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South Africa's new smart cities: a roadmap for transforming all our cities

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How GIS can drive the smart city philosophy forward

In 2019, President Cyril Ramaphosa shared his dream for a new South African city that would be "driven by smart technologies of the fourth industrial revolution". At that point, many scoffed at the idea. Yet, at the beginning of 2021, during his State of the Nation Address, the president shared that his vision was coming to life.

He confirmed that three new smart city developments would be going ahead in South Africa: one in Lanseria, the Durban Aerotropolis, and the Mooikloof Mega-City development in the east of Pretoria.

The ultimate purpose of South Africa's new smart cities is more sustainable, inclusive and socio-economically relevant urban development. But the president's vision of what "smart technology" can do for all stakeholders involved in these specific developments, can also be a reality for every existing city in South Africa. Everyone – from local and provincial governments to commercial entities and citizens – can benefit from their cities becoming smarter. Ultimately, a smart city is a manifestation of sustainable urbanisation in action.

At the heart of this "smart technology" that would make a smart city possible, is geospatial information systems (GIS). According to an article in GIM International, the concept of a smart city can be defined as "developing a comprehensive system that uses geospatial data to enhance the understanding of complex urban systems and to improve the efficiency and security of these systems."

The article further explains that geospatial data for a smart city include: the urban built environment (like infrastructure, buildings and public spaces); the natural environment (including biodiversity, green spaces, air quality, soil and water); and urban services (including transport, municipal waste, water, energy, health and education). The article then summarises that the ultimate goal of smart city thinking is to "transform the silo-based management of cities into a shared system that involves all urban stakeholders into the design, realisation and evaluation of urban projects".

When one starts looking at the statistics, the imperative for sustainable urbanisation – or for adopting a smart city philosophy for all cities – becomes clear:

In 2013, the United Nations (UN) released a report identifying ways to eradicate poverty and transform economies through sustainable development. The report categorically states that "cities are where the battle for sustainable development will be won or lost."

This is understandable if one considers that in 1980, over 1.7-billion people worldwide (39% of the world population) were living in cities. By 2015, the number had increased to just under 4-billion (54%); and according to projections, the urban share of the world population will grow to just over 6.4-billion (66%) by 2050.

In 2020, about 67% of South Africa's total population lived in urban areas and cities. With housing and equal access to basic urban services being critical issues in South Africa, of the total amount of those urban dwellers, a staggering 23% are estimated to live in informal settlements.

Collectively, the global geospatial industry is acutely aware of how decades of poorly planned or unplanned urbanisation can give rise to transport challenges, sanitation hazards, inadequate housing and resulting informal settlements, corruption, pollution and even the rise of diseases and epidemics. Together with vulnerabilities to extreme weather patterns, the problems of urbanisation are indeed a global concern.

In South Africa, it may feel almost futuristically surreal that such a city is possible. However, the "smart technology" needed for smart cities already exists. At its core, a successful smart city is built on the foundation of a single, trusted source of quality and verified spatial data, onto which other layers of information and data can be built.

Without most people realising it, geospatial information systems (GIS) are already fully entrenched in the daily lives of every citizen. Anyone who has travelled by plane used a GIS-enabled public transport service, used a vehicle's GPS, or given location permission to a smartphone app, already has first-hand experience with GIS technology.

At the heart of it, GIS is the ultimate "connector of dots", and is the key to unlocking the true value and potential of the smart technology that's required to digitise urban ecosystems and make smarter cities a reality.

By understanding the value of, and entrenching GIS as fundamental to smart city thinking and planning, the resulting socio-economic benefits can be invaluable. On a very practical level, GIS can unlock benefits like: better performance of assets and management; improved efficiencies; more efficiently engaged communities; optimal use of resources; end-to-end solutions; economies of costs and time; smarter services; and resilience to man-made and natural events.

We are on the edge of a geospatial transformation in South Africa. GIS has the power to unlock rich new insights, power better decision-making, and act as a catalyst for new products and services across all industry sectors. It has the potential to add billions to our economy, improve the quality of life and wellbeing of our communities, and help protect our planet.

With a smart city mentality, AfriGIS has resolved multiple municipal concerns, driving transformation towards optimised smart city development and implementation by:

- Creating solutions that improve and optimise workflow and service delivery efficiency within municipalities.
- Utilising searchable spatial data layers to provide essential location and property information from multiple sources.
- Providing location and traffic data critical for decision-making relating to urban expansion.
- Implementing spatial technology to score and lay down digital routes which determine the need and impact of public transportation between points of interest.
- Continuous innovation and creation of custom location solutions that address community and municipal concerns.

In our next article, we will explore more practical examples of where geospatial solutions are already being implemented successfully to make South African cities smarter. We will also look at which cities in Africa are receiving recognition for adopting and implementing a smart city philosophy successfully.

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