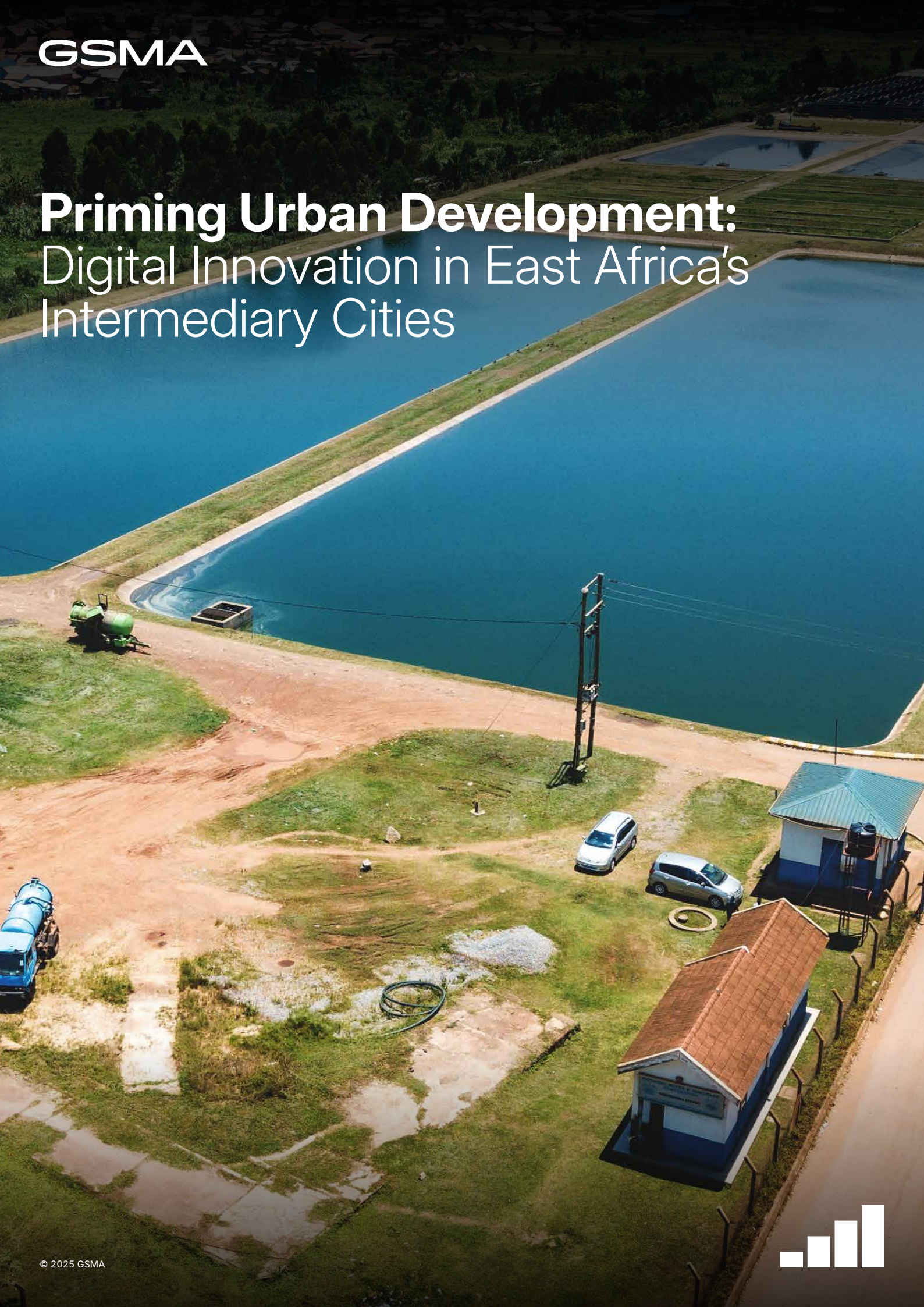
GSMA

Priming Urban Development: Digital Innovation in East Africa's Intermediary Cities



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Foreword

On behalf of the Government of Rwanda, I would like to extend sincere gratitude to GSMA in collaboration with UN-Habitat and the Connected Places Catapult for the completion of this report. This a true testament of the results that multi-disciplinary collaborations can lead to, especially in the advancement of sustainable urban development in the 21st century.

From the year 2000, Rwanda identified technology as a key lever to rebuilding our economy, and later re-calibrated to both technology and innovation, to enable us attain accelerated socio-economic development. This is displayed in our Smart Rwanda Master Plan, among others, that aims to position Rwanda as an Innovation and Proof of Concept Hub on the continent, and consequently transition the country into a high-income economy by 2050.

These ambitions require regular pulse checks to assess progress vis-à-vis our goals, and ensure that we are making evidence-based decisions along our journey. Our intention in conducting this research, particularly across three of our intermediary/ secondary cities - namely Rubavu, Musanze, and Bugesera - was to carry out that pulse check, and identify their readiness for digital innovations, or lack thereof, as these cities are critical pillars to Rwanda's economy and catalysts for balanced urbanization and regional trade.

This report comes at the cusp of our transition from the First National Strategy Transformation (NST1) to the Second (NST2), geared towards our Vision 2050 goals for sustainable economic growth and high quality of life for all citizens. Through NST1 we built the foundations of a competitive, inclusive, and green economy that we aim to scale and enhance in NST2.

For Rwanda, platforms such as Irembo have been a significant step towards enhancing public service delivery and improving government efficiencies. And initiatives such as the Hanga Hubs are enabling us to nurture the next generation of entrepreneurs across our secondary cities, a deliberate move to expand urban innovations beyond Kigali and bring innovation opportunities closer to the people. However, as this report reveals, despite our various efforts there still remains much work to do, to level the playing field and maneuver the complexity of intermediary cities, especially not as stand-alone structures but rather as pieces of a larger network of factors that build the economic resilience of nations.

The cities assessed also have diverse strengths or economic focuses: trade, tourism, urban mobility, agriculture, industrialization, or education. Which provide a wealth of lessons to be shared amongst cities, and an opportunity for continued inter and intra-city collaborations across the region. This affirms the assumption that multi-stakeholder partnerships are critical in the development of digitally innovative intermediary cities.

The report offers practical recommendations to assist in the attainment of sustainable digital transformations in intermediary cities such as the need to enhance: modern infrastructures, innovative financing models, digital skills programs, and strengthening private sector collaboration to unlock the myriad opportunities that they have to offer. But most importantly, to promote human-centric designs, by including city residents in development efforts if we are to achieve socio-economic transformation.

It is my hope that these recommendations will inspire stakeholders across East Africa and beyond to join us in shaping the future of intermediary cities, where digital innovation serves as the cornerstone of prosperity for generations to come.

Eraste Rurangwa

Permanent Secretary
Ministry of ICT and Innovation, Rwanda.



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Abbreviations

AfCFTA	Africa Continental Free Trade Agreement
AfDB	African Development Bank
AI	Artificial intelligence
APIs	Application programming interfaces
ARPU	Average revenue per user
B2B	Business-to-business
DESA	UN Department of Economic and Social Affairs
DRC	Democratic Republic of the Congo
EAC	East African Community
EVs	Electric vehicles
GIS	Geographic information systems
IoT	Internet of Things
IRAS	Integrated Revenue Administration System
ISPs	Internet service providers
KES	Kenyan Shilling
KIC	Kigali Innovation City
LMICs	Low- and middle-income countries
MNOs	Mobile network operators
MoUs	Memoranda of Understanding
MSMEs	Micro, small and medium enterprises
NBI	National Backbone Infrastructure
OCA	Open Capital
PAPSS	Pan-African Payments and Settlement System
PAYG	Pay-as-you-go
PPA	Power purchase agreement
PPP	Public-private partnership
R&D	Research and development
RWF	Rwandan Franc
SEZ	Special Economic Zone
SUED	Sustainable Urban Economic Development
TIV	The innovation Village
UGX	Ugandan Shilling
USD	United States Dollar
USMID	Uganda Support to Municipal Infrastructure Development
VC	Venture Capital
WASH	Water, sanitation and hygiene
WEEE	Waste electrical and electronic equipment

Executive summary

By 2050, one in four people globally will live in African countries, with 80% of the growth in the African population taking place in cities. The next global wave of urbanisation is an African story. Of the 50 fastest growing cities 2010-2030, 36 are African, and 31 of those African cities are intermediary cities of under one million people. With a median age of 19 years, Africa's young and aspirational generation are looking to cities as centres of opportunity.

While megacities often dominate policy, as of 2020 54% of Africa's urban residents live in intermediary cities of under one million people. In African countries, "urban primacy" – the proportion of the urban population living in the largest city – is generally much higher than in other parts of the world. The result is enormous pressure from a few large cities while many more small cities struggle to attract policy attention and investment.

Cities are engines of productivity, but their potential can only be realised when people have the essential services needed to thrive: housing, water, energy, waste management and transport. When less than half of urban residents have access to basic services, higher levels of urban primacy have been shown to reduce GDP growth. With more than half of the urban population in African countries living in informal settlements, the challenge is clear.

As in capital and primary cities, digital solutions offer intermediary cities a pathway to extend essential services, build effective governance and support broad-based economic development. Mobile money is driving a wave of financial inclusion on the continent, with 1.1 billion registered accounts and $1.1 trillion circulating in Sub-Saharan Africa's mobile money ecosystem. Beyond financial inclusion, digital solutions such as Internet of Things (IoT) applications, artificial intelligence (AI), geographic information systems (GIS) and big data are playing a vital role in extending the essential services on which thriving cities are built.

This report takes stock of the trends shaping the adoption of digital innovation in intermediary cities. It synthesises findings from a review of digital adoption in intermediary cities in Kenya, Rwanda and Uganda, evaluating the unique dynamics in each country that both enable and constrain adoption. Three case study cities were selected from each country to ground the findings and provide a range of contexts. The research is based on more than 100 interviews, drawing on insights from national ministries and agencies, municipal authorities, utility service providers, private sector innovators, mobile network operators (MNOs), donors, startup support organisations and academic institutions.

Digital innovation in intermediary cities

Intermediary cities face a more challenging policy environment than their larger counterparts. With a more limited tax base and different forms of governance than large cities, their policy autonomy and fiscal freedom is often limited. While in recent years there has been a clearer and explicit policy focus on supporting intermediary cities, the same core constraints continue to inhibit their potential roles in national urbanisation strategies.

Innovation ecosystems in Kenya, Rwanda and Uganda are thriving but remain concentrated in capital cities. The flagship investments of Konza Technopolis in Kenya and Kigali Innovation City (KIC) in Rwanda are two prime examples of large government investments in public private partnerships aimed at creating national innovation hubs. While a degree of centralisation is common, and to an extent desirable, for access to people,

finance and tools, more attention needs to be given to intermediary cities for startups looking to scale nationally and to ensure there are sufficient linkages between national hubs and talent and innovators from intermediary cities.

Scaling up digital innovation requires links to intermediary cities, and there are risks to unbalanced investment in urban development and innovation. While the agglomeration benefits of clustering startups in national hubs are harder to replicate in smaller cities, decentralising investment in innovation is essential, as it provides talented startups that lack the means to relocate with access to support, and creates more fertile ground for municipalities, businesses and residents to adopt innovation. The different economic profiles of intermediary cities offer opportunities for investment beyond building an ecosystem for startup incubation and funding.

Key opportunities for digital innovation

The main opportunities for digital innovation in intermediary cities can be found in the ventures already operating in Africa and the underlying funding trends. Between 2019 and 2024, fintechs in Africa raised $8.8 billion in funding, making it the single biggest tech sector funded with just under half of all funding to digital ventures. Climate Tech solutions raised a combined total of $4.3 billion, making it the second largest sector and accounting for just under a quarter of all funding to tech startups in Africa. Energy, and decentralised energy in particular, represented the largest share of this funding.

Climate Tech solutions and companies are building the foundations for liveable cities. Energy access represents one of the biggest bottlenecks for cities and their digital development. Where thriving, the off-grid and productive use sectors have been critical to driving energy access and enabling small business growth in this study's three focus markets. In Uganda, off-grid sources provide the majority of energy access, while in Rwanda just under a third of access is off-grid and more solar units have been sold in Kenya than anywhere else on the continent.

Kenya, Rwanda and Uganda are rapidly positioning themselves as continental leaders in e-mobility by combining ambitious policy targets with active private-sector participation. Rwanda has pioneered a supportive regulatory framework, including tax exemptions on electric vehicles and charging equipment. Intermediary cities like Kisumu in Kenya and Gulu and Mbarara in Uganda are fast becoming proving grounds for e-mobility innovation, offering conditions that are nimble enough for experimentation yet large and connected enough to demonstrate market viability. These cities sit at a sweet spot between the complexity of national capitals and the small-scale limitations of rural areas, making them ideal for testing context-specific technology and business models.

A key opportunity for strengthening local fiscal autonomy and governance is the digitalisation of government services. Particularly important are digitalisation initiatives that support local revenue collection. Digitalising tax collection, particularly property, business rates and trade-related taxes provides a route to greater municipal fiscal autonomy. National e-government programmes also offer important opportunities to build digital skills within municipalities.

Pathways to supporting digital innovation

Political and administrative leaders play a decisive role in either enabling or stalling digital innovation. In intermediary cities, heavy central oversight,

fragmented mandates and weak fiscal autonomy mean that even promising solutions can struggle to scale. However, digital innovation can be supported by creating clearer lines of authority, granting budgetary control and aligning city priorities with national strategies. Where city leadership has been engaged early and equipped with resources, innovation pilots have generated political goodwill and outside investment. Greater decentralisation, paired with performance-linked transfers, can transform cities from passive implementers into proactive adopters of digital innovation.

Low levels of digital literacy and last-mile inclusion hinder both service uptake and innovation development in intermediary cities. While curriculum reforms and expanded university offerings have increased technical skills, gaps persist. Strengthening local capacity requires investment in both specialist training for government and business staff, as well as basic skills for urban residents, often delivered through peer learning, mobile services and innovation hubs. Embedding digital competency more widely enables cities to adopt new tools effectively and fosters inclusive participation in innovation.

Digital adoption depends on reliable and affordable infrastructure and digital systems. In many intermediary cities, limited broadband, intermittent electricity and inadequate transport networks restrict the reach of innovations. National investments have extended fibre and grid connections, but gaps remain. Mobile networks are the primary way urban residents access digital tools as coverage is generally high in intermediary cities, but addressing handset affordability and gender and usage gaps is critical to widespread digital adoption.

For many intermediary cities, supporting the adoption of digital innovation requires blending public, private and philanthropic capital effectively. Development and multilateral finance are an important source of funding for large-scale infrastructure, but the extent to which these larger investments are designed to accommodate digital innovation can enable or block adoption. Public funding is central to de-risking companies operating nationally from working in intermediary cities. For startups already based in intermediary cities, there needs to be a focus on mechanisms for deploying smaller ticket sizes and access to finance for working capital. Sector or site-specific national funds are one clear way to channel smaller amounts of capital.

To build sustainable innovation ecosystems in intermediary cities, several conditions must be met. Innovations at various stages of development, both experimental and validated, must be present to showcase the dynamism of the environment. Entrepreneurs must have the resources necessary to advance from the ideation to the pilot stage, and the public and private sector need to collaborate effectively to provide pathways to scale. Intermediary cities can create the innovation ecosystems necessary to address their most pressing service gaps by creating unique incentives to draw capital city-oriented startups to smaller locales, by developing a conducive environment for entrepreneurial support organisations and by piloting unique partnership frameworks.



1
Introduction



By 2050, nearly seven in 10 people will live in cities.[1] Centres of economic activity, cities account for the majority of GDP and tax receipts in most countries. As of 2018, the world's largest 3,000 cities accounted for 67% of global GDP.[2] The World Bank estimates that the total urban share of GDP may be as high as 80%.[3] Urban primacy – the share of population or GDP of a country's largest city – is a measure of this concentration in an economy and is markedly higher in African countries. While urbanisation has historically been associated with higher wages and living standards, more recent research has shown that the economic benefits of agglomeration are only realised when cities provide a foundation for populations to thrive. When fewer than half of urban residents have access to basic services, higher levels of urban primacy have been shown to reduce GDP growth.[4,5] With more than half of Africa's urban population living in informal settlements, the challenge of extending these basic services is a major bottleneck to growth.[6]

By 2050, one in four people will live in African countries, up from just under one in five today.[7] The continent's population is both the youngest and fastest growing in the world. With a median age of 19 years, young people are looking to cities as centres of opportunity. In African economies, a 10% increase in density is associated with an increase in productivity (as measured by wages) of 1.7%, compared to just 0.4% in the United States and 0.3% in France.[8] However, the research identifying this wage growth also highlights that these wage gains are largely offset by the costs of living in African cities. This is due to the decoupling of urbanisation and economic growth that has been observed – described as "urbanisation without growth" or "premature urbanisation".[9,10]

Many African cities are also urbanising at lower levels of density, leading to urban sprawl. The capital expenditure required to provide basic infrastructure, such as water pipes or sewer networks, is sensitive to the density at which urbanisation occurs and the degree to which expansions are planned.[11] Meanwhile, many fast-growing African cities face a complex set of fiscal challenges – linked to higher levels of informality and intergovernmental fiscal relationships - and lack the tax base to invest in essential infrastructure.[12] Realising the promised benefits of urbanisation requires building inclusive cities that sustain its residents. In the pursuit of more balanced urban development, cities are faced with the twin challenge of needing to urbanise with growth while also contending with the impacts of climate change.

> *Cities are both victims of climate change and among its worst perpetrators: not only are they disproportionately exposed to its impacts, but they are also responsible for generating a large share of global emissions.*
>
> UN-Habitat World Cities Report 2024

1. UN DESA. (2018). World Urbanization Prospects: The Revision. *Report*.
2. McKinsey Global Institute. (2018). Superstars': The dynamics of firms, sectors, and cities leading the global economy. *Report*.
3. World Bank. (n.d.). Urban Development. *Webpage*.
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9. Glaeser, E. (2014). A World of Cities: The Causes and Consequences of Urbanization in Poorer Countries. *Journal of the European Economic Association*.
10. World Resources Institute. (2020). World Resources Report. *Report*.
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12. UN-Habitat. (2018). The State of African Cities 2018: The geography of African investment. *Report*.

Intermediary cities – often also referred to as secondary cities – are set to play a vital role in African urbanisation. Generally defined as cities with populations between 100,000 and 1 million, intermediary cities host one-third of the world's population.[13] According to United Nations data, 44 of the world's 50 fastest-growing cities between 2010 and 2030 are intermediary cities, and 36 of those cities are African (see Figure 1).[14] There are an estimated 710 intermediary cities on the continent where more than 180 million people live. By 2050, these numbers are expected to rise to more than 1,150 intermediary cities and 310 million people.[15] Many of these intermediary cities are set to grow beyond a million people, with Africa expected to have 159 urban agglomerations of more than 1 million inhabitants by 2050, roughly double the current number.[16]

While megacities and large informal settlements often dominate the spotlight, as of 2020, 54% of Africa's urban residents live in cities of less than 1 million people.[17] Between 2000 and 2020, just one capital city – Abuja – was among the 20 fastest-growing cities in Africa.[18] In low- and middle-income countries (LMICs), intermediary cities play an outsized role as connection points between rural areas and metropolitan centres, providing access to services and facilities. Intermediary cities are often regional centres of government and education, hubs for logistics supply chains, bases for agricultural aggregation and processing, destinations for recreation and tourism and cores of manufacturing and industry. Some are regional centres of economic activity and governance, like Bunia, Kananga and Mbuyi-Mayi in the Democratic Republic of the Congo (DRC) and Port Harcourt in Nigeria.[19] Others are satellite towns located on the edges of larger cities. For example, Ruiru, situated on the outskirts of Nairobi, ranks among Africa's fastest-growing cities. Gwagwalada, a satellite town for Nigeria's capital, Abuja, is also expanding rapidly.[20]

As in capital and primary cities, digital solutions provide important pathways for intermediary cities to strengthen basic services, build effective governance and support broad-based economic development. Mobile money is driving a wave of financial inclusion on the continent, with 1.1 billion registered accounts and $1.1 trillion circulating in Sub-Saharan Africa's mobile money ecosystem.[21] Beyond financial inclusion, digital solutions such as Internet of Things (IoT) applications, artificial intelligence (AI), geographic information systems (GIS) and big data are playing a vital role in extending the essential services – water, energy, sanitation, waste management and transport – on which thriving cities are built.

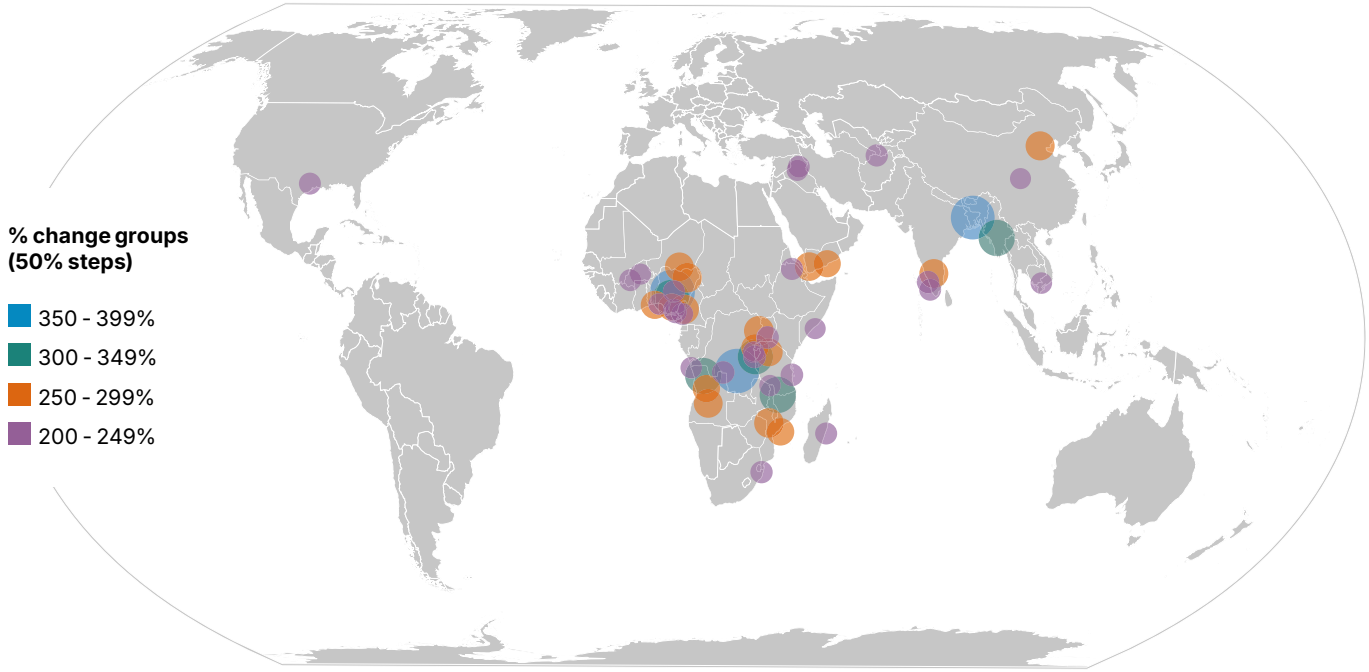
This report takes stock of the trends shaping the adoption of digital innovation in intermediary cities. It synthesises findings from a review of digital adoption in intermediary cities in Kenya, Rwanda and Uganda, evaluating the unique dynamics in each country that both enable and constrain adoption. Three case study cities were selected from each country to ground the findings and provide a range of contexts. The research is based on more than 100 interviews conducted in nine case study cities with national ministries and agencies, municipal authorities, utility service providers, private sector innovators, mobile network operators (MNOs), donors, startup support organisations and academic institutions. The report is structured as follows:

- The remainder of Chapter 1 outlines the role of intermediary cities in the three focus countries, details the policy landscape governing the adoption of digital innovation in cities and provides details of the case study cities.
- Chapter 2 discusses key areas in which digital innovation can support urban development and the building blocks for adoption in intermediary cities.
- Chapter 3 outlines pathways for supporting the adoption of digital innovation.

13. GSMA. (2023). The challenge of service provision in intermediary cities: In search of solutions. *Blog*.
14. Authors analysis of File 22 of UN DESA World Urbanization Prospects data
15. OECD. (2025). Africa's Urbanisation Dynamics 2025 Planning for Urban Expansion. *Report*.
16. Ibid.
17. Ibid.
18. The Economist. (2023). The growth of Africa's towns and small cities is transforming the continent. *Media*.
19. GSMA. (2019). Digital Solutions for the Urban Poor. *Report*.
20. Asterisk Magazine. (2025). Yes In My Bamako Yard. *Blog*.
21. GSMA. (2025). State of the Industry Report on Mobile Money. *Report*.

Figure 1

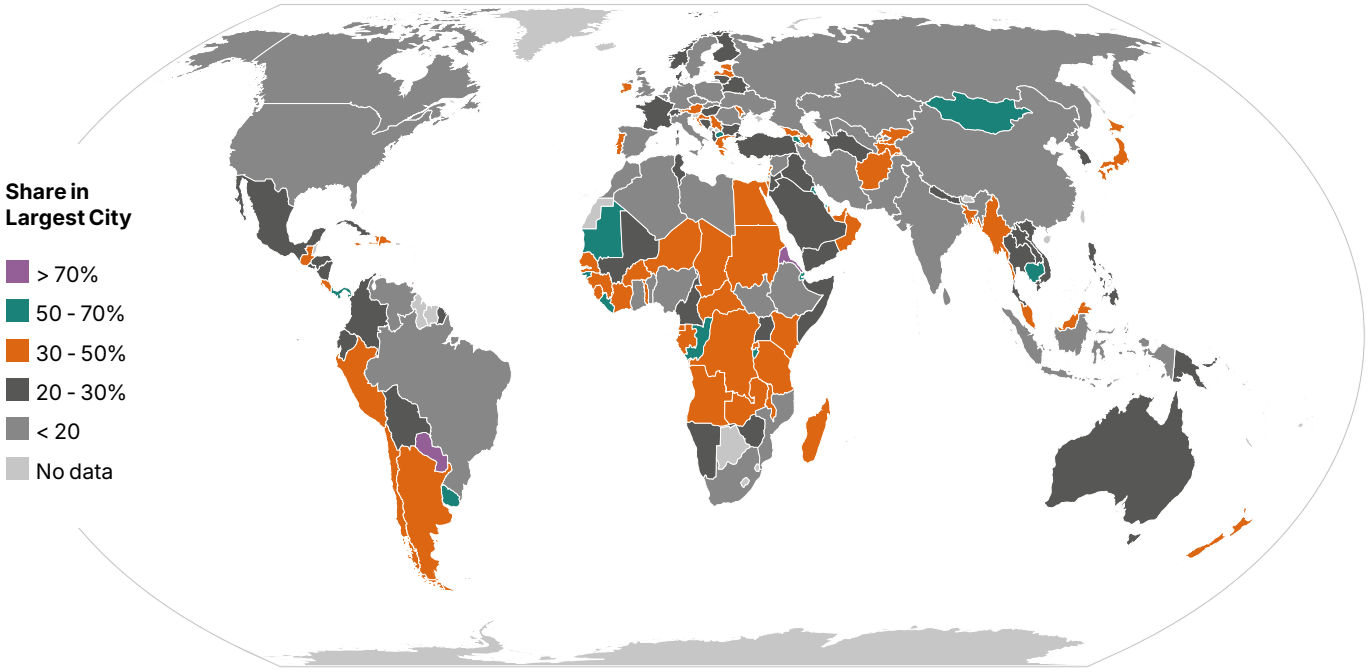
The world's 50 fastest-growing cities, 2010–2030



Source: Author's analysis of UN Department of Economic and Social Affairs (DESA) data

Figure 2

Share of urban population in the largest city



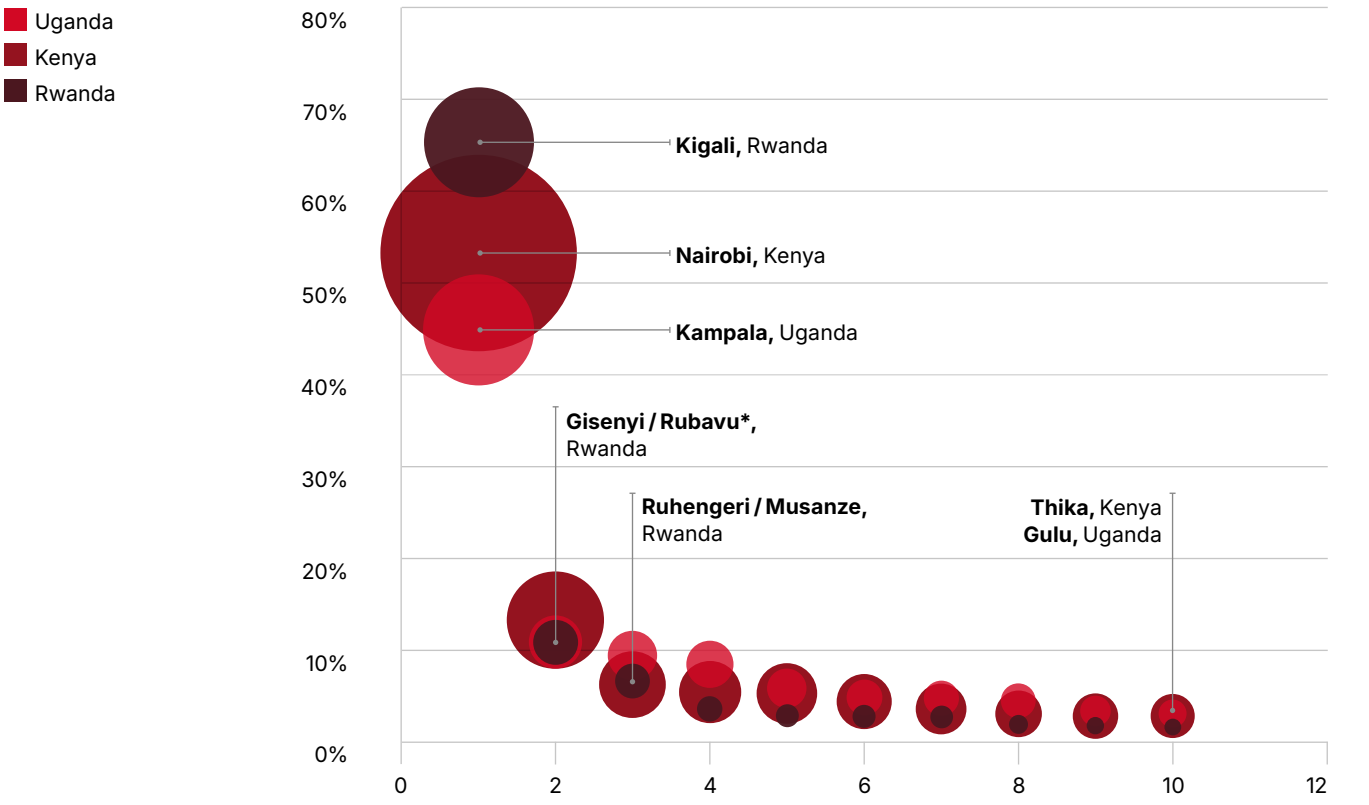
Source: UN DESA World Urbanisation Prospects, accessed via World Bank databank

1.1 Focus countries and cities

Despite their vital role in national economies, intermediary cities have historically received less funding and policy attention than capital cities, and face a set of unique challenges. The roots of this imbalance can be found in colonial-era investments in coastal cities that facilitated extraction and exports –many African countries with access to the sea have coastal capitals.[22] This is reflected in changing urbanisation trends, with 81% of urban growth set to take place in interior rather than coastal cities.[23] All three focus countries have a high degree of urban primacy. According to World Bank data 33% of Kenya's urban population are in Nairobi, 50% of Rwanda's in Kigali, and 30% of Uganda's in Kampala. Figure 3 shows how the population of the 10 largest cities in these countries is divided and the gap between capitals and the nine next largest cities. While large drops in population can be expected,[24] the difference in African countries is generally greater than other parts of the world, and is a trend in many countries on the continent.[25]

Figure 3

Share of population in the 10 largest cities of Kenya, Rwanda and Uganda



Source: Census of Kenya (2019), Rwanda (2022), and Uganda (2024)

*Note: City and district

22. Ricart-Huguet, J. (2021). The Origins of Colonial Investments in Former British and French Africa. *Blog*.
23. OECD. (2025). Africa's Urbanisation Dynamics 2025 Planning for Urban Expansion. *Report*.
24. Arshad, S. et al. (2018). Zipf's law and city size distribution: A survey of the literature and future research agenda. *Physica A: Statistical Mechanics and its Applications*.
25. AfDB. (2022). The Dynamics of Systems of Secondary Cities in Africa: Urbanization, Migration, and Development. *Report*.

Today, many intermediary cities face challenges that include financial reliance on inconsistent central government transfers, a limited tax base, difficultly attracting and retaining talent and weak local governance. Also, because many of Africa's intermediary cities are located inland and because they often have weak institutional capacity, limited data and visible opportunities, limited infrastructure and high levels of informal and under-employment, they often fail to attract the same kinds of investments as larger capital cities. Despite hosting a significant percentage of the continent's urban population, intermediary cities receive only a fraction of national infrastructure budgets.[26] This, in turn, makes it more difficult for them to serve residents and adopt innovative solutions to meet basic needs.

Intergovernmental fiscal relationships are critical to investment in intermediary cities, with municipalities often constrained. On one hand, the dominance of informal economies makes it difficult to track and ensure equitable tax compliance locally, as many economic activities operate outside formal regulatory frameworks. On the other hand, a significant number of residents do pay taxes – often through indirect channels or national-level systems. A core issue for intermediary cities lies in the disconnect between tax collection and local service delivery. National governments, which typically collect these revenues, often fail to reinvest them adequately into urban infrastructure and public services. Meanwhile low levels of municipal collections undermine city-level debt servicing capacity.[27] Strengthening municipal finance is critical to building inclusive, resilient cities. Particularly through localised, digitalised tax systems that empower city governments to directly collect and manage revenues.

To address these challenges, national and city governments have been prioritising programmes and investments that foster innovative public service delivery. As intermediary cities grow, they will continue to be important tourism, cultural and economic hubs. Strategic urban planning, intentional resource allocation, good governance and accessible innovation will be crucial to ensuring that intermediary cities, particularly in East Africa, can provide robust livelihoods, thriving communities and a healthy quality of life for their residents. To differentiate the continent's intermediary cities, the African Development Bank (AfDB) uses spatial categorisations.[28] While these categorisations are not mutually exclusive, they provide a broad framework for characterising key differences (see Figure 4).

Among the challenges lie opportunities. Substantial service and infrastructure gaps in East Africa's intermediary cities make them fertile ground for market-creating innovations. Mid-sized cities are often manageable enough to pilot solutions without the constraints and scale of larger metropolitan areas, while also having unique comparative advantages due to their strategic location and historical development. Intermediary cities also tend to be more representative of the national population than capital cities and have stronger connections to nearby rural settlements, which offer lessons that can be applied to markets outside urban centres. For example, as part of a $800 million project to develop Uganda's e-mobility sector, Kiira Motors Corporation chose to pilot public e-buses in the intermediary city of Jinja, rather than the capital Kampala. Jinja was selected as it was more representative of cities across the country and because of the availability of land in the Jinja Industrial Park, which allowed for end-to-end vehicle production.[29,30] Similarly, in Kenya, the Sustainable Urban Economic Development (SUED) programme worked in 12 municipalities to develop urban economic plans for cities based on their key challenges and comparative strengths. The programme claims this has catalysed about $85 million (KES 11.1 billion) in investment, including to support urban drainage in Isiolo and agricultural processing in Malindi.[31]

26. Ibid.
27. OECD/UN-Habitat. (2022). Intermediary Cities and Climate Change: An Opportunity for Sustainable Development. *Report*.
28. AfDB. (2022). The Dynamics of Systems of Secondary Cities in Africa: Urbanization, Migration, and Development. *Report*.
29. Uganda Radio Network. (2024). Uganda's Public Transport to be Fully Electrified by 2030. *Media*.
30. Bloomberg. (2018), Uganda backs Electric Vehicle Project it says can lead continent. *Media*.
31. SUED. (2021). Case Study: Effective Management of Storm Water in Urban Spaces. *Report*.

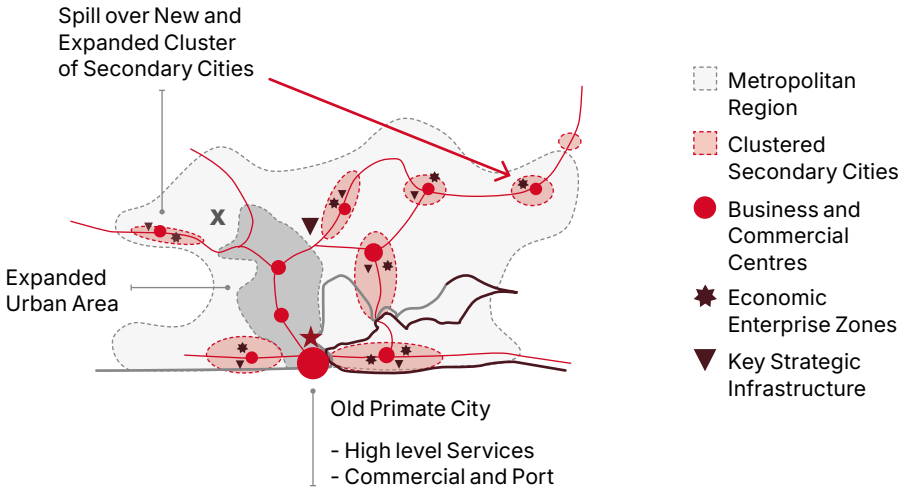
Figure 4

Spatial typologies of secondary cities in Africa

METROPOLITAN CLUSTERS

Intermediary cities that are on the periphery of larger urban areas

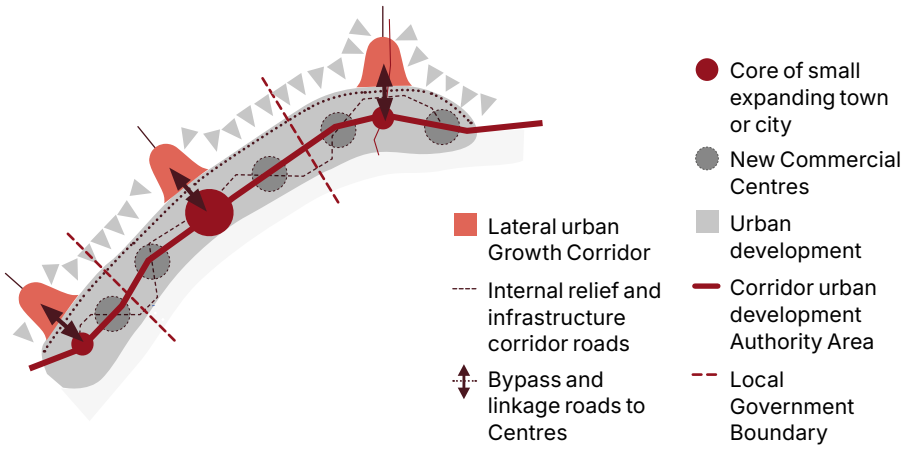
These cities are often interdependent industrial or satellite cities within a 100-kilometre radius of a larger metropolitan area. For example, Bugesera, a satellite city that will host Rwanda's new international airport, is located approximately 40 kilometres outside of Kigali. Thika, a fast-growing industrial city in Kenya, is the same distance from Nairobi. Both serve as valuable economic hubs and release valves for the sprawl of their larger metropolitan neighbours.



CORRIDOR CITIES

Linear urban grouping of communities along a key highway or coastal route

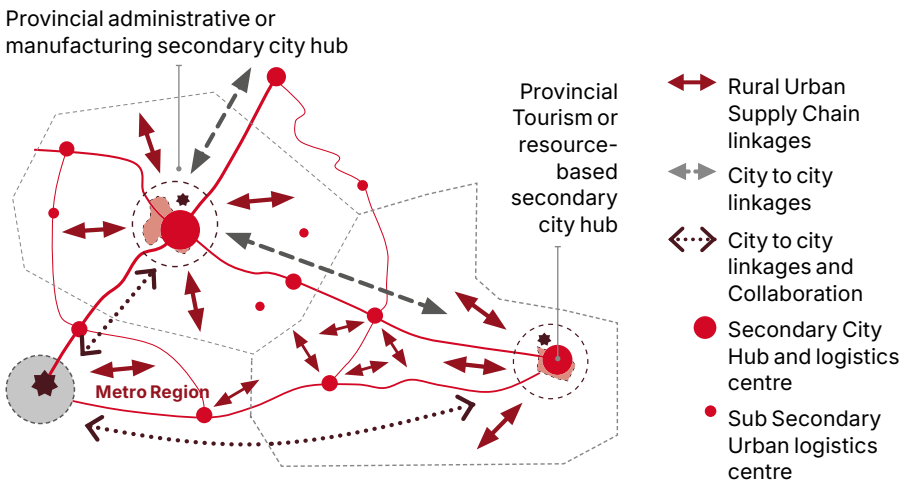
Having grown along primary trade routes, cities such as Isiolo in Kenya, situated as a key trade hub along the Lamu Port-South Sudan-Ethiopia Transport Corridor, and Mbarara in Uganda, which serves as a primary transport hub for goods moving between Uganda and Rwanda, play a key role in the transport and logistics of many goods moving in and out of their respective countries.



REGIONAL CITIES

Provincial centres that play role in supporting key national economic sectors through manufacturing, industrial, extraction, or port activities.

They primarily serve as military, transportation, tourism, religion, or education-based centres. Uganda's Hoima, for example, is bolstered by the discovery of oil and its position along the East African Crude Oil Pipeline, while Rwanda's Rubavu, situated along Lake Kivu, provides both port-based and tourism economic contributions.

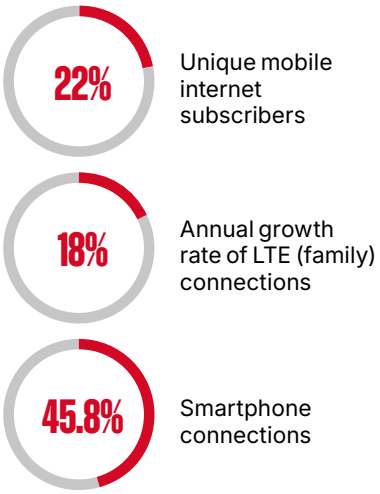


Source: AfDB. (2022). The dynamics of systems of secondary cities in Africa: urbanisation, migration and development.



Figure 5

Case study city profiles





Uganda

HOIMA

REGIONAL HUB

With the discovery of 6.5 billion barrels of oil in 2006, Hoima rapidly transformed from a town to a city. While agriculture employs 63% of workers, non-farm activities - including merchandising, market vending and healthcare - are becoming more important.[32] Under construction, the Kabalega International Airport is a new transit hub expected to facilitate business and workforce mobility in the oil and tourism sectors. While oil discoveries have driven rapid transformation, there are growing concerns about over-dependence on the sector and exposure to Dutch disease risks that may crowd out other forms of growth.

GULU

REGIONAL HUB

With 43% of licensed businesses involved in trade, Gulu is leveraging its strategic position as a trade and transit hub, following mass conflicts in and around city in the 1990s to mid-2000s.[33] In recent years, the city has seen major investments in the road network and water and sanitation systems. In the 2024–2025 financial year, 18% of the city's UGX 41 billion (~$11 million) wage and non-wage budget was allocated to roads and engineering alone.[34]

MBARARA

CORRIDOR CITY

Mbarara is a strategic city located within Uganda's "cattle corridor" and serves as a major hub for dairy production and the livestock trade. Mbarara accounts for more than 30% of Uganda's total milk and the area produces more than 100,000 litres per day. The city is also anchored by large businesses, including Coca-Cola Beverages Uganda Ltd and Pearl Dairy, which are drawn by the city's position as a trade hub serving neighbouring Rwanda, DRC and Tanzania.

32. UNDP.(n.d.) Hoima District Investment Profile. *Report.*
33. Ministry of Finance. (2021) Gulu City, DINE profile 2020/21. *Report.*
34. Ministry of Finance, Planning, and Economic Development. (2023). LG Draft Budget Estimates 2024/25: Gulu. *Report.*



Unique mobile internet subscribers



Annual growth rate of LTE (family) connections



Smartphone connections



Kenya

MALINDI

REGIONAL HUB

Malindi is a coastal city that is a tourist centre and focal point for government support programmes in the region. Currently, 88% of residents have access to improved water sources and 76% have access to improved sanitation, despite the city's lack of a sewerage system.[35] In 2022, the 53 MW Malindi Solar Power Station was opened, significantly improving energy access. Still, the city faces significant staff shortages with only 14 technical staff managing key departments, compared to the 80 recommended by the central government for a municipality of its size. Chronic gaps in infrastructure and a shortage of municipal staff limit service delivery capacity, making the city highly dependent on external support and well-suited for digital solutions that can ease administrative burdens.

ISIOLO

CORRIDOR CITY TO REGIONAL HUB

Located along the Lamu Port-South Sudan-Ethiopia Transport corridor, but in a historically marginalised region, Isiolo has lagged in infrastructure investments.[36] With 65% of Isiolo's land classified as very arid, the city and region face critical water scarcity challenges.[37] Nomadic pastoralism shapes the county's way of life, with 80% of residents relying on livestock for their livelihoods.[38] With its location and regional focus, Isiolo is positioning itself as a key regional agricultural trade hub.

THIKA

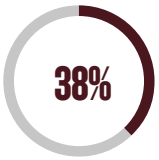
METROPOLITAN CLUSTER AND REGIONAL HUB

Located within 50 kilometres of Nairobi and with approximately 100 small-scale industries and 50 major factories, Thika is emerging as an important industrial base. The electrification rate of 85% is one of the highest in the country, offering a strong environment for manufacturing.[39] Located on major arterial roads, the city is also well positioned as a trade hub, both to the north of Kenya and the coast.

35. KNBS. (2019). 2019 Kenya population and housing census: Vol IV. *Report*.
36. Amutabi. M. (2017). Captured and steeped in colonial dynamics and legacy: The case of Isiolo town in Kenya. *Cambridge University Press*.
37. ADA Consortium. (2024). Strategic planning for water, energy and climate change- Isiolo County. *Blog*.
38. KCOMNET. (n.d.) Community media mobilizing for accountability in Kenya. *Report*.
39. KNBS. (2019). 2019 Kenya population and housing census: Vol IV. *Report*.



Unique mobile internet subscribers



Annual growth rate of LTE (family) connections



Smartphone connections



Rwanda

In Rwanda districts are the main units of local administration with legal and fiscal authority. In national planning, city-related policy often corresponds to a district boundary and naming, and as such these are the descriptions used in this report.

MUSANZE

REGIONAL HUB

Musanze is the provincial administrative hub of Musanze District in Rwanda's Northern Province. It is similarly designated as a secondary city and positioned as a provincial centre for administration and tourism, with a growing role in agriculture and higher education. The gateway to Volcanoes National Park – Rwanda's primary sightseeing attraction – more than 40% of Rwanda's tourists pass through the city. The area's rich volcanic soil supports high yields of many crops, making agriculture the second biggest driver of economic growth, with 70% of Musanze's population engaged in agrarian activities. Recognising Musanze's importance to the country's tourism economy, the Rwaza and Kigasa hydropower plants boosted electricity production, and the development of the Mutobo Water Treatment Plant improved access to clean water.[40,41]

RUBAVU

REGIONAL HUB

Rubavu is a tourism and trade hub on the shores of Lake Kivu. As the starting point of the Congo Nile Trail, the city attracts an average of 50,000 visitors every day through the Petite Barrière border with the DRC.[42] As a tourism and trade centre, the district has recently constructed a port to facilitate the flow of 2.7 million people and 700,000 metric tonnes of goods annually.[43] Additionally, recent energy upgrades have increased the distribution capacity of Rubavu's network fourfold. Rubavu is one of Rwanda's six officially designated secondary cities, prioritised in national urbanisation strategies as a hub for trade, tourism and cross-border activity.

BUGESERA

METROPOLITAN CLUSTER

Bugesera has been marked as a priority development zone to decongest Kigali and drive regional growth. Bugesera is planned as a satellite city to Kigali, with its development trajectory shaped by national flagship projects such the Bugesera Special Economic Zone and the Bugesera International Airport. With the population projected to exceed 800,000 by 2032, the city leadership is expanding utility infrastructure and constructing a water treatment plant and electricity lines.[44]

40. The Republic of Rwanda. (2022). 2022/2025 - Annex II-1: District Budget. *Policy document*.
41. Paris Peace Forum. (2018). Volcanoes National Park Expansion Program in Rwanda, Africa – improved conservation and tourism as a catalyst for community and economic transformation. *Media*.
42. Rwanda Dispatch. (2024). DRC Closes Major Border Post with Rwanda; Petite Barrière Remains Open. *Media*.
43. Ministry of Infrastructure. (2024). Rubavu Port: A Catalyst for Trade, Regional Integration, and Maritime Transport Transformation in Rwanda. *Press release*.
44. National Institute of Statistics. Rwanda Subnational Population Projections by Provinces (2023–2032)

Figure 6

Socio-economic data for the case study cities

	HOIMA	GULU	MBARARA	UGANDA	MALINDI	THIKA	ISIOLO	KENYA	MUSANZE	RUBAVU	BUGESERA	RWANDA
Population	143k	233K	264k		327k	285k	121k		477k	547k	551k	
Additional daytime population	+47k	+91k	+60k						96k	50k	46k	
Annual population growth (doubling time, years)	3.8% (20)	2.4% (31)	3.0% (40)	5% (14.4)	3.1% (23)	6.3% (11)	6.3% (11)	3.7% (19.5)	2.6% (27)	3.1% (23)	4.3% (17)	3.2% (22.5)
Population completed secondary school (across the region)	8.3%	5.9%	10.7%	11.2%	18%	36%	23%	25%	18%	17%	20%	15%
Residents employed in nonagricultural sectors	37%	N/A	<50%	32%	61%	65%	58%	68%	54%	34%	34%	47%
Population with access to grid/ electricity*	75%	58%	76%	52%	62.8%	77%	67%	76%	67%	71.3%	54%	64%
Incubators, accelerators and startup hubs	<2	2	11	82	2	<5	1	50+	3	2	3	-
City contributions to annual revenue	7.8%	12.5%	20.9%	N/A	10%	33%	4%	N/A	14%	15%	10%	-

Sources: 5th Population and Housing Census: Rwanda, 2022; National Population Census 2024, UBOS; 2019 Kenya Population and Housing Census, KNBS; World Bank/IEA SE4ALL/ESMAP Global Electrification Database; GSMAi data; OCA consultations.

Intermediary cities face a more challenging policy environment than larger cities, operating at lower tiers of government and with a smaller tax base, their level of autonomy and fiscal freedom is often limited. Governance and policy frameworks determine the degree of autonomy, flexibility and coordination that cities can exercise to adopt innovative public service delivery models. These frameworks dictate their autonomy to form partnerships with innovators and the private sector more broadly. Key details of the legislation governing intermediary cities is presented in Figure 7. While there are differences in the level of decentralised powers, the cities in this study share a heavy reliance on central government transfers. The proportion of locally generated revenues varied between the nine cities (4% in Isiolo to 33% in Thika) but generally did not exceed 20% of municipal budgets.

In recent years, there has been a much more explicit policy focus on supporting intermediary cities. In Uganda, the Local Government Act grants cities similar autonomy as districts. In Kenya, the Urban Areas and Cities Act (2011) specifically establishes city boards and assigns more autonomous roles to city officials for decision-making. In Rwanda, Organic Law No. 29/2005 (on Decentralised Administrative Entities) goes only as far as defining administrative entities and structures.[45,46,47] These pieces of legislation give cities the ability to design, implement and enforce programmes, regulations and policies in a transparent manner. Stable, effective governance and productive policy frameworks allow for coordination among key stakeholders across both the public and private sectors. Their presence also ensures closer alignment with national goals and consistent policy across different cities.

Figure 7

National drivers of governance and institutional structures in Kenya, Rwanda and Uganda

	Uganda	Kenya	Rwanda
Key legislation and policy	– Uganda Constitution (1995) – Local Governments Act (1997) – Physical Planning Act (2010) – National Development Plan III (2020-25) – Uganda Cities and Municipalities Infrastructure Development Progamme (2025)	– Kenya Constitution (2010) – County Governments Act (2012) – National Urban Development Policy (2016) – Urban Areas and Cities Act (2011, revised 2019)	– 2003 Constitution (Revised 2015) – Law on Decentralised Entities – National Urbanisation Policy – Smart City Rwanda Master Plan (2015)
National strategies	– Vision 2040	– Vision 2030	– Vision 2050
Governance structure	– Political wing led by a directly elected mayor – Administrative wing led by a town clerk appointed by the central government	– City Board led by chairperson nominated by board members – City Board reports to county administration	– Districts led by a council composed of councillors who elect a mayor – Reports to a centrally appointed Provincial Governor
Level of autonomy	Low with political oversight from national level	Medium with political oversight at county level	Medium with political oversight at provincial level

45. ACODE. (2020).Creation of New Cities - Congratulations Amidst Concerns. *Report*.
46. ACODE. (2019).Decentralization in Uganda. *Report*.
47. Republic of Kenya. (2011). Urban Areas and Cities Act. *Policy document*.



Uganda

In April 2020, Uganda's Parliament approved the creation of 15 new cities. By 1 July 2020, 10 were formally gazetted (Arua, Fort Portal, Gulu, Hoima, Lira, Jinja, Masaka, Mbale, Mbarara and Soroti) and a subsequent five formally declared as cities in July 2022. In line with Uganda's National Development Plan III, this effort showcases Uganda's commitment to achieving more balanced and productive urbanisation. The government has a series of objectives associated with the creation of these new cities:

- **Balancing urban development:** Kampala's overwhelming dominance in population, GDP output and formal employment is constraining broader economic growth, especially given Uganda's low-income status. With rural-urban migration focused on Kampala, the growth potential of intermediary cities is limited.
- **Unique opportunities for new cities:** These include proximity to rural areas for agricultural trade, lower land and labour costs compared to Kampala and potential for regional trade due to strategic location near Uganda's borders – particularly interesting for Uganda given that it is a key trading hub in the East African Community (EAC) and Great Lakes Region.
- **Proactive land use planning:** Engaging in land use planning before population growth increases further can help policymakers manage density, curb costs and guide liveable growth.

Of course, declaring new city status is insufficient on its own. A priority for policymakers in Uganda will be to complement this effort by setting clear governance frameworks that establish authority, accountability and capacity for urban decision-making and implementation. For the local administration of newly created cities, there is an opportunity to increase access to financing by mobilising domestic resources and attracting foreign investment. The recently announced Uganda Cities and Municipalities Infrastructure Development Progamme, which is also supported by the World Bank, builds on the previous Uganda Support to Municipal Infrastructure Development (USMID) programme and will support cities including Hoima, Gulu and Mbarara to implement climate-resilient infrastructure with a focus on waste management, mobility and green jobs.[48]

48. Monitor. (2025). Cities, municipalities to benefit from new World Bank project. *Media.*



Kenya

Kenya's 2010 Constitution ushered in sweeping devolution, creating 47 county governments to decentralise political power, public finance and service delivery, and ultimately promoting greater equity, accountability and local responsiveness. This devolution was intended to address historical grievances related to centralisation, inequality and uneven service delivery across the country. While the constitutional framework for devolution is largely in place, several challenges have hampered effective implementation:

- **Resource allocation:** Ensuring equitable and sufficient funding for all counties remains a challenge.
- **Capacity building:** Strengthening the capacity of county governments to manage their responsibilities effectively is crucial.
- **Intergovernmental relations:** Navigating the complex relationships between national and county government is especially relevant when county governments are led by political parties that are in opposition to national government.
- **Citizen participation:** Fostering meaningful participation of citizens in local decision-making is vital.

Kenya's devolution process has made notable gains in establishing subnational institutions, executing recurrent budgets and building platforms for financial innovation. Yet, critical gaps remain in development spending, intergovernmental clarity and citizen engagement. Addressing these through streamlined financing systems, better-defined roles, digitalised systems, participatory governance structures and human resource capacity investments is essential for devolution to deliver better service outcomes.[49]

49. World Bank. (2022). Making Devolution Work for Service Delivery in Kenya. *Report*.



Rwanda

Within this broader context, the governments of Rwanda and Uganda have recently taken steps to explicitly designate secondary cities, while Kenya's 2010 Constitution provides a strong foundation for county governments that host intermediary cities. Rwanda launched a long-term urbanisation strategy under the Economic Development and Poverty Reduction Strategy (EDPRS 2) to become a high-income country by 2050. Part of this vision includes expanding its urban network by developing six secondary cities – Rubavu, Huye, Rusizi, Muhanga, Musanze and Nyagatare – aimed at decongesting Kigali and fostering balanced, green urban growth. The cities were prioritised for their strategic locations and business activity potential and are guided by master plans that provide detailed land use plans for settlement, infrastructure development and green industrialisation. District Development Strategies (DDS) provide roadmaps for district priorities, implementation costs and monitoring systems. They align with national targets for urbanisation (targeting 35% by 2024) and broader development frameworks like Vision 2020/2050, EDPRS II and NST1, as well as Rwanda's Green Growth and Climate Resilience Strategy (GGCRS). A recent report from the Global Green Growth Institute provided a synthesis of district development strategies and identified challenges as well as opportunities for the government to build on:[50]

Opportunities:

- Integration of green growth strategies in district planning
- Inclusion of local voices in participatory planning
- Capacity building and increased ownership at the district level

Challenges:

- Frequent changes in DDS guidelines and formats from ministries and a lack of local ownership
- Unrealistic cost estimates or overly ambitious targets

50. The Global Green Growth Institute. (2022). Mainstreaming Green Growth Into Rwanda Secondary Cities. *Report*.

2
Digital innovation in intermediary cities



Innovation ecosystems in the three focus countries are thriving but remain concentrated in capital cities. Nairobi, for example, hosts 38% of Kenya's innovation hubs and in the country's 2024 Innovation Outlook, 88% of interviewees were based there.[51] Kigali, Rwanda's capital, hosts the country's largest innovation hubs, including Norrsken Kigali House, Impact Hub Kigali, KLab and 250STARTUPS. While a degree of centralisation is common, and to an extent desirable, for access to people, finance and tools, more attention needs to be given to intermediary cities for startups looking to scale nationally and to ensure sufficient linkages between national hubs and talent and innovators from intermediary and secondary cities. The flagship investments of Konza Technopolis in Kenya and Kigali Innovation City (KIC) are two prime examples of large government investments creating national innovation hubs that blend higher education, industry and the innovation ecosystem. Also notable is that both Konza and KIC are being developed with clear public-private partnership (PPP) frameworks. Such concentrated investments create opportunities for investment in key infrastructure (e.g. data centres and specialist manufacturing), dense networks of companies and funders and knowledge spillover effects – all difficult to replicate at a smaller scale.

The benefits of clustering startups in national hubs are harder to replicate in smaller cities. However, scaling the adoption of digital innovation requires links to intermediary cities, and there are risks to unbalanced investments in urban development and innovation. Decentralising investment in innovation is essential to providing access to support for talented startups without the means to relocate, as well as to creating more fertile ground for municipalities, businesses and urban residents to adopt digital innovation. Cities with different economic profiles offer opportunities for investment beyond building ecosystems for startup incubation and funding. For example, satellite and corridor cities are potential sites for manufacturing and trade investments. In this study, the Bugesera Special Economic Zone (SEZ) is an example of an intermediary city that encourages manufacturing capacity by offering duty-free imports of machinery and preferential corporate tax rates. Across Africa, the number of SEZs has increased from 20 in 1990 to more than 230 in 2020, with Kenya a leader with 61 legally designated SEZs.[52] While African SEZs have not historically delivered as many benefits as other regions,[53,54] recent progress on the Africa Continental Free Trade Agreement (AfCFTA) and the supporting Pan-African Payments and Settlement System (PAPSS) widen the scope for the impact of such investments.[55]

Regional hub cities present opportunities for place-based research and development (R&D) investment and investment in anchor institutions to stimulate regional development. In the longer term, these offer paths to clustering effects outside of single national hubs. This is particularly relevant in the East African Community (EAC) and Great Lakes Region, which have significant formal and informal trade flows, and several intermediary cities strategically located near country borders. In 2023, trade within the EAC accounted for approximately 15% of the region's total trade, which is slightly higher than in previous years, according to the East African Business Council. While there are clear benefits to creating national and continental innovation hubs, urban populations will only reap the full benefits through more balanced trade and investment strategies built on the comparative advantages and place-based nuances of a city.

51. KENIA. (2024). Kenya Innovation Outlook 2024. *Report*.
52. UNCTAD. (2021). Handbook on Special Economic Zones in Africa. *Report*.
53. World Bank. (2011). Special Economic Zones in Africa : Comparing Performance and Learning from Global Experience. *Report*.
54. Rodriguez-Pose, et al. (2022). The challenge of developing special economic zones in Africa: Evidence and lessons learnt. *Regional Science Policy & Practice*
55. UNIDO-AEZO. (2024). Characteristics, trends, and way forward for Special Economic Zones in Africa. *Report*.

This section presents an overview of the digital innovation ecosystems in the three focus countries and the key opportunities for innovators, before turning to the factors that hinder and enable adoption in intermediary cities. To ensure that intermediary cities do not continue to fall behind larger, centralised cities, the factors and constraints influencing the success and scalability of innovative ecosystems in each country must be addressed.

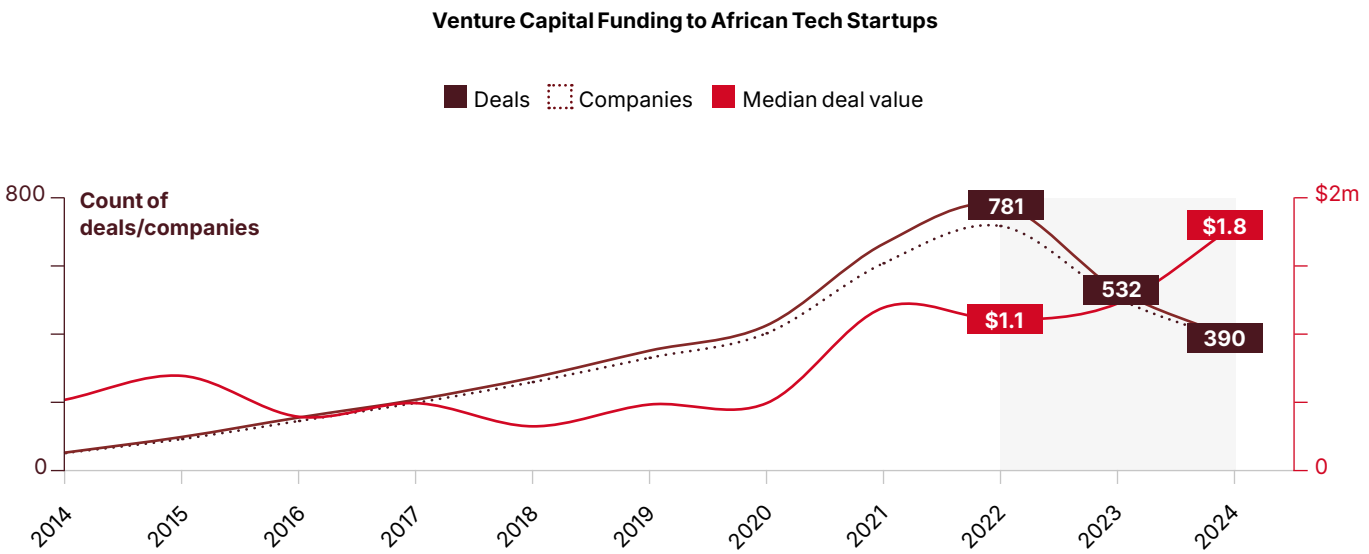
2.1 Digital innovation ecosystems in Kenya, Rwanda and Uganda

Between 2019 and 2024, African tech startups raised more than $19 billion in funding. While an impressive figure for an emerging ecosystem, in absolute terms and per capita this figure is considerably lower than other parts of the world. Venture capital (VC) funding to African startups is concentrated in the "Big 4" – Nigeria, Kenya, South Africa and Egypt – which between 2019 and 2024 accounted for close to 80% of all funding to tech startups, many of which operate on a regional or continental level. Alongside this geographical concentration, approximately half of all VC funding to African startups in this period went to one sector – fintech – reflecting the need and opportunity to scale digital financial services.

Funding for startups in the focus countries reflect continent-wide trends. Kenya, by far the largest of the three in terms of deal count and funding, is notable for hosting some of Africa's leading off-grid energy providers. Recently these pay-as-you-go (PAYG) energy providers have secured large, securitised debt deals to scale off-grid energy both regionally and within Kenya. Rwanda's tech startup ecosystem is notable for its growing focus on e-mobility, in line with a concerted push in government policy to make Rwanda a regional centre for e-mobility. Uganda's funding trends more closely mirror the continental profile with fintech dominating, followed by funding for essential services (energy, water and transport) and agriculture.

Figure 8

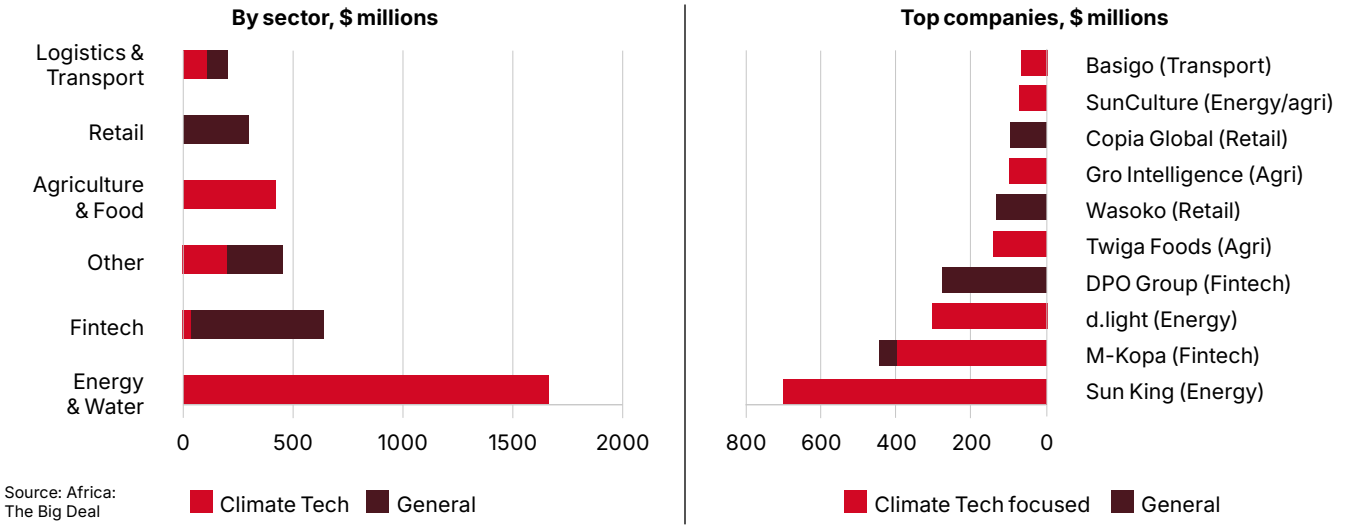
Venture capital funding to African tech startups



Kenya's tech startup ecosystem

Figure 9

Funding to Kenyan tech startups, 2019–2024



Source: Africa: The Big Deal

Kenya's startup ecosystem is growing, driven by a strong network of innovation hubs and diverse funding sources. Kenya ranks 58th globally and second in Africa for the strength and development of its startup ecosystem.[56] This is largely due to its vibrant entrepreneurial environment, which hosts more than 50 innovation hubs, incubators and accelerators.[57] Nairobi, Mombasa, Uasin Gishu, Kisumu and Nyeri are home to more than half of the country's innovation hubs. To encourage a similar ecosystem across the country, the government is establishing more than 1,500 Constituency Innovation Hubs through the Constituency Innovation Hubs (CIH) Project. There are 420 so far, facilitating business growth, peer learning and networking.

Between 2019 and 2024, 342 Kenyan tech startups collectively raised $3.7 billion.[58] Notable investors include Kepple Africa Ventures, DOB Equity, Factor(e), Novastar, Acumen, and Founders Factory Africa.[59] In 2024 alone, Kenya attracted more than $650 million in startup funding driven by large debt deals in Climate Tech, notably investments in d.light, BasiGo and SunKing.[60] Commercial banks, such as the National Bank of Kenya, are also increasing access to capital, particularly in high-impact sectors like water, sanitation and hygiene (WASH). So far, the National Bank has deployed KES 2 billion ($15.5 million) in the water sector. The highest uptake is in extraction, primarily for drilling, followed by working capital.

Public universities are playing a key role in the innovation ecosystem by translating research into market-ready solutions. Science parks like the one at Dedan Kimathi University of Science and Technology, innovation hubs like Fablabs at the University of Nairobi and the Chandaria Innovation Center at Kenyatta University, are strengthening the innovation ecosystem in Nairobi. In intermediary cities, examples include Mount Kenya University's Innovation and Incubation Centre in Thika and the University of Eldoret's Directorate of Research and Innovation.

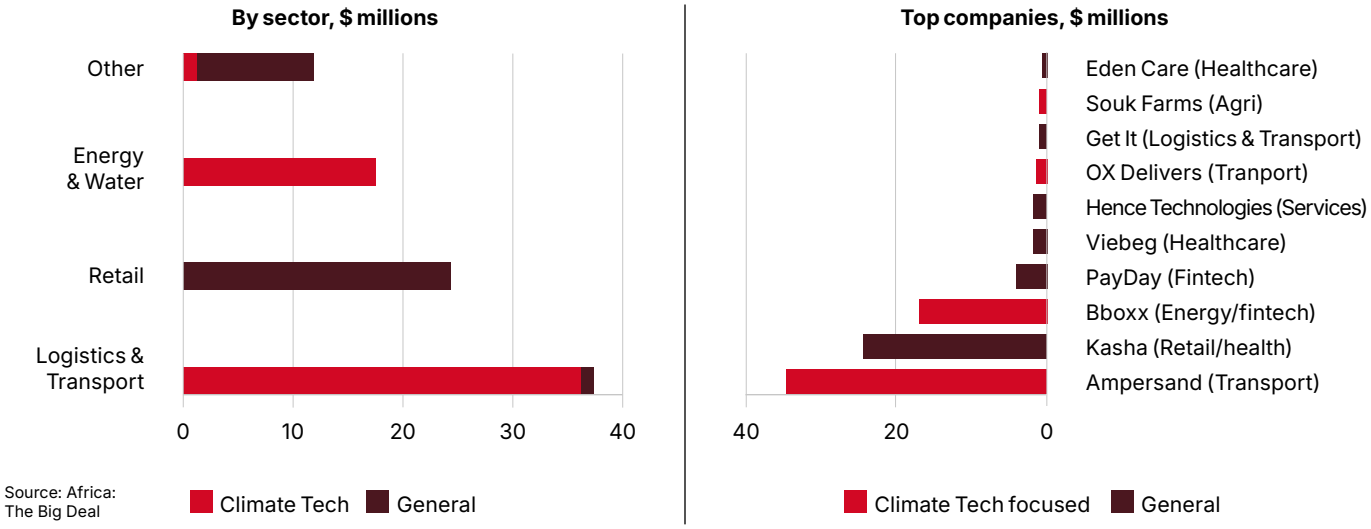
Mobile operators are driving digital innovation by expanding access to mobile payments, IoT solutions and next-generation network technology. Safaricom, through its Daraja portal, provides open application programming interfaces (APIs) that allow startups, developers and businesses to seamlessly integrate M-PESA for payment processing. This has fuelled the growth of e-commerce, fintech and digital services. Additionally, Safaricom, in partnership with Sumitomo Corporation, has launched Spark Accelerator Program. Implemented by iHub, the programme supports and scales commercially viable startups that generate positive social impacts.

56. StartupBlink. (2025). The Global Startup Ecosystem Index Report 2025. *Report*.
57. UNDP. (2022). Mapping the innovation ecosystem in Kenya. *Report*.
58. Authors analysis of Africa: The Big Deal data
59. Disrupt Africa. (2022). The Kenyan Startup Ecosystem Report. *Report*.
60. Africa: the Big Deal. (2025). Kenya & East Africa in the lead again in 2024. *Blog*.

Rwanda's tech startup ecosystem

Figure 10

Funding to Rwandan tech startups, 2019–2024



Source: Africa: The Big Deal

The growth of Rwanda's startup ecosystem can be attributed to favourable policies such as the Startup Act, the presence of accelerator programmes and incubation hubs and increased funding opportunities. This growth is more recent than other countries – 60% of all funding since 2019 was in 2022 alone, thanks to investments in Ampersand, Bboxx and Kasha.[61] Since 2019, just over $100 million has been invested in Rwandan tech startups, from firms including Angaza Investment Management, H2O Venture Partners, Seedstars and Renew Capital.

The government has also worked closely with development partners to establish innovation hubs, known as Hanga Hubs, in Rubavu, Musanze and five other intermediary cities. The country seeks to have 20 such hubs by 2029 and one in each 30 districts by 2050. These hubs support innovative ideas by providing co-working space, entrepreneurship lessons and modern technology – such as 3D printers and laser-cutting machinery – to innovators in the ideation stage. Since 2021, more than 200 tech startups have participated in the annual pitch competition, Hanga Pitchfest, and more than RWF 600 million (approximately $428,000) in funding has been disbursed to innovative ventures. Other innovation hubs and collectives are supporting early-stage ventures by providing mentorship, networking opportunities and funding.

Norrsken hosts Rwanda's largest co-working hub and accelerator programme, connecting entrepreneurs to investors. With more than 1,000 entrepreneurs, Norrsken House Kigali provides access to shared resources. At the same time, Norrsken 22, an investment fund, improves access to funding for local entrepreneurs and has so far raised $205 million to invest in tech companies in Africa. Other notable centres include Kigali Innovation City's (KIC) Smart Mobility Lab, a collaboration between Volkswagen, GIZ and Carnegie Mellon University Africa, which seeks to promote digital solutions that help decision-makers and mobility providers improve their services.[62]

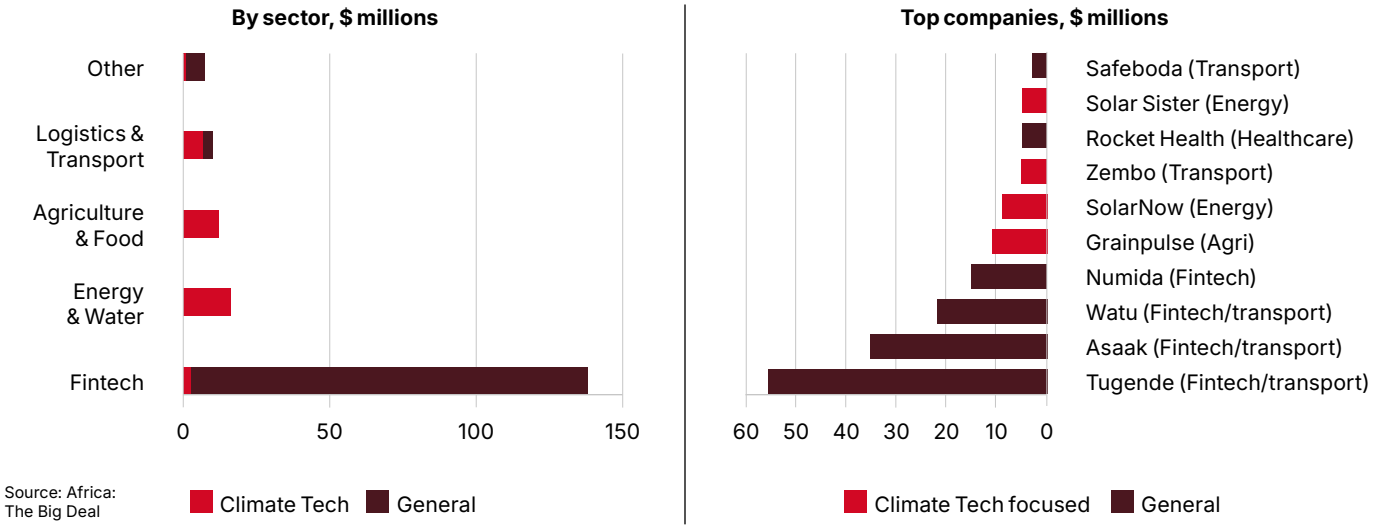
Targeted policy updates have accelerated 4G adoption and attracted investment in connectivity infrastructure. As part of the country's updated National Broadband Policy and Strategy, in 2022 Rwanda moved away from a single wholesale network model and allowed mobile operators to reframe spectrum bands so they could be used in parallel with other technologies. As more mobile operators then entered the market, the adoption of 4G services increased significantly, jumping from just 2% in 2022 to 30% in 2024.[63]

61. Authors analysis of Africa: the Big Deal data
62. Carnegie Mellon University Africa. (2024). Smart Mobility Lab launched. *Press release*.
63. GSMA. (2024). Abandoning its single wholesale network unlocks significant connectivity growth for Rwanda. *Blog*.

Uganda's tech startup ecosystem

Figure 11

Funding to Ugandan tech startups, 2019–2024



Source: Africa: The Big Deal

Uganda's innovation ecosystem is increasingly well supported, with private sector resources equipping entrepreneurs with tools and networks. Uganda's ICT sector employs 2.3 million people and represented 2.5% of GDP in 2023.[64] However, accounting for unrecorded activity, the sector's actual contribution may be as high as 9% with year-on-year growth of 14%, outpacing overall GDP growth by three times.[65] Uganda hosts more than two dozen unique entrepreneurial support organisations that provide resources, mentorship and collaborative spaces for co-working in Kampala and across intermediary cities. Examples include The Innovation Village (TIV), which is helping to decentralise access to entrepreneurial support with four hubs across the country, including in Gulu and Mbarara. TIV has a community of 140 startups that have collectively raised more than $3 million. It has fostered successful startups such as SafePay, a fintech offering payment solutions for public transit, and Xente, an e-commerce platform providing tools for businesses.[66]

Between 2019 and 2024, Ugandan tech startups collectively raised $183 million in funding from investors, including Goodwell, Iungo Capital, Verdant Capital and Y Combinator. More than in Kenya and Rwanda, investments in Uganda have favoured fintech, with a few leading companies accounting for the majority of investment in the ecosystem. It is notable that three of these companies – Tugende, Asaak and Watu – all focus on lending for motorcycles as their primary business.

Businesses are spearheading initiatives such as accelerators, incubators and hackathons to build capacity and foster innovation. For example, Stanbic Bank Uganda runs the Stanbic Business Incubator offering training, funding opportunities and a sandbox environment for innovators in the financial services sector. These programmes have been extended to reach entrepreneurs beyond Kampala as well, with regional incubators set up in cities like Hoima and Mbarara.[67] In recent years, MTN Uganda and Airtel Uganda have been driving innovation through open APIs, such as MTN Mobile Money (MoMo) APIs and the Airtel Developer Platform. These platforms have enabled businesses to integrate financial services in their models, enabling them to capture revenue, grow and scale.

64. MoICT & NG. (2023). Digital Transformation Roadmap 2023/2024 – 2027/2028. *Policy document*.
65. NITA-Uganda. (2023). National Information Technology Authority-Uganda: Statistical Abstract. *Report*.
66. GIST IHub: Uganda – The Innovation Village," GIST, 2018, Link
67. Chimpreports. (2019). 468 Entrepreneurs Graduate from Stanbic Business Incubator. *Media*.

2.2 Key opportunities for digital innovation in intermediary cities

The best opportunities for digital innovation in intermediary cities can be found in the ventures already operating in Africa and continental funding trends. Between 2019 and 2024, African fintechs raised $8.8 billion in funding, making it the single biggest tech sector funded with just under half of all funding to tech startups in Africa.[68] However, Climate Tech solutions (taken together as a sector) raised a total of $4.3 billion, making it the second largest sector and representing just under a quarter of all funding. Energy, and decentralised energy in particular, accounted for the largest share, with other notable sectors including transport and e-mobility, agritech, water and waste management.

Core Climate Tech solutions and companies are building the foundations for liveable cities. Alongside the need, intermediary cities provide opportunities to scale a business. For off-grid energy providers and those providing productive use equipment, urban economic hubs with chronic power shortages are an attractive entry point. Solar companies can make their PAYG business model economically sustainable much faster than they could in larger centres. Urban households and small businesses have relatively higher levels of demand and ability to pay. A recent PAYG pilot by Bboxx, DFID, Shell Foundation, USAID and Power Africa in Goma, DRC, revealed that average revenue per user (ARPU) from Bboxx customers in Goma were "~4x greater than the average off-grid solar customer in East Africa".[69] While purchasing power in intermediary cities is generally lower than in capital cities, it is higher than in surrounding rural areas, making intermediary cities important hubs for off-grid and decentralised services with rural and urban applications, as well as those in agricultural value chains. The concentration of economic activity in intermediary cities also makes them favourable sites for business-to-business (B2B) models to scale, particularly fintechs seeking to fill asset financing gaps or providing much-needed working capital to micro, small and medium enterprises (MSMEs). The remainder of this section considers the opportunities for intermediary cities in these sectors.

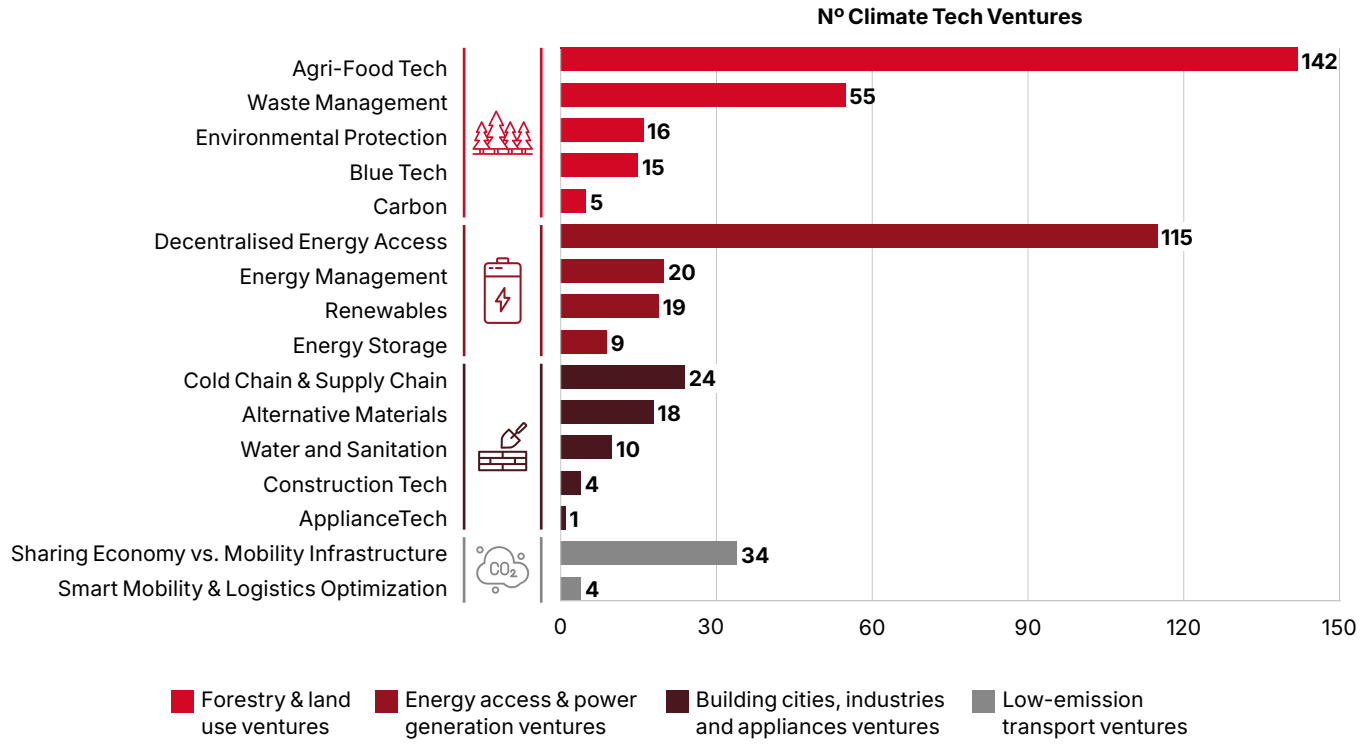
Decentralised energy and the productive use of energy

Access to energy is a major bottleneck for intermediary cities and the development of their digital economies, and the off-grid sector has been driving access in all three focus countries. Today, more than 85% of those without energy access live in African countries, making it critical to rapidly scale up access to achieve Sustainable Development Goal (SDG) 7 and enable households and businesses to be productive.[70] Energy access in intermediary cities is consistently lower than in capital cities, where businesses operate with either no electricity from the grid or an intermittent supply. Kenya, Rwanda and Uganda – and East Africa more broadly – have been centres for the PAYG solar sector, and off-grid access now accounts for a significant proportion of energy access in these countries. In intermediary cities, decentralised solutions are often needed as much to stabilise and make power affordable. Access to energy in Rwanda stands at 82% with 57% on-grid connections and 25% off-grid connections.[71,72] In Uganda, off-grid sources now account for most energy access with 29% of the population having access to mini-grids of stand-alone solar, compared to 28% of the population connected to the grid.[73] While there is much to celebrate, key challenges remain. Mini-grid tariffs are often higher than subsidised grid provision, grid outages pose a key challenge for hybrid and battery-reliant solutions, and caps in contract duration (e.g. 5 years for centralised systems in Rwanda) can deter long-term investment.

68. Based on Africa: The Big Deal data
69. GSMA. (2024). Why off-grid energy providers are increasingly paying attention to urban areas – insights from the DRC and beyond. *Blog*.
70. IEA. (n.d.) Access to electricity. *Webpage*.
71. Rwanda Energy Group. (n.d). Electricity Access. *Webpage*
72. World Bank. (2024). Ingredients for Accelerating Universal Electricity Access: Lessons from Rwanda's Inspirational Approach. *Media*
73. Ministry of Energy and Development/GOGLA. (2024). National Road Map on Scaling Up Productive Use of Solar Energy. *Report*

Figure 12

African Climate Tech ventures by sector



Source: Briter. (2025). Climate Tech Venture Landscape In Sub-Saharan Africa: Data-driven assessment of the climate tech ecosystem in SSA

In Uganda, off-grid sources provide the majority of energy access, and more solar units have been sold in Kenya than anywhere else on the continent. There are more than 400 companies in Uganda providing solar home systems (SHS), mini-grids and solar thermal solutions. Notably Village Energy, Sun King, Solarika Energy and Equatorial Power. In the second half of 2023 alone, more than 250,000 solar home kits were sold in Uganda, along with nearly 8,000 solar-powered appliances such as TVs, fans and refrigerators.[74] In 2023, more than 1.2 million off-grid solar home kits were sold in Kenya, approximately a third of all sales in Sub-Saharan Africa.[75] The success of the industry has prompted companies to diversify their offering to appliance and smartphone financing, and using their reach to expand into fintech. These companies have found success in both rural and urban markets, which is significant as many urban residents lack access to the grid.

The success of the off-grid industry has been driven by enabling policies and direct support from government programmes. Rwanda's 2013 EDPRS II included power source diversification as a key objective, and the government has since signed Memoranda of Understanding (MoUs) with 27 private companies, including Bboxx, BUIM, Ignite Power and Hello Renewables, to increase the supply of off-grid SHS. In 2023, the Ugandan government revised its energy policy to integrate off-grid solar solutions in the national electrification plan, cementing regulatory and tax incentives such as VAT exemptions on solar panels to drive private-sector involvement.[76] Similar VAT exemptions are in place in Kenya and Rwanda and have been key to making solar products more affordable.[77] For example, taking advantage of the zero-rated VAT and import duty exemptions on renewable energy equipment, the $6 billion Rwaza Hydropower Plant developed through a partnership between

74. GOGLA. (2022). National Road Map on Scaling Up Productive Use of Solar Energy. *Report*.
75. Based on GOGLA sales data
76. International Energy Agency. (2023). Uganda 2023: Energy Policy Review. *Report*.
77. GOGLA. (2024). Kenya- country brief. *Report*.

DC Hydropower Limited, Frontier Energy, Carbon Energy Fund and responsAbility Renewable Energy Holding now operates on a 25-year power purchase agreement (PPA) with REG, feeding Musanze and the grid 2.6 MW of run-of-the-river hydropower and providing a stable power supply to local industries.[78]

A mix of off-grid and on-grid energy solutions are increasingly being formalised through partnerships, such as the Utilities 2.0 Twaake pilot in Uganda that saw Umeme (former Ugandan distribution company) deploy its distribution network to support mini-grid systems. This pilot, which combined productive use deployment with a mix of off-grid and on-grid energy, saw the levelized cost of electricity fall by more than 60%, demand increase by 3,000% and local business revenues increase by 68%.[79]

Electric mobility

Rwanda, Uganda and Kenya are rapidly positioning themselves as continental leaders in e-mobility by combining ambitious policy targets with active private-sector participation. Rwanda has pioneered a supportive regulatory framework, including tax exemptions on EVs and charging equipment, and has attracted innovators like Ampersand and Safi to scale electric motorcycle and battery-swapping models. In November 2024, the Government of Rwanda announced that beginning in 2025, only e-motorbikes would be eligible to register as motorcycle public transit operators in the City of Kigali; and the recently published National Transport Policy and Strategy frames EV adoption within Rwanda's broader decarbonisation goals.[80] Uganda's 2024 National E-Mobility Strategy sets one of Africa's most ambitious transition goals – full electrification by 2030 – backed by VAT exemptions, public procurement pilots and the expanding presence of firms like Zembo, Gogo Electric and Spiro. Kenya has leveraged its abundant renewable energy mix and early-stage incentives to attract companies such as Basi-Go, Roam and Ampersand, which are piloting battery-swapping and lease-to-own schemes in cities like Nairobi and Kisumu.

Collectively, e-mobility startups in the three countries have raised more than $153 million in funding, with Kenya leading the way with more than 10 e-mobility companies funded between 2019 and 2024. Together, these countries are not only shaping East Africa's e-mobility market, but also setting precedents for how policy, infrastructure investment and business innovation can accelerate the shift to clean transport across the continent.

Figure 13

Incentives for electric mobility Rwanda



Source: "Strategic Paper on Electric Mobility Adaptation in Rwanda" Ministry of Infrastructure, Link

78. World Bank. (2024). Energizing Rwanda's Development. *Report*.
79. Microgrid Knowledge. (2025). Final Results: Uganda's Twaake Minigrid Pilot. *Media*.
80. Republic of Rwanda. (2021). National Transport Policy and Strategy for Rwanda. *Policy document*

Intermediary cities in East Africa, such as Kisumu in Kenya and Gulu and Mbarara in Uganda, are fast becoming proving grounds for e-mobility innovation, offering conditions that are nimble enough for experimentation yet large and connected enough to demonstrate market viability. These cities sit at a sweet spot between the complexity of national capitals and the small-scale limitations of rural areas, making them ideal for testing context-specific technology and business models.[81,82] However, e-mobility startups in these markets face a distinct combination of constraints. Infrastructure remains the most immediate challenge. Kisumu, despite being home to pilots by companies like Roam and Ampersand, still relies on a small number of solar-powered charging hubs located far apart, limiting the companies' operational reach. In Mbarara, Uganda, where companies such as Zembo, Gogo Electric and Spiro have been setting up swap networks, there were just four battery-swapping stations at the end of 2024, while Gulu, a major northern hub, had none. This scarcity makes it difficult for riders to confidently switch from petrol motorcycles, especially in the informal boda-boda sector where downtime directly translates to lost income. Unreliable electricity grids compound the challenge. Peri-urban Kisumu experiences periodic outages, while in Gulu and Mbarara power cuts can last hours, disrupting battery-charging schedules and diminishing user trust. Companies like Zembo have experimented with integrating solar panels at swap stations to reduce reliance on the grid, but scaling such solutions requires significant capital investment. While a defining feature of the early African EV market is the prevalence of vertically integrated businesses – supplying vehicles and charging service – recent years have seen the emergence of a small number of companies focused on providing charging networks alone; a key example from within the focus countries being EVChaja in Kenya.

High upfront costs for electric two and three-wheelers have also slowed adoption, even where operational savings are compelling. In Kisumu, the price tag for an electric motorcycle from suppliers such as Roam or Ampersand remains prohibitive for most riders, who often operate with razor-thin margins. While some firms experiment with lease-to-own models – where riders pay a daily or weekly fee that includes battery swaps – affordable credit remains scarce. In Uganda, financing constraints are similarly acute, with high loan default rates in Gulu deterring microfinance institutions from entering the sector. In contrast, Mbarara's denser motorcycle market (726 bikes/km²) and lower default rates create better conditions for commercial viability, explaining why Gogo Electric and Spiro have prioritised swap station expansion there.

Social acceptance and awareness, although improving, remain mixed. In Kisumu, many boda-boda riders are still unconvinced about the reliability, range and maintenance needs of EVs. In Uganda, awareness is notably higher – 98% in Mbarara and 88% in Gulu have heard of e-boda services – but riders remain wary of technology unfamiliar to their mechanics and peers. Here, companies like Zembo have invested in rider education and free trial schemes, allowing operators to experience fuel cost savings first-hand before committing. Maintenance and parts supply are also weak links. In both contexts, trained EV mechanics are few, spare parts are often imported and downtime from mechanical issues can last days or weeks. Some companies are starting to address this – Ampersand trains local technicians in Kisumu while Gogo Electric partners with vocational institutes in Mbarara – but these are still early-stage efforts.

Policy frameworks are emerging but uneven. In Kenya, tax and duty reductions and the creation of an E-Mobility Taskforce are important steps, yet there is still no comprehensive regulatory framework covering vehicle certification, safety standards or the licensing of swap infrastructure. In Uganda, the 2024 National E-Mobility Strategy sets ambitious targets – complete transition by 2030, and more than 3,500 public chargers and 10,000 fast chargers by 2040 – and provides VAT exemptions for EVs and related equipment. However, inconsistent enforcement, outdated traffic regulations and unclear harmonised system codes for EV imports create uncertainty for investors and operators alike.

Despite these barriers, intermediary cities are fertile ground for innovative business models. In Kisumu, battery-swapping pilots by Roam and Ampersand are testing the economics of clustered swap hubs in high-demand corridors, often paired with lease-to-own motorcycle schemes. Public-private partnerships – such as collaborations between city authorities and local solar firms –

81. Martins, J. (2025) Electric mobility initiatives in Kisumu. *Sustainable Earth Reviews*.

82. Courtright, T. (2025). A Study on the Business Cases for E-Mobility (2- and 3-Wheelers) in Two Major Cities (Mbarara and Gulu) in Uganda with a Focus on Gender. *Report*

are emerging to fund off-grid charging solutions, potentially leapfrogging unreliable grid connections. In Uganda, three distinct business cases are gaining traction. First, battery swapping for e-bodas in Mbarara leverages the city's dense rider base and growing swap network, with potential for women's employment as station operators, mechanics and sales agents. Second, local government procurement of e-motorcycles for fleets used by police, public health officers and district staff offers a high-visibility, lower-risk pathway to demonstrate performance, with women in administrative and mechanical roles supported by training from companies like Gogo Electric. Third, in Gulu, flat terrain and a strong agricultural economy make electric cargo tricycles a promising fit for farm-to-market transport. Here, women-led savings and credit cooperative organisations and cooperatives could play a leading role in fleet ownership and management.

The gender dimension is particularly pronounced in Uganda, where Gulu has shown relatively higher cultural acceptance of women riders, and targeted initiatives – such as vocational EV maintenance training for women – are building pathways into what has been a male-dominated sector. By contrast, in Kisumu, gender inclusion is not yet a prominent part of e-mobility strategies. Ultimately, these intermediary cities illustrate how innovation can emerge in constrained environments: by clustering infrastructure in demand hotspots, integrating renewables in charging systems, tailoring financing to informal sector realities and embedding local capacity building from the outset. If Kisumu, Gulu and Mbarara can leverage their adaptable scale, strategic locations and growing local expertise, they could become key hubs for scaling e-mobility solutions across East Africa, demonstrating that some of the most valuable transport innovations may be born in cities that are neither the largest nor the wealthiest, but the most agile.

Waste management and sanitation

A severe lack of infrastructure and increasing waste flows have made effective waste management an urban challenge across East Africa. Intermediary cities are experiencing rapid population increases, resulting in higher volumes of solid waste. However, management infrastructure and systems have not kept pace. In Kenya, only 10% of generated waste reaches designated disposal sites. This is a result of insufficient infrastructure, limited financial and technical capacity at both national and local government levels and weak enforcement.[83] A similar trend exists in Uganda, where only 8.4% of the 10.2 million tonnes of waste generated annually is properly disposed of.[84] Meanwhile, in Rwanda only 10% of the country's 1.5 million tonnes of waste is properly managed.

Private companies are beginning to recognise the opportunity. For example, Enviroserve Green Park Rwanda is a pioneer in e-waste recycling and management in East Africa, setting an example for other operators, including Enviroserve's Kenyan entity. The Enviroserve Rwanda waste electrical and electronic equipment (WEEE) recycling plant can handle more than 10,000 tonnes annually, equivalent to 70% of all e-waste generated nationally.[85] In Gulu, public entities like the National Water and Sewerage Corporation (NWSC) and private companies such as TakaTaka Plastics and Yo-Waste, launched the Integrated Catchment Management Partnership to improve waste management through a mobile app that enables residents to schedule collections.[86] Sanivation, a company focusing on faecal waste, are pioneering efforts to develop replicable PPP models for intermediary cities. In the sanitation sector, revenues in line with ability to pay are very often insufficient to cover full operating costs. To address this issue, Sanivation's PPP models create a clear space in agreements for public CapEx investments that effectively subsidise the service, enabling affordable cost-recovery tariffs.[87]

Progress in e-waste management remains slow in other East African countries due to high collection and processing costs, limited financing for innovators and the early-stage nature of the recycling industry. Recognising these opportunities, some countries have begun to respond with targeted initiatives, including allocating dedicated funding and reclaiming land previously lost to unmanaged waste. For instance, the Government of Rwanda launched a plastic waste

83. Fie Consult. (2023). State of solid waste management in Kenya. *Report.*
84. UBOS. (2024). National Population Census 2024. *Report*.
85. Republic of Rwanda. (n.d.). Country Status on E-waste management. *Report*.
86. NatuRes. (2022). The Gulu Integrated Catchment Management Partnership.
87. GSMA. (2023). Success in partnership and planning: Sanivation's evolving circular sanitation model in Kenya. *Blog*.

management fund in partnership with the Private Sector Foundation in 2021. Since its establishment, the fund has enabled the collection and processing of more than 1,500 metric tonnes of plastic waste and created more than 1,300 jobs, including at Nduba landfill, which now hosts a waste sorting and separation centre and a biowaste treatment facility. In contrast, the perception of waste as "tomorrow's problem" persists in Uganda, since it is often out of sight with minimal detrimental impacts on daily life. While the country generates close to 600 metric tonnes of plastic waste daily, only 6% is collected, mostly by private sector actors. This highlights a significant gap and presents an opportunity for scalable innovations in waste management should resources and attention be properly allocated.

Digitalisation of government services

There is a key opportunity to strengthen local fiscal autonomy and governance by digitalising government services. The e-government offering in all three focus countries is expanding. Notably, Rwanda's e-government platform, Irembo, allows citizens to access government services online, while digital tax collection tools have enhanced public sector efficiency and transparency. In Uganda, Gulu has implemented the Integrated Revenue Administration System (IRAS), an online platform and mobile app that enables transparent and efficient government revenue collection. These platforms create a clear way to support the adoption of digital solutions.

Particularly important are digitalisation initiatives that support local revenue collection. Digitalising local tax collection, particularly property and business rates and trade-related taxes, provides municipalities with a route to greater fiscal autonomy. UN-Habitat's rapid own-source revenue analysis (ROSRA) tool is a key example of a foundational tool for understanding gaps in local revenue collection, and was developed through work with Kenyan municipalities. Initiatives in East Africa also include the Africa Urban Lab, which has developed tailored research products and training for municipal staff. An example from outside the focus countries is Freetown's digitally supported property tax reforms. Satellite images and aerial drone photographs were used alongside geospatial data and ownership information to update the city's property register. This led Freetown to double its number of registered properties to 120,000 in just one year. Similarly, in Kampala, digital tools were central to adding 300,000 geotagged properties to the tax register since 2014.[88] With more than $133 million worth of goods moved via Lake Kivu unofficially in 2022, Rubavu invested in a port in 2022 that included a "one-stop shop" to simplify customs clearance and capture more revenues.[89] Such efforts are particularly important in the context of rapidly expanding cities, where advanced planning and zoning are essential to ensuring local governments can recoup returns on infrastructure investments through fair land value capture.[90]

In delivering public services, the wealth of data available from innovative data sources provide an opportunity to plug critical gaps in municipal records.[91] Due to the rise of digitalisation, a lot of valuable data for urban planning and service delivery is generated passively by mobile operators, big tech companies and other private sector service providers. Data can also be generated cheaply through public satellite imagery records or handheld sensors and GIS tools. In Musanze and Rubavu, as part of the $22 million Urban Development (URBANDEV) project led by Enabel, local government received training on digital inspection tools.[92] The tools also enable local governments to make real-time changes to land plans using Urban Dynamic Maps. These are interactive city maps that provide details on land use, population density, transportation patterns and environmental factors. In response to such challenges, cities like Thika in Kenya are adopting geospatial tools, such as digital topographical and cadastral maps, to modernise urban planning and utility management. To deliver sanitation services, under the Kampala Faecal Sludge Management Project the Kampala Capital City Authority (KCCA) developed a GIS-based sanitation database that, alongside binding service-level agreements for faecal sludge collection, increased their visibility of the disposal of faecal waste in the city and enabled enforcement of illegal dumping.

88. ODI. (2022). Digitalisation of property taxation in developing countries: Recent advances and remaining challenges. *Report*.
89. Cenfri. (2023). Reaping the dollar benefits but bearing the costs of cash: Rwanda-DRC informal cross-border trade. *Blog*.
90. OECD. (2022). Global Compendium of Land Value Capture Policies. *Report*.
91. GSMA. (2021).Innovative Data for Urban Planning: The Opportunities and Challenges of Public-Private Data Partnerships. *Report*.
92. Ministry of Infrastructure. (2022). Forward Looking Joint Sector Review Report Fiscal Year 2022/2023. *Report*.

Figure 14

Companies working in energy, e-mobility and waste management in Kenya, Rwanda and Uganda

Uganda

ENERGY

EnerGrow is a startup offering asset financing and training to small businesses for productive-use appliances.

FRES Uganda, based in Mbarara, provides flexible stand-alone solar systems for homes and businesses.

Innovex provides remote monitoring solutions for PAYG assets such as REMOT.

WASTE

Nature Waste Management Uganda provides collection and recycling services for electronic waste from households and businesses.

Yo-Waste offers a mobile app that connects households and businesses with nearby waste collectors, using GPS to schedule and manage pick-ups efficiently.

TRANSPORT

Zembo is Africa's first locally built, end-to-end electric mobility ecosystem for commercial two-wheelers.

SafeBoda launched a ride-hailing app in 2015 that offers rides, parcel delivery, payments, savings and other financial services to more than 1 million customers.

Tugende provides lease-to-own services for income-generating assets such as motorcycles, boat engines, special hire cars and taxis.

Kenya

ENERGY

PowerPay provides IoT solutions to support the digitalisation of PAYG appliances from various manufacturers and distributors.

Bright Life offers flexible payment plans allowing users to pay daily, weekly or monthly using PAYG technology on their mobile phones.

WASTE

Alternative Energy Systems Limited converts plastic waste into useable forms of energy through pyrolysis, improving service delivery through outsourced waste management solutions.

TakaTaka ni Mali enables businesses and other waste generators to track and report how their waste is managed across the entire value chain.

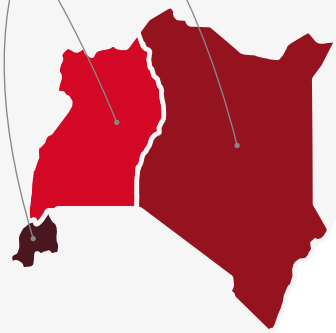
Sanivation operates faecal sludge treatment plants under PPP models in intermediary cities.

TRANSPORT

BasiGo specialises in electric buses, offering a pay-as-you-drive subscription model.

E-safiri operates solar-powered charging stations for electric tuk-tuks and motorbikes and runs awareness centres to educate users on the economic and environmental benefits of e-mobility.

eWaka specialises in electric cargo bicycles for last-mile delivery and agricultural transport.



Rwanda

ENERGY

AlphaESS is a green energy company providing storage systems to help establish mini-grids.

MeshPower Rwanda are a company providing solar-powered nanogrids and smart metering systems that provide affordable electricity through pay-as-you-go and energy-as-a-service models.

WASTE AND SANITATION

Pit Vidura is conducting research to better serve their customers, collecting operational and customer-oriented feedback and then sharing it with other African sanitation service providers to improve safety and delivery.

Wastezon is an e-waste management company leveraging technology platforms.

Recyl'Africa, a waste management social enterprise, is raising awareness of waste management in Musanze District through education in schools on the importance of recycling products, including plastic bottles, into creative items and reusing food waste to produce organic fertiliser.

TRANSPORT

Ampersand is an e-mobility two-wheeler manufacturer operating battery swap stations.

KABISA is an EV dealer installing fast charging stations in intermediary cities including Rubavu and Musanze.

IZI is a company that offers 'E-Mobility-As-A-Service' as a full-service leasing package, offered at a low per KM fee or on a revenue share basis.

2.3 Building blocks of digital innovation adoption

Governance and policy frameworks

Drivers

1. Early buy-in from city leadership leads to political goodwill, a key indicator of innovation.
2. Clear city autonomy and budget control enable authorities to respond expeditiously to unique city needs.

Barriers

1. Misalignment with national priorities results in duplication of development efforts.
2. Fragmented and underfunded authorities are unable to implement development objectives.

Political and administrative leaders play a decisive role in the success or stalling of digital innovations for public services, especially in highly regulated sectors like utility services. Without explicit leadership support, even promising innovations face bureaucratic bottlenecks, implementation delays and limited adoption. Successful programmes have built political will by incentivising leaders and ensuring they participate in development and implementation. For example, the UNESCO Global Network of Learning Cities initiatives appoint a focal person, seconded by the mayor, to ensure adequate city representation throughout the programme. Another example of securing political buy-in is Sanivation in Malindi, which first engaged with the city through a planning process.[93,94] After conducting an assessment identifying the city's biggest challenges, brainstorming solutions and creating an investment action plan, the city and Sanivation were able to secure World Bank funding for a waste-to-value faecal sludge treatment plant. Early and open engagement are key to securing support from leadership for these initiatives, coupled with sufficient investment in capacity building within administrations.

The digital innovation gap between capital and intermediary cities is widening because of differing priorities, levels of autonomy and visibility. Cities tend to prioritise digital innovations that address their most pressing public service needs. Larger capital cities often have easier access to resources than intermediary cities because they host successful businesses, high-level politicians and international government representatives. By contrast, smaller cities tend to have fewer resources – a more foundational service delivery challenge. In Gulu, for example, various stakeholders, including innovators, development partners and municipal leadership, have recognised the need to address waste management challenges in the face of limited budgetary allocations and institutional capacity. They have consequently embraced partnerships and mobilised resources to address their public service delivery gaps, for example, through the Gulu Integrated Catchment Management project. In the context of limited fiscal freedoms, business models that rely on municipal expenditure need to drive new municipal revenue streams. For waste management innovators focused on intermediary cities, this requires adopting business models with multiple revenue streams.

93. Sanivation. (2020). Malindi Solid Waste Management Report, for Malindi, Watamu and the Surrounding Peri-Urban Areas. *Report*.
94. GSMA. (2023). Success in partnership and planning: Sanivation's evolving circular sanitation model in Kenya. *Blog*.

Intermediary cities are often constrained by requirements to align local budgets with central government priorities. Cities that have successfully adopted digital innovations often exhibit strong budgetary authority and an ability to align their financing with local priorities. This enables them to not only take more risks when piloting new and unique solutions, but also to make corresponding processes, such as business registration or service provision contract development, smoother and more efficient. Kenya's Urban Areas and Cities Act (2011) grants city boards the authority to develop budgets that are approved by county executives. In contrast, Uganda's more centralised approach – where budget approvals are made at the national level – can limit the ability of cities to respond to local challenges. For instance, despite Hoima's growing need to support private sector-led solutions for waste collection, water access and sanitation, only UGX 13 million ($3,550) – 0.03% of the city's budget – was allocated to private sector development. In the absence of greater fiscal devolution, utilising the full range of central government transfer mechanisms – including compacts or performance-linked budgets – can be a way for central government to support innovation in intermediary cities.

Innovation happens when intermediary cities are allowed to act freely and address their most pressing challenges. Beyond budgetary authority, legislative frameworks across East Africa grant varying degrees of municipal autonomy, significantly affecting local decision-making power. This extends to providing services and leveraging partnerships for service delivery. For instance, Rwanda's National Urbanisation Policy, supplemented by the country's strong urban development regulations and strategy, grants intermediary cities authority to implement individual plans approved at the provincial level, speeding the implementation of urban improvement projects. This authority to act has enabled cities like Musanze and Rubavu to quickly implement transformative interventions such as the AfDB-funded Sustainable Water Supply and Sanitation Program, which increased Musanze's water pipe network by 151 kilometres and established 30 water kiosks with advanced monitoring technology.

Contracting frameworks shape the incentives and viability of innovation in intermediary cities. While government-led service contracting remains central to utility delivery in East Africa, its current design often constrains private sector participation and limits long-term investment. In Rwanda, most independent water distributors operate under five-year contracts, restricting their ability to access commercial finance or commit to infrastructure upgrades. The AquaVirunga partnership in Rubavu, operating under a 15-year concession, demonstrates how longer contract tenors can unlock capital and enable more substantive improvements. In Uganda, frequent renegotiations and heavy dependence on central transfers create similar uncertainty for city-level PPPs, while in Kenya, rigid county procurement processes often exclude SMEs and start-ups from service provision. Without reforming these frameworks to extend time horizons, de-risk investment, and broaden participation, intermediary cities will struggle to attract the innovation and finance needed to close their service delivery gaps.

Digital and core infrastructure

Drivers

1. Reliable internet connectivity facilitates reach and access to innovations.
2. Growing awareness of waste management challenges is spurring the development of innovative solutions.

Barriers

1. Limited physical infrastructure restricts access to public services.
2. Unpredictable impacts of climate change limit the ability of cities to accurately plan public service delivery.

Innovation in public service delivery depends on the availability and effectiveness of connectivity infrastructure and technology. This includes foundational physical and digital systems that enable innovations to be deployed and used. Across East Africa, national governments have invested in extending infrastructure, including for electricity, internet connectivity and transport. These efforts are aligned with national development agendas, including Kenya Vision 2030, Uganda Vision 2040 and Rwanda Vision 2050, all of which underscore the role of infrastructure and technology in accelerating innovation and economic transformation. Across these agendas, key infrastructure development initiatives include the adoption and use of innovations such as e-governance systems, online data management platforms and mobile services.

Baseline physical infrastructure, including accessible roads, a functional electricity grid and water distribution networks, enable effective digital innovations. In the absence of reliable physical infrastructure, innovations are unable to reach their intended users or function as designed. However, cities that integrate smart solutions in upgraded infrastructure can drive higher adoption rates. Achieving this integration requires systems-level approaches that combine physical infrastructure with enabling systems such as electricity and climate-resilient features (including flood management systems). These supportive elements ensure that both the infrastructure and digital solutions built on top of them can operate efficiently. For example, the Uganda Electricity Distribution Company (formerly operated by UMEME), was able to onboard 98.4% of its total customers to a prepaid smart meter system only after setting up a dynamic network and making 1.9 million connections.[95]

Development and adoption of digital innovation are difficult in the absence of reliable internet and mobile connectivity. Innovators based in areas with access to high-volume internet provided by internet service providers (ISPs) or mobile operators can build and test solutions, run simulations (including climate-related risk models, system performance and user experience tests) and make digital services available to users. However, ISPs face challenges providing reliable connectivity due to the high upfront costs of setting up network infrastructure. For instance, more than 80% of mobile towers located in bad- or off-grid areas across Africa rely on expensive diesel generators.[96] To address this, governments seeking to accelerate innovation have established broadband infrastructure and provided internet access to innovation hubs and schools. In Uganda, for example, the government has completed 57% of the National Backbone Infrastructure (NBI) project, covering 4,300 kilometres and connecting it to schools, universities and innovation hubs.[97] While

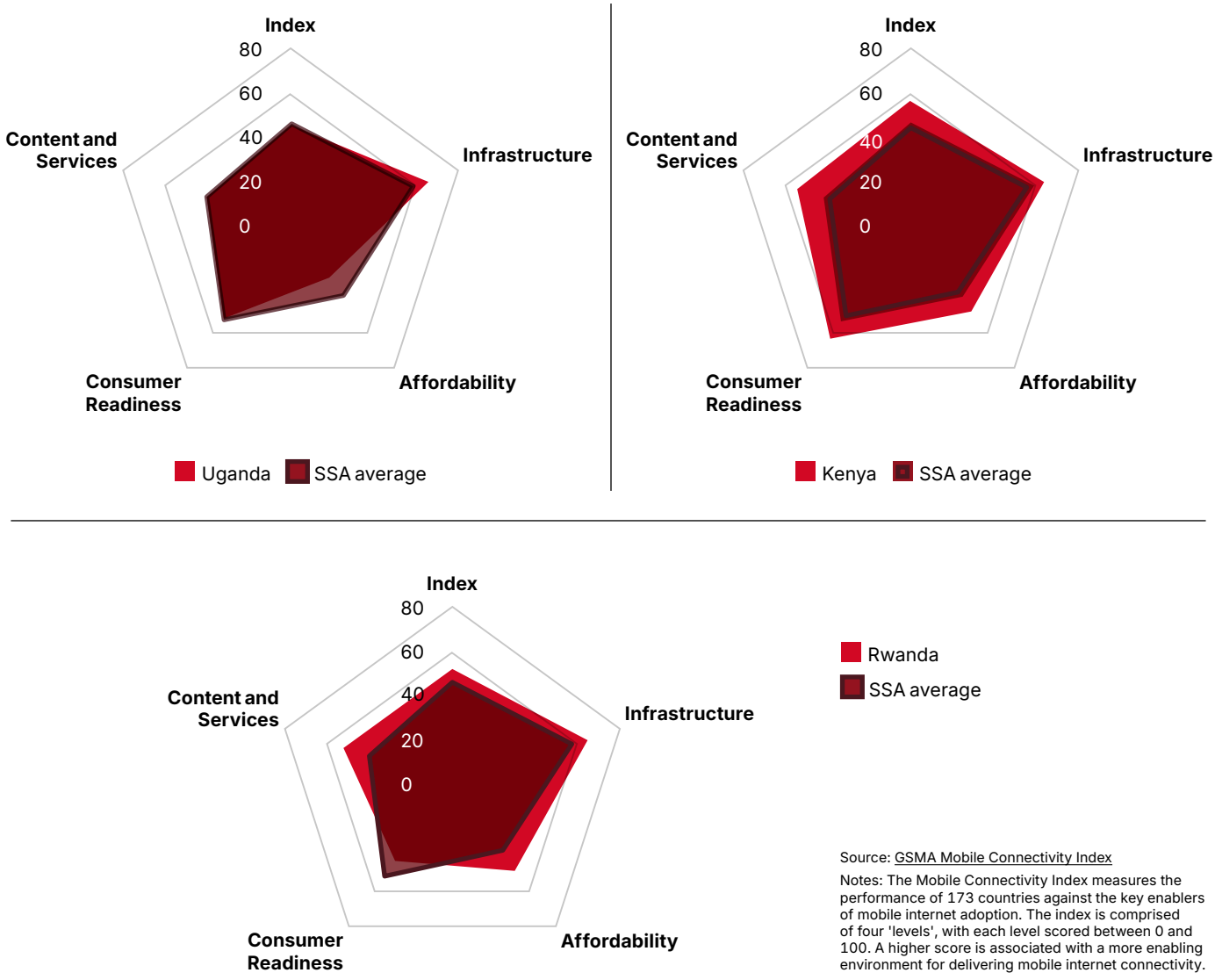
95. UMEME. (2024). Annual report. *Report*.
96. GSMA. (2024). Why and how mobile operators are looking to renewables to power networks across Africa. *Blog*.
97. Uganda Communications Commission. (2023). The Communication Sector Journey. *Report*.

broadband is central to supporting digital adoption in businesses, municipalities and education, many individuals will become reliant on mobile connectivity and devices. This means accelerating digital adoption in the short and medium term will require closing gender and usage gaps in mobile access.

Climate resilience is one entry point for funders and municipalities to test new infrastructure and digital service models. Innovative and climate-adaptive solutions, such as HydroBox in Kenya which combines hydropower with a solar hybrid system to ensure consistent energy supply, can be leveraged to solve service delivery issues that will be exacerbated by climate change. Programmes such as the Kenya Urban Support Program II are providing technical support and training to local governments on urban resilience to climate adaptation. These programmes, and the associated funding, enable innovators to develop innovative solutions that can close the service gaps not currently addressed by centralised utilities. For instance, companies like Majik Water are using atmospheric water generation to provide affordable and sustainable drinking water in cities like Isiolo that have arid or semi-arid climates and struggle with regular access to water. This not only provides companies with opportunities to test and scale their solutions, but also strengthens climate resilience in the cities where they operate.

Figure 15

GSMA Connectivity Index



Source: GSMA Mobile Connectivity Index

Notes: The Mobile Connectivity Index measures the performance of 173 countries against the key enablers of mobile internet adoption. The index is comprised of four 'levels', with each level scored between 0 and 100. A higher score is associated with a more enabling environment for delivering mobile internet connectivity.

Digital skills

Drivers

1. Best practices from other cities provide benchmarks for cities seeking to adopt digital innovations in public service delivery.
2. National reforms in the past decade like curriculum updates and the liberalisation of universities, have increased digital skills.

Barriers

1. Low levels of digital skills and last-mile inclusion hinder the ability of cities to develop digital innovations and residents to adopt and benefit from them.
2. Limited access to digital tools, particularly at the last mile, hinders the ability of residents to develop and sharpen digital skills.

Without digitally literate populations, technically capable institutions and city staff empowered to implement change, even well-designed innovations struggle to gain traction. Capacity gaps, whether in basic user skills (mobile money literacy, mobile app familiarity, USSD code navigation and online safety) or more specialist skills (coding, data analytics and system integration) in local government and businesses, directly constrain public service delivery outcomes and limit scalability. The specialist digital skills needed within business and government often require strong educational institutions as hubs for innovation. For example, Mbarara University and Mount Kenya University in Thika serve as learning centres and help build crucial knowledge and skills in the workforce. End users, on the other hand, are often less reliant on formal training to develop core digital skills, instead turning to peers, community-based services and service providers.

Low digital skills and last-mile inclusion continue to make it difficult for intermediary cities to fully leverage digital innovation. Access to digital skills is uneven, particularly in intermediary cities where there are fewer universities and technical institutions. For example, in Hoima, Uganda, both the public and private sector are often forced to recruit from Kampala or other nearby cities because Hoima does not have enough tertiary education infrastructure to develop sufficient local talent. In contrast, Mbarara and Isiolo host Mbarara University of Science and Technology and the Isiolo Technical Training Institute, and have cultivated comparatively vibrant innovation ecosystems. Challenges accessing digital tools for skills development and use hinder the adoption of digital innovations for public service delivery. Despite the promotion of technical training curricula and the establishment of additional learning institutions, new skills are only put into practice when digital tools are available. Affordability, low value recognition and unreliable power infrastructure have all kept access to digital devices low, particularly in the last mile, limiting the effectiveness of curriculum changes.

Figure 16

National digital skills interventions

	Kenya	Uganda	Rwanda
Institutional reforms	The Science, Technology and Innovation Act (2013) created the National Commission for Science, Technology and Innovation and the Kenya National Innovation Agency (KeNIA). KeNIA operates innovation hubs across the country, such as the Isiolo Youth Innovation Centre.		
Education reforms		The Ministry of Education in Uganda updated its higher education curriculum in 2012 to require students to study ICT.[98]	Building Digital Literacy in Rwanda is a programme with an ambitious target to modernise school curricula to meet the realities of today's economy. The programme has set a goal for all secondary school graduates to receive a "digital passport", meaning they have demonstrated core technical and digital competencies such as word processing, spreadsheet proficiency and information searches.
Training partnerships and centres	Malidi's Elimu Resource Center's Digitech Lab has trained more than 240 students in emerging technologies, including AI, machine learning, cybersecurity and blockchain, ensuring youth are prepared for the digital economy.	The UCUSAF Digital Skilling Program enhances productivity and local content creation by promoting ICT adoption across all demographics.	
Access to devices and digital tools	Innovation centres like LakeHub in Kisumu provide access to both basic and modern digital tools, such as data analytics and GIS mapping software, to develop digital skills at every level.	Mobile operators in Uganda have moved to open APIs to support a more vibrant and accessible innovation ecosystem.	The Internet Society Foundation established the Kibungo Internet Access Centre in Bugesera, which provides 48 computers, as well internet access, for community use in the Ntarama Sector. The Connect Rwanda Campaign, launched in 2020 and spearheaded by MTN Rwanda and the Ministry of ICT and Innovation, pledged more than 24,000 smartphones for vulnerable households to increase access to devices.

In many cases, it will be the innovators themselves who develop digital skills, as the roll-out of core services entails training both end users and B2B clients. Innovators planning to scale in contexts with lower digital skills will often have to build training into both their sales cycles and roll-out plans. This is equally true of the digitalisation of government services. For example, while the Rwandan government has rolled out Irembo to provide access to e-government services, there is low uptake of digital platforms. According to district officials, some of the primary issues are low literacy levels, which in turn affect digital literacy, a hesitancy to change behaviours and adopt digital tools and a lack of trust of online platforms and preference for in-person meetings.

The GSMA Mobile Internet Skills Training ToolkitMobile Internet Skills Training Toolkit (MISTT) has been used to train more than 80 million people in digital skills in 40 countries. A major lesson has been that skills training for end users needs to be aligned with their life needs. As digital technology becomes more embedded in daily life, B2B interactions and government services, skills development must target their specific needs. This will vary by context and requires careful consideration based on the digital competency and proficiency of end.

98. The Observer..(2012). Uganda: Skepticism as Govt Introduces ICT At A-Level. *Media*.

Funding and financing innovation

Drivers

1. Digital lending and innovative finance mechanisms are creating new avenues for collateralisation and borrowing for innovators.
2. The availability of public finance mechanisms, particularly donor support, creates opportunities for innovators to test and refine new solutions.

Barriers

1. Misalignment with existing finance mechanisms limits the ability of innovators to attract "missing middle" financing.
2. Low budget allocation for private sector development and limited co-financing limits private sector development in cities.

Innovators originating in intermediary cities face more challenges than those in major cities. Perceived as higher risk, they are often also seeking smaller ticket sizes – typically $30,000 to $150,000 – which means the time and resources required for due diligence and support do not justify the investment. To address these gaps, national governments are empowering innovation hubs, such as the Hanga Hubs in Rwanda and the Isiolo Youth Innovation Centre in Kenya, to provide seed financing to innovators in the form of grants. These initial seed grants can take startups through proof-of-concept, but accessing the next stage of capital remains a challenge. In many cases, donor or government-backed sector-specific or geographically targeted investment funds are bridging the gap, providing funds for market validation and initial scaling that can take startups to the next phase of funding (see Figure 17 for examples).

For individuals and small firms, digital lending platforms can facilitate access to working capital in the early stage. The increased use of digital technologies generates substantial volumes of data, including mobile money data, transaction histories and others that can be leveraged for non-traditional credit scoring and rating. Consequently, innovators and residents alike are increasingly taking advantage of digital lending platforms. For instance, M-Kopa provides access to asset financing for mobile devices and then unlocks access to digital loans if users are compliant with payment terms for three months. In addition to creating new lending platforms, digital technologies are enabling the emergence of alternative credit-scoring mechanisms, for example, the use of mobile money records where collateralisation is difficult. Companies like GnuGrid in Uganda and Transunion in Kenya are using self-reported transaction and operation data to supplement traditional lending verification checks, such as those for loan collateral used by commercial banks and other traditional lenders. Another example is JUMO, which uses GSM records and mobile wallet transaction data to assess creditworthiness, allowing automated loan decisions for unbanked individuals. Additionally, country governments are leveraging online payment systems and forming partnerships with e-service providers, such as Irembo in Rwanda, to simplify payments, ensure accountability and reach more citizens.

National companies looking to scale to intermediary cities have a wider range of innovative financing options. Receivables financing is playing a major role in supporting energy access in the region, and d.light and Sunking have collectively secured more than $1 billion in securitised debt deals to support their expansion in East Africa.[99,100] These deals are important for

99. Citi. (2025). $156M Sun King Securitization to Deliver Solar for Over a Million Kenyans. *Press release*.
100. The Out. (2025). d.light Secures $300 Million to Expand Solar Financing for Off-Grid Communities in Africa. *Media*.

several reasons: 1) they are either local currency or multi-currency deals; 2) in the case of d.light they blend donor and more commercial capital; and 3) in both cases, the companies are in successive funding rounds and raised more than $100 million per round having successfully repaid previous debt. Beyond receivables-backed debt for smaller assets, leasing models are emerging for assets that are too expensive to be offered on a PAYG basis and can be digitally monitored and tracked. In 2024, Basigo secured $42 million in a Series A round to scale this model, initially focusing on Kenya and Rwanda.[101]

Financing from donors and other development partners continues to play a key role in major infrastructure development. While it is uncommon for smaller companies to receive direct support, there are positive signs that more innovative delivery models are being deployed, particularly in infrastructure-heavy sectors with complex value chains like waste management and sanitation. Here, a large infrastructure investment is likely to only address one part of the value chain (such as centralised treatment), while other companies that depend on that infrastructure can operate in other parts of the value chain (such as digital tools for waste collection). The opposite can be true, as with Sanivation in Malindi, which centrally manages the faecal sludge treatment plants under a design, build, operate and maintain (D-BOM) PPP model, with other parts of the value chain coordinated by other actors. Integrating innovative models in large infrastructure investments requires both coordination and a portfolio approach. There are positive signs in the energy sector that mixed provision strategies are feeding through to coordinated implementation (as outlined in section 2.2), while scalable PPP models such as Sanivation's require working in multiple cities to justify the transaction costs.

Figure 17

Mechanisms for strengthening innovation funding

	Kenya	Rwanda
 **Sector investment funds**	The Kenya Climate Innovation Center's (KCIC) AgriBiz programme is targeting rural and peri-urban youth and women solving climate issues in the agricultural sector in eight counties. The programme will deploy KES 5.1 billion (~$40 million) for promising startups in the agriculture sector. There is improved access to finance from commercial banks like the National Bank of Kenya, along with early-stage, risk-tolerant capital from initiatives such as the Kenya Innovative Finance Facility for Water (KIFFWA). For instance, KIFFWA, in partnership with Earthview Management Limited, a provider of e-billing software and hardware solutions that uses IoT and smart technologies, are helping Water Resources Authority (WRA) implement an advanced smart metering infrastructure network across the country, demonstrating how catalytic funding can accelerate tech adoption in the water sector. The $14 million Impact for Northern Kenya Fund, which provides funding to financial institutions for on-lending to MSMEs in agriculture, livestock and related sectors, are helping create the conditions for innovation in Isiolo.	The European Investment Bank signed a $22 million line of credit facility with the Development Bank of Rwanda to support Ireme Invest, the country's flagship private-sector climate financing initiative. In 2024 alone, this fund issued grants worth $1.9 million to 16 companies. The Rwanda Green Fund (FONERWA) and BRD, through the Ireme Invest Credit Facility and supported by Agence Française de Développement (AFD), launched a $23 million (RWF 34 billion) programme to provide accessible and affordable financing for low-carbon or resilient green projects. Through the facility, BasiGo was awarded a recoverable grant of $225,000 (RWF 300 million) to upgrade its charging infrastructure and support its growing fleet of electric buses in Kigali, addressing the need for sustainable urban transport solutions.

101. Basigo. (2023). BasiGo Secures $42M in Funding to Scale Public Transport Electrification in Sub-Saharan Africa. *Press release*.



Government-backed innovation competitions and R&D funds

Uganda

The Ugandan National ICT Initiatives Support Programme (NIISP) has issued grants worth $2 million to 45 health innovators to develop solutions to COVID-19-related challenges.

Rwanda

The Government of Rwanda has set up Hanga Hubs, which host the annual Hanga PitchFest competition. Since 2021, this competition has disbursed more than RWF 600 million ($428,000) in funding to more than 200 innovative ventures.

The Rwanda Innovation Fund provides technical support and funding for tech startups. The fund offers investment tickets based on the company's size, typically ranging from $250,000 to $10 million (RWF 0.35–14 billion). SMEs in the export sector also benefit from the Export Growth Fund, a $9.4 million (RWF 12.8 billion) government-managed initiative.

Agaciro Development Fund (AGDF), Rwanda's sovereign wealth fund, has diversified beyond government securities into equity investments in private companies such as Gasabo 3D, an engineering firm, and Prime Economic Zones Ltd (PEZ), the developer and operator of the Kigali Special Economic Zone (KSEZ).



Results-based funding facilities

Uganda

The Beyond the Grid Fund for Africa (BGFA) has signed two new agreements in Uganda to establish new mini-grids and scale up the distribution of solar-powered refrigerators in the country.

Kenya

The Kenya Off-Grid Solar Energy Access Project received $150 million in World Bank funding to provide results-based financing to off-grid solar providers to expand access. The funding was designed to act as a subsidy to incentivise investment in underserved areas.

Rwanda

Solektra, a beneficiary of the national Results-Based Financing project, has distributed more than 1,200 SHS to low-income households in several districts, including Rubavu.



Investment guarantees

Kenya

The Kenya Small Vehicles E-Mobility project has allocated $3.8 million (EUR 3.5 million) in second-loss partial credit guarantees to de-risk loans for commercial fleets, particularly those operating in peri-urban and rural areas. The project is unlocking private sector debt financing through a $5.9 million (EUR 5.5 million) first-loss credit guarantee fund, which covers up to the first 10% of losses, mitigating risks associated with local e-vehicle manufacturing and assembly.

Rwanda

The Kigali International Financial Centre (KIFC) is a key ecosystem player attracting private equity and VC firms to invest in Rwandan companies, which often struggle to secure traditional bank funding. The government creates an enabling environment for KIFC members by granting a preferential corporate income tax rate and exempting them from withholding tax on dividends, interest and royalty payments. KIFC-backed investments include Admaius' 2024 equity investments in TRES Infrastructure Limited.



Blended finance

Regional

Since 2020, African Frontier Capital (AFC) has worked with d.light to secure a total of $842 million in funding through its Brighter Life Kenya receivables financing facilities. Brighter Life Kenya 1 (BLK1) has already repaid its $110 million senior debt to the development finance institutions (DFIs) and commercial investors that supported the vehicle, and has enabled 1.5 million people living off-grid in Kenya to benefit from improved energy access.

Kenya

Sun King and Citi have collaborated on a pioneering $156 million securitisation transaction, denominated entirely in Kenyan shillings. The senior debt is taken by ABSA, Citi and Kenyan banks, while the mezzanine debt is supported by British International Investment (BII) and other more impact-focused funders.



Bonds

Rwanda

In late 2024, Prime Energy, a Rwanda-based renewable energy producer, listed the country's inaugural green bond on the Rwandan Stock Exchange. The $6.8 million (RWF 9.6 billion) seven-year bond was offered in two tranches – an RWF tranche at a 13.75% interest rate and a USD tranche at 9.5%. Prime Energy is partnering with BK Capital as a lead financial advisor, as well as BPR Bank to oversee compliance, ensuring accountability throughout the capital raise and deployment processes. Additionally, two sustainability-linked bonds (SLBs) were recently listed on the Rwandan Stock Exchange: an IFC-backed "Umuganda" bond in 2025 to support the deployment of digital infrastructure and a Development Bank of Rwanda bond in 2023 aimed at supporting women-owned business.


STOP

3

Pathways to supporting digital innovation



Realising the innovation potential of East Africa's intermediary cities requires more than isolated interventions. It demands coordinated, system-wide shifts in how cities access infrastructure, finance, skills and partnerships. A cross-country analysis of Kenya, Rwanda and Uganda revealed several pathways, reflecting not only the distinct governance and economic contexts of each country, but also the shared structural challenges that shape digital innovation across the region. These pathways are designed to respond directly to the recurring barriers identified in this assessment, while offering scalable, locally relevant strategies to unlock innovation-led service delivery.

3.1 Governance and policy frameworks

A lack of autonomy in making decisions and setting priorities makes it difficult for intermediary cities to address service delivery gaps. The first three pathways are intended to address these gaps and give cities greater authority to set priorities and motivate intentional action from governments.

Pathway 1: Create city-level centres of expertise to support digital adoption. National governments have created digital working groups, such as the Digital Transformation Working Group in Uganda and the Ministry of ICT and Digital Economy and the Inter-Ministerial Working Group in Kenya. However, coordination at the city level is limited. Creating local centres of expertise that reach across municipal functions is key to supporting broad-based adoption. India's model of creating municipal special purpose vehicles for the implementation of the Smart City Mission is an example of institutionalising this function, while Rwanda's Joint Action Development Forums (JADF) are an example of an existing mechanism that could be strengthened.[102] Such centres of expertise are vital to making sound choices about the digitalisation of government services and reflecting sound technology choices in public procurement decisions.

Pathway 2: Focus local e-governance initiatives on revenue-generating activities. Given the limited fiscal space at the municipal level, the digitalisation of government services can reap more immediate returns when focused on revenue-generating areas. Examples include those related to trade, payments for essential services and land taxes associated with urban expansion. When cities do not plan land for formal settlement, prices can escalate forcing many new residents to informal settlements and contributing to urban sprawl. By proactively organizing the periphery to accommodate future population growth, urban expansion planning can help cities generate revenues while also supporting future residents to reap the benefits of formality.[103]

102. GSMA. (2025). Digital Foundations: The Path to People-Centred Smart Cities. *Report*.
103. Africa Urban Lab. (2025). Urban Expansion & the Periphery. *Report*.

Pathway 3: For central government transfers, consider "innovation compacts" that link incentives for digital transformation and fiscal autonomy. Innovation compacts, agreements that ring-fence a portion of central transfers for city-level innovation pilots, would offer flexible financing or technical upgrades in exchange for measurable progress on digital transformation. Such pay-for-performance metrics could include the percentage of residents accessing e-services, digital payment penetration or the integration and use of public feedback mechanisms. Making funding unrestricted would enable cities to address the most pressing issues. Kenya's devolved governance model and Rwanda's strong provincial planning frameworks provide enabling conditions for such compacts to be piloted and scaled. In more centralised contexts like Uganda, pilot demonstrations and city-by-city advocacy may be required to build the case.

Pathway 4: Identify fast-growing cities and grant them the fiscal autonomy to plan for growth. In many cases, this is tied more closely to operationalising devolution frameworks, rather than establishing them. With the ability to raise, manage and allocate their own revenues, intermediary cities can invest in infrastructure, housing and basic services tailored to local needs. Fiscal autonomy also strengthens accountability, fosters innovation in revenue generation and enhances resilience, positioning these cities as engines of inclusive and sustainable national development. In Rwanda and Uganda, greater fiscal autonomy for cities is particularly important because both countries have highly centralised governance systems that limit local decision-making and resource mobilisation. Greater fiscal autonomy would allow them to capture local revenues, prioritise context-specific needs and drive balanced regional development, reducing overdependence on capital cities like Kigali and Kampala.

3.2 Digital and core infrastructure

Addressing core infrastructure gaps, both for digital and essential services, lays the foundation for balanced urban development. Strengthening basic infrastructure through policymaking, investment and financial incentives enables innovation to thrive, with e-mobility, waste management and increased energy supply all fertile opportunities. In many cases city-level institutions will have service mandates, but many of the relevant levers sit with national utilities, regulators, and private operators. Cities can influence land-use planning, rights-of-way, and local pilots, but are limited in reference to national infrastructure investment, tariffs and certain regulatory requirements for service delivery.



Pathway 1: Plan the periphery, prepare for growth. In most cases, rapid urban expansion happens at the periphery of a city, with densification often only accounting for a small proportion of growth. For rapidly growing intermediary cities, it is important to ensure this growth is planned, as retrofitting infrastructure can be more than three times as expensive and poorly planned expansions may mean municipalities miss the opportunity for land value capture. Effective digital and core infrastructure planning is the backbone of well-planned urban expansion. A key limitation to overcome in delivering on this aim is under-resourced municipalities, ensuring the combination of planning an enforcement needed to deliver planned expansion requires a focused investment in city administrations. Urban expansion planning offers a cost-effective altnernative to large-scale master planning and focusses on four key themes: expanding city boundaries, delineating public and private land, securing land for a grid of arterial roads, and protecting environmentally sensitive spaces.[104]

104. Africa Urban Lab. (2025). Urban Expansion & the Periphery. *Report*.

Pathway 2: Use digital technologies to blend centralised and decentralised essential services. Digital technologies offer the opportunity to blend centralised and decentralised modes of delivery across essential services – in energy through virtual and smarter grids, in waste management and sanitation through coordinating central treatment and disbursed value chains and in transport through tracking and coordinating public and private assets. By partnering with private service providers, intermediary cities can close growing urban service gaps, while focusing scare fiscal resources on key priorities.

Pathway 3: Invest in the full spectrum of connectivity. Inn ovation in intermediary cities will be built on both mobile connectivity and internet access. To support government, industry and education, extending national broadband networks is key to digitalising government services, MSMEs and industry. For public digital adoption, cellular connectivity is likely to remain the primary channel, as network coverage is generally high in intermediary cities. Addressing handset affordability remains the greatest barrier to closing the digital divide in usage and the gender gap.[105,106] The GSMA Handset Affordability Coalition has published guidance on addressing the barriers of cost, access to finance and awareness among end users.[107]

3.3 Digital skills

The development of digital skills requires addressing the core barriers underpinning gender and usage gaps. Access to connectivity and devices is typically lower in intermediary cities, which means digital services must be built with the risks of exclusion in mind. The deployment of digital services, in many cases, will itself be a key opportunity to build people's core skills. For the more specialist skills needed in business and government, the roll-out of national programmes is a key opportunity. The long-term development of both specialist and general digital skills starts with strengthening digital skills training in schools, tertiary and vocational training and education.

Pathway 1: Use the roll-out of digital services as upskilling opportunities. While digital divides will continue to limit the scope of business-to-customer (B2C) services and e-government services for citizens, B2B and B2G use cases provide an important opportunity to build more specialist skills. As noted earlier, these are particularly important in revenue-generating opportunities. Examples include Gulu's digitalisation of trade and the roll-out of Irembo in Rwanda. National initiatives are also an important mechanism for distributing much-needed essential equipment for municipalities.

Pathway 2: Align digital skills initiatives with the economic identities, growth trajectories and local priorities of intermediary cities. While foundational digital skills training, including basic computer use, internet navigation and online safety, are applicable across regions and use cases, it is important for training programmes to be nuanced in their approach and aligned with the economic identities and growth priorities of different cities.

105. GSMA. (2024). The State of Mobile Internet Connectivity Report 2024. *Report*.
106. GSMA. (2025). The Mobile Gender Gap Report 2025. *Report*.
107. GSMA. (2024). Improving handset affordability in low- and middle-income countries. *Report*.

Pathway 3: For more specialist digital skills, enhance the capacity of educational and training institutions. These institutions often lack sufficient technical capacity, including digital tools and internet connectivity, to ensure these skills are usable in an increasingly connected world. The Isiolo Youth Innovation Centre, for example, provides training in technology and business skills, but struggles to implement more advanced digital software courses due to poor internet connectivity. To address this gap, governments and development partners can establish and equip innovation labs in educational institutions. National governments can also empower public institutions by providing specialised tools such as software licences, collaboration platforms and prototyping equipment to support product development. For example, the Kenyan government has implemented an initiative through the iHubs partnership with the University of Nairobi, organising a civic innovation challenge that promoted the development of digital platforms for e-government services at the county level.

3.4 Funding and financing innovation

For many intermediary cities, supporting the adoption of digital innovation will require blending public, private and philanthropic capital effectively. Development and multilateral finance are a key source of funding for large-scale infrastructure, but the extent to which these larger investments are designed to accommodate innovation can either enable or block innovation.

For private capital flowing to startups, there is an important distinction between startups that operate nationally and make investments across multiple intermediary cities, and startups that originate in intermediary cities. The latter (broadly) requires access to much smaller ticket sizes and finance focused on small capital investment and working capital.

Pathway 1: Use public funding to de-risk access to finance through guarantees, concessionary funding and regulatory reform, and embrace innovative financing mechanisms. Results-based funding has proved vital in spurring the off-grid energy sector, with programmes active in all three focus countries.[108] With a clear precedent set, these mechanisms can be effective in other digitally enabled use cases, such as productive use equipment, e-mobility and mini-grid development. National governments should embrace novel financing mechanisms, including the issuance of green bonds, that specifically target innovation in public services.

Pathway 2: To support innovators from intermediary cities, focus on financing mechanisms for smaller ticket sizes and access to finance for working capital. Sector or site-specific national funds can be used to channel smaller amounts of capital to early-stage companies, with many examples already operational. For working capital, digital lending is likely to remain important for many MSMEs with non-existent or limited credit histories. For many others, receivables financing is an opportunity to access working capital based on customer repayment histories.

108. "Unlocking Off-Grid Solar: How Results-Based Financing is driving energy access and powering productivity", GOGLA, 2024. Link

3.5 Innovation ecosystem and partnerships

To build sustainable innovation ecosystems in intermediary cities, several conditions must be met. Innovations at various stages of development, both experimental and validated, must be present to showcase ecosystem dynamism. Entrepreneurs must have the resources necessary to advance from the ideation to the pilot stage, and the public and private sector need to collaborate effectively to provide pathways to scale. Intermediary cities can create the innovation ecosystems necessary to address their most pressing service gaps by creating unique incentives to draw capital city-oriented startups to smaller locales, by developing a conducive environment for entrepreneurial support organisations and by piloting unique PPP frameworks. Intermediary cities also offer the opportunity to pilot innovative solutions that could be scaled up nationally.

Pathway 1: Make public-private partnerships work for innovation by structuring, aligning and localising collaboration models. PPPs and other cross-sector collaborations hold enormous potential to accelerate innovation in intermediary cities. However, they have had mixed success across East Africa. While partnerships have enabled impactful service delivery in some cities, such as Malindi's sanitation planning or Kigali's Innovation City, many remain ad hoc, duplicative or stalled due to misaligned incentives and unclear governance. To unlock their full potential, PPPs must move beyond bilateral relationships and become institutionalised, performance-oriented and locally grounded. This requires designing fit-for-purpose partnership models that reflect the unique capacities and constraints of intermediary cities.[109] For example, rather than relying solely on national-level PPP units, cities can establish local innovation coordination desks or focal points within municipal governments to act as conveners, manage partnership portfolios and streamline collaboration with private innovators and development partners.

Pathway 2: Use national frameworks to simplify scaling to intermediary cities. National government development actors can introduce light-touch, pre-negotiated frameworks such as model concession agreements, innovation procurement templates or co-financing protocols. These lower transaction costs and reduce delays in structuring partnerships. Rwanda's partnership with Carnegie Mellon University in Kigali, in which the government contributed land and regulatory support while private actors brought in technology and capacity, is one model of clearly structured, multi-party engagement.

Pathway 3: Close the gap between national and city innovation ecosystems. Both national and city governments can encourage privately operated innovation hubs to expand to additional cities. Following a similar model to the Government of Uganda's partnership with The Innovation Village (TIV), national governments can sign MoUs with private players to prioritise expansion to specific geographies. To facilitate the expansion, cities can offer physical space to these innovation hubs or reduced rates on rent in public buildings, as well as concessions on local licensing or administrative fees. Universities in intermediary cities are excellent anchor institutions for these initiatives.

109. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/gsma_resources/partnering-with-the-public-sector-a-toolkit-for-start-ups-in-the-utilities-sectors/

Pathway 4: Take full advantage of existing mechanisms to support innovation in utilities. Mechanisms such as performance-based transfers, shared savings contracts (especially for utilities) or digital adoption-linked bonuses can better align public and private actors on measurable outcomes. In service provision partnerships, both parties should be incentivised and obligated to conduct regular reviews of key revenue drivers, such as tariff levels or billing collection rates. Lastly, successful collaborations such as Malindi's Citywide Inclusive Sanitation Committee or Gulu's Integrated Catchment Management Partnership, emerged from multi-stakeholder planning processes that brought in youth-led businesses, utilities and community organisations. Cities should adopt participatory planning mechanisms, formalised through working groups or task forces, to ensure innovation reflects diverse perspectives and is better positioned for local uptake.

Pathway 5: Donors and enabling organisations can play a catalytic role in supporting digital innovation in intermediary cities across East Africa. To drive digital innovation in East Africa's intermediary cities, donors and enabling organisations should adopt a dual approach: support place-based innovation locally while enabling startups from capital cities to scale. On the one hand, donor programmes can directly fund municipalities, universities and local innovation hubs to test and adapt solutions that respond to city-specific needs – whether in mobility, utilities or service delivery. This strengthens local ownership and ensures that digital tools are tailored to the context rather than imported wholesale. At the same time, many promising startups have emerged from capital cities where ecosystems and financing are stronger. Donors can provide grant funding and concessional capital to help these firms de-risk expansion to intermediary cities, where commercial viability may be less certain but the social and development impact is significant. Flexible funding instruments, coupled with technical assistance to adapt products to new markets, can be game changers. There are emerging models worth building on. The Challenge Works "Accelerating Innovation in Rapidly Growing Cities" programme shows how open calls can mobilise digital solutions to pressing urban challenges.[110] Cities Alliance's Secondary Cities programme demonstrates the long-term value of capacity building and coordination for intermediary urban growth.[111] Meanwhile, the World Bank's investment in 35 Ghanaian intermediary cities highlights how structured, large-scale financing can significantly expand service delivery.[112] By blending challenge-style innovation funding with support for capital and major city-based startups to scale, donors can create pathways for digital transformation that reach well beyond national capitals and strengthen East Africa's intermediary cities as engines of inclusive growth.

Realising the vision of sustainable development across intermediary cities in East Africa, enabled by innovation and digital technology, will require sustained commitment, collaboration and investment. The pathways identified in this report underscore that intermediary cities are not peripheral, but central to shaping inclusive urban and economic futures in the region. The GSMA is committed to advancing these pathways by leveraging its expertise, partnerships and industry convening power to help cities strengthen governance frameworks, expand digital and core infrastructure, build digital skills, unlock financing and foster dynamic innovation ecosystems. Working alongside governments, private sector actors and development partners, the GSMA will continue to champion scalable, locally grounded solutions that empower intermediary cities to deliver better services, create economic opportunities and improve quality of life for residents. By doing so, East Africa's intermediary cities can emerge as powerful drivers of sustainable development and engines of innovation across the continent.

110. https://challengeworks.org/thought-leader/accelerate-innovation-in-rapidly-growing-cities/

111. https://www.citiesalliance.org/themes/secondary-cities

112. https://www.worldbank.org/en/news/press-release/2022/06/08/afw-world-bank-supports-ghana-to-scale-up-and-improve-urban-services-to-2-million-people-in-35-secondary-cities

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