

URBANIZATION AND INFRASTRUCTURE DEVELOPMENT: A COMPARATIVE STUDY OF THE DEVELOPMENTAL IMPLICATIONS OF RAPID URBAN GROWTH IN AFRICAN CITIES.

By

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Abstract

Africa is urbanizing faster than any other world region, with megacities emerging alongside rapidly expanding secondary and intermediary cities. This paper compares developmental implications of rapid urban growth across 18 economically important African cities spanning North, West, Central, East and Southern Africa. Using a comparative secondary-data approach, it synthesizes city-level population and urban expansion data (Africapolis, UN WUP), national and urban infrastructure indicators (electricity, water, sanitation, transport) from World Bank WDI and WHO/UNICEF JMP, and recent analyses from UN-Habitat and OECD to examine how infrastructure provisioning — or its absence — mediates economic, social and human development outcomes. Findings reveal three major patterns: (1) rapid population growth and spatial expansion frequently outpace infrastructure investments, causing pervasive service deficits and informal settlement growth; (2) heterogeneity across cities: some (e.g., Cairo, Casablanca, Johannesburg) show stronger service coverage and formal economic bases, while others (e.g., Kinshasa, Lagos, Luanda, Dar es Salaam) face large informal economies and infrastructure

backlogs; (3) governance, fiscal capacity and land-use planning quality are key determinants of whether urbanization translates into inclusive development or intensified deprivation. The paper concludes with policy recommendations for prioritizing integrated infrastructure financing, inclusive land-use governance, municipal fiscal reforms, and context-sensitive partnerships with private and community actors to convert Africa's urban transition into a development dividend. Key implications are drawn for donors, national governments, municipal authorities and private infrastructure providers.

Keywords: urbanization, infrastructure, Africa, cities, urban governance, development, comparative analysis

1. Introduction

Urbanization is one of the most consequential demographic and economic transformations of the twenty-first century. Globally, cities are engines of productivity, innovation, and social change, but in Africa, urbanization is occurring at a pace and scale unmatched by corresponding infrastructure development. Africa is currently the fastest urbanizing region in the world, with its urban population projected to more than double between 2020 and 2050 (United Nations Department of Economic and Social Affairs [UNDESA], 2022). This rapid urban expansion presents significant opportunities for economic growth and structural transformation, but it also poses acute challenges related to infrastructure provision, service delivery, housing, environmental sustainability, and social inequality (UN-Habitat, 2022; World Bank, 2023).

Unlike historical urban transitions in Europe, North America, and parts of Asia, African urbanization is characterized by high rates of informal settlement growth, limited industrialization, constrained municipal fiscal capacity, and uneven governance systems (Fox, 2014; Gollin, Jedwab, & Vollrath, 2016). As a result, many African cities experience a disconnect between population growth and infrastructure expansion, leading to deficits in access to electricity, safe water, sanitation, transport, and waste management. These infrastructure gaps undermine public health, constrain productivity, and exacerbate urban poverty and spatial inequality (UN-Habitat, 2020; WHO & UNICEF, 2023).

Statement of the Problem

Despite extensive literature on African urbanization, a persistent problem remains: rapid urban population growth in African cities has not been matched by proportional infrastructure development, resulting in widespread service deficits and uneven developmental outcomes. Existing studies often focus on individual cities or national contexts, limiting comparative understanding across different urban systems. Moreover, there is insufficient synthesis that integrates geospatial urban expansion data with infrastructure access indicators and governance factors across multiple African cities. This gap constrains evidence-based policymaking aimed at transforming Africa's urbanization into an inclusive development pathway.

Research Questions

To address this gap, the study is guided by the following research questions:

1. How has rapid urban population growth affected infrastructure provision and service access in major African cities?
2. To what extent do infrastructure deficits mediate economic and human development outcomes in rapidly growing African urban areas?
3. What explains the observed differences in infrastructure performance and developmental outcomes across African cities?
4. How do governance capacity, fiscal systems, and land-use planning influence whether urbanization generates inclusive development or intensified deprivation?

This study examines these questions through a comparative analysis of 18 economically significant African cities spanning North, West, Central, East, and Southern Africa. By synthesizing secondary data from authoritative sources—including UNDESA, UN-Habitat, the World Bank, OECD, Africapolis, and WHO/UNICEF—the paper aims to identify structural patterns and policy-relevant lessons. The findings contribute to scholarly debates on urban development while offering actionable insights for policymakers, municipal authorities, and development partners seeking to harness Africa's urban transition for sustainable and inclusive growth.

2. Literature review

2.1 Urbanization in Africa: scale, speed and uniqueness

Multiple scholars and international agencies document that Africa is urbanizing rapidly but unevenly. The lack of a single standard definition of “city” complicates comparisons, but geospatial datasets (e.g., Africapolis) and UN population projections consistently show large increases in urban populations and built-up area (Heinrigs et al., 2020; UN WUP). Rapid urban expansion has been accompanied by high levels of informal settlement growth in many cities, influenced by rural–urban migration, high fertility, and peri-urbanization. (OECD, 2020).

2.2 Infrastructure as a mediator of development

Infrastructure — defined here to include basic services (water, sanitation, electricity), transport (public transit and major roads), and solid waste management — is central to translating urban agglomeration into economic productivity and human development. Infrastructure deficits create health risks, limit productivity, and constrain formal economic activity; conversely, timely infrastructure investment amplifies agglomeration economies (UN-Habitat, World Bank). The

literature emphasizes the importance of both physical infrastructure and institutions (planning, finance, governance) for effective service delivery. (WHO & UNICEF, 2023)

2.3 Comparative urban studies in Africa

Comparative studies show heterogeneity: a handful of African cities have built substantial modern infrastructure and integrated into global networks (e.g., Casablanca, Johannesburg), whereas many rapidly expanding cities struggle with service provision and governance capacity (e.g., Kinshasa, Lagos peri-urban zones). Secondary cities and fast-growing agglomerations are increasingly responsible for urban expansion, complicating national plans focused only on historic primate cities (OECD Africapolis; Korah, 2024). These patterns influence economic specialization, poverty patterns, and vulnerability to climate and health shocks (OECD, 2025).

2.4 Gaps in the literature

While considerable work documents urban growth and infrastructure gaps in specific cities or countries, cross-city comparative analyses that integrate geospatial evidence, service coverage metrics and governance variables across many African cities are scarcer. This paper aims to contribute by synthesizing multi-source secondary data for 18 major cities to identify common patterns and policy levers relevant to policymakers and practitioners.

3. Methodology

3.1 Research design

This is a comparative, cross-sectional synthesis study using secondary published data. The design triangulates multiple reputable sources to (a) measure city population and growth (Africapolis, UN WUP, World Bank), (b) compile infrastructure access and coverage proxies (national/urban-level electricity, water and sanitation statistics from World Bank WDI and WHO/UNICEF JMP), and (c) integrate qualitative/interpretive evidence from UN-Habitat, OECD, peer-reviewed articles and authoritative reports.

3.2 City selection and rationale

Eighteen cities were selected to ensure geographic coverage and economic importance: Lagos, Cairo, Kinshasa, Johannesburg, Nairobi, Dar es Salaam, Abidjan, Addis Ababa, Luanda, Accra, Casablanca, Dakar, Kampala, Maputo, Tunis, Harare, Port Harcourt and Windhoek. These cities represent national economic hubs, regional trade and finance centers, industrial or port cities, and capitals with strategic planning roles. The selection balances megacities, large secondary cities and fast-growing intermediary cities to capture diverse urbanization trajectories.

3.3 Indicators and data sources

Primary indicators used:

- **Population / urban agglomeration size (most recent available):** UN World Urbanization Prospects & Africapolis (population and built-up area proxies). UNDESA, 2022
- **Electricity access (urban % / national urban indicator where city-level unavailable):** World Bank WDI and national energy reports. (World Bank Group, 2023).
- **Access to improved water and sanitation (urban where available; otherwise, national urban estimates):** WHO/UNICEF Joint Monitoring Programme (JMP) and OECD water governance reports (OECD, 2025).
- **Transport and mobility proxies:** presence of planned mass transit (metro/light rail), road network expansion projects, congestion indices from UN-Habitat/OECD reports and city planning agencies (UN-Habitat, 2020).
- **Complementary sources:** World Bank urban sector publications, UN-Habitat World Cities Report 2022, OECD Africapolis 2020–2025 reports, and peer-reviewed literature on individual cities.

Because city-level service coverage data are not uniformly available across 18 locations, the analysis uses a combination of city agglomeration statistics (Africapolis/UN) and national urban service proxies (World Bank, JMP). This mixed approach is transparent about limitations while enabling comparative interpretation.

3.4 Comparative analysis approach

Data were collated into two main comparative tables (Table 1: city population and growth proxies; Table 2: infrastructure and service proxies). The analysis identifies patterns by subregion and by city typology (megacity, large intermediate city, port/industrial hub). Qualitative synthesis draws on institutional and fiscal explanations for differences and on recent literature documenting governance outcomes.

4. Results

This section presents synthesized results for the 18 cities. Two tables summarize: (a) city population/size and (b) infrastructure/service proxies (electricity, water, sanitation, and transport notes). After the tables, I provide a cross-city comparative narrative and highlight patterns.

Note on sources: city population figures are derived from UN WUP/Africapolis estimates and current consolidated city population sources; infrastructure statistics are drawn from World Bank WDI, WHO/UNICEF JMP and UN-Habitat/OECD publications. Where exact city-level metrics were unavailable, national urban indicators are used and cited.

Table 1. Selected cities and estimated urban agglomeration/population (selected most recent public estimates)

City (Country)	Approx. urban agglomeration population (most recent estimate)	Source(s)
Lagos, Nigeria	~15–21 million (est. range; remains among Africa’s largest agglomerations)	Lagos UN WUP / World Population Review / UNDESA, 2022 / Africapolis.
Cairo, Egypt	~20–23 million	UN WUP / World Population Review. UNDESA, 2022
Kinshasa, DRC	~13–17 million (rapid growth)	UN WUP / Africapolis. (OECD, 2020)
Johannesburg (Greater), South Africa	~5–7 million (metro area)	UN WUP / UN-Habitat. (UN-Habitat, 2020).
Nairobi, Kenya	~4–6 million (metro/urban agglomeration)	UN WUP / World Population Review. UNDESA, 2022
Dar es Salaam, Tanzania	~6–7 million (rapidly expanding)	UN WUP / Africapolis. (OECD, 2020)
Abidjan, Côte d’Ivoire	~4–5 million	UN WUP / Africapolis. (OECD, 2020)
Addis Ababa, Ethiopia	~4–5 million	UN WUP / Africapolis. (OECD, 2020)
Luanda, Angola	~4–8 million (estimates vary; high urban concentration)	UN WUP / Africapolis / news estimates. (OECD, 2020)
Accra, Ghana	~2–3 million (metro area)	UN WUP / World Population Review. UNDESA, 2022
Casablanca, Morocco	~3–4 million	UN WUP / national statistics. UNDESA, 2022

City (Country)	Approx. population estimate)	urban (most recent public agglomeration)	Source(s)
Dakar, Senegal	~2–3 million		UN WUP / Africapolis. (OECD, 2023)
Kampala, Uganda	~2–3 million		UN WUP / Africapolis.
Maputo, Mozambique	~1–2 million		UN WUP / Africapolis.
Tunis, Tunisia	~1–2 million (metro)		UN WUP / national sources. UNDESA, 2022
Harare, Zimbabwe	~1.5–2 million		UN WUP / Africapolis.
Port Harcourt, Nigeria	~2–3 million (regional industrial/energy hub)		Africapolis / national data.
Windhoek, Namibia	~0.4–0.6 million (the capital and largest city)		UN WUP / national statistics. UNDESA, 2022

Notes: City population estimates vary by data source and by definition of agglomeration vs city proper; Africapolis and UN WUP are used as principal comparators. The population ranges indicate recent public estimates and projections; these numbers illustrate relative city sizes for comparative analysis. For authoritative national urbanization projections and city lists, see UN WUP and Africapolis datasets.

Table 2. Infrastructure/service proxies for selected cities (latest available urban or national urban data; percentages indicate reported urban access where available)

City / Country	Electricity access — urban (%)	Improved access — urban (%)	Basic water sanitation — urban (%)	Transport notes
Nigeria (Lagos, Port Harcourt)	Urban access higher than rural; national urban access ~80% (varies by city).	Access to improved water: urban ~85% (national JMP est.).	Urban sanitation safely managed low (~20–40% depending on industrial transport needs)	Lagos: major congestion; some mass transit projects; Port Harcourt: industrial transport needs

City / Country	Electricity access — urban (%)	Improved access — urban (%)	water Basic sanitation — urban (%)	Transport notes
Egypt (Cairo)	Very high urban electricity access (near universal in urban areas).	Urban access relatively high; expansion in Cairo.	Higher sanitation coverage than sub-Saharan Africa average. (The World Bank 2008)	country and congestion metrics). (World Bank, 2023)
DRC (Kinshasa)	Urban electricity access limited; frequent outages; urban networks under strain.	Water & sanitation access in urban areas; low; informal providers common. (World Bank, 2023)		
South Africa (Johannesburg)	High urban electricity and water access (~90%+ urban) but inequality exists.	Sanitation provided in formal areas but service settlements face deficits.	largely Established road networks and commuter rail; congestion in metro area. (UN-Habitat, 2022)	
Kenya (Nairobi)	Urban electricity access high; water and sanitation variable across informal settlements.	Ongoing investments in commuter rail and BRT corridors. (World Bank, 2023)		
Tanzania (Dar es Salaam)	Urban electricity access improving but many informal initiatives	Urban water access gaps; major transport initiatives (e.g., Bus Rapid Transit) under		

City / Country	Electricity access — urban (%)	Improved access — urban (%)	water Basic sanitation — urban (%)	Transport notes
	settlements	have implementation.		
	intermittent supply.	(UN-Habitat, 2022)		
Côte d'Ivoire (Abidjan)	Urban service access moderate; infrastructure investments ongoing post-conflict.	Port and logistics hub; port infrastructure significant for economy.		
		(OECD, 2023)		
Ethiopia (Addis Ababa)	Urban electricity access improving; large investments roads/metros.	Ongoing metro and urban infrastructure public programmes.		
		(UN-in Habitat, 2022)		
Angola (Luanda)	Urban access to services variable; rapid urban growth strained services.	High concentration infrastructure backlog due to rapid growth and fiscal constraints.		
		(World Bank, 2022)		
Ghana (Accra)	Urban electricity relatively high; water and sanitation urban-rural disparities.	Bus rapid transit and mobility plans in progress.		
		(OECD, 2022)		
Morocco (Casablanca)	High urban infrastructure coverage relative to region; transport systems (tram, highways).			
		(UN-Habitat, 2022)		

City / Country	Electricity access — urban (%)	Improved access — urban (%)	water Basic sanitation — urban (%)	Transport notes
Senegal (Dakar)	Urban services improving; investments in urban transport and sanitation underway (e.g., Dakar TER). (OECD, 2023)			
Uganda (Kampala)	Urban services uneven; significant infrastructure investment needs. (World Bank, 2023)			
Mozambique (Maputo)	Urban infrastructure constrained; port and logistics functions important for national economy. (OECD, 2023)			
Tunisia (Tunis)	Relatively high urban infrastructure coverage (North Africa comparative advantage). UNDESA, 2022			
Zimbabwe (Harare)	Service delivery constraints due to fiscal/ macro instability; electricity shortages affect urban services. (World Bank, 2023)			

City / Country	Electricity access — urban (%)	Improved access — urban (%)	water Basic sanitation — urban (%)	Transport notes
Namibia (Windhoek)	Capital with relatively high service coverage for Southern Africa standards; smaller scale allows easier management but finance limits remain. UNDESA, 2022			

Notes: The table shows broad service access proxies rather than precise city-level metrics for every indicator due to variability in data availability. For comprehensive country/urban statistics, the World Bank WDI and WHO/UNICEF JMP databases are recommended and were used for national urban indicators where city-specific metrics were unavailable. (World Bank, 2023).

Comparative patterns observed

From the compiled data and literature synthesis, three overarching patterns emerge.

1. Urban growth frequently outpaces infrastructure expansion. Across many cities (e.g., Lagos, Kinshasa, Dar es Salaam, Luanda), built-up area and population have expanded faster than formal water, sanitation and electricity networks, producing large informal settlements serviced by on-demand private providers (water vendors, small-scale electricity arrangements) and weak waste management systems. This is consistent with continental findings reported by UN-Habitat and Africapolis. (UN-Habitat, 2020).

2. Significant heterogeneity across cities. Cities in North Africa (e.g., Tunis, Casablanca, Cairo) and South Africa (Johannesburg) often show higher formal infrastructure coverage and stronger institutional capacity than many cities in sub-Saharan Africa, though inequality within cities persists. Some smaller capitals (Windhoek, Tunis) achieve relatively high coverage because of scale and governance advantages, while megacities with explosive growth (Lagos, Kinshasa) show deep service gaps. OECD/Africapolis analyses and UN-Habitat reports highlight this divergence. (OECD, 2025).

3. Governance and fiscal capacity shape outcomes. Cities with clearer municipal revenue streams, stronger planning capacity and better intergovernmental coordination tend to translate urbanization into better service delivery. Where municipal finance is constrained and land

governance is weak, infrastructure deficits are greater and informalization is more pronounced. This conclusion aligns with governance-centered literatures and policy reports (World Bank, OECD, UN-Habitat). (World Bank, 2023).

5. Discussion

The results presented in Tables 1 and 2 reveal a clear structural relationship between urban scale, growth dynamics, and infrastructure performance across African cities. Table 1 shows that megacities such as Lagos (~15–21 million), Cairo (~20–23 million), and Kinshasa (~13–17 million) dominate the urban hierarchy, while smaller cities like Windhoek (~0.4–0.6 million) and Maputo (~1–2 million) operate at significantly lower population scales. When these population patterns are compared with infrastructure indicators in Table 2, a consistent trend emerges: larger and faster-growing cities tend to experience more severe infrastructure deficits, particularly in sanitation, transport, and reliable electricity provision.

For instance, despite Lagos and Kinshasa being among the largest urban agglomerations (Table 1), Table 2 shows that both cities face substantial service gaps, including low sanitation coverage and strained electricity systems. This supports the argument that rapid urban expansion without proportional infrastructure investment leads to systemic service deficits, a pattern widely documented in African urbanization literature (UN-Habitat, 2020; World Bank, 2023). In contrast, cities such as Cairo and Johannesburg, which also rank high in population size, demonstrate relatively better infrastructure outcomes due to stronger institutional capacity and sustained investment (UN-Habitat, 2022).

This comparison highlights that city size alone does not determine infrastructure outcomes; rather, the interaction between growth rate and governance capacity is critical. This aligns with findings by Gollin et al. (2016), who argue that urbanization without corresponding structural and infrastructural transformation limits development outcomes.

The combined evidence from Tables 1 and 2 reinforces the strong regional and city-level heterogeneity emphasized in the literature. North African cities such as Cairo, Casablanca, and Tunis show consistently higher levels of electricity, water, and sanitation access (Table 2), despite having large populations (Table 1). This reflects long-term investments in urban infrastructure and relatively stronger governance systems (World Bank, 2008; UN-Habitat, 2022).

Conversely, many Sub-Saharan African cities—including Kinshasa, Dar es Salaam, and Luanda—combine rapid population growth (Table 1) with incomplete infrastructure systems (Table 2). For example, Dar es Salaam's population (~6–7 million) is expanding rapidly, yet Table 2 indicates persistent gaps in water access and reliance on emerging transport systems such as BRT, reflecting transitional infrastructure development. Similarly, Kinshasa exhibits both high population growth and weak service provision, with limited electricity access and heavy reliance on informal systems (World Bank, 2023).

These results are consistent with OECD (2025) and Africapolis analyses, which emphasize that African urbanization is not uniform but highly differentiated, shaped by colonial legacies, economic structures, and governance capacity. The data also confirm that smaller cities (e.g., Windhoek, Tunis) can achieve relatively higher service coverage due to more manageable population sizes and administrative efficiency, supporting arguments in comparative urban studies (OECD, 2020).

Table 2 highlights that in cities where infrastructure provision lags behind population growth (as shown in Table 1), informal systems become dominant mechanisms of service delivery. In Lagos, Nairobi, and Kinshasa, the limited reach of formal water, sanitation, and electricity networks has led to widespread dependence on informal providers, including water vendors, diesel generators, and paratransit systems.

While these informal systems play a crucial role in filling service gaps, they often operate at higher costs and lower efficiency, reinforcing urban inequality. This observation aligns with WHO & UNICEF (2023), which note that informal provision is both a coping mechanism and a symptom of systemic infrastructure failure. The data in Table 2—particularly low sanitation coverage and inconsistent electricity supply—provide empirical support for this duality.

Furthermore, the persistence of informality reflects institutional and planning limitations, as cities struggle to extend formal networks at the pace required by rapid urban expansion. This supports Fox's (2014) political economy perspective that informal settlements and services are deeply embedded in governance and fiscal constraints.

A key insight emerging from the comparison of Tables 1 and 2 is that governance and fiscal capacity mediate the relationship between urban growth and infrastructure outcomes. Cities such as Johannesburg and Casablanca demonstrate that high population levels do not necessarily lead to service deficits when supported by strong municipal systems, stable revenue bases, and effective planning (UN-Habitat, 2022).

In contrast, cities like Luanda and Harare illustrate how fiscal instability and weak institutional coordination constrain infrastructure development despite significant urban demand. Table 2 shows that these cities face electricity shortages, service interruptions, and infrastructure backlogs, reflecting broader macroeconomic and governance challenges (World Bank, 2023).

This finding is consistent with the governance-centered literature, which emphasizes that urban outcomes depend less on urbanization itself and more on the capacity of institutions to manage it (OECD, 2025; World Bank, 2023). The variation observed across cities in Table 2 therefore underscores the importance of municipal finance, intergovernmental transfers, and planning systems in shaping development trajectories.

Transport indicators in Table 2 further illustrate how infrastructure shapes urban functionality. Cities such as Cairo, Addis Ababa, and Dakar have invested in mass transit systems (metro, light

rail, BRT), improving mobility and economic integration. In contrast, Lagos and Nairobi continue to experience severe congestion and fragmented transport systems, despite ongoing reforms.

When interpreted alongside population data in Table 1, this suggests that transport infrastructure is particularly sensitive to rapid urban expansion, often lagging behind spatial growth. The result is increased commuting times, reduced productivity, and spatial inequality, especially affecting peripheral and informal settlements (UN-Habitat, 2020).

These findings reinforce the argument that transport investment is central to realizing agglomeration economies, as emphasized in urban economic theory and World Bank reports (World Bank, 2022).

Overall, the evidence from Tables 1 and 2 supports the central proposition of this study: urbanization in Africa produces divergent development outcomes depending on infrastructure provision and governance capacity. Cities with relatively strong infrastructure systems (e.g., Casablanca, Johannesburg, Cairo) are better positioned to harness the benefits of urbanization—such as productivity gains and improved living standards—while those with significant infrastructure deficits (e.g., Kinshasa, Lagos, Luanda) face compounded challenges of poverty, inequality, and environmental risk.

This conclusion aligns with UN-Habitat (2020) and World Bank (2023), which emphasize that infrastructure is the critical mediator between urban growth and development outcomes. Without adequate investment and governance, rapid urbanization risks reinforcing deprivation rather than generating inclusive growth.

6. Policy implications and recommendations

Based on the comparative synthesis, this paper advances concrete recommendations structured for policy-makers, municipal administrators, donors and private sector infrastructure providers.

- a. Governments should adopt **data-driven and spatially targeted infrastructure planning**, prioritizing rapidly expanding urban corridors where service deficits are most acute. Integrating geospatial tools (e.g., Africapolis data) with population projections can enhance efficiency, reduce infrastructure gaps, and improve long-term urban productivity (OECD, 2023).
- b. Urban authorities require **sustainable and diversified revenue systems** to support large-scale infrastructure development. This includes reforming intergovernmental fiscal transfers, expanding municipal revenue bases, and leveraging innovative financing mechanisms such as **municipal bonds, public–private partnerships, and land value capture** (World Bank, 2023).

- c. Given their critical role in bridging service gaps, **informal providers should be incorporated into urban service frameworks** through regulation, standardization, and targeted support. This approach can improve service quality and affordability while facilitating gradual expansion of formal infrastructure networks (WHO & UNICEF, 2023).
- d. Urban infrastructure planning must incorporate **climate adaptation and resilience measures**, particularly in flood-prone and coastal cities. Investments in drainage systems, resilient transport networks, and climate-proof housing are essential to reduce vulnerability and ensure sustainable urban development (UN-Habitat, 2020).
- e. Infrastructure development should be coordinated with **housing, land-use, and social service policies** to prevent spatial inequality and informal settlement expansion. Inclusive planning frameworks can enhance access to services while supporting equitable urban growth.
- f. African cities can benefit from **knowledge-sharing platforms and policy transfer**, drawing lessons from successful initiatives such as metro systems, BRT networks, and urban governance reforms. However, such models must be **adapted to local institutional and fiscal contexts** to ensure effectiveness.

7. Limitations and directions for future research

This study synthesizes secondary published data and acknowledges limitations: (1) city-level service coverage metrics are uneven; where city-level data were unavailable, national urban proxies were used — this constrains micro-level inferences; (2) time lags in data sources and definitional differences across datasets (city proper vs agglomeration) mean some city estimates have ranges rather than precise point values; (3) the study emphasizes infrastructure and governance but does not include primary household-level survey data which would enrich analysis of lived experiences.

Future research should (a) mobilize fine-grained city datasets (household surveys, geospatial infrastructure maps), (b) analyze causal pathways linking specific infrastructure investments to economic outcomes in selected cities using quasi-experimental designs, and (c) evaluate the impacts of municipal fiscal reforms and PPPs on service outcomes.

8. Conclusion

Africa's urban transition presents a pivotal opportunity for developmental transformation — but realizing the development dividend depends crucially on infrastructure provisioning, governance,

and strategic financing. The comparative synthesis across 18 major African cities reveals that while some cities show stronger capacity to deliver services and capture economic gains, many fast-growing urban agglomerations face infrastructure backlogs that threaten inclusive outcomes. Policy efforts should therefore combine data-driven spatial planning, municipal fiscal strengthening, pragmatic engagement with informal service systems, and resilience investments to ensure that rapid urbanization translates into equitable economic and human development.

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Appendix A — Additional data notes

- **Data caveat:** City population estimates are drawn from UN WUP and public consolidations ((United Nations Department of Economic and Social Affairs [UNDESA], 2022), Africapolis). Exact population figures differ by source and by agglomeration vs city-proper definitions; the ranges included in Table 1 reflect this. UNDESA, 2022
- **Indicator sourcing:** Electricity, water and sanitation indicators are principally from World Bank WDI and WHO/UNICEF JMP urban statistics; where city-level data were lacking, national urban averages were used and explicitly noted. (World Bank, 2023).