Briefing Note

DEPARTMENT OF SCIENCE AND INNOVATION/THE ACADEMY OF SCIENCE OF SOUTH AFRICA

INNOVATION FOR INCLUSIVE DEVELOPMENT (IID) SEMINAR SERIES ON

The Smart City Initiative in South Africa and Paving a Way to Support Cities to Address Frontier Issues Using New and Emerging Technologies

March 2020
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Summary

The seminar was hosted on 3 September 2019, St George's Hotel, Pretoria by the Academy of Science of South Africa (ASSAf) in partnership with the Department of Science and Innovation (DSI) and the South African Local Government Association (SALGA). The intent of the seminar was to solicit input from various stakeholders to define characteristics of a smart city in the South African context, how the concept aligns with the 2019 White Paper on Science, Technology and Innovation (STI) and where cities are in terms of their smart city strategies and/or projects.

The outcome of the seminar brought a common understanding that the country needs a national framework on smart cities and that the framework should meet basic needs in a manner that advances inclusive economic growth in an environmentally sustainable manner. The following aspects were considered to achieve this: a clear definition of a smart city from a South African context, addressing all the existing challenges and not emulate first world smart city models; smart cities should link to the global market but provide solutions to local problems and not compete with first world countries; the national framework and policies for smart cities should clearly define roles and responsibilities of key stakeholders, be flexible and amendable in line with the 4IR; incorporate building blocks of smart cities, including: STEM education, citizen rights, enablers (such as power, water and internet connectivity), urban versus rural, shared goals and vision. The proceedings will form part of DSI's ongoing consultations on the concept of smart cities.

Introduction

South Africa continues to engage in the discourse on smart cities and in this regard, various frameworks, research, implementation models, etc. have been introduced as various cities aspire to be smart. The smart city initiatives offer cities a different approach to manage the challenges of urbanisation. Despite these ongoing initiatives, there continues to be a perceived need for a clear South African position on the concept of smart cities.

The role of digital technologies has become increasingly important in urban development in recent years. Ubiquitous sensor networks, big data, open data, internet of things, virtual reality as well as data accessibility, privacy and accountability are becoming more common as part of urban development. These technologies create opportunities to develop new urban services that have the potential to improve cities' operational performance, provide greater transparency and more interaction with citizens, and reduce the local environmental impact. For the city to be classified as a "smart city," innovations must be on a citywide scale. This requires contributions from commercial firms, governments and citizens. It is on this basis that ASSAf, the DSI and SALGA hosted the seminar to reflect on on-going SA smart city initiatives; establish consensus on the definition of smart cities in the local context and define policy requisite, technical and institutional interventions from government and the private sector necessary to support on-going SA smart city initiatives.

Welcome and Introductions

Ms Nonhlanhla Mkhize, **DSI** welcomed the participants and indicated that the outcome of the seminar will feed into a number of processes and ongoing consultations on smart cities. One of the founding principles of the White Paper is to harness science, technology and innovation (STI) for inclusive development. The DSI and its partners are already investing in initiatives aligned to the smart cities concept. The IID Seminar series provides an opportunity for the DSI to engage with stakeholders based on existing initiatives or new areas of work and serves to feed into DSI programmes to assist the department in framing interventions on areas that require improvement.

Session 1: Smart City Concept: South African Perspective

Mr Mxolisi Mchunu, **SALGA**, presented on the SALGA Smart Cities Development Framework which seek to address the modernisation and transformation of municipal functions and operations through the use of smart technologies. The framework make use of the maturity model to look at sustainable governance, enhanced service delivery, municipal data intelligence and citizen enablement to assess the maturity of municipalities to implement appropriate and compatible smart technologies.

Although technology forms a common foundation for smart cities, other aspects that address municipal functions include socio-economic, legal, political and environmental dimensions. The framework differentiate these elements as follows: Smart Economy (Competitiveness); Smart People (Social and Human Capital); Smart Governance (Participation); Smart Mobility (Transport and ICT); Smart Environment (Natural Resources) and Smart living (Quality of life). It also addresses the use of Big Data and how it should be managed to prevent any intrusion to the data that municipalities have control over.

Session 2: Smart City Concept: Global Perspective

Mr Guilherme Johnston, **Global Business Engagement, Connected Places Catapult, UK.** Connected Places Catapult is a non-profit organisation created by the UK government to support the commercialisation of products and services related to urban innovation. Its main objective is to help develop the products and services that could meet the changing needs of cities globally. It supports cities in the UK to be more progressive in their quest to deliver innovative projects in implementing smart cities in areas such as urban innovation, intelligent transport systems, mobility, air quality, water and sanitation. Funding of the activities comes from the UK government, research and commercial projects.

Catapult has worked in various advanced urban services, such as design, planning, architecture, engineering, construction, infrastructure, urban data, software modelling and analytics, environmental management, professional services, urban resilience, real estate, urban health, and knowledge and skills provision. The organisation aims to grow demand in the global market for UK innovations and support British firms to access new international opportunities to enjoy a disproportionately large share of the global market. Most countries included advanced urban services and smart cities in their strategies and regarded these as ways to improve the way cities worked and to generate jobs and business for them.

Some of the barriers for smart cities to access markets include:
- The lack of buyer confidence in technology
- Fragmentation and silos in terms of services and assets
- Poor market coordination
- Rigid regulatory environments
- Lack of evidence for business cases
- Privacy and security concerns
- A disconnect between supply and demand

Session 3: Defining Smart Cities in the South African Context: Learnings from other Cities' Experiences

Panel Discussion

Ms Stacey-Leigh Joseph, **South African Cities Networks, SACN**, facilitated the panel discussions. She shared on the establishment and role of SACN in her opening remarks. The aim of the network is to help cities to think more strategically on how to drive spaces that are more inclusive, sustainable and productive, and how these spaces can be governed to achieve the transformation agenda, through sharing of information, experience and best practices. The network has since produced the *State of South African Cities Report* every five years, aligning with local government elections. The 2016 report indicated that urban local governance is about the various sectors in society, including the State as a whole, private sector, civil society and academia and that innovation and creativity are facilitated and driven within the nexus of integration among these different actors. Ms Joseph encouraged its member cities present at the seminar to give input in order to understand the support requirements of the cities and their experience over the past number of years, in order identify step-by-step changes that will need to happen to make the smart cities concept successful and thus have a framework that engages with potential solutions.

Panellists

Mr Segofatso Thepa, **Enterprise Project Management Office, City of Ekurhuleni,** presented on the City's Growth and Development Strategy (GDS) 2055. The strategy focuses on five pillars being implemented in three phases, namely: re-urbanise, re-industrialise, regenerate, re-mobilise and re-govern. These pillars encompass smart principles which underpin the future vision of the city. The first phase, which began in 2012, focusses on the city becoming well-managed, resourced and financially sustainable as a 'delivering' city. In the second phase, the city aims to become a 'capable' city through inclusive industrial economy, with meaningful reduction in unemployment and poverty. The third phase envisaged the city to be a clean, green and sustainable African manufacturing complex to classify itself as a 'sustainable' city.

Challenges being experienced relates to the lack of a unified vision and definition of a smart city, and issues relating to communication, collaborations, coherent policy and information sharing.

Mr Lawrence Boya, **Smart Cities Program, City of Johannesburg (CoJ)**. Mr Boya firstly raised the point that he was unaware of SALGA's Smart City Development Maturity Framework and requested SALGA to involve the CoJ. He further mentioned several challenges that seem to have an impact on the realisation of the smart city concept in South Africa:

- Government has not provided a national framework, therefore, cities are inclined to define for themselves what they understand as smart cities. This has also resulted in a lack of proper coordination through strategies, guidelines or legislation at a national level.
- It remains unclear whether local government has been consulted about President Ramaphosa's appointment of the Presidential Commission on the 4IR.
- Municipal Integrated Development Plans (IDPs) do not relate to the concept of smart cities and that the IDP framework was designed decades ago and thus needs to be replaced with a new mandate for local government that focusses on raising competitiveness.
- The Smart city programme is low priority for the CoJ, though it ought to be an all-encompassing priority, integrating all the strategic planning instruments to deliver the Johannesburg smart city.
- The National Development Plan (NDP) ought to be revisited to incorporate the 4IR and become the main strategic agenda of South **Africa**.

The CoJ approached the GDS by firstly conducting a diagnosis in terms of the challenges faced by the city, bearing in mind the vision and the outcomes it hopes to achieve. The city has chosen eight focus arears centred around citizens. CoJ aspires to become a 24/7 city both as an economy and in terms of access to municipal services.

Session 4: Break-Away Sessions

The purpose of the breakaway session was to gather information and feedback from stakeholders, with the hope of framing a support programme led by DSI for smart cities relevant to South Africa. Stakeholders were divided into two groups in order to have different perspectives: government, NGOs and NPOs; and private sector and academia. The following questions were posed to facilitate the discussions and the outcomes thereof:

1) How is a smart city characterised in the South African context?

- There is no universal definition of a smart city. Definitions are contextual depending on where the city is in the world. The main common attribute is ICT which is an enabler.
- They should link to a global market base while providing solutions to the local day-to-day challenges.

2) Are there any policies and/or institutional mechanisms in existence to support smart cities? Are they adequate?

- Environmental management is an important aspect of smart cities. The South African Bill of Rights must be taken into account so that smart cities become citizen-centric.
- The national institutional policies, resources and mechanisms for enabling smart cities include SA Connect, the Universal Service and Access Agency of South Africa (USAASA), the Electronic Communications and Transactions Act (No. 25 of 2002), the Science, Technology and Innovation Roadmap for Sustainable Human Settlements (STI 4 SHS), and the Human Settlements Framework on Innovation. The policies however, remain fragmented.

3) What initiatives or programmes exist to support South African cities where frontier technologies are being used to improve urban outcomes?

- South Africa is trying to fix cities of the past that were created for different purposes and in the process missing the opportunity to consider a different model of a city to create from scratch, as other countries have done. Example, does Waterfall City meet the criteria of a smart city?
- Various national frameworks support the smart cities concept, but the missing link is the municipalities.
- The CoJ's GDS commits to addressing climate change related issues, through the climate change action programme integrated into one of its focus areas.

4) Which role players are required to support smart city initiatives? What is/should their role be?

- Role players are government, academia, the private sector, civil society and citizens. It is important, however, to classify their roles. A partnership consortium has not been well understood or established in South Africa.
- Stakeholders pointed out that government creates unnecessary red tape and obstacles, instead of creating an enabling environment.

5) What role can the private sector and civil society play to support future cities using new and emerging technologies such as the 4IR, Big Data, the Internet of Things (IoT), ICT and Artificial Intelligence?

- Start-ups are the drivers of ICT and need to be involved in this debate.
- The private sector enables smart city initiatives especially in the metropolitan areas. For example, Vodacom network is 5G ready, and considers that all South Africa's major cities are capable of big data, IoT, ICT and artificial intelligence. The onus is on cities to engage in partnerships with technical enablers in order to take advantage of these opportunities.
- Civil society uses technology as a means to mobilise, take action and provide solutions.

6) What educational skills are required to maintain smart cities' infrastructure? Are our educational institutions producing the required relevant skills?

- The Sector Education and Training Authorities (SETAs) need to establish partnerships to coordinate the initiatives of higher education and training sectors.
- Educational institutions are not producing people that can work with big data, IoT

and artificial intelligence, but rather train people to be employed, with a focus on theory, research and research papers.
- Municipalities have adopted the notion of smart cities but lack capability for implementation.
- The gaps between scientists, engineers and politicians need to be bridged in order to take a coordinated approach.
- Discussions should start at a primary school level to ensure that children are prepared for smart cities.

7) What policy recommendations are necessary to ensure that smart cities are realised in a manner that benefits local communities?
- Policies related to smart cities need to be linked with current IDPs, spatial development frameworks, legislation etc; much of the regulation is outdated and needs to be revised; policies need to be flexible and amendable in line with the 4IR; integrate the national framework for smart cities, which clearly defines roles and responsibilities of key stakeholders; better regulatory framework and culture of innovation that allows new materials and design to facilitate the concept; new policies have to be developed to allow citizen engagement with the open data.
- Solutions need to address clearly defined and identified problems by each city.
- Partnership through collaboration and use of integrated models is critical in relation to smart cities.
- The issue of trust needs to be addressed.
- The digital divide needs to be recognised and dealt with.
- Access to information is a serious problem, therefore, issues relating to ethics of surveillance through technology would have to be addressed.
- Smart cities must be society-centric and address local challenges.
- Infrastructure is key to promoting smart cities.
- Ensure connectivity and accessibility in order to implement the smart cities

concept.
- Develop a monitoring and evaluation (M&E) framework to assess the long-term impact of implementing smart cities within the South African context.

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Glossary

4IR:	4th Industrial Revolution
STEM:	Science, Technology, Engineering and Mathematics
SA:	South Africa
ICT:	Information and communications technology
UK:	United Kingdom
NGO:	Non-governmental organisation
NPO:	Non-profit organisation