INFRASTRUCTURE Dialogues

Building for the Future in South Africa's Cities
City futures: certainty vs uncertainty: so what for now?

15 February 2018

1. Introduction

"Uncertainty is the only certainty there is, and knowing how to live with insecurity is the only security" (John Allen Paulos). Knowing what infrastructure is needed for the future is impossible to say with certainty, but that didn't stop discussions on building for the future at the 46th Infrastructure Dialogue.

As the pace of change accelerates, the complex risks in an interconnected world are straining the systems and testing the absorptive capacity of institutions, communities and individuals. Being prepared means looking into the future. And a bridge to this future is physical and metaphorical infrastructure. Infrastructure must serve present and future needs with different timeframes: the short-term horizons of financiers and developers in search of intervention and investment opportunities, current and future users, as well as the long-term horizons of the planners and engineers tasked with creating and maintaining the infrastructure over the course of its working life.

The panellists presented some provocative ideas around city infrastructure legacies, digital infrastructure and the role of DFIs. These ideas provided the basis for the discussion about issues to consider if South Africa is to build infrastructure for the future, including balancing technological advances and jobs, developing skills and education, supporting pilot projects and localised solutions, creating collaborative platforms and new funding models, and regulating where necessary.

The Infrastructure Dialogues are hosted jointly by the Development Bank of Southern Africa (DBSA), the South African Cities Network (SACN), the National Business Institute (NBI) the Performance Monitoring and Evaluation Department in the Presidency, and the Department of Economic Development, with the Engineering News as media partner.

2. Programme and Panellists

Danga Mughogho of the SACN welcomed the audience to the 46th Infrastructure Dialogue and introduced the partners. **Geci Karuri-Sebina** of SACN facilitated the Dialogue, after introducing the following panel members:

Mr Indra de Lanerolle	Head of JamLab at Wits University
Mr Paul Currie	Chief Investment Officer of the DBSA
Mr Marius Oosthuizen	Futurist and member of faculty at GIBS

3. Overview


BUILDING for the Future in South African Cities
Infrastructure is the bridge to future economic growth
DATA is the gold of the future
Digital access is key
LOCALISE
People create solutions to their needs
Decentralise networks to town/city level
INNOVATE
Thinking about education and jobs for the future
Pricing & financing models (e.g. localised)
TEST
Pilot projects: start small, do, learn, change ... "leapfrog in another direction"
Balance technological advances and jobs
SHARE
Create a platform for collaboration
Share lessons, best practices and perspectives
South Africa can
unleash society's creativity, resulting in massive growth
have wealth, jobs, power remain in hands of a few

4. City Infrastructure Legacies

To understand cities and their infrastructure legacies starts with understanding the reason for their locations, as very often their development is driven by the presence of certain underlying drivers. In the case of South Africa, "ships, maize and gold" were the underlying drivers. Cape Town became a city, attracting all kinds of people from all around the world, because of the technological thrust that ships made possible. Then, with the discovery of gold up north, many people moved to Gauteng, a part of the world with little water or reason for being there in large numbers (apart from gold). On the way to the north, some people stopped and built farms around present-day Bloemfontein and the North West, in an area that became a maize hub.

While the drivers "ships, maize and gold" are unlikely to drive the infrastructure of the future, other drivers will. Therefore, it is important to think about what underlying forces are going to shape the infrastructure, human settlements and cities of the future in South Africa. One of these forces – the gold of the future – is data and how this data is used to build more efficient and effective education, transport and other systems. This is because we are now in the fourth industrial revolution, which is the coming together of data, connectivity, broadband and mobile, and the digitalisation of services. The technology is there; the challenge is adopting the technology in useful ways, not just for the elites but at societal level.

Previous industrial revolutions

- The first was driven by steam energy, which allowed the building of industrialised cities.
- The second was driven by electricity and mechanisation, which enabled large conglomerates of productivity in cities.
- The third was driven by computers, which led to the growth of cities as services hubs.

5. Digital infrastructure

Digital infrastructure, such as fibre-optic cables and transmitters) carries data and is driving the future form of cities. Mapping these physical objects allows the mapping of a city's digital network. Like digital infrastructure, most traditional communications infrastructures (roads, rail) are networking infrastructure, connecting people and places, and in effect mapping – and entrenching – social and power relations. For example, the famous urban planner, Robert Moses, who was responsible for laying out much of the road system in and around New York, despised poor blacks and Puerto Ricans. Therefore, when he designed the "parkways", or highways, that connected New York City and Long Island, he deliberately made the bridges over the parkways too low for buses – the transport used by the working class. Although at the time, in the 1930s, only cars (driven by middle/upper-middle class people) were allowed on these roads, he knew that regulations and laws can change, but infrastructure is much more difficult to change. In so doing, Moses was embodying a set of social relations in brick more effectively than regulators could do.

In South Africa, apartheid spatial planning resulted in physical inequalities that persist today. Of concern is that these physical inequalities are being reproduced in the digital arena. For example, in Johannesburg, the two major companies (Telkom and Vumatel) rolling out fibre-optic cables (the essential infrastructure to enable digital services) are working in the same geographical areas, which do not include Soweto or Alexandra townships. Yet the demand for digital access is there, as shown by the people congregating in malls and other places where free WiFi is available. A lack of digital infrastructure creates more barriers for those without access across sectors (e.g. retail, transport), especially as mobile technology is unaffordable (the poor already pay more for data) and impractical for most applications. For instance, a driverless car uses up to 500 GB per day and so must be close to the fibre-optic network.

To avoid reproducing the physical inequalities in the digital space will require understanding two key differences between traditional physical and digital infrastructure networks:

- Cities build most of their physical infrastructure, whereas private companies are building digital infrastructure.
- Cities have regulatory power over the physical infrastructure within their boundaries but not over digital infrastructure, apart from telling companies where to run their cables, as digital infrastructure is regulated at national level.

Every network infrastructure offers a new possibility, an opportunity to enhance and change what was lacking in previous networks. However, doing this will be very challenging.

6. The Role of Development Finance Institutions

"Taking risk at the forefront of change."

Just as government's role is to push the common good to areas where the private sector will not go, the role of Development Finance Institutions (DFIs) is to deal with risks that banks do not deal with. In other words, DFIs would not be needed if financial markets were performing effectively and covering every risk aspect. However, the reality is that DFIs are needed to deal with the risk associated with the uncertainty that exists in moving forward. DFIs also have to continually reinvent themselves to stay relevant. An example is the German DFI, KfW, which was initially established to reconstruct Germany after the war and then used to rebuild Germany after the falling of the Berlin Wall. The Development Bank of Southern Africa (DBSA) has also changed over the years. Established in the 1980s, the DBSA was originally an apartheid structure, part of Foreign Affairs, used to finance the homelands. In 1994/95, it evolved to focus on municipalities and then, in the early 2000s, broadened its focus to look at sectors that required growth stimulus. By the end of the 2000s, the DBSA had accumulated many seriously under-performing investments, which was the result of both taking high-end risk and struggling to evaluate that risk. Consequently, the DBSA refocused on core bulk infrastructure projects and assisting metros unable to assess funding from commercial banks. In about

2016, the DBSA realised that it was no longing "taking risk at the forefront of change", as commercial banks had entered this space, and business was slowing down.

The DBSA decided that it was time to change its operating model. After going through a process of self-disruption, looking at how the organisation could do things differently and redesigning its business model, the DBSA identified three areas: partnerships, structured products, and internal innovation. The internal innovation area includes creating a "disruptive den", which would allow for multi-stakeholder innovation forums to discuss existing infrastructure problems and programmes. In addition, about a quarter of the staff have been taken through a formalised innovation programme, while a select few have been exposed to programmes such the singularity university event that took place at Kyalami. The purpose is for people in the organisation to start to understand that technology and infrastructure in their current forms will not remain the same for very long – especially given the potential of climate change to disrupt all of this – and so expecting the same old things to work is not going to happen.

7. Building the future: what needs addressing

The challenge for South Africa is to build infrastructure for the future in a way that makes us efficient, effective and competitive, and creates clusters of economic opportunity that pulls the society up out of poverty, inequality and unemployment.

Balance technological advances and jobs

One of the biggest challenges for South Africa is unemployment, and the fear is that technology will do away with even more jobs, especially low-skilled jobs, through (for example) the introduction of driverless cars and automatic check-outs in the retail industry. To counter this, one solution is to promote a balanced approach, as adopted by Thailand where the unemployment rate is 0.97%. To achieve this, the country decided to use technology only where absolutely necessary, and so most of the work is still done manually, even cleaning of pecan nuts. South Africa could look at a similar balanced approach.

An alternate view was that technology does create jobs that do not necessarily require a PhD in computer science. People often have a certain idea of what technology and jobs look like, such as a cross between a person in a white-lab coat and a geek. Yet digital jobs include Uber drivers. Uber has arguably had the biggest impact on jobs in Joburg, creating between 4000 and 6000 jobs, more than any corporation. These can be considered digital jobs because the driver needs to have (and know how to use) a smart phone. This smart phone gives drivers access to market and enables them to deliver the service even if they do not know the city well. Another example is mobile money. M-Pesa launched in Kenya with 50 000 agents – one in almost every village – and created virtually a whole new industry overnight.

These "digital jobs" are perhaps better described as digitally enabled income opportunities, which speaks to another point raised during the discussion: the need to change our thinking about employment. The idea of having a job and working for corporations is a recent innovation in human history. Instead of being locked into productivity in the formal economy and taking jobs to the people, perhaps the future lies in creating conditions that enable people to bring out their innate ability to be creative, allowing them the space, skills and resources to create solutions to their societal needs. Perhaps decentralised, enabled networks of capability can provide people with livelihoods, rather than jobs attached to an employer (i.e. large corporations or government).

> "Human beings have this innate ability to create". One example from Bronkhorspruit: three boys aged about 6, 8 and 10 years old have a mowing business, mowing 4–5 lawns on a Saturday. This illustrates "finding a need in the market, finding a machine that would serve that need, and developing the skills and business acumen to put the two together and to sustain themselves".

Develop different skills and education

Upskilling is needed to address the issue of unemployment. Participants agreed that people need to develop skills/be trained to meet the future needs of the country, such as learning how to operate drones (that deliver everything from medical supplies, to pizza, to bombs) or to maintain the infrastructure that supports driverless cars. Beneficiation was raised as another way to address unemployment: instead of mining and then shipping to other countries for value add, South Africa should develop the capacity to produce value-added products here, such as jewellery making.

The education of the future must consider what skills are needed for the fourth industrial revolution. The current education system was created during the first and second industrial revolutions, with the aim of creating long production lines using a standardised approach. Standardisation and the separate development of education have led to a decoupling of productivity from the learning process. A different approach is needed that looks at the kind of learning capability required in a specific town and the kind of institution that would facilitate such learning. An example given was in Bronkhorspruit where the agro-processing business has to fly in a miller from Israel because local expertise does not exist. One way to address this would be to educate children differently: instead of sitting in a classroom, children could be taken on walkabouts through factories, to expose them to work experience. This might get their creativity going, prompting them to dream about (for example) starting a bakery in the area.

> "Currently what happens in that town is a gogo earns her salary in a town working as a domestic worker; she then goes and buys a bread at R12 after the flour has travelled all the way to Gauteng into the industrial area in Kempton Park to be baked, packaged and shipped back again. So, the opportunity exists for productivity, consumption and trade, but the basic skills at that education level are missing.".

Promote localised solutions

A common thread throughout the discussion was the need for localised solutions. Networked localism is where energy is generated, water is used and trade within communities takes place at a local level. Such local networks are less vulnerable to a whole-system collapse than interconnected systems, such as those found in European/American smart cities, where everything (water, communications etc.) depends on energy. This is important for African countries, where everything goes off if Eskom switches off or the system gets hacked.

Decentralising power generation could also help resolve a common issue in the smaller towns and cities, that of there being no value proposition for local government and business to exchange. If power generation is decentralised, a municipality will have something to offer business (e.g. rebate as an incentive), which could galvanise players to work together towards a common vision for the future.

South Africa tends to want to solve problems from the top, not at local level. The general sentiment was that the country's fixation on big capex is misguided. Large infrastructure projects can also have unintended consequences. For example, Bronkhorspruit lies about 30 kms from Khusile power station. With the building of this large infrastructure project, the town is changing: restaurants and B&Bs have sprung up to accommodate the engineers, workers and managers working at Khusile; locals say that girlfriends are hard to find, as they work as nurses to workers on the Khusile project.

Identify your competitive advantage

Part of developing localised solutions is identifying the competitive advantage of an area. Two interesting examples are Oman and Estonia.

Oman is a small country with a large desert, a small population and some oil. The country understood that their competitive advantage was the desert because it is similar to the surface of Mars – it's hot, dry and with few resources. As a result, NASA sent a group of astronauts to live in the desert to Oman to experience life on Mars.

Estonia became an expert in cryptography (protecting information online), when its government deciding to go digital, which meant developing biometrics and double cryptography. The only time the process is not digital is when you get married or buy/sell property, i.e. when your asset rights change, but government needs to know who you are in person. The country spawned a competitive new industry by solving an insecurity problem.

In brief, the focus need to be more about working on repairing what we already have, rather than big fancy projects. Localism needs to be built into the future and must be contextual – it must happen town by town, city by city.

> "The unintended consequences of the large infrastructure build in energy at Khusile is that the unemployed youth of Bronkhorspruit are selling their virtue at R50 on a Friday night."

Support pilot projects

When planning infrastructure, two methods used to plan innovation in the tech space are useful. The first is the "agile or lean development", or how to plan in uncertainty. It is essentially an iterative process, whereby you start small, plan, do, learn and change; it requires a different kind of budgeting, planning and thinking. The second method is "broken world thinking", which look at repairing what is not working rather than building new, shiny infrastructure. This approach offers more opportunity for success than the big plan roll-out, as it is about unlocking existing resources, not looking for new resources, and can be applied in many areas, including procurement processes that can be an obstacle to innovation. For instance, a working group is currently working on developing guidelines around procuring for technical innovation that meets the requirements of the Public Finance Management Act. In other words, it is looking at new ways of working together that in the process unlocks energy and resources.

For some time, "pilot project" has been considered a dirty word, but this is changing. Pilot projects provide a way of testing new technologies and, by their nature, carry risk, which can be managed through processes that allow learning and the testing of assumptions. The DBSA is in the process of establishing several pilot projects looking at off-grid power, broadband and alternative solutions for water – the water crisis in Cape Town is highlighting a country-wide problem that could affect social stability.

> "Solar Turtle that runs a contained-based, solar-powered system in a town in the middle of nowhere. The town had grown because the school there had a 90% success rate and had grown from 800 inhabitants to about 3000 pupils, and they didn't have sufficient power. This woman would sell power in a milk bottle which was enough to run a clinic for two weeks, and connectivity associated with it."

Create platforms for multi-stakeholder collaboration

Participants agreed on the need to have more collaboration and the importance of sharing experiences of pilot projects, so that we can be "able to leapfrog in another direction or not make the same mistakes". The private sector has an interest in seeing government succeed in creating an enabling environment for infrastructure and other investment, but the stumbling block is often the inherent distrust between the private and public sectors. This has been reflected in most of the Infrastructure Dialogues that suggest South Africa is not very good at collaboration.

In bringing government, business and labour together to solve the country's problems, it is important to understand that collaboration works if there are shared interests, mutuality and levels of trust. Collaboration starts with getting to know each other and through dialogue, until eventually arriving at a place where each can see the future from the other's perspective.

The suggestion was made that collaboration is happening at the wrong level, especially given that South Africa is more of a nation state with a flag than a country. The point was made that people in

Guguletu or Khayelitsha or Waterkloof are living in a very different country compared to people in Constantia. Their infrastructural experience, financial experience and retail experience are fundamentally different.

> In a township, your store-keeper on the corner might be an Ethiopian employing a Somalian, whereas Whitey Basson might be your provider in your middle-class township."

All agreed that collaboration is the only way forward and that what is missing is a platform that allows for that collaboration. This will no longer be the case from September/October 2018, when the CSIR will launch its online urban knowledge exchange devoted to sharing best practice policies, policies, thinking around urban development (quite broadly defined). CSIR is working with at least six national departments, and forums of universities, civil society, private sector, institutes etc. to have an online sharing platform on which this type of network can shared peer-reviewed knowledge.

Develop new funding models

The general agreement was that new pricing models and approaches are needed for infrastructure, especially related to connectivity. Despite the apparent lack of appetite for innovative financing models for public goods, several suggestions were made. One idea proposed was to find service providers at the least possible cost to the public purse through reverse auctions, which is when several sellers compete for the price that a buyer will accept. Another suggestion was to look at financing through pooling risk capital, DFI money and regulatory contributions, although a new business model is needed for payment and cost recovery.

In relation to localised solutions, financing models and "guardian" structures could be effectively franchise-based and supplied with technology and support extension services. The financing model will be at this level and would trickle down into the underlying micro-enterprises, effectively opening up micro-businesses that would typically not exist on their own. The challenge would be to create a risk profile within those investment vehicles that allowed traditional financiers to participate. The feeling was that it should be possible to create these innovative financial structures, as real people, assets and services are involved and so payment flows are there. However, institutions like the DBSA will initially have to support these kinds of investment, as the private sector will only join in once a certain level is attained.

Regulate where necessary

The big challenge to democracy is the lack of transparency, which is increasing because of technology. Companies such as Facebook and Google prefer having as little human input as possible and instead rely on algorithms. This creates quite deep problems for accountability and governance. Traditionally, the tech community has viewed the lack of regulation and interference by government to be "productive anarchy". However, this has become untenable, and some regulation is required. The key is not to have that regulation happen too quickly and, in so doing, to create a fair operating

environment that does not kill the innovation. In South Africa, the tendency is to over-regulate in the interest of protecting the public, but in the process protect the public from the prospect of innovativeness. The suggestion was made that a rethink is needed institutionally about regulation and its purpose.

8. Conclusion

"There is a Chinese curse which says, 'May he live in interesting times'. Like it or not we live in interesting times. They are times of danger and uncertainty; but they are also more open to the creative energy of men than any other time in history".[1]

The 46th Infrastructure Dialogues looked at many issues to consider when building infrastructure for the future. But, at the end of the day, participants agreed that South Africa can either remain a country with a highly consolidated economy where wealth, jobs and power are in the hands of a few in business and government, or become a country that allows society's creativity to be unleashed at a localised and micro level. The last decade has shown that massive growth will not come from South Africa's first-world economy. Growth will come from finding efficiencies within the developing economy and will require the public and private sectors to work together and support small businesses. What is needed is more conversations and innovation in how we talk to each other and how we do business – sharing lessons and working out what works and what doesn't work.

> "We could leapfrog other countries, not go through the same mistakes […] but let's take care about which direction we leap in, so we don't have to leap in the same direction as the other frogs."

[1] Speech by Robert Kennedy, Cape Town, June 1966.

Black Construction / BE Professional Companies and their Participation / Transformative Prospects in the Infrastructure Sector

Speakers Biographies

Indra de Lanerolle leads the JamLab at Tshimologong, Johannesburg – Africa's only journalism and media accelerator. He teaches television and video journalism, media entrepreneurship and theories of new media at Wits. His recent research includes a study of mobile use amongst low-income South Africans, and a study of technology innovation in civil society organisations in South Africa and Kenya. Indra has presented at many conferences in South Africa and at the Universities of Oxford, Harvard and Lisbon. He has worked as a journalist, television producer, communications consultant and media entrepreneur. He has produced television series and feature films in South Africa, the US and the UK and was a senior producer of the BBC Newsnight and Panorama programmes. His work has received a Peabody Award and an Emmy nomination.

Paul Currie is the Chief Investment Officer of the Development Bank of Southern Africa (DBSA). Before joining the DBSA, he held several senior management positions at the Nedbank Group, including Head of Risk: Investment Banking, and General Manager: Corporate Banking Credit. During his tenure as the Chief Risk Officer at the DBSA, Paul Currie has been responsible for the bank's Credit Risk Monitoring and Governance function. Under his leadership, the Group Risk Assurance Division has re-engineered and rolled out credit risk rating and project pricing methodologies, implemented policies and processes to ensure alignment with the DBSA's requirements and strategic business initiatives, instituted the Enterprise-Wide Risk Management Framework, ensured that the DBSA is in full compliance with applicable regulations and supported the development of new products. He has enhanced the monitoring and reporting of Group Risk to Exco, Board and various rating agencies and stakeholders. Paul holds a BSC (Physiology) Degree from the University of Cape Town, a BCom (Acc) Degree and a Post Graduate Diploma in Accountancy from the University of Port Elizabeth. He attained his MBA (with distinction) from the Manchester Business School and University of Wales and completed the Advanced Management Program (AMP) at INSEAD. He is a member of the South African Institute of Chartered Accountants.

Marius Oosthuizen is a futurist and member of faculty at GIBS. He teaches leadership, strategy and ethics and heads up the Future of Business Project on the future of South Africa, Africa and BRICS. A previous participant of the Oxford Scenarios Programme at Saïd Business School, University of Oxford, UK, Marius holds a Master's in Strategic Foresight, is pursuing a PhD on Integrative Public Leadership and completing a Masters in Applied Social and Political Ethics. He has worked with business leaders, policy makers and civil society using stakeholder dialogue, scenario planning, strategic foresight and systems thinking to create future-orientated strategy. He is a recent participant in London's School of International Futures, as well as contributing to the European Strategy and Policy System in Brussels. He has consulted to IT, financial services, insurance, agriculture, manufacturing (chemicals), warehousing and logistics, oil and gas, international relations, social development, tourism, city and regional planning and mining engineering.

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Dialogue in Pictures

Picture below: 46th Infrastructure Dialogue Facilitator and Speakers
From left to right: Dr. Geci Karuri-Sebina (SACN), Mr Marium Oosthuizen (GIBS), Mr Paul Currie (DBSA), Mr Indra de Lanerolle (JamLab,Tshimologong)

Pictures below: 46th Infrastructure Dialogue – Dialogue participants