UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG 100 1922 2022

African Centre for the Study of the United States

The Second African Smart Cities Lab Initiative

2025 Summary Outline

Theme:

Re-imagining Smart African Cities:
Concepts, Practices and Implementation

October 1-3, 2025

Smart Cities Lab Partners

GAUTENG PROVINCE
CO-OPERATIVE GOVERNANCE AND TRADITIONAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

GAUTENG PROVINCE
INFRASTRUCTURE DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

WITS SCHOOL OF GOVERNANCE
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SCHOOL OF ARCHITECTURE & PLANNING

Executive Summary

The Cities Project is one of the flagship programmes at the African Centre for the Study of the United States, University of the Witwatersrand. The project has both knowledge production and policy outreach components. The focal point of the project has been to critically explore intellectual discourse and research on the following themes: sister city partnerships, city diplomacy, sustainable urban development, smart cities, and city-to-city university partnerships.

Africa is a rapidly developing continent presenting various opportunities relating to the unprecedented population growth, coupled with a high rate of urbanization. Africa's cities are a beckon towards effectively responding to massive overcrowding, poor infrastructure, and limited economic opportunities. There are concerns about the quality of life and underperformance of cities in Africa. These challenges serve as opportunities for cities to rise to their full potential as economic transformation agents. Smart city concepts and practices have become pathways to solutions that aim to aid cities in solving the socio-economic problems that African cities face in different contexts. The emergence of smart cities from the ground up or the adoption of smart city aspects in existing cities in Africa has been heavily influenced by globally circulating models showcasing smart urbanism as a means of global competitiveness. At the core of these models is the development of modern infrastructure and institutions. What has resulted is a mode of smart city development that has largely followed a kind of urban fantasy. For example, nationally driven, master planned, new city developments that are irreconcilable with the present realities of African cities have been sold as panaceas to urban problems. These new city developments rely on alliances between global real estate interests, national and municipal politicians, and an emerging African urban middle class; therefore, ostracizing the context of the communities, which then propels the manifestation of inequality in urban development.

Cities such as Konza Technopolis in Kenya, the redevelopment of Rwanda's capital Kigali as an innovation city, Eko Atlantic in Nigeria, and Lanseria Smart City in South Africa, have been marketed as "smart cities" offering the means through which African governments can respond to the challenges of urbanization, whilst providing economic opportunities that sustain urban growth. This stems from a belief that the future of Africa is global and global competitiveness is contingent on constructing "world- class" cities that exhibit cutting-edge infrastructure and institutions.

In response to the above challenges, the Smart Cities Lab we hosted in 2025 concluded that the adoption of smart city ideas in Africa must be rooted in contextual realities and properly calibrated to create urban spaces that are sustainable and inclusive. If ineffectively deployed, smart urban technologies might deepen existing inequalities and amplify spatial exclusions through the marketisation of the urban space.

Background and Context

The annual African Smart Cities Lab was held at the University of the Witwatersrand from October 1-3, 2025. This was the second edition of the initiative following the inaugural Smart Cities Lab held in August 2024. The Lab is a signature event under the Africa-US Cities Project in the African Centre for the Study of the United States, organized in conjunction with multiple partners representing academia, policymaking and government, think tanks, and the private sector. The Lab officially launched Urban October, a month-long campaign by the UN-Habitat that dedicates October's 31 days to promoting a better urban future. The 2025 Urban October was linked to the G20 Summit's Urban20.

The concept of 'smart cities' is traced to the city of Los Angeles in the 1970s. Its application grew alongside the evolution of digital technologies in the 1990s and the 2000s. The term was first used in a book entitled "The Technopolis Phenomenon: Smart Cities, Fast Systems, Global Networks," published in 1992. Since then, virtually all cities worldwide have adopted one or another smart city aspect. The smart city paradigm leverages information and communications technology (ICT) alongside Internet of Things (IoT) networks to enhance urban operations, services, and the interaction between governmental officials and the citizenry, thereby striving to attain sustainability without detrimentally affecting the environment, social welfare, or economic systems. The concepts and practices of "smart city" have gained significant traction globally over the past decade. They have emerged as crucial elements in not only urban strategic planning but also implementation, management, and monitoring and evaluating city management. The concept has garnered widespread acceptance and has been extensively deliberated and utilized from a multitude of perspectives, resulting in a substantial corpus of literature concerning frameworks and implementation that permeates the global dialogue.

The African Smart Cities Lab is traced to the Wits African Centre for the Study of the US's work on the internationalization of cities since 2019. The concept formed one of the panels during an Africa-US cities conference held in Johannesburg in February 2023, in partnership with the Washington, DC-based Sister Cities International. Following the conference, the idea of the African Smart Cities Lab was launched, with the first event held in August 2024. The inaugural event was organized in partnership with the Development Bank of Southern Africa, Wits School of Governance, Waterfall City Management Company, Steyn City, Itana and Charter Cities Institute.

Building on the 2024 event, the 2025 Lab was convened under the theme, “Re-imagining Smart African Cities: Concepts, Practices and Implementation”. Re-imagining African cities from a “smart” perspective aimed to infuse African realities in an otherwise largely global phenomenon. Analyzing concepts was motivated by the multifaceted dimensions, perspectives, and interests that form the broader smart city ecology. Focusing on practices meant drilling down to the real-time smart roll opportunities, as well as gaps and limitations. Implementation brought out best practices adaptable to the African context. The Lab aimed to establish a space for knowledge sharing, diffusion, and cultivation on smart cities concepts and practices. It sought to create a space that would demystify and provide a contextual understanding of the smart cities concept from an African perspective, as well as impart practical skills relevant for urban sector stakeholders with a focus on efficient problem-solving towards inclusive and sustainable urban development. To achieve this, the lab drew on the following frameworks:

- South African Smart Cities Framework: Department of Cooperative Governance.
- South African Local Government Association Smart Cities Development Majority Framework.
- UN-Habitat Smart Cities Guidelines.

A great deal of the challenges that the Lab explored included socio-economic inequality, governance capacity, financing, climate change, digitalisation, and requisite skills. These factors pose urban challenges that cut across African cities. Thus, the Lab intentionally engaged with frameworks and experiences relevant beyond South Africa.

Smart Cities 2025 Objectives

The overall objective was to create a common understanding of the concept of smart cities that can assist in the re-imagination of smart cities in Africa, because re-imagination can only take place when there is a clear understanding of the concept. In some respects, the smart cities concept is a very abstract, complex, and open-ended phenomenon that is embedded in several factors. These include policy and legislation, governance and leadership, infrastructure and technology, the human resources factor, and climate change. Collectively, these factors contribute to complexities about the concept, leading to misunderstandings about the concept and its manifestations. Ultimately, this makes it difficult for stakeholders to interpret and apply the concept. When there is no clarity in

interpretation, it becomes difficult to identify the appropriate interventions. To address these challenges, the Lab focused on the following specific learning objectives:

- Analysing the smart cities concept drawing from an African-US viewpoint.
- Reviewing the policy contexts under which smart cities are being established and managed.
- Exploring innovative alternatives for funding and financing smart cities.
- How to set up and manage digital technologies as a core ingredient in smart city management.
- How to incorporate sustainable environmental management in existing and new cities.

Beyond conceptual clarification, the Lab interrogated smart cities as a governance and political economy challenge, shaped by institutional capacity, financing constraints, and uneven urban development contexts.

Partners

Local Government and Policymakers: The Gauteng Provincial Government, the Department of Infrastructure Development, Cooperative Governance, the Gauteng Infrastructure Financing Agency, and the Manzini Municipality, eSwatini.

Knowledge Partners: the Wits School of Architecture and Planning and the Wits School of Governance.

Financial Institutions: The African Development Bank and the Development Bank of Southern Africa.

Smart Cities: the Waterfall City Management Company.

Opening Session: Context and Key Messages

The three-day programme began with a high-level opening session directed by Dr Bob Wekesa, Director, African Centre for the Study of the United States. During the opening session, a keynote address was presented by Professor Mfaniseni Sihlongonyane, Head, Wits School of Architecture and Planning. His address reflected on the role spatial planning plays in shaping smart cities. He observed that “smart cities should always be human-centric and never technocentric, because it is the people that engage with the infrastructure around them”.

He pointed out that “technology is just an enabler and accelerator of service delivery.” He cautioned that when people are ostracized by the technology and innovation that come with the smart city projects, inequality manifests, thus keeping the majority in the periphery. He further stressed the significant role that data plays in shaping and informing smart cities, arguing that urban data is integral to policymaking and decision-making.

The opening session incorporated a message of support from the Mayor of eThekwini, Mr Cyril Xaba. In his address Mr Xaba stressed the importance of collaboration in urban development, adding that “government alone cannot fast-track the realization of the concept of smart cities; it needs to collaborate with well-wired institutions on the concept.” He pledged the city of eThekwini’s commitment to building smart, inclusive, and sustainable cities that respond to the different contexts confronted by the eThekwini residents through collaborative innovation and global partnerships.

Ms Tasneem Motara, who was the acting Member of Executive Council (MEC) for Infrastructure Development and Cooperative Governance at the time, reflected on the strategies the Gauteng government has been deploying for the realization of the smart cities concept. She emphasized the importance of urgency and collaboration as essential building blocks for urban development, arguing that smart city initiatives require partnerships with universities, businesses, communities, and the broader global community. She added that, “through the tripartite collaboration of the Department of Infrastructure Development, the Department of Cooperative Government and the Gauteng Infrastructure Financing Agency, the government is leveraging its mandate to ensure infrastructure and urban development drive socio-economic transformation.” Smart cities are about governance that works, reliable infrastructure, and services that improve people’s lives, and the government must lead this transformation, she concluded.

Smart Blueprints: Unpacking Smart City Frameworks

The second session of the Smart Cities Lab was a policy discourse on smart blueprints, unpacking smart city frameworks. This was a policy discourse between Ms Yashena Naidoo, Researcher, Gauteng-City Region Observatory and Dr Aurobindo Ogra, Senior Lecturer, Department of Urban and Regional Planning, University of Johannesburg. Given the disparities inherent among cities across nations, varying frameworks have been developed across Africa and abroad to serve as guidelines for the development of smart cities. Some of the frameworks include the following:

- South African Smart Cities Framework by the Department of Cooperative Governance.
- Smart City Development Maturity Framework by the South African Local Government Association.
- the “technological development lessons from Africa's smart cities” by the Development Bank of Southern Africa, and
- the “International guidelines on people-centred smart cities”, by the United Nations Human Settlements Programme.

This session noted that smart city frameworks encompass a multitude of components, including technology, governance, citizen engagement, and sustainability, aimed at addressing the multifaceted challenges posed by urbanization while enhancing the quality of life of the residents. Research has been done on various aspects. No consensus has, however, been reached. While some researchers focus on technology as the core of smart city development, others prioritize social and human capital, while others place primacy on environmental issues. Further challenges with these frameworks are in the form of areas of action. Some focus on implementation and transformation, while others focus on the evaluation and assessment of successes and failures in implementing the frameworks. In several cases, climate resilience is not considered at all. Despite the availability of extensive literature-based frameworks, there is still no consensus on a smart city framework that suits all cities worldwide.

The dialogue concluded that with the ‘Africa Rising’ narrative gaining currency, the need arises to examine the current frameworks on smart cities in Africa, and how they can assist in the acceleration of the African Union’s Agenda 2063.

Governance session

In this session, the Lab explored the abstraction of smart leadership: balancing policy and legislative issues with day-to-day management. The panelists included

- Dr Caryn Abrahams, Research Director, Senior Lecturer at the Wits School of Governance,University of the Witwatersrand.
- Mr Bongani Dladla, Chief Executive Officer, Construction Industry Development Board (CIDB).
- Mr Lufuno Ratsiku, President, South African Council for the Project and ConstructionManagement Professions.

This session confirmed that the implementation of smart city initiatives must be underpinned by a framework of smart leadership that prioritizes equity and inclusivity as integral components of the process. By acknowledging and addressing the intricate interplay between the evolving economic landscape, transformative technologies, and the imperatives of equitable and inclusive governance, smart leadership can guide smart cities towards realizing their full potential as catalysts for innovation, economic growth, and enhanced quality of life for all residents. The panelists further acknowledged that the imperative for leadership in urban development to nurture critical thinking and uphold ethical conduct is paramount in propelling the functionality of smart cities. Governance failures often undermine smart city ambitions more than technology gaps. Leadership, ethics, and institutional coherence are preconditions, not add-ons.

Infrastructure Session

This session explored the lessons and insights from new cities as well as smart transformation: the renewal of existing cities. The session speakers consisted of:

- Mr Willie Vos, Chief Executive Officer, Waterfall City Management Company.
- Mr David Jidy, Associate, Special Projects, Charter Cities Institute.
- Mr Lethu Collen Masango, Urban Economist, The World Bank.

Mr Willie Vos, Chief Executive Officer of Waterfall City Management Company, shared some insight into the lessons from new cities. He made it explicit that a smart city requires detailed context-oriented planning that involves the residents, further acknowledging that proper planning is not expensive. “South Africa does not need any new cities; we just need to renew and revitalize what we already have,” he argued. Mr Collen Masango from the World Bank reflected on smart transformation: the renewal of existing cities. He started by highlighting some of the realities of South African cities, which include collapsing services, fiscal constraints, urban decay, and crime. He contended that urban regeneration often fails due to fragmented planning and investment. However, smart interventions and regeneration exist to assist with revitalization, for instance, the Integrated Urban Development Framework, a policy initiative of the Government of South Africa, coordinated by the Department of Cooperative Governance and Traditional Affairs (CoGTA).

Digital Session

Day one concluded with a session on Smart technology: practical use of artificial intelligence, internet of things, data centre and other digital technologies. The session was facilitated by Dr. Allen Mutono, Chief Executive Officer, IALE Institute, South Africa. In his address, Dr Mutono noted that the global shift towards urban living has reached unprecedented levels, "with over 55% of the world's population residing in urban areas in 2018, a number projected to rise to 68% by 2050." This massive urbanization presents cities with challenges like overcrowding, traffic congestion, pollution, and resource scarcity. In response, nations are increasingly focusing on transforming cities into smart, sustainable hubs, leveraging Information and Communications Technology (ICT). Central to this transformation are Artificial Intelligence (AI) and the Internet of Things (IoT), viewed as key drivers of the fourth industrial revolution. AI encompasses machine learning algorithms, including computer vision for traffic monitoring and natural language processing for virtual assistants.

The Internet of Things lies at the heart of smart city initiatives, facilitating ubiquitous data collection and connectivity across physical infrastructure and services. IoT devices embedded with an array of sensors, processors, and communications capabilities generate massive streams of real-time operational data from within urban systems. The convergence of AI and IoT promises revolutionary changes, transitioning urban systems from reactive to proactive models. Dr. Mutono further highlighted the application of AI in smart cities; he identified the catalytic role played by AI in transportation. AI has revolutionized transportation through machine learning and deep learning, analyzing extensive traffic data for real-time optimization. Smart cameras are distributed across cities, using computer vision, monitoring traffic conditions, extracting insights, and identifying anomalies. He further stressed the role AI plays in public safety, through diverse technologies, including large IoT-enabled camera networks with computer vision.

These cameras continuously monitor crowded areas, employing face recognition algorithms for real-time identification of known criminals or suspects, triggering alerts to police response teams. In conclusion, he advised that as AI accelerates decision-making across ethically critical urban functions, algorithms must be designed, developed, and governed with ethical considerations in mind. Models used in public services must be audited rigorously to identify and mitigate biases stemming from unequal representation in data. This helps ensure equitable, fair treatment for demographic groups.

Finance session: masterclass

Day two of the Smart Cities Lab began with a masterclass on smart funding: identifying resources for private and public development projects. The masterclass provided an overview from the Development Bank of Southern Africa, whose mission is to serve as the bank for the government. The session was facilitated by:

- Ms Mojabeng T Monyamane: Coverage Head, Municipal Sectors, Development Bank of Southern Africa.
- Mr Elvandre Brooks: Senior Deal Originator, Municipal Sectors, Development Bank of Southern Africa.

The masterclass highlighted some bankability challenges that confront the bank when it comes to resource disbursement for public development projects. They included institutional capacity, poor project packaging, the creditworthiness of municipalities, and inefficient delivery and operating models. Solutions to these challenges included capacity building in municipalities, revenue enhancement, asset care, debt management programmes, integrated infrastructure planning, technical assistance support, and credit enhancement. In the banks' quest to facilitate urban development, some of their focus areas and funding have been channeled into water and sanitation, energy, and infrastructure projects, which are the integral building blocks for smart cities.

The DBSA delegation concluded the masterclass by sharing insights about the Vumela Bulk infrastructure funding product. The Vumela Bulk infrastructure is designed to assist the municipalities in providing the bulk infrastructure required to unlock large-scale property, real estate, and housing developments. It supports municipalities in fast-tracking the delivery of bulk infrastructure and assists municipalities with the planning, preparation, funding, and implementation of necessary bulk infrastructure. It also supports municipalities in their efforts to stimulate economic growth. Financing challenges are not merely financial but reflect deeper governance and institutional capacity issues. Smart cities are, therefore, state-capacity projects, not only bankable assets.

Climate and Energy session

The second session of the day was on smart energy, looking at strategies for energy efficiency, sustainable energy infrastructure, and solutions. The panelists included:

- Dr Enoch Sithole, Executive Director, Institute for Climate Change Communication.
- Ms Ruse Moleshe, Managing Director, RUBK (Pty) Ltd.
- Dr Isaac Salagae, Chief Director: Project Development, Gauteng Infrastructure Financing Agency.

In his opening remarks, Dr Enoch Sithole conceded that the world is undergoing a transformative shift in the way energy is generated, distributed, and consumed. At the heart of this transformation is the concept of smart energy, which is a system that integrates advanced technologies and data-driven strategies to achieve efficient, resilient, and environmentally sustainable energy infrastructure. The panelist recognized the pivotal role that Artificial Intelligence (AI) and Big Data are playing in modern energy systems, particularly in enhancing energy efficiency and optimizing smart infrastructure. AI, with its machine learning algorithms, processes large volumes of data from smart sensors, energy grids, and user behaviours in buildings. These technologies help analyze data in real-time and derive actionable insights to predict energy consumption and optimize energy distribution systems. AI-driven systems, such as artificial neural networks and reinforcement learning, have been applied to predict energy demand, improve energy distribution, and automate energy management processes.

The panelists furthermore highlighted the ability of AI models in forecasting energy demand, which is a crucial aspect of energy management. By analyzing historical consumption data, weather patterns, economic indicators, and societal trends, these models can predict peak times, seasonal fluctuations, and overall demand trends with high accuracy. This predictive capability enables energy providers to balance supply and demand more effectively, reducing the need for expensive and polluting peaking power plants. The session concluded that smart energy systems offer a transformative path toward sustainable and resilient urban development. For South Africa, the integration of smart technologies into the energy sector is both a necessity and an opportunity. It allows for a reduction in the dependence on coal, mitigation of climate impacts, and improved quality of life for urban and rural populations.

Smart Climate, Energy and Water session

A session on smart climate followed, looking at strategies for greening and cleaning cities for livelihoods and environmental sustainability. The panelists included:

- Mr Morgan Padayachee, Manager: Innovation and New Technologies, Rand Water.
- Mr Jisas Lemasagarai, Senior Market Engagement Manager, Global Systems for Mobile Communications Association.
- Mr Mluleki Hlatshwayo, Chief Engineer: Research and Green Technology, Gauteng Department of Infrastructure Development.

The increasing impacts of climate change, rising sea levels, unpredictable weather conditions, unforeseen natural events, natural disasters, extinction of biodiversity, and the vulnerability of ecosystems are causing concerns across the globe. Amidst the environmental vulnerabilities and unique socio-economic contexts, cities worldwide face severe challenges in ensuring sustainable development. Therefore, climate change adaptation and mitigation are critical components of planning and developing smart cities. The panelists acknowledged that cities often lack capacities to develop measures to tackle the impacts of climate change quickly. That leaves its residents at the bottom of the socio-economic scale vulnerable to climate change's negative consequences.

Timely investment in developing climate-resilient infrastructure will reduce the effects of extreme weather and foster development. Less pollution, better waste management, and more green spaces improve the quality of life for the residents of all cities. Adaptation to climate change in smart cities is crucial to ensuring urban resilience and sustainability. Smart cities use technology, data, and innovation to improve the quality of life while addressing environmental challenges. The following were some of the adaptation strategies that highlighted smart infrastructure: green buildings, resilient water systems, and flood-resilient designs. Data-driven climate monitoring; IoT sensors, predictive analytics; sustainable mobility, electric and autonomous vehicles, public transit, and micromobility, as well as the strategy on energy transition and grid resilience, which consists of smart grids and energy storage.

Partnership session

Day two was concluded by a reflective session on smart linkages: the role of networks of smart city initiatives and connections. The panel consisted of:

- Mr Sizwe Dlamini, Head of Strategy, Manzini Municipality, eSwatini,
- Ms Monique Griffith, Head: Innovation Partnerships, Smart City Office, City of Johannesburg

- Mr Kemraj Ojageer, Head: Project Development, Gauteng Infrastructure Financing Agency.

The panel emphasized the significance of collaboration in urban development through networks, highlighting sectoral interconnectedness as integral for achieving sustainable, efficient, resilient cities. Initiatives such as city diplomacy and sister city partnerships foster collaboration between governmental bodies and private entities, leveraging diverse resources and expertise to finance and implement smart city projects efficiently. International linkages were also highlighted as one of the ways in which cities advance their sustainable development initiatives. Partnerships require clear governance arrangements and acknowledge the power asymmetries between cities and private actors, which must be managed.

Waterfall City Tour

Day three of the lab was closed off with a firsthand look at a state-of-the-art smart city in action in Waterfall City. Representatives from the Waterfall City Management company guided the city tour through key locations of the development, showcasing landmark buildings. Along the route, the lab delegates visited the Munyaka Estate Lifestyle Centre and Crystal Lagoon, the Waterfall Valley Mature Lifestyle Estate, and commercial hubs such as Attacq's offices and PricewaterhouseCoopers (PWC).

Conclusion and Policy Implications

This outline provided the essence of the discussions that took place in the 2025 Smart Cities Lab. The Lab had identified the following as the essential building blocks for inclusive sustainable urban development.

- Smart city frameworks
- Smart Governance
- Smart Infrastructure
- Smart people
- Smart living
- Digitization
- Smart Finance
- Climate change, energy, and water
- Smart Partnerships

It was evident from the lab findings that there is still a challenge in the interpretation of the smart cities concept, particularly from an African perspective, because of its open-endedness; there arestill people who do not really understand what the concept encompasses. The conglomeration of definitions that are tied to the concept tends to focus only on technology as the driver and enabler of smart cities, and ostracize the human resource factor, the people who are central to the realization of smart cities. A call was then made to coin a continental definition of smart cities that will be reflective of the context of the African cities, because smart city interventions in African cities are implemented in contexts characterized by socio-economic inequalities, chaotic transport systems, and massive governance failures, among other challenges.

Therefore, the conceptualization of smart cities needs to consider the former context. Given that the bulk of the population in African cities is extremely poor and living in informal settlements, the lab expressed concerns that the realities of these African cities are completely disregarded in these urban development plans. This then results in fundamental gaps between the vision of the smart cities framework, the realities of poverty in actual African cities, and the improbability that the development plans will ever materialize. Therefore, community involvement is a crucial consideration when developing policies so that policies respond to the needs of the communities. These are imperative concerns that investors and policymakers need to consider.

Way forward

Building on the outcomes of the 2025 Smart Cities Lab, the following steps were identified to consolidate learning, strengthen capacity, and support policy-relevant engagement going forward:

- Establishment of a Smart Cities Lab Advisory Committee to provide strategic guidance and support continuity in preparation for the 2026 Lab.
- Publication of a Smart Cities Lab Impact Report to capture key insights and policy-relevant lessons for cities, policymakers, and development partners.
- Development of a Smart Cities short course curriculum focused on practical skills for urban practitioners and policymakers.
- Launch of the Smart Cities Lab short course to translate conceptual debates into applied knowledge.
- Announcement of the 2026 Smart Cities Lab theme, informed by emerging governance, financing, climate, and digitalisation challenges.

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