

Urban Perspectives from the Global South

Timothy Nubi

Taibat Lawanson

Basirat Oyalowo *Editors*

# Transit Oriented Development in West African Cities

 Springer

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## **Urban Perspectives from the Global South**

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Timothy Nubi • Taibat Lawanson  
Basirat Oyalowo  
Editors


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**Part I**  
**Introduction**

# Chapter 1

## Introduction



Taibat Lawanson , Basirat Oyalowo , Isaac Arthur, and Timothy Nubi 

### 1.1 Transport in Infrastructure Development of Africa

Transportation infrastructure across Africa from colonial times has to a large extent determined the role and importance of cities. According to Gwilliam (2011), the chief goal of road and rail networks was to link mines, plantations, and other sites for the exploitation and transportation of natural resources to ports, rather than to provide general connectivity within the region. As such, not a lot of attention was paid to ensure that transport infrastructure served the needs of urban dwellers.

Rapid rates of urban growth across the continent have resulted in fast growing megacities and the proliferation of secondary cities—which range from 100,000 to one million people in population. These already houses more than 40% of Africa’s urban population and are expected to absorb two-thirds of Africa’s future urban growth (OECD, 2020; Riley & Crush, 2023). This urban growth has resulted in many towns growing without physical development plans and the prevalence of urban sprawl. Urban sprawl comes with an urgent requirement for effective

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transportation infrastructure that will serve the resource and mobility needs of people within and across cities on the one hand and between urban and rural areas on the other hand.

A society cannot function optimally if it does not have measures in place to facilitate efficient transport. Efficient transportation is vital for overall productivity and sustainable development. It is important as a lifeline for millions of Africans in that it connects them to people, places and economic opportunities. It also builds thriving communities, creates jobs, eases traffic congestion and promotes a cleaner environment. Investment in public transportation spurs both local and national economies. One way of achieving this according to the Institute for Transport and Development Policy (2020) is through a global shift from urban sprawl to inclusive transit-oriented development.

## 1.2 What Is Transit-Oriented Development?

Transit-oriented development (TOD) is a form of urban development conceived or implemented to integrate people's everyday activities and public space together, with easy walking and cycling connection between them and near-excellent transit service to the rest of the city (Wood, 2022). It means inclusive access for all, to local and citywide opportunities and resources by the most efficient and healthful combination of mobility modes, at the lowest financial and environmental cost and with the highest resilience to disruptive events. Inclusive TOD is a necessary foundation for long-term sustainability, equity, shared prosperity and peace in cities (Institute for Transportation and Development Policy, 2020). However, it is easier conceptualised than implemented as complex and interdependent variables must be brought together. These variables cut across infrastructure, building codes, planning standards, regulators and finance. As such, numerous stakeholders ranging from transport, planning, infrastructure and finance must engage effectively to ensure that local community needs and interests are provided for and protected.

TOD has been practiced with varying levels of success across the world. Many towns in Japan, Sweden, Denmark, the Netherlands and France have many of the characteristics of TOD communities (Cervero et al., 2002). However, Huang et al. (2018) has argued that despite the success stories of TOD in Asia and Europe, the strategy is yet to be practiced widely in Sub-Saharan Africa. According to him, though TOD's concept of leveraging on major transit infrastructure to affect integrated land-use development for greater benefits has gained recognition, there are few examples of successful TOD on the continent with the probable exception of South African cities, mainly Cape Town and Johannesburg. Interestingly, the implementation of TOD in South Africa has been criticised in the academic discourse (see Robinson et al., 2020; Harrison et al., 2019). However, there is limited documented evidence of similar empirical discourse in West Africa, hence the *raison d'être* of this book.

### 1.3 The Book

This book is a collection of theoretical and empirical studies, anchored on scoping studies and transdisciplinary engagements. The first section explores the theoretical perspectives of TOD implementation through a geographic focus on Lagos, West Africa's largest city. The collection of reviews highlights the conceptualisation, implementation, challenges and opportunities for transit-oriented development in Lagos. The chapters keep in sight alternative forms of provision and learnings across Africa while focusing strongly on the complementarity of Sustainable Development Goals (SDGs) to a TOD agenda. The thematic foci cut across urban planning and development, housing, land administration, spatial data infrastructure, urban design and infrastructure, construction and building utilities and maintenance, urban health and well-being as well as pro-poor development.

Complementary to these thematic studies are empirical case studies in the second section of the book. They highlight on the state of urban infrastructure in West Africa with reference to introducing and/or better managing of TOD implementation in six west African cities. They include the capital cities of Nigeria (Abuja), Ghana (Accra), The Gambia (Banjul) and Sierra Leone (Freetown), as well as Lagos and Osogbo, Nigeria. They represent a typology of cities across the subregion with Abuja as a planned city, Accra as a fast-growing city in emerging economy, Banjul as an island city, Freetown as a post-conflict city, Lagos as West Africa's megacity and Osogbo as a typology of secondary city. However, we find that everyday realities to a large extent remain the same with dominant informal transport services, foreign funding for transport infrastructure development and reforms anchored on a cost-recovery model that does not take into full account the everyday lives of urban residents of many African cities.

The authors of the chapters cut across various academia and urban development practitioners in the case study cities. Limitation to anglophone West African countries is largely due to the composition of the African Research Network on Urbanisation and Habitable Cities. The network is part of the African Research Universities Alliance Centre of Excellence for Urbanisation and Habitable Cities, funded by the UKRI. The aim of the network is to foster collaboration between African-based urban researchers and other stakeholders in order to catalyse action towards contextualised solutions for addressing Africa's grand challenges. Since 2019, the centre engaged in scoping reviews, stakeholder meetings and webinars on multifaceted African urban dimensions. The various network activities have highlighted the critical role of nuanced understanding of urban planning and urban infrastructure issues and, with the authors being urban citizens also encountering the everyday dimensions of the challenges they study, are better placed to espouse the structural and institutional reforms that are essential to delivering a better urban future for African urban residents. This volume is borne out of a desire to document and disseminate our findings to both academic and policy audiences whose work is at the interface of urban planning, development, finance, infrastructure and governance in Africa.



## 1.4 Overview of Chapters

### Part I: Introduction

Chapter 1 by Lawanson et al. is a brief but very concise introduction to the topic of discourse. It explains the concept of transport in infrastructure development of Africa, and the authors define transit-oriented development. In order to aid readers in understanding the premise upon which this text was written and the authors, there is a subsection on the book and an overview of the various chapters.

### Part II: Conceptualising Transit-Oriented Development: A Thematic Study of Lagos

Chapter 2 by Oduwaye et al. examines the effect of urbanisation on transport infrastructure investments and proposes policies for achieving transit-oriented development (TOD). These authors discuss conceptually the linkages between urban growth and transportation and underscore the relevance of TOD for cities experiencing urban growth challenges to achieve the United Nations Sustainable Development Goals 1, 8, 11 and 13. They argue that despite significant transport infrastructure investments and innovation such as BRT, the lack of an efficient intermodal transport system, poor service delivery and management of existing facilities and infrastructure stifle accessibility in Lagos and negatively impact the functionality of the city. Furthermore, the failure to integrate physical development and transport infrastructure priorities holistically contributes to the gaps in TOD implementation.

Moreover, they extend their argument on the relevance of TOD for cities in both the Global North and Global South by discussing case studies of TOD policies implemented in Copenhagen, Curitiba, Hong Kong, Denver and Johannesburg while highlighting key lessons for Lagos. They demonstrate that these policies resulted in increased utilisation of public transit, thus reducing automobile reliance and carbon footprints. As a result, the chapter recommends the reallocation of road space from cars to pedestrian-friendly walkways, bus and cycle lanes and community advocacy and participation through local organisations supporting incremental short-term improvements, while larger-scale changes in transit networks are implemented.

Chapter 3 by Nubi et al. appraised the nexus between housing and TOD in an urban African context. The appraisal is predicated on an attempt to understand ways in which affordable housing can be achieved in TOD projects, the prospects for affordable housing in neighbourhoods that have experienced transportation investments in the absence of TOD as a conscious planning- investment regime and the available solutions for places where housing development has preceded transportation investment. The authors draw on experiences from cities around the world to establish the relationship between transportation challenges and housing in peripheral areas of the city—where land prices are cheap as opposed to high transport costs for residents and how that influences the residential location choices of individuals. They argued for the viability of TOD as a solution for proving sustainable development interventions in African cities, using examples from Johannesburg (mixed-use infrastructure development) and Addis Ababa (light railway transit

project) to validate the concept. The authors posit that the two cases provide important lessons, including the necessity for inclusive, culturally sensitive models, the importance of not ignoring the creation of negative externalities as a result of TOD and the critical role of government and private sector participation in TOD projects.

In examining the viability of the idea, it was revealed that while investments in housing and transportation do not seem to be strategically connected, there are no present intentional plans for TOD interventions in Lagos. For workable strategies, the authors proposed that the expansion of existing BRT network as it offers an incentive for TOD implementation, urban regeneration and creating job opportunities using TOD principles, the current developments along existing highway routes and the proposed light rail routes can be made more transit-friendly through additional infrastructure investment following TOD principles that respect and protect the culture of the local inhabitants. Similar to Oduwaye et al. (this book), the authors present recommendations to the government, investors and communities on the best practices for TOD projects. They conclude with the assertion that although TOD will not address all urban issues, it provides a wide range of social, economic and physical development opportunities in peripheral areas.

Omirin et al. in Chap. 4 acknowledge the multidimensional relevance of TOD in ensuring sustainable African cities. However, they bring attention to the critical role of land policy, planning and market-led articulations of land uses to ensure inclusive benefits of TOD interventions. In their submission, they focus on the existing state of affairs of TOD developments and the potential for successful land resource infusion into TOD in a complex land regime like Lagos.

This chapter develops on the importance of transportation to the economy and social development, noting that rapid urbanisation places a compulsion on government investment in transportation infrastructure. The centrality of their argument is that access to land for TOD and infrastructure provision is fraught with challenges which must be clearly understood and mitigated at key stages of project conceptualisation, planning and execution using the case study of Miami-Dade to highlight the importance of effective land management practices. This argument is germane, taken against the backdrop of the social and economic role of transportation, the need for government involvement and the use of private sector funds. They tie this argument into a conceptual linkage with SDG 11 in particular, highlighting value-chain connections between TOD and land provision, land-use planning and value enhancement.

With specific reference to Lagos, issues around informal land markets, acquisition of land titles, equitable and fair compensation on land compulsorily acquired and rapid urbanisation were all highlighted as challenges to implementing transit-oriented development in the city. They recommend multipronged approaches to regional development, deliberate emphasis on compactness and mixed-use development, land readjustment options to encourage land release and better documentation of land rights as key factors if TOD is to be successful in cities like Lagos.

Lack of data harmonisation frameworks for predictions and decision-making for improved urban systems aggravate inadequate transport systems in cities is the key issue established by Agunbiade et al. in Chap. 5. They argue that spatial data

infrastructure framework that combines data activation and multimedia annotation technologies to process and integrate multiple sources and heterogeneous, massive, and decentralised data is key to any successful TOD processes. But not only that; this must accommodate both real-time signal processing and scalability, by supporting data analysis on a large scale. They then proceed to provide an analysis of the nature and depth of the prevailing spatial data infrastructure issues in Lagos, noting that lack of a relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data limits sustainable urban form and mobility.

In this chapter, the conceptual and theoretical linkages between transportation, TOD and spatial data infrastructure are established through the connections of the SDGs, with TOD being presented as a possible route to achieving the New Urban Agenda. From a spatial data infrastructure perspective, the authors appraise the TOD systems in Cape Town and Curitiba and assert that in the case of Lagos, mobility planning needs to be refocused on the people and not on vehicles, and even though this requires an examination of human issues in data sharing, it still provides a means of integrating data into city transportation systems. The chapter calls for extension of information gathering on travel pattern, trip behaviour and other transportation data to the grassroots/local constituencies and the neighbourhood level as a pivot to the success of any policy engagement.

Against the backdrop of poor infrastructure development in African cities and its effects, Adebamowo et al. in Chap. 6 discuss the intermodal transport system of Lagos from the perspective of TOD. They argue that the intermodal transport system can be a panacea for addressing the transport challenges of an African city like Lagos. This is given its ability to provide sustainable mobility, improve the quality of life of the people and provide an adequate enabling environment for businesses to thrive. The authors begin their discussion by highlighting the links between transportation challenges and urban infrastructure in Lagos and similar to Oduwaye et al. in Chap. 2, conclude that poor urban planning, weak multi-modal coordination and a lack of urban public transportation to meet the city's growing need for mobility, urban traffic congestion, security and environmental friendliness all play a role in Lagos' transportation issues. In establishing the conceptual linkage between TOD, Sustainable Development Goals and urban infrastructure, they developed a sustainable transport infrastructure model. The model consists of soft infrastructure (institutional capabilities and policies used to address emerging challenges) and hard infrastructure (bridges, terminals, roads, railways, tunnels, etc). The authors operationalised the model by demonstrating how the Ministry of Transport has provided policies and strategic plans for improving transportation in addition to the provision of BRT, proposed light rail and water transport services, among others.

The discussion on thematic-based issues and priorities for Lagos is climaxed with highlights on the main outputs of specific plans associated with the extension of Lagos' Strategic Transport Master Plan (STMP) defined in the context of freight, non-motorised transport (NMT), road safety and climate change. The authors proposed some recommendations for the government, investors and communities, and

these include the adoption of a policy framework for deployment of environmentally friendly multimodal transport systems across the city.

Adenuga et al. in Chap. 7 trace the connection between TOD and the SDGs through the lens of SDGs 7, 9, 11, 13 and 17. As their emphasis is on the building structure and utilities upon which TODs are anchored, the authors developed a narrative of the adequacy of existing building infrastructure in any attempt at TOD projects in Lagos. They provide evidence from stakeholder engagement that suggests that the existing condition of buildings and utilities around areas which could be designated as TOD is poor and thus highlighted the need for interventions in the areas of facility management and maintenance management, innovations in the designs for new and urban upgrade projects and sustainable practices in the design, construction and post-construction operations of motor parks and garages. Finally, the authors call for investment in other modes of transportation to ensure the inter-connection of systems across Lagos.

Transportation and health nexus is the focus of Nwokoro et al. in Chap. 8. Specifically, the chapter explored the relationship between land use, transportation infrastructure, the environment and health in Africa and the significance of these relationships in achieving the African Urban Agenda and the SDGs given the significance of regional connectivity and cooperation required. In essence, it was meant to develop a framework through which sustainable transport, improved urban health and liveability can be achieved in Africa. They argue that through this framework, the implementation of TOD will serve as a link between SDGs and transportation.

Using the case of Johannesburg, South Africa, the authors analysed the condition of transport infrastructure in Johannesburg from a TOD perspective and determine that apartheid and modernist planning to a large extent influenced land-use activities in Johannesburg (Wood, 2022). According to them, post-apartheid interventions were instituted to reverse racial spatial segregation by constructing transit arterial connections to link apartheid-isolated areas to other parts of the city, and the effects were that of inadequate equitable transport accessibility resulting in over-reliance of automobiles and long-distance shuttling with attendant health implications. To broaden the discussion on health issues associated with transportation, the authors highlighted the transportation system in Lagos detailing the modes of transport and statistics of their usage and their operational, technical and design challenges. They argued that these challenges have huge health impacts ranging from physical health and mental health to environmental health problems. The chapter proposed that a feasibility and viability study is required to identify locations that need social and spatial restructuring using TOD; the outcome of the feasibility and viability study should serve as benchmark for city managers to collaborate with relevant stakeholders to develop a sustainable TOD strategy that will control urban development and reverse transport-related health issues, urban sprawl and low-density urban forms in African cities.

In the final chapter of this section (Chap. 9), Lawson et al. bring to attention the critical role of the informal sector in urban transportation in Africa. The chapter explores the connections between TOD and urban poverty in African cities with a

review of transportation, pro-poor development and urban governance in Africa. It highlights how rapid population growth and congestion is hampering the movement of people and goods in many cities, with attendant environmental, health and economic concerns. It focuses on the specific transportation challenges faced by the urban poor and how recent TOD initiatives and transport innovations impact them. Thereafter, conceptual linkages between TOD, the SDGs and pro-poor development are explored. Some case studies of TOD are reviewed with key issues and priorities for the implementation of TOD in other cities elaborated. These include the transit-oriented development used in Addis Ababa, Dar es Salaam, Johannesburg, Curitiba, Ahmedabad and Lagos. The final part of the paper provides key recommendations for improving transportation in Lagos with implications for other African cities. The chapter concludes by calling for creative alternatives of integrating formal and informal transport systems to address mobility challenges in African cities.

The various chapters addressing these thematic issues highlight the linkages between TOD, the SDGs and the creation of inclusive and authentic African city processes using Lagos as a case study.

### **Part III: Deep Dives of TOD in West African Cities**

This section is a review of TOD implementation in six West African cities, highlighting the processes, challenges and potentials of TOD for engendering a sustainable urban future.

In Chap. 10, Arthur et al. describe the Greater Accra Metropolitan Area (GAMA) as being in a process of intense urbanisation and thus the focal point of expansive peri-urbanisation sprawl driven by in-country, regional and international migration. They note that global capital and the presence of international non-governmental organisations (NGOs), multinational corporations (MNCs), expatriates and international returned migrants all add to the economy of the city. The major infrastructural challenge for Accra as far as transportation is concerned is the lack of coordination between road transport investments and urban planning, coupled with the weak capacities of the municipal and metropolitan governments that have contributed to the intensification of urban sprawl and gaps in transport, utility service provision, sanitation and waste management and housing.

Accra's transportation infrastructure is reliant on international donor organisations and financial institutions. In arguing that the transport infrastructure has not been at pace with the urbanisation trends of the city, the authors posit that bureaucratic processes rather than management are a major challenge. Here, they maintain that the application of TOD would be severely called to question, while Accra adopted the National Transport Policy that had the objective of making Accra, and other major Ghanaian urban centres, transit-oriented cities. Arising from this, attempts at introducing mass transit buses in 2003 have failed due to operational problems with the Bus Rapid Transport system picking up only a small proportion of the travelling public. The authors urge adoption of TOD interventions that are culturally focused, especially taking account of the predominant informality in the transport system, the investment by private sector and the involvement of multiple stakeholders.

Abuja, Nigeria's capital city, is the focus of Nuhu et al. in Chap. 11. Abuja is described as a planned city in that it emerged from a 1976 government decree designating it Nigeria's capital city. The intentional creation of a country's administrative capital required a master plan design, and this was vested in the Federal Capital Development Authority (FCDA). The city's design included provision of an Abuja Rail Mass Transit and several ten-lane super multiple carriage highways. Over 40 years later, the rail mass transit is not functional, and the transportation sector is dominated by mostly informal providers. The authors recommended the formulation of policies that would enable informal transit system to play complementary role within an integrated modal transport system, but with regulations to streamline operations and align with formal transport services.

Chapter 12 by Fabiyi et al. presented the Banjul case study. They describe Banjul as The Gambia's port town, city capital and seat of power. In the overview of Banjul's transportation infrastructure, the authors identify the broad challenges facing road transportation, drawing attention to the limitations posed by undefined hierarchical structure of roads within the Greater Banjul Area and unclear institutional structures for the governance of air and water transportation.

The chapter assesses the state of road transportation in Banjul as being one to be concerned about, noting the persistent congestion during rush hours and the poor condition of roads. They argue that the introduction of technological enhancements in road management would be more efficient than road expansion, showing that since 1998, investment in road network provision, with the National Transport Policy (1998–2006), was concentrating on investment in road infrastructure and management in the Greater Banjul areas. They also argue that Banjul's development and investment in road networks requires a sector-wide approach that recognises road classification and hierarchies. Thus, they call for a more clearly defined responsibility of road infrastructure, funding of urban road maintenance, traffic regulation and enforcement and the introduction of traffic demand management measures and signalisation at intersections.

Chapter 13 focuses on Osogbo, a secondary city and UNESCO World Heritage site in South-West Nigeria. Here, Olaleye et al. trace a broad history of the city that bears the heritage of the Yoruba people and note that Osogbo does not have sufficient infrastructure that promotes an integrated basic service delivery. The author contends that the growth of the city from a small commercial centre along a number of radial exit and intra-city road networks has affected its growth, form and land-use pattern.

The authors found that Osogbo is technically a mono-modal city, as road is the only functional transport mode. The moribund railway does not provide commuting services for the residents, and the only river is non-navigable. Even then, road transportation is characterised by predominantly commercial motorcycles and micro-minibuses. Plans exist to convert an aerodrome to an airport but progress is slow. They posit that the transportation challenges in Oshogbo reflect both infrastructure (lack of maintenance, drainage, technologically driven management) and attitudinal deficits (on-street parking, loading and offloading of goods).

However, there currently exists no urban transport policy for any Nigerian city; hence, regulation is done through government ministries in an ad hoc manner. The state government is the most significant funder of transportation investment in the state. Investment itself has been focused on the road infrastructure. The authors argue that the most urgent need for Osogbo today is for a transport policy and master plan that will guide transportation planning in the city. Only within this context can opportunities for transit-oriented development occur.

In Chap. 14, Koroma et al. present a city profile of Freetown, Sierra Leone. The chapter described a city characterised by difficult topography, but incredible urban sprawl arising from its rapidly growing population. An overview of Freetown's transportation network also identifies the primacy of road transport and general problems such as lack of proper hierarchy of roads and poor connectivity, inadequate vehicle capacity of roads and poor pedestrian facilities. In terms of governance framework for the city's transportation sector, Koroma et al. also show that despite the multiplicity of government ministries and departments in planning, financing, running and enforcement of the sector, the delivery of infrastructure and services is complex and inadequate. They highlight the activities of an active informal transportation sector, dominated by minibuses (poda-poda), three-wheel motorcycles/tuk-tuks (kekeh), motorcycles (okada) and shared taxis. In addition to this, the authors identify the lack of mass transit services which inadvertently increases the use of private vehicles. Unplanned growth on land availability, transport and infrastructure development/expansion in the city all add pressure to the system. The complexity of navigating these existing problematic factors may be additional reasons why transit-oriented development is not likely to be adopted as a major policy decision-making process by both national and city authorities. They therefore challenge the government to build resilient, sustainable transport infrastructure that is inclusive, less dependent on foreign aid and more embedded in urban planning frameworks.

The final chapter of the book (Chap. 15) is a profile of Lagos by Oyalowo et al. This chapter identifies the broad infrastructural challenges facing Lagos, West Africa's largest economy and Nigeria's most urbanised city. Like Freetown, it is a primate city.

In an overview of its transportation infrastructure, the authors highlight the dependency on road transportation in the city. Current challenges in the transportation system include traffic congestion occasioned by the overconcentration of industries and businesses in specific areas of the city, an increase in private car ownership, the lack of an efficient public transport system, poor town and highway planning, small roads and poor driving behaviour. The authors also draw attention to transport governance and investment framework of the city, identifying the agency of the informal sector, as areas of synergy, overlap and conflict among actors. The informal sector is presented as an intensely powerful actor imposing road taxes and levies without concomitant infrastructure or even welfare investment. They highlight the massive investment in the Bus Rapid Transit system and its continual expansion though fraught with extensive maintenance gaps. Lagos is unique for the existence of ride-hailing cabs and taxis from different operators.

Rail transportation is under construction to serve intra-city movement, as opposed to the currently existing inter-city rail network operated by the federal government. While investment has occurred in the water transportation sector, the inadequacy of boats and selected route to high-density areas leaves other communities underserved. The authors recommend more intentional synergies between transportation investment and real estate development if TODs are to serve any purpose for the city. They call for the repositioning of urban transportation as a service rather than an infrastructure and require that informal sector operators and their unions be integrated into new projects with clear parameters for engagement.

## 1.5 Conclusion

The rationale for the book was to better understand how city development processes across West Africa are being shaped by principles of transit-oriented development. The aim was to leverage this understanding to advance pragmatic approaches to the complexities of urban infrastructure deployment and the intricate mix of stakeholder considerations that are required for the implementation of both a transport and planning and management system that enhances inclusion and well-being for urban citizens, thus fostering sustainable development.

With lessons from six West African cities, this edited volume shared conceptual and empirical approaches to navigating urban infrastructure challenges, highlighting what worked, what did not work and why. We hope this volume will offer key learnings beyond the six case study cities and contribute to the discourse and action required to create a better urban future for Africans.

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**Part II**  
**Thematic Study**

# Chapter 2

## Transit-Oriented Development and Urbanisation in African Cities



Leke Oduwaye, Victor Onifade , Victor Ilechukwu, Peter Elias, Damilola Odekunle, and Damilola Olalekan

### 2.1 Introduction

The urban population in Africa has been growing at a very high rate, from 27% in 1950 to 40% in 2015 and is projected to reach 60% by 2050 (UN-DESA, 2014). As this population continues to grow, an increasing number of people are moving to cities with the hope of securing better living, higher quality education, good health care and greater economic opportunities. One of the major drivers of urbanisation in Africa is the growth of towns and intermediate cities (Rico, 2016), and this growth is expected to be linked and facilitated by transportation. While urbanisation can be a boost to the national economy, it can also present many infrastructure and humanitarian challenges. The emergence of traffic congestion, inadequate facilities and services, unemployment, poverty and environmental deterioration are common consequences of urbanisation. Currently, Lagos is the largest city in Africa, with a population of 14.4 million at a growth rate of 3.26% ([worldpopulationreview.com](http://worldpopulationreview.com)), out of which two-thirds of Lagos residents are experiencing these urbanisation challenges.

In most cities in Africa, traffic congestion could be attributed to the types and qualities of transport infrastructure. Roads dominate the transport sector in most African countries, carrying 80–90% of passenger and freight traffic (World Bank, 2011), followed by railway, air and marine transports. Moreover, the condition of the road system is poor by international standards and the usage is also inefficient. Besides, the road transport system faces challenges of traffic congestion and parking difficulties, longer commuting time, the inadequacy of public transport,

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difficulties for non-motorised transport, loss of public space, high infrastructure maintenance costs, environmental impacts, energy consumption, accidents and safety, among others (Berg et al., 2017).

Transport infrastructure investments can be very costly and need to accompany the fast pace of urbanisation currently occurring in developing countries, especially in Africa. While the provision of transport is potentially crucial for development, there is often a risk that transport investments are not cost-effective and do not produce the range of expected outcomes due to trend or pattern of urbanisation as well as backlogs of transport infrastructure investment, inadequate regulations in the transport sector and rising social costs in terms of congestion, pollution and accidents (Berg et al., 2017).

There is an obvious relationship between the consequences of urbanisation and the level of investment in transport infrastructure. For instance, there is underinvestment in the roads of most suburban areas of African cities where the poor live (Blimpo et al., 2013). Also, poor physical connection between jobs and residences leads to high commuting costs that are detrimental to the workers getting a job (Gobillion & Selod, 2014). Furthermore, transport costs have an impact on educational opportunities and choices that can increase or decrease enrolment rates of students in schools (Khandker et al., 2009). Also, there are potential food and health benefits from better transportation (Blimpo et al., 2013). This underlines the relevance of transit-oriented development which drives smart growth and addresses intimidating urbanisation problems such as traffic congestion, inadequate housing, sprawling, decaying inner-city and disinvestment. Integrating the goals of sustainable transportation, inclusive cities and local economic development is an important consideration in transit-oriented development. The principles of transit-oriented development are derived from the need to create balanced land-use planning and development which accommodates pedestrian footpaths and segregates cycle tracks, a connection that improves access to goods, services and public transportation characterised by frequent, fast and reliable high-capacity rapid transport (ITPD, <https://tod.itdp.org/what-is-tod/eight-principles-of-tod.html>).

In light of the above discussion, this paper examines the influence of urbanisation on transport infrastructure investment and proposes policies for achieving transit-oriented development in African cities.

## 2.2 Transportation Challenges and Urbanisation

Sustainable transportation development demands a balance between economic, social and environmental concerns. Urban sustainability development involves several aspects, including populations (socioecology), land use and urban structure and mobility behaviour (transportation) [Alberti, 2008]. The dynamics of urban development is reflected in the interaction between humans and the environment in spatial and temporal contexts. With that, such a complex system, spatial structure strategy alone or partial strategies, such as transportation infrastructure policies,

cannot be sufficiently relied upon for achieving sustainability but requires integrated land use, transportation and environmental strategies. Land-use management system has good potential in ensuring a good urban environment, particularly if the land-use system could manage the people's mobility. The spatial distribution of settlement areas, working places, commercial centres and other activities contributed to the trip origin-destination patterns in urban transportation and impacted the trip distance, energy consumption and pollutant emission. As the statement suggests, the urban spatial structure could decrease the trip distance and simultaneously increase urban environmental quality (Petersen, 2010).

Jing and Zhentao (2007) emphasised that the rapid development of urbanisation has resulted in a prominent aggregation of people and buildings among metropolises, creating new urban growth poles or sub-centres. Urban structure evolution, from a monocentric to a polycentric model, always emerges along with economic development and the growth of urban areas at different scales. Uncontrolled development gives rise to urban issues, most of which derive from the imbalances between supply and demand. Urban elements such as land and transportation belong to the static supply side, and human behaviour always belongs to the demand side. The limitation of urban boundaries restricts urban land supply, thus enhancing urban densities. The lack of an efficient public transportation system results in congestion and pollution, especially in rapidly developing cities. Meanwhile, unaffordable housing prices and rents in downtown areas force people to relocate to the undeveloped suburbs, generating crowded and lengthy commutes. Owing to the economic bubble and financial crisis, the unemployment rate is high, resulting in a vacancy problem in both residential houses and commercial houses (Bentley et al., 2016). All of these phenomena reflect urban disequilibrium. To achieve balanced development as a result of the high speed of urbanisation, it is necessary to build a compact, balanced and sustainable city. The relation and interaction of different urban elements and their comprehensive impact on the urban structure are very crucial; these include transportation, road networks, distribution of buildings, land-use patterns, economic performance and human behaviours (Yingqun et al., 2019).

Cities can be described as an engine for economic growth; many cities in the developing world increasingly fail to deliver what is expected of them. Many cities are unable to cope appropriately with rapid population growth and are facing such challenges as lack of urban infrastructure, a deteriorating living environment, growing vulnerability to natural disasters and widening economic disparities. In developing countries, the poor state of transportation infrastructure, including roads, railways, ports and airports, has impeded the attainment of both economic growth and poverty alleviation. The development of transportation infrastructure is therefore indispensable to achieve sustainable economic growth, facilitating the efficient movement of people and goods. The demand for transportation infrastructure is high worldwide. The need to maintain, repair and upgrade aging structures is ever-growing (JICA Annual Report, 2016). There is a reciprocal relationship between transportation and urban growth. Transport plays a vital role in urban development. Transport systems provide essential mobility options for people and goods and influence patterns of growth and the level of economic activity through the

accessibility it provides to land (Meyer & Miller, 2001). Urban growth and transport are strongly related issues. On the one hand, transport infrastructure attracts urban development; on the other hand, urban growth and population cause an increase in travel demand and thereby an increase in the requirement for transport infrastructure.

### **2.3 Transit-Oriented Development, the Relevant SDGs and Urbanisation**

Transportation routes open the access of the city to the countryside and are responsible for urban development. Roads are the major catalyst in the process of regional development. Transportation as established by Meyer and Miller (2001) plays a crucial role in urban development and growth; it provides mobility for people and goods and influences patterns of growth as well as the level of economic activity through accessibility. There is a strong relationship between urban growth and the transportation system in a city. There is no urban development and growth without a high increase in population; as the population increases as a result of the influx of people, the existing transport facilities become inadequate, thereby resulting in traffic delay, jams and an increase in man-hour rate on the roads. In the space of just a few decades, urban areas across the world, in both developed and developing countries, have become increasingly automobile-dominated and less sustainable. In developing countries, in particular, cities have experienced rapid growth in transport-related challenges, including pollution, congestion, accidents, public transport decline, environmental degradation, climate change, energy depletion, visual intrusion and lack of accessibility for the urban poor (Dorina & Dominic, 2015).

As reported by the United Nations (2011), nearly half of the world's 3.9 billion urban dwellers reside in relatively urban settlements with fewer than 500,000 inhabitants, while only around one in eight lives in the 28 megacities of 10 million inhabitants or more. Overall, the urban population in developing countries is set to double from 2010 to 2050 while remaining stable in developed countries (United Nations, 2015). At the moment, cities with less than 100,000 inhabitants represent a third of the world's urban population, a figure which is predicted to grow to 40% in 2050. The fastest-growing urban agglomerations are medium-sized cities with less than 1 million inhabitants, located in Asia and Africa (United Nations, 2015). This requires adequate and urgent intervention in order to synergise transit-oriented development and city growth.

Transit-oriented development (TOD) as described by Still (2002) and Bernick and Cervero (1997) is a mixed-use community that encourages people to live near transit services and to decrease dependence on their driving and also the practice of developing or intensive residential land use near rail stations and housing, along with complementary public uses, jobs, retail and services, which are concentrated in mixed-use developments at strategic points along with the regional transit systems