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A city reinventing itself with digital technology

JOHANNESBURG

A city reinventing itself with digital technology

Smart city status is no longer a 'nice to have' goal in Johannesburg – it is an urgent 'must have'. Covid-19 lockdowns have exacerbated the city's historical inequalities by restricting many people's access to basic infrastructure and services. Now, the city aims to harness smart technologies with a citizen-centric approach to repair its "stubborn faultlines" and build a more sustainable future.

Over the years, Johannesburg's most vulnerable citizens have been disadvantaged by the remnants of apartheid, structural poverty, unemployment, the changing climate causing extreme floods and droughts, and most recently the Covid crisis. The city administration is now under pressure to increase access to its services and improve the quality of life for its residents.

The city's response? A vision of becoming a smart city – one that is globally competitive and responsive to changing economic, social, environmental, and health conditions.

"The pandemic opened our eyes to the importance of becoming a smart city," says Mayor Geoff Makhubo. "This strategy lays the foundation to ensure the city is agile and adaptable no matter the natural or human challenges we might encounter."

IT'S TIME TO GET SMARTER

Home to more than five million people, Johannesburg is bracing for continued population growth and challenges from the pandemic fallout and climate change. To cope, it will need to become smarter.

"Being a smart city is not a 'nice to have'," says Makhubo. "It is an absolute necessity if Johannesburg is going to retain its status as an economic hub that supports and determines the growth of this country and counters unemployment related to the rapid contraction of the economy."

The work required to get there is multifaceted – from developing an inclusive physical infrastructure that gives all citizens access to water, power and internet, to enabling access to education and skills training.

One way in which the city administration is tackling these challenges, says Lawrence Boya, Director and Head of Smart City Office, City of Johannesburg, is by "reviewing and transitioning municipal services and leveraging technology to protect the wellbeing of our citizens and the essential services they require."

Over the next decade, the city plans to incorporate technology within its traditional service delivery mandates, including by rolling out a cloud-based, integrated information communications technology (ICT) platform.

This will integrate access to municipal services and improve the delivery and accountability of basic services such as waste disposal, supply chain management, crime response, transport, governance, and people management. It will also allow employees and city residents to manage their energy consumption and pay municipal bills.

POWER TO THE CITIZENS

Lawrence Boya says he wants to put this kind of technology in the hands of Johannesburg's residents to empower them. "When this is accomplished, we will have shifted the power and made the citizens active – and that is critical," he says.

"Apartheid was grossly corrupt, and a lot of the people in the private sector and in government acknowledge that we are exposing the things that have happened in the past and the willingness to deal with them now," says Boya. "This shows intent, and the more we do this the better. And technology has a critical role to play in this. For example, public procurement tenders are now published for comment."

So in this smart city, citizens will be expected to have more active involvement – for example by participating in consultations on public services and procurement and reporting on faults and services.

MANY WAYS TO BUILD ON POTENTIAL

The smart city vision does not end at digitalizing municipal services. Johannesburg is also looking at mobility, buildings infrastructure, energy systems, and industry 4.0 to upgrade manufacturing.

Some buildings no longer support modern business operations.

A report by Accenture estimates that the use of digital technologies in government services can add more than ZAR2 trillion (approx. $142 billion) in value to the economy, and more than ZAR3 trillion (approx. $213 billion) when applied across different sectors, including financial services, agriculture, and manufacturing.
Siemens' Atlas of Digitalization, meanwhile, has given Johannesburg a digital potential score of 5 out of 10, and says that the city has "many ways to build on its potential."

Investments and public-private partnerships to pilot new applications and technologies in energy, water, and waste disposal will be critical here. "A smart township has to have access to water, electricity, and ICT," says Sabine Dall'Omo, CEO, Siemens Southern and Eastern Africa. "These three have to be established concurrently.

"But this will take time," she adds. "Johannesburg has a legacy set-up that you do not overcome overnight. Many buildings in the inner city in areas such as Newtown and Braamfontein were built between the 1930s and 1950s, and this infrastructure no longer supports modern business operations."

> "Water supply is especially critical in light of Covid and the hygiene implications."
>
> *Sabine Dall'Omo, CEO, Southern and Eastern Africa, Siemens*

Dall'Omo says that Johannesburg has not lived up to its potential. "Compared with other cities such as Gaborone and Accra, Johannesburg has developed e-services and e-meters at a much slower pace," she says.

In a city that is suffering more droughts and floods as a result of climate change, there is one area in particular where this needs to be rectified: water management. And that has become even more crucial since Covid-19. "Water supply is especially critical in light of Covid and the hygiene implications, and smart technology can help with water conservation by detecting leaks, for example."

EVERYONE SHOULD "FEEL THE SMARTNESS"

However, while technology can help solve the problems the city faces, city administrators should not get carried away by technology as an end in itself. The citizen should remain central.

"If people in informal settlements don't have access to water, electricity, roads, then that's not smart," says Boya. "If people don't feel the smartness and don't feel connected to the city, then it's not a smart city.

"For example, the smart meters we are rolling out empower citizens to manage their power consumption and plan how they use their power," he says. "That's a smart use of technology."

But there are two major obstacles in the path of smart city progress and citizen involvement: digital access and skills.

> The lack of access at home has caused suffering to a lot of families that were on the wrong side of the digital divide, because they weren't able to get their children educated."

Brice Richard, Smart City Advisory Lead, Arup South Africa

JOHANNESBURG'S DIGITAL DIVIDE THREATENS PROGRESS

Mobile devices have helped with this access problem. The average affordability of internet devices and data packages in sub-Saharan Africa has improved over the past couple of years[1], and Johannesburg continues to roll out free Wi-Fi hotspots – particularly around transport hubs. But 50% of people in Johannesburg and 80% of residents in informal settlements remain without access to the internet[2].

The potential of the digital divide to exacerbate existing inequality represents a major challenge to the city's social and economic sustainability.

"The lack of access at home has caused suffering to a lot of families that were on the wrong side of the digital divide, because they weren't able to get their children educated," says Brice Richard, Smart City Advisory Lead at Arup South Africa. "The digital divide exists, and it is really strong."

Richard says that fixing the problem starts at the top. "You need to address the issue upstream at the policy level, and ensure that inclusivity principles drive the infrastructure planning, design, and implementation," he says.

"It needs to be done but not at the expense of the people's ability to afford it," he adds. "If it's done properly, with the right amount of planning in mind, eventually it will directly address and hopefully reduce some of those digital inequalities."

[1] https://www.gsma.com/r/wp-content/uploads/2020/09/Mobile-Internet-Connectivity-SSA-Fact-Sheet.pdf

[2] https://www.engineeringnews.co.za/article/city-of-johannesburg-resumes-free-wifi-hotspots-roll-out-2020-09-14

NO ONE LEFT BEHIND

Another part of Johannesburg's efforts to address the structural divide is local skills training and job creation. As the emphasis of the economy shifts in support of South Africa's decarbonization targets – from polluting heavy industry to digital and service sectors – vocational training and technical and digital skills will be essential.

Here too, public and private sector collaboration is necessary to accelerate progress. In February 2021 the Council for Scientific and Industrial Research (CSIR) and Siemens South Africa partnered up to enhance digital skills among the workforce and pilot digital industry applications in sectors such as food and beverage, water, cybersecurity, and manufacturing.

"Our strategy together with the CSIR is to introduce people to digital skills so that when we roll out smart technology in the townships there will be people who are able to manage it.

But we also incorporate basic skills, such as electrical work, plumbing and bricklaying, in the vocational programs. That's how the residents in the disadvantaged communities can benefit from smart city projects from day one," says Dall'Omo.

Johannesburg has made a good start, but to create resilience for future challenges and keep up with a growing population, it has more to do:

- Invest in its infrastructure to provide water, electricity, and internet to all residents
- Establish trust and provide good governance and public accountability and transparency in public procurement
- Create sustainable jobs, provide e-learning opportunities and digital skills
- Develop public and private partnerships to embed new technologies.

Mayor Makhubo is optimistic about the impact of technology and Johannesburg's smart city vision: "We believe that technology and its penetration will contribute to our fight against what we call the stubborn faultlines of poverty, unemployment, and inequality – especially the spatial inequality."

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