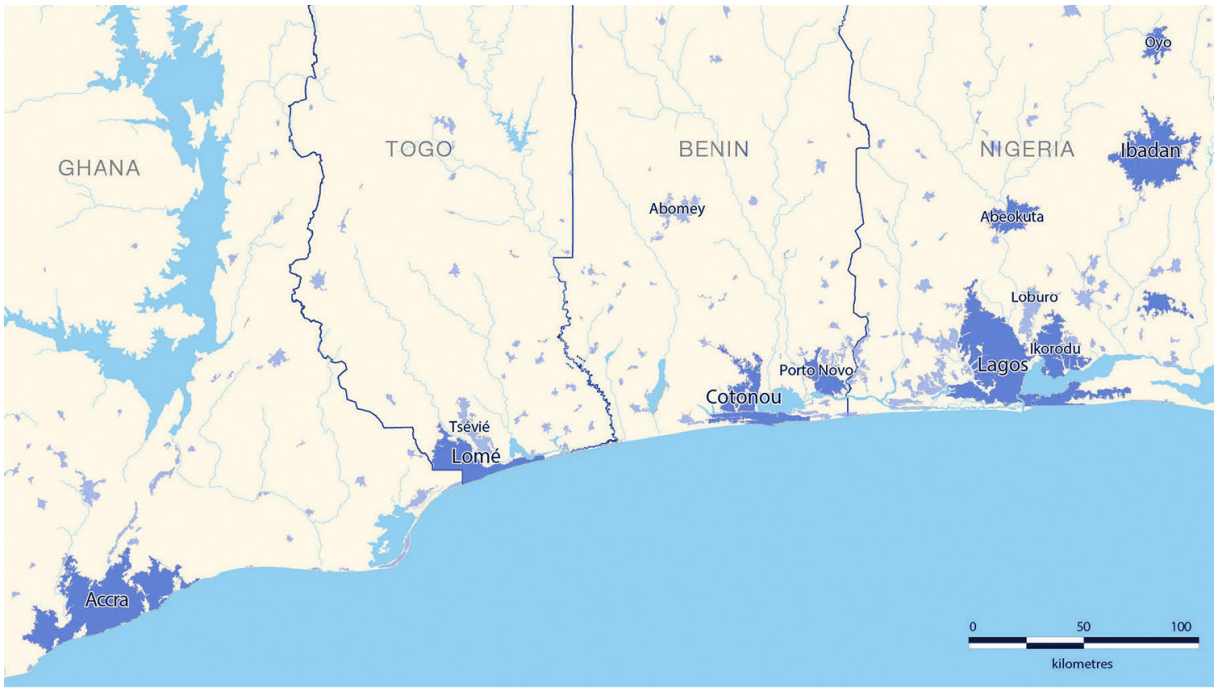


These investments may even create new cities at the interstices between urban nodes and corridors. As an example, as part of the PSE undertaken by the administration of H.E. President Macky Sall, Senegal has made a series of key investments aimed at linking the port city of Dakar to two key secondary cities. According to the AfDB, the project cost nearly €388 million, of which €65 million was provided by the AfDB. Diamniadio is the new city being developed between Dakar and the new airport named the Blaise Diagne International Airport, which opened in December 2017. The new city is connected to Dakar by a 32 km toll highway, which initially reduced travel time from 90 minutes to 15-30 minutes. Diamniadio is also connected to Dakar by a new railway line, which by 2020, will be part of the link between Dakar and the Blaise Diagne International Airport.

2.3.3 International systems of cities

Despite the central importance of national states in all transnational affairs, African cities are increasingly important players in continental and global economies. While national decision-makers undeniably hold most power, the economic power of cities is well recognised. In Africa, key cities located across nations form powerful agglomerations and corridors. As an example, the West African case of the urban corridor that links Ibadan to Accra via Lagos, Lomé and Cotonou, is known as the Greater Ibadan Lagos Accra Urban Corridor. It is one of many examples of transnational urban corridors. Efforts are being made to harmonise regulations and legislation to improve mobility across this corridor.

DIAGRAM 2: TRANS-AFRICAN URBAN CORRIDOR



Notably, addressing the issues of national borders in Africa is not only an economic project, but a political one too. The political leg of this project reflects a pan-African agenda for the continental movement of goods and people. This movement has been led by the AU, which, comprising its member states, has prioritised enhancing regional integration and development, and in 2016, decided to move towards a borderless Africa with seamless intracontinental migration and trade. The bloc created a single continental passport and first gave it to national leaders, with a plan to distribute it more widely, thereby enabling Africans to move around the continent without a visa. Two years later, the effort was codified in the AU Protocol on Free Movement of Persons. The AfCFTA reflects a similar effort. In reality, this integration has been patchwork and has mostly occurred on a subregional level, with gradual steps to broader free movement.

Transnationally, African cities are not only linked to each other in important ways, but are also linked to global economies and cities across the world. Nevertheless, African nations, and by extension African cities, are not evenly integrated into the global economy. The flow of people, goods, ideas and money link Africa's urban areas into global networks in ways that are structurally uneven, reflecting the history of colonisation and resource extraction.

3 STATE OF URBAN MOBILITY INFRASTRUCTURE IN AFRICA

This section presents the status quo of each of the key infrastructures discussed in the framing section. It also focusses on the status quo of urban governance in African cities in relation to mobility. The section is organised into infrastructure, covering roads and highways, rail, ports and buses.

3.1 Status quo of roads and highways

The modal dominance of roads in SSA cities is ubiquitous (Beck et al., 2017; Urry, 2004). Roads and highways carry 80%-90% of passenger and freight movement on the continent (Gwilliam, 2011). Currently, the average density of roads in Africa is 20.4 km per 100 km² of land area, of which only a quarter of the roads are paved (Ushakov et al., 2019).

Investment in roads has been deeply rooted in developmental discourses related to GDP growth. Development of a regional network of connectivity across the continent has been a cornerstone of the discourses on economic development and the programmes of key international lenders, such as the World Bank, for the past decade. The TAH, for example, promised to unlock landlocked countries for business and growth (Gwilliam et al. 2008).

The urban road network, which has been classified in different ways in different countries, accounts for just under 200 000 km of road, often with limited paving (Ibid). Colonial and post-colonial authorities, and planners have largely designed cities around the needs of vehicles, including trucks and lorries, private cars, minibuses and motorcycle taxis. In and around cities, African governments' bias towards large, physical infrastructure such as highways has resulted in in road congestion, pollution, fragmented cities and communities, low density urban sprawl, and dependence private and informal sectors for the provision of public transport (Klopp & Cavoli, 2019; Kumar & Barrett, 2008).

Moreover, the focus of grants and loans has been on capital investments, particularly new highway construction. While there is often enthusiastic support during the construction phases, it remains more difficult to maintain and manage these large roads to ensure their ongoing productivity (Wasike, 2001). This is particularly true of national investments, which are often supported by development/aid partners who want to see on-the-ground developments unlocking the economic potential of regions and countries. While most countries were compelled as part of the loan conditions of multilaterals to develop second-generation road maintenance funds, the ongoing management, repair and upgrading of roads have been challenging, particularly in Africa's urban areas (Gwilliam, 2011). The capital bias is most strong in countries that are classified as low income, those with difficult geographical contexts, and those that have not established road funds (Gwilliam, 2011).

The interface between highways and urban roads is complex. In many cases, large-scale highway investments have required the development of bypass roads around cities to ensure rapid movement along corridors. Where they have intersected with urban roads, such as the intersection between the Thika Superhighway and the Nairobi CBD, it has caused congestion.

The urban roads challenge is, therefore, acute. Urban roads that connect and integrate suburbs of cities are typically underdeveloped and highly congested. In SSA, excluding South Africa, more than half of urban roads are unpaved, and even more are in a poor condition (Gwilliam, 2011). There are many reasons for this, as follows:

- Local governments have limited budgets, often insufficient to manage large road investments or maintain extensive networks. Local governments may also not have the mandate to maintain key urban roads.
- National governments may prioritise regional projects for economic development, but may also resist investment in opposition-run urban areas due to political contestation.
- As urban areas are dense and actively used, road construction projects require complex negotiations, for example, with traders on road reserves.
- Road funding and road spending are not always aligned. Problems with the execution of road budgets reduce actual spending, for example, capital execution ratio. Issues of corruption and mismanagement also impact the translation of committed budgets to actual investment.

THE RISE OF TOLL ROADS IN URBAN AFRICA

In many new road projects in Africa, tolls are used as a form of revenue generation. As an example, the (infamous) Kampala-Entebbe Expressway and the Dakar Toll Highway Project are new projects in which this model is deployed.

According to the World Bank, various innovative schemes of government support can reduce the risks of demand volatility faced by private actors in the creation of toll roads, thereby incentivising investment, as follows:

- Shadow tolling: The private sector collects tolls for the public sector who is then paid by the latter based on traffic volume and composition. The public sector, therefore, directly benefits if traffic is higher than expected and can provide subsidies to the concessionaire if traffic is lower.
- Availability payments: The government pays the concessionaire on the basis of the availability of required capacity, in other words, the number of lanes in an acceptable condition, etc., regardless of traffic volumes.
- Minimum traffic guarantees: The government compensates the concessionaire if revenue or traffic volume falls below a specified minimum. Inversely, if revenues are higher than expected, the concessionaire shares the surplus with the government.
- Setting and adjusting toll rates: Tolls can vary according to the concessionaire's direct costs, congestion levels and/or the road users' ability to pay, as in the scenario of the Maputo Toll Road below. Toll rates must be set out in the initial bidding contract. Centralising revenue in an independent road fund, moreover, allows funding from large toll roads to cover operation costs on rural and feeder roads.

3.2 Status quo rail

Railways in Africa are predominantly used for the movement of goods, with subsidised options for regional passage travel. The first railway in SSA was built in South Africa in the 1860s, with lines inland from the ports of Cape Town and Durban. Decades later, when railways were built elsewhere in Africa, they followed similar patterns, linking ports to landlocked mining areas. This history, coupled with competition with road-based freight, has resulted in a fragmented and undermaintained pan-African rail network, with weak coherence and limited interoperability. Gwilliam (2011:85) states that "the rail system of Africa comprises various lines and small networks that, combined, offer low-density coverage and little interconnection between regions". While many ambitious plans exist to connect and improve regional rail for freight and passenger mobility, the capital cost of new rail is prohibitive, especially on non-lucrative lines.

One of the largest projects is the construction of a railway corridor in East Africa, which will connect several countries in the region. A State-owned Chinese company, China Road and Bridge Corporation are implementing this project. The East Africa Railway Masterplan railway project, which is estimated at US$13.8 billion, is considered the largest in Kenya's entire history. The Chinese Bank Export-Import Bank of China financed 90% of the construction of the Mombasa–Nairobi section and is a key player in the extension to the Ugandan border and to the Lake Victoria port of Kisumu. This branch line will be one of the most expensive facilities out of several dozen transport and construction projects in Africa, implemented with the participation of China's FDI.

As a rule, urban trains in Africa, which link suburbs within cities and metropolitan areas, are cheap for riders, expensive for the State, undermaintained and under-capacitated. Modal share of rail is generally low, estimated at under 2% for Dakar, Nairobi, Lagos and Kinshasa (Kumar & Barrett, 2008). Very few cities across the continent have functional and operational rail systems with continued and rapid decline in the quality and ridership of that mode of transport (Agunloye & Oduwaye, 2011; Godard, 2013). South African cities, for example, have witnessed the near collapse of commuter rail. Acute governance failures in rail have led to dramatically deteriorating service in the last few years, and ridership has dropped dramatically.

TABLE 1: EXAMPLES OF METROPOLITAN LRT AND RRT IN AFRICA (AUTHOR'S REPRESENTATION)

Type	Project	Country	Date operational	Instrument	Finance
LRT	Addis Ababa Light Rail Transit System Project	Ethiopia	2015	Concessional loan	China Exim Bank signed a US$475 million loan agreement with the Ethiopian Railways Corporation.
	Abuja Light Rail Transit Project	Nigeria	2018	Concessional loan	China Exim Bank and the Government of Nigeria signed a US$500 million preferential buyer's credit agreement for Phase 1. The Federal Government of Nigeria made a counterpart contribution of US$314 million.
	Cairo Light Rail Transit Project	Egypt	2021	Soft loan	China Exim Bank signed a loan agreement with Egypt's Ministry of Transport to provide a US$1.2 billion soft loan for the project.
RRT	Gautrain Rapid Rail Link Project	South Africa	2012	Grant, debt and equity	The Gautrain Management Agency provided financing in the form of a US$3 billion grant, while the Bombela Concession Company (Pty) Ltd raised US$360 million in debt and US$70 million in equity.
	Nairobi Air Rail Link Project	Kenya	2021	Not defined	An agreement was signed between France and Kenya of US$2.6 billion.

This is not a complete table.

The LRT systems in African cities are predominantly transit systems powered by overhead electrical wires, and for medium capacity in metropolitan cities. Many of the LRT systems in African cities have been financed by the China Exim Bank, such as the Addis Ababa Light Rail Transit System through a concessional loan. In Nigeria, the China Exim Bank financed the project, with the Federal Government of Nigeria providing co-funding. In the case of Egypt, the China Exim Bank financed the Cairo Light Rail Transit Project through a soft loan to the Ministry of Transport. In South Africa, the Gautrain Rapid Rail Link Project was financed through a grant and through the project company raising a combination of debt and equity. In the case of Kenya, the project was financed through a bilateral agreement with France. The RRT systems in African cities are largely air–rail link projects which provide a service from an airport to a city via rapid transit.

The Light Rail Transit System, Addis Ababa, Ethiopia. Source: Liza Rose Cirolia

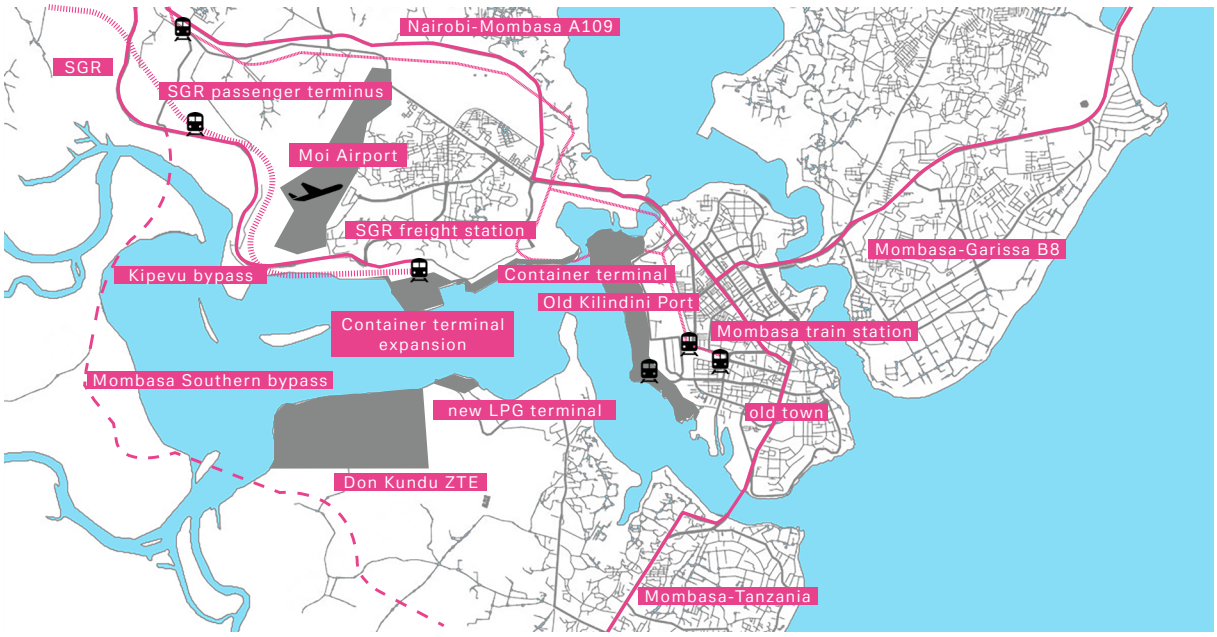
3.3 Status quo of ports

Africa represents a small portion of global trade, with exports largely commodity-based, including oil, coal, iron ore, ferrochrome, precious metals, cocoa, palm oil and timber (PWC, 2018). Ports represent a crucial gateway for these commodity exports, but are also crucial mechanisms to improve diverse and sustainable growth. However, facilitating improvement in African trade through ports are complex as “ports are often fed by inland corridors that have their own infrastructure, delay and cost issues. Many African countries have no direct access to the sea” (PWC, 2018:1). Ports currently feature heavily in the investment strategies of regions in countries that have sea access.

From an urban perspective, port investments generally link ports to regional and transnational mobility corridors. In East Africa, for example, the LAPSSET Corridor Project in Kenya is positioned as an ambitious transport corridor between Kenya and Ethiopia, linking countries and expanding the port cities that are connected through these investments. Built by the China Communication Construction Company, the

first three of the planned 32 berths cost US$367 million, which is part of the wider US$23 billion corridor (Parliament of Kenya, 2019). Kenya is also seeing port investments in Mombasa, which is a city developed largely because of its port. Here, a large logistic-driven restructuring is radically transforming the outskirts of the city, with multimodal investment in port infrastructure, such as a new container terminal, the already-mentioned SGR with a freight terminus linked to the port and the airport, and a new highway bypassing the old city and connecting directly to the Mombasa–Tanzania highway. Ambitious projects such as the LAPSSET Corridor Project continue to be announced across Africa, demonstrating the appetite for governments to launch large-scale mega infrastructure interventions underpinned by port developments.

DIAGRAM 3: PORT CITY URBAN INTEGRATION OF MIXED MODAL MOBILITY INVESTMENT (AUTHORS' REPRESENTATION)



As discussed in the previous section, there are important direct relationships between ports and the port cities that have formed around these hubs (ICA, 2016). The relationship between ports and cities in Africa is integral to development projects. According to a World Bank report on ports in East and Southern Africa, -

> *ports and their related services and industries create substantial employment for local workers. As port traffic has grown, port-related labour demand has increased, usually unskilled and from the immediate vicinity of the port. While increased containerisation and mechanisation in a port has diminished the number of unskilled cargo handlers, generally ports remain significant local employers at the heart of an economic cluster (World Bank, 2019:4).*

Many of the largest ports in Africa are located in secondary cities, such as Tangier in Morocco, Durban in South Africa, Mombasa in Kenya, Casablanca in Morocco and Tema in Ghana. Similarly, new port development and upgrading projects are also focussed on secondary cities, often in an effort to shift urban development trends in the countries, of which examples include Lekki in Nigeria, Ndayane in Senegal, and Lamu in Kenya.

Despite the benefits, the direct and indirect negative impacts of ports on cities are substantial. These externalities include the following:

- Road safety, especially when roads are not maintained;
- Air, water and soil pollution;
- Congestion around the port, especially when linking roads are weak; and
- Growth of informal areas in cities in response to jobs.

3.4 Status quo of public buses

Over the past few decades, governments across Africa have neglected appropriate investment in urban transport, particularly in public transport. Most African cities experienced the privatisation and deregulation of buses in the 1980s and 1990s. Bus services that remained in public ownership, such as in Kampala, typically succumbed to austerity, with most of those that were privatised, such as that of Nairobi and Dakar, finding the economics of public transport extremely difficult, losing significant market share, and withdrawing to only the most lucrative routes (Gorham, 2017). The number of companies and services declined (Pendakur, 2011). The resulting failure and collapse of these systems meant that many governments across the region had very little risk appetite to invest further in subsidised public transport systems that needed sufficiently on-board lessons learnt, differentiation and localisation (Olvera et al., 2013).

A small handful have opted to invest in various forms of BRT, inspired by experiences in Latin America. In addition to creating dedicated lanes and investing in new fleets, reforms have generally included the formation of national agencies, tasked with the roll-out and operations of these systems. Examples include the GAPTE, DART/UDA–RT, LAMATA and the NaMATA. The BRT systems in African cities differ from place to place and are sometimes described as BRT-lite compared to Latin American models. The vast majority of the BRT systems in Africa has been financed by the World Bank, with support from AfD. AfD, coupled with funding from a bilateral agreement with South Korea, will fund the Addis Ababa BRT. In Dakar, funding emanates from the World Bank and EIB. In the case of South Africa, BRT has been driven by the national governments, offering cities conditional grants to implement upgraded bus projects.

In South Africa, the BRT agenda has not emanated primarily from global lenders, but instead has been driven by a coalition of government actors within individual cities, the National Department of Transport, and National Treasury. Inspired by global discourses on TOD, the national government created a conditional grant specifically for BRT, the PTISG, and Cape Town, Johannesburg and several other cities have undertaken to develop BRT in alignment with this policy approach. Low densities, sprawl and the polycentric nature of South African cities, as well as implementation failures, have put a strain on these new systems, resulting in large operational deficits carried by the local government.

TABLE 2: BUS RAPID TRANSIT PROJECTS IN AFRICA (AUTHOR'S REPRESENTATION)

City / Metro area	Service name	Start date
Lagos in Nigeria	Lagos–BRT	2008
Johannesburg in South Africa	Rea Vaya Johannesburg	2009
Cape Town in South Africa	MyCiTi	2010
Tswana in South Africa (Pretoria)	A Re Yeng	2012
George in South Africa	Go George	2015
Accra in Ghana	ABS	2016
Marrakesh in Morocco	BHNS de Marrakech	2017
Dar es Salaam in Tanzania	Dar es Salaam–BRT	2017
Addis Ababa in Ethiopia	–	Under construction (as of 2021)
Nairobi in Kenya	–	Under construction (as of 2021)
Dakar in Senegal	–	Under construction (as of 2021)
Cairo in Egypt	–	Scoping phases

Most projects are BRT-lite

The underlying challenge with transforming local bus operations towards high-quality services or, alternatively, initiating new high-quality bus services (in the form of BRT, for instance) has been the lack of institutional capacity and limited segmentation with cities to accommodate the complexity of these formalised and scheduled services. In some cases, ingrained urban economies, such as paratransit, have blossomed in response to a lack of commuting options and, therefore, often mobilise against investments in new bus systems.

While some authors have cited a 'BRT craze' in Africa, in reality, only a few BRT systems have been built. South Africa has been leading in this regard, with special national transfer programmes having been designed to support BRT development in cities. In South Africa, as well as in other cities, BRT investments continue to demand large budget allocations investment. However, these new systems serve very small segments of the population. BRT systems and other high-quality bus systems can simply neither produce the sufficient movement of people during peak traffic periods nor can these systems overcome the sprawling nature of cities. Furthermore, the reform agenda has been hamstrung by poor coordination across spheres of government, including associated agencies; fragmented planning; the inability to address entrenched interests; conflicts of interest; capacity restraints, as well as existing road-orientated transport planning that is geared towards the private vehicle over all other modes of transport. Despite ongoing challenges of financing, BRT is often presented as a flagship or world-class investment. However, the reality is that the vast majority of the public transport needs in cities are attended to with minibuses.

The gaps in public bus systems have given rise to the private provision of mobility in and between African cities. Minibuses are often referred to as paratransit as they are privately operated and financed. Minibuses have flourished since the 1990s, in the gaps left by the public bus systems (Gwilliam, 2011). However, little investment has been made into this sector. Table 3 below shows that operates tend to use ageing and undermaintained vehicles with knock-on effects in terms of safety and emissions.

TABLE 3: VEHICLE AGE AND TYPE FOR MINIBUS TAXIS IN SELECT AFRICAN CITIES (ADAPTED FROM: VISAGIE & KRAUSE, 2021:17-18)

Country	Age of fleet	Important vehicle types
Blantyre in Malawi	10 years old	Toyota, Nissan and Mazda
Gaborone in Botswana	15 years old	Toyota HiAce
Kinshasa in the DRC	15-20 years old	Toyota HiAce, VW Transporter and LT and Mercedes TN
Lagos in Nigeria	15 years old	VW microbus, VW LT and Toyota HiAce
Maseru in Lesotho	18 years old	Toyota HiAce

Overall, paratransit has a mix of positive and negative attributes in African cities. Positive aspects of paratransit include high levels of adaptability, affordability, ease of access for passengers and reach in areas that are often within urban sprawl and often neglected. Negative aspects generally cited include poor labour conditions, lack of safety, pollution, fluctuating and high fares, poor accessibility for vulnerable groups, sexual harassment, and ineffective and poor network design.

Nevertheless, minibuses are a huge part of urban mobility. Table 4 below shows the modal share numbers in key cities. While modal share numbers have shifted owing to the introduction of new mass transit systems in cities such as Lagos and Nairobi, minibuses still dominate provision in these cities owing to their flexibility and affordability.

TABLE 4: NAME, MODAL SHARE AND SEATING IN MINIBUS TAXIS IN SELECT AFRICAN CITIES (ADAPTED FROM: GWILLIAM, 2011:237)

Country	Age of fleet	Important vehicle types
Blantyre in Malawi	10 years old	Toyota, Nissan and Mazda
Gaborone in Botswana	15 years old	Toyota HiAce
Kinshasa in the DRC	15-20 years old	Toyota HiAce, VW Transporter and LT and Mercedes TN
Lagos in Nigeria	15 years old	VW microbus, VW LT and Toyota HiAce
Maseru in Lesotho	18 years old	Toyota HiAce

In recent years, the poor state of roads, the high cost of vehicles and the inability of bus companies to maintain supply have led to an increase in the use of motorcycles for commercial transport in many African cities. Decreases in import costs for locally assembling motorcycles have also contributed to this shift. Known as boda boda in Kenya, moto in Kigali and a variety of other names, motorcycle taxis have been instrumental in the provision of passenger services and have contributed to the movement of goods through cities (Kumar & Barrett, 2008).

Being operated privately, paratransit is generally financed privately. Individuals who have amassed basic savings can buy a vehicle or a small fleet. This mode of mobility infrastructure finance sits in contrast to networked, public and fixed-route investments, which characterise historical efforts to develop public transport in African cities, and indeed are the more classical understanding of public transport in developing cities. It does not require a large and coordinated upfront investment. Rather than receiving government money, paratransit is a source of revenue for many local governments. It is, therefore, negatively subsidised as a mode of transport, paying the State rather than getting money from it. Payments to local and national authorities are in the form of licences, fees to enter and use modal interchanges, and fines for all manner of traffic breaches.

Notably, in the past five years, there has been a rise in interest among venture capitalists in the paratransit sector. As an example, in the first half of 2021, the recent round of funding saw the commitment of US$14.5 million in the London-based Cape Town-founded WhereIsMyTransport, led by early-stage investment vehicle Naspers Foundry, Cathay AfricInvest Innovation Fund and SBI Investment. Venture capital has also played a major role in the expansion of motorcycle-based mobility in Africa's e-hailing and on-demand logistics sector. Venture capitalist and broader equity finance continue to have a healthy appetite to invest into platform-driven or tech-based platforms within transport, but the risk appetite within this ecosystem requires a fair level of further development. The opportunities that venture capitalists identify will, however, not be sufficient to respond appropriately to the scale of the infrastructure backlog for transport and mobility infrastructure needs. However, the investment frame adopted by venture capitalists may identify strategic interventions that align more frequently with hub-and-spoke regional infrastructure investments that seek to leverage large-scale infrastructure typologies such as regional roads, ports, airports and rail networks.

3.5 Status quo of mobility governance

In many African countries, there is significant institutional and territorial fragmentation at the urban level, with a range of different entities fulfilling urban functions (Pieterse 2019; Pieterse & Parnell, 2014). The general conditions of institutional fragmentation and contestation in African cities and urban policy are particularly acute regarding mobility investments in urban Africa. Mobility governance, by who and how decisions over mobility infrastructure are made, is key to the effective functioning of infrastructure. As Gwilliam (2011:9) states:

> *Whatever the mode of transport, however, the most serious impediments are administrative. For road transport, the regulation and market structures of the road freight industry, rather than the quality of road infrastructure, are the binding constraints on international corridors … it is not only in physical terms but also in governance that transport infrastructure in Africa is insufficient.*

In Africa, mobility governance is highly fractured, particularly at the urban scale. In part, this is as a result of contested processes of decentralisation, overlaid with many rounds of reform in transport. These processes have incrementally fragmented urban mobility governance. As an example, in a study of 14 African cities, Gwilliam (2011) found that it was extremely rare that a single institution governed all three areas of urban planning, infrastructure maintenance and public transport services. Overall, there has been a proliferation of agencies and authorities, complicating governance and eroding the authority of local governments. Mobility investments have been uneven and highly politicised. Interventions in the mobility space often fail to recognise the reality of hybrid systems of service provision, the interconnectedness of various modes and the way that they collectively shape urban systems.

Key sites of fracture in the mobility governance space include the following:

- Between the various components discussed above. Ports, roads and private vehicles, buses, urban rail, paratransit, and walking and cycling often operate in silos, each with its own governance structure and arrangements.
- Between capital expenditure and maintenance responsibilities for the same infrastructure.
- Between planning for infrastructure and land use/spatial planning, which is often a local government function, despite not having control over key sectors.
- Between the power of formal institutions, such as agencies, and informal sectors, such as taxi associations.
- Between local governments and the new metropolitan transport agencies developed to undertake projects that span several local government jurisdictions.

3.6 Implications for how African cities operate

There are many implications, including issues of fossil fuel dependency and pollution, affordability and access, pollution, road safety and economic losses.

3.6.1 Fossil fuel dependency and pollution

Many modes of mobility currently rely on fossil fuel consumption. In cities, congestion increases automobile and vehicle emissions, which degrades the air quality, which is often worsened by the lack of cargo and commuter rail networks in cities. The concentrations of hydrocarbon, carbon monoxide and oxides of nitrogen emissions are major issues. Increased air pollution due to congestion in cities often results in morbidity and premature health issues, including death, among the people living or working near major roadways and highways. It also contributes to overall carbon emissions, linked to longer-term climate change trajectories. There is a clear need to ensure that mobility investments aimed at developing African cities and regions are made in ways that are attentive to their carbon contribution.

3.6.2 Affordability and access

Of the main outcomes of the fragmented nature of urban mobility in African cities is that access is severely restricted. These constraints are acute across scale, but manifest in important ways in cities. Limited subsidised public transport, intense sprawl and undermaintained roads increase travel times and costs. These factors also contribute to intense congestion and traffic. According to a World Bank assessment from 2019, less than 1/5 of all jobs are accessible within an hour of travel and people in the largest cities travel one to two hours each day to reach their workplaces. In Lagos, Nigeria, it is estimated that passengers and commuters spend approximately 30 hours in traffic every week. Transport costs represent 10%-40% of household income (World Bank, 2019).

3.6.3 Road safety

Transportation in Africa is often unsafe (Gwilliam, 2011). Road accidents are common, often owing to undermaintained vehicles and infrastructure (such as potholes). In an article written in September 2021, the World Resources Institute found that -

> *[w]hile road safety is a critical issue across the globe as more cars hit the road and more people move to cities, African cities are disproportionately affected. Africa is the least motorised region globally yet has the highest road traffic fatality rates. 650 people die on Africa's roads every day, and 39% of fatalities are among pedestrians and other vulnerable road users'. The numbers are especially bad for young people; a child in Africa is twice as likely to die on the road than a child in any other part of the world" (World Resources Institute, 2021).*

3.6.4 Economic losses

Dysfunctional mobility systems have large costs. Most importantly for movement within cities, traffic congestion has a direct impact on the economic metrics, shaping urban economies and everyday life. Passengers in these cities waste significant amounts of time in traffic daily and slow down the delivery of goods, impacting the economy negatively. In Cape Town, South Africa, congestion "costs the city R2.8 billion a year as the failure of people, goods and services to reach their destination in time leads to lower job growth, loss of productivity and decreased attractiveness for investment" (Charles, 2019). Traffic congestion results in higher fuel consumption where it is estimated that fuel consumption is 3.5 times higher in congested traffic than in free-flow traffic based on a simulation conducted by the Massachusetts Institute of Technology.

3.7 Conclusion to the section

There is a wide range of challenging implications stemming from the status quo of urban mobility investment in Africa. The material implications of investment choices over the past 100 years have been acute and pervasive. Some of these challenges have shaped the DFI lending agendas for mobility investment in Africa. However, much of the investment agenda has focussed on large-scale investments, without substantial effort undertaken to understand the implications for cities and urban economies. The specifics of these financing approaches are presented in the sections that follow.

4 FINANCING THE MOBILITY SECTOR

The investment agenda for mobility projects and programmes in Africa has been focussed on leveraging bank-able and high return infrastructure projects. In this section, the financing patterns prevalent in the sector are discussed, with a focus on who is involved in financing and what types of investments are being made. Notably, mobility is the largest area of spending in Africa. ICA's assessment of a six-year window of all multilateral organisations' commitments between 2012 and 2017 estimates an average commitment to urban mobility and transport of US$32 billion (ICA, 2018a). Notably, owing to the substance and structure of mobility investment, African governments are the most important contributor to this spending and roads account for the majority of sectoral investment (ICA, 2018a).

4.1 High-level overview

Mobility finance is often categorised by sector, including aviation, rail, roads and ports. In 2017, roads and highway projects accounted for the largest proportion of transport infrastructure finance. Rail and ports received around the same amount of investment.

TABLE 5: FINANCE BY SECTOR (ICA, 2018A)

Subsector	Total financing in 2017	Important vehicle types
Aviation	US$119 million	5.6 %
Railways	US$550 million	25.9 %
Roads	US$923 million	43.4 %
Maritime/Ports	US$535 million	25.9 %

Despite the importance of public buses and other modes of public transport, it is not generally considered as part of these investment programmes.

Table 6 below shows the spend on key actors on mobility infrastructure. As is the case with most infrastructure, direct investment by African national governments drives the sector. These investments can include concessional loans to these states; however, it is difficult to disaggregate the data. Notably, Chinese investment has grown year on year.

TABLE 6: FINANCE BY LENDER (ICA, 2018A, 2018B)

Lender	Transport sector commitments (2016)	Transport sector commitments (2017)	Transport sector commitments (2018)
African national governments	US$16.349 billion	US$20.117 billion	US$19.59 billion
ICA members	US$4.982 billion	US$8.125 billion	US$3.923 billion
Private	US$1.005 billion	US$360 million	US$439 million
China	US$1.287 billion	US$3.390 billion	US$6.570 billion
Other bilateral / multilaterals	US$2.622 billion	US$2.050 billion	US$1.931 billion
Total	US$26.24 billion	US$34.04 billion	US$32.5 billion

4.2 Detailed finance by lender and sector

Table 7 below shows the spend across key sectors by lenders in the African context. Overall, investors have sought to support large-scale connective infrastructures, such as railways, ports, roads and highways. The largest multilateral lender is the World Bank, and the largest bilateral lender is the Chinese government.

TABLE 7: FINANCIAL COMMITMENTS ACROSS SPECIFIC SECTORS (COMPILED FROM: AFDB, 2021; EIB, 2021; ICA, 2018A, 2018B)

Type	Lender	Priority Technologies	Commitment in 2017	Commitment in 2018
Multilateral	WBG	Aviation Railways Roads and highways Rural and inter-urban roads Ports and waterways BRT	US$2.2 billion	US$597 billion
	AfDB	Aviation Railways Roads and highways Rural roads Ports	US$1.5 billion	US$2.1 billion
	EIB	Aviation Rail Roads Ports and waterways Innovative transport Urban transport	US$312 billion	US$544 billion
	IFC	Airports Railways Roads Ports	US$46 billion	US$5 billion
Bilateral	China	Airports Railways Roads Ports	US$3.390 billion	US$6.6 billion
	AfD	Roads Paratransit BRT Corridor development	-	-
	JICA	Corridor development Bridge and one-stop border post Roads Railways and trams Ports Master plans, including for mobility)	US$400 billion	US$88 billion
Regional develop-ment banks	DBSA	Aviation Rail Ports and pipelines Road Modal transfer	US$381 billion	US$36 billion
	BOAD	Airports Roads and highways Ports	US$262 billion	US$222 billion
	EBID	Roads and highways Rail Ports and waterways	US$10 billion	-

4.3 Types of finance

For investments in mobility mega-projects (the sorts of projects supported by key lenders in Section 4.2), there are several dominant financing approaches. Overall, African governments have historically financed a sizable share of the continent's infrastructure development on balance sheet. Sovereign financing refers to investments made by national governments, generally documented on the financial accounts of national agencies or line departments. This is the most common source of funding for large-scale transport investments in Africa. In these cases, a public actor, such as a national agency or ministry-related to transport, takes out a loan for a project or programme (see Section 1).

Countries that are creditworthy can use various financial products to raise finance from global capital markets of public treasuries. Monies raised can then be spent directly on infrastructure by national line departments, subnational governments or parastatal agencies. African governments, however, struggle to raise affordable finance for mobility projects and other investments. As pointed out in the Addis Ababa Action Agenda, a critical challenge is the weak credit rating of national governments in Africa, coupled with constraints in domestic capital markets, with local banks often not being able to supply the tenor of loans needed for long-term infrastructure investment. South Africa is the obvious exception. Countries such as Nigeria, Kenya and Ghana have recently seen substantial growth in their capital markets. Efforts are also underway to develop regional facilities that are able to account for the specific risk appetite, project-specific requirements and appropriate blended financial instruments, for example, the World Bank GFTD (Benitez & Bisbey, 2021).

Notwithstanding efforts to mobilise local and own source financing, the result is that most sovereign financing is provided by development finance institutions, such as the World Bank, usually acting in a consortium of lenders. Grants are also provided, with the explicit understanding that projects will neither generate revenue themselves, nor will they enable immediate growth in GDP, which could be used to repay loans. Grants are, therefore, given either with the intention of developing unbankable projects or with the intention of derisking investments in order to bring in return-seeking lenders (UN, nd.).

DFIs and donors generally offer capital at a subsidised rate, for example, concessional finance, owing to the social and sometimes political values that projects bring. While DFIs are interested in financing GDP-enhancing investments, such as those that unlock trade and logistics, they infrequently want to cover the full cost of projects with concessional lending tools. Sovereign states need to either use domestic sources of revenue or attract private sector capital to fill the gaps.

Private sector finance has been widely promoted in order to support countries to bridge the infrastructure financing deficit. The main types of private sector finance mechanisms include corporate finance and project finance (see Section 2).

What is called 'corporate finance' is the most common form of private infrastructure finance, including mobility infrastructure. Private companies that build and/or operate mobility projects, such as rail lines or toll highways, either issue shares or take out loans to cover the costs of a project. The project actor is usually a private company, such as a railway company or bus company. For corporate finance, the risk of a particular project is spread over the full portfolio of the firm. The creditworthiness of the firm itself as opposed to the profitability of the project, therefore, drives the cost of capital. This generally lowers borrowing costs for the project. For the firm taking out the finance, however, there are many risks outside the specific project that need to be accounted for, for example, political stability or currency risks that may impact projects across the portfolios.

In contrast to corporate finance, project finance is the long-term financing of infrastructure projects based on the use of a non-recourse or limited recourse financial structure. The lending arrangement (debt and equity) is based on the cash flow generated by the project. The most common project finance mechanism used by private actors is to separate the project risks from their balance sheet by creating a legally and financially independent project company known as an SPV. The capitalisation of SPVs is lower than corporate finance.

It is, therefore, a widely used instrument for capital intensive projects, particularly those that will generate revenue over a long period.

4.4 Managing blended finance

Most mobility projects in Africa reflect a combination between public and private investments. In the mobility space, concessions are commonly used to create the conditions to bring private finance into public infrastructure spaces. For concessions, the conditions are stipulated in a concession contract between the different concessionaires' counterparties, usually a sovereign State and a private sector actor. Usually, an SPV is established through which rights are granted for a set period of time to build and/or operate infrastructure railway projects under specific conditions set by a government. When the concession period ends, conditions are provided in the contract regarding the return of assets to the government. Common types of concessions in the mobility space include BOT and O&M concessions. In the 1990s, the World Bank and other international donors introduced rail concessions to manage investments and were used to replace State-owned railways through different schemes. The initial railway concessions model, for example, first-generation, required the concessionaire to take responsibility for the infrastructure, investment and maintenance, as well as operation. Second-generation models hold investment and ownership with the public sector.

TABLE 8: COMPARISON OF FIRST- AND SECOND-GENERATION AFRICAN RAIL CONCESSIONS (AFDB, 2015)

	First-generation African concessions (Madagascar, Senegal)	Second-generation African concessions (Initial Tanzania and Zambia. Amended concessions Cameroon and Madagascar)
Rolling stock investment	Private	Private
O&M rolling stock	Private	Private
O&M infrastructure	Private	Private
Infrastructure investment	Private	Public
Infrastructure ownership	Public	Public

Much of the debate about blending financing and the contractual instruments such as concessions that enable this relates to the management of risk. Some risks are related specifically to projects. However, there are also risks that relate to the wider political economy of African countries that impact mobility investments negatively. Guarantees are one of the instruments used to address risk. MIGA, for example, offers political risk insurance (or guarantees) against certain non-commercial risks to investments in developing countries. MIGA's coverage is for a period of 15 years against the risks of transfer restriction, expropriation, war and civil disturbance, and breach of contract. Risk insurance is used to derisk projects in order to attract private investment.

EXAMPLE OF RISK GUARANTEES FOR AFRICAN MOBILITY INVESTMENT

In 2012, MIGA supported the construction and operation of the Henri Konan Bedié Toll Bridge and access roads in Côte d'Ivoire. The project, originally initiated in 1996, but placed on hold due to the prolonged civil conflict in the country, represents an important milestone in the country's efforts to rebuild its infrastructure. The project is structured as a public–private partnership and is being implemented under a 30-year build-operate-transfer concession agreement. It involves the financing, design, construction, operation and maintenance of the bridge over the Ebrié lagoon, and access roads to the north and south between the residential area of Riviera and the industrial area of Marcory. This is the first public–private partnership since the country's civil war.

Overall, how risk is calculated for projects, programmes, subnational agencies and national states impacts mobility investment in African cities. Understanding how risk is managed and costed is essential for the creation of more just and effective institutional arrangements and contracting agreements to drive blended finance and investment programmes.

5 KEY SUSTAINABILITY ISSUES IN THE SECTOR

More sustainable investment in urban mobility infrastructure requires carefully balancing the needs of cities and regions, people and economies, and soft and hard infrastructures. While not the only issues in the sector, critical areas are outlined in this section for consideration.

5.1 Low carbon and efficient

A key part of addressing sustainability in the mobility sector is reducing the dependency on fossil fuels (Benitez & Bisbey, 2021). Long-term reliance on fossil fuel-based energy sources has many risks, including susceptibility to oil shocks, carbon emissions, among others. Decarbonisation in the mobility sector has been encouraged through the use of fiscal programmes, for example, taxation, that are aimed at disincentivising emitting behaviours and encouraging transitions to more efficient movement patterns and vehicle types (Benitez & Bisbey, 2021). Overall, much more attention should be paid to localised and responsive measures for transitioning the mobility sector, based on the specific needs of places and economies. Reducing emissions is as much about retrofitting vehicles as it is about ensuring productive and efficient connections between the parts of mobility systems. Planning and capacity building are, therefore, at the heart of these transitions. Regarding logistics, the link between ports and roads is essential. The ability to leverage technology, conduct modal analyses and transport planning data will allow for the appropriate use of geolocations, which will, in turn, improve the passengers' and firms' interface with pre-existing infrastructure (Cas et al., 2018).

5.2 Resilient to climate change and uncertainty

Key to building resilient cities is investing in ways that are adaptable and responsive to uncertainty and change. As such, trade-offs between large-scale (and indeed very fixed) investments that can redirect development pathways need to be balanced with more incremental changes intervening in existing systems in careful and adaptive ways. As an example, trains being low carbon, but also very high cost and fixed investments, are not adaptable for climate change risks, such as sea-level rise or fires. Similarly, a shift towards electric vehicle projects, such as in Ghana, Kenya, Tanzania and South Africa, may reduce carbon emissions, but may not have the scalar effect needed to truly impact climate change objectives.

5.3 Megaprojects and new technologies

There is a clear tension between investment in the types of flagship urban megaprojects that reflect global and world-class aspirations, such as BRT or light rails and the more mundane and indeed invisible investments that might incrementally improve the everyday operations of cities. New technologies often attract the attention of lenders. However, they come with many technological, regulatory, financial and operational risks. As an example, they often face sustainability risks related to operations and maintenance, especially if they require skills and parts not available locally. In contrast, these more mundane investments in the infrastructural ecosystem, such as modest institutional reforms to how infrastructure and service delivery is managed or incremental upgrading to everyday movement systems, often require addressing complex power dynamics, behavioural patterns and nested system dynamics.

5.4 Socially inclusive and consistent

At the urban scale, the immediate outcome of these poorly designed, disconnected, built urban transport systems is that commuter and passenger trips are negatively affected by longer travel times, longer distances and high costs of transportation. This has high social and economic costs. Measures to improve how urban mobility systems operate need to consider how public transport functions. For inter- and intra-

urban passenger movement, paratransit modalities, such as minibuses, need to be integrated with large-scale formal systems, shared public transport infrastructure interchanges and digital systems for connecting end-users and transport planning (Wan et al., 2018).

5.5 Cities in global value chains

Mobility investments can work in service of equitable development of African cities in global economies. Much of the investment in African urban infrastructure does not fundamentally alter Africa's position within international value chains. It does not create long-term opportunities for the localisation of industries needed to support these infrastructures and it does not enable cities to centre themselves, as is the case in Europe, in this process. If considered at all in projects such as the TAH, cities are thought to be a hindrance to the effective movement of goods due to congestion and political issues, among other factors. The rise of bypass roads, the rush to mechanise labour and the very limited work done on the port–city interface in Africa reflects this. It is imperative that healthy relationships are formed between city-scale investments, for example, in local public transport, and mega investments that link the city into regional and global systems. More work is needed to understand how this can be done in practice.

6 CONCLUSION

Africa has an immediate opportunity to utilise transport infrastructure as the mechanism to enable regeneration and developmental objectives of its urban areas by connecting people, amenities, services, places, information, and infrastructure (Connolly et al., 2019). As discussed in this paper, serious trade-offs need to be made in the mobility sector (Wan et al., 2018). Cities, metropolitan areas and towns will navigate these possibilities and trade-offs differently. Local conditions, such as population density, inequality, the state of road and public transit infrastructure, pollution and congestion levels, and local governance capabilities, will determine what changes occur and how quickly. Competing interests, contested politics, material gaps and existing structural challenges shape the ability of sustainability objectives to be applied meaningfully in particular contexts. Key to navigating these trade-offs and localising sustainability objectives is working with current realities and ensuring that the institutional development of infrastructural sectors is taken seriously. To attract more finance for hard investments, it is necessary to ensure that there is adequate institutional capacity and support to implement, and that institutional discoordination is addressed.

It is evident that the vast majority of finance aimed at the mobility sector is being directed at regional scale investments in logistics corridors. This finance dwarfs investments, for example, inner-city commuter buses, the so-called BRT craze, are very small and are mostly concentrated in South Africa. These large-scale projects have major impacts on cities; however, city governments are rarely involved. For those concerned with sustainable investment in support of cities, it is vital to engage directly with conversations about the nature and design of corridor projects and programmes. These projects are consolidating huge resourcing, not only from mobility tranches, but also from budgets for sectors engaged with industrialisation, for example, SEZs, or even residential development, for example, new cities. Even small changes in these very large programmes may have substantial impacts on cities, towns and urban development trajectories. Intervening in these programmes can go hand in hand with encouraging urban scale investments, such as in public transport, integrated land use and efficient urban economies.

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