

Smart South Africa: An Intelligent Built Environment

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Definitions

“**Smart**” or “**Intelligent**” indicates something that is well adapted for, the place, time and context in which it occurs or happen in.

“**NDP**” means National Development Plan

“**IDP**” means Integrated Development Plan

“**LAN**” means Local Area Network

“**WAN**” means Wide Area Network

“**Foreign**” means originating outside of Afrika

Abstract

Environment

24. Everyone has the right—
- (a) to an environment that is not harmful to their health or wellbeing; and
 - (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—
 - (i) prevent pollution and ecological degradation;
 - (ii) promote conservation; and
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Property

25. (1) No one may be deprived of property except in terms of law of general application, and no law may permit arbitrary deprivation of property.
- (2) Property may be expropriated only in terms of law of general application—
- (a) for a public purpose or in the public interest; and

- (b) subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or decided or approved by a court.
- (3) The amount of the compensation and the time and manner of payment must be just and equitable, reflecting an equitable balance between the public interest and the interests of those affected, having regard to all relevant circumstances, including—
 - (a) the current use of the property;
 - (b) the history of the acquisition and use of the property;
 - (c) the market value of the property;
 - (d) the extent of direct state investment and subsidy in the acquisition and beneficial capital improvement of the property; and
 - (e) the purpose of the expropriation.
- (4) For the purposes of this section—
 - (a) the public interest includes the nation’s commitment to land reform, and to reforms to bring about equitable access to all South Africa’s natural resources;
 - and
 - (b) property is not limited to land.
- (5) The state must take reasonable legislative and other measures, within its available resources, to foster conditions which enable citizens to gain access to land on an equitable basis.
- (6) A person or community whose tenure of land is legally insecure as a result of past racially discriminatory laws or practices is entitled, to the extent provided by an Act of Parliament, either to tenure which is legally secure or to comparable redress.
- (7) A person or community dispossessed of property after 19 June 1913 as a result of past racially discriminatory laws or practices is entitled, to the extent provided by an Act of Parliament, either to restitution of that property or to equitable redress.
- (8) No provision of this section may impede the state from taking legislative and other

measures to achieve land, water and related reform, in order to redress the results of past racial discrimination, provided that any departure from the provisions of this section is in accordance with the provisions of section 36(1).

- (9) Parliament must enact the legislation referred to in subsection (6).

Housing

26. (1) Everyone has the right to have access to adequate housing.
- (2) The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right.
- (3) No one may be evicted from their home, or have their home demolished, without an order of court made after considering all the relevant circumstances. No legislation may permit arbitrary evictions.

We, the youth of South Africa recognise the importance of Section 24, 25 and 26 of the Constitution and thus the right to as safe environment, property and housing.

Noticing our peoples cry for the return of their land and the recent political will to make land reform a priority as a vehicle for education, technologic, social and economic transformation.

Recognising the noble vision set out in the [NDP](#) herein described as Vision 2030 which seeks to create a prosperous and more equitable Republic South Africa.

Recognising the intelligent built environment initiatives of Act 43 of 2000.



Illustration 1: Summary of the goals set out in Visions 2030

Realising the need for an integrated approach between the building of infrastructure, using resources properly (building the economy), job creation and nation building.

Seeing the need to take advantage of the 4th Industrial Revolution to achieve a mutually beneficial relationship between man, machine, the natural and the built environment.

Desiring to enhance the principle of Batho Pele in our use of the 4th Industrial Revolution to achieve our vision for 2030.

We, The Council of Built Environment Youth Forum submit this framework to guide our path to 2030 and beyond.

Introduction

Having recognised the deep landscape need to advance intelligent systems in the built environment where public sector, private sector and civil society met to discuss the concept of Intelligent Built Environment. Central to the discussion was a few key missing ingredients to cook up the concept of a Smart City in the context of South Africa:

1. A national framework on Intelligent Built Environment; scope of change and velocity of change in the art and science of national wealth.
2. Roles of public sector, private sector and civil society in the building and running of these national wealth;
3. An interconnected and interdependent coherence planning system, integrating seamlessly between national, provincial, municipal and district governments.

A few challenges key were also discussed in forum including:

1. The need to define Intelligent Built Environment as to expropriation in the context of the South Africa we find ourselves in now rather than try to import solutions or concepts from other parts of the world.
2. The tendency of South African and South African institutions to work uniformly, whether in the public sector, private sector or civil society
3. A triangular and circular system that will continuously improve the scope of change and the velocity of change for a static and dynamic intelligent system within the built environment.

Our framework will suggest a complete solution covering all the issues stated above and possible solutions to problems that will arise due to the framework itself.

Chapter 1 – Framework

Quality for a mutually beneficial relationship between man, machine, built environment and natural environment.

This framework focuses on using the best of each of these components in order to achieve the mutually beneficial relationship. We begin by looking at the strengths of machines, computers to be specific. Computers have the ability to take in and process a large amounts of information, make it readable for humans (by simplification) as well as make decision on that information.

This means a computer can be used to monitor people to help with service delivery.

A computer can be used to monitor the built environment to ensure its integrity and maximal efficiency of it use.

A computer can be used to monitor the natural environment to ensure its sustainable use for development.

This is suggested scope of change in the framework described as follows:

- Intelligent economy (monitoring the movement of goods and services);
- Intelligent people (using computer simplified information to make decisions);
- Intelligent governance (monitoring people, the built and natural environment to monitor and the progress of NDPs or IDPs and evaluate the efficiency of policies in achieving the goals of NDPs or IDPs);
- Intelligent mobility (monitoring train movements, car traffic flows and air traffic flows);
- Intelligent environment (monitor pollution levels of air, water and earth as well as their rate of use);
- Intelligent living (monitoring people's standard of living and government's service delivery).

Chapter 1 – Smartness or Intelligence of a system

In order to determine the whether or not a system is smart or not, intelligent or not one need only answer the following questions. If and only if all the questions are answered as yes, then the system can be considered smart or intelligent.

1. Is the system suitable for the geographical location?
2. Is the system suitable for the climatic and weather conditions?
3. Is the system suitable for the traditions and customs of the people in its geographical location?
4. Is the system achieving the reason it was installed for?
5. Is there local capacity to build and maintain the system?

“Colonialism has three components: dispossession, dependency and oppression. Indigenous people live with these disorder everyday of their lives”.

Our battle is a long way from being done. Regardless, the requirement for cautious cognizance as Native individuals is more grounded than any time in recent memory. Resolution and compromise is recolonization since it is permitting the colonizer to clutch his perspectives and mind-set, and doesn't challenge his conduct towards our kin or the land. It is recolonization since it is telling Native youngsters that the issue of history is fixed. But then they know through life experience that things have not changed and are deteriorating, so they should finish up I'm the issue. On the off chance that compromise is permitted to rule, our youngsters will bear the brunt of this recolonization and convey a strain within them that is troublesome if not difficult to live with – to be sure we are as of now seeing the nauseating aftereffects of this mental conflict on our young individuals in the stunning and repeating floods of self-mischief and self-destruction that torment all of our networks.

It started with dispossession: our lands were taken out from under us. The following stage was to guarantee that we are made altogether reliant on the intruders so they can handle each part of our lives and guarantee we can't ascend to seize back our lands. To do this, colonists continue to strip us of our capacity to accommodate ourselves.

Compromise's indicated blessings can never really exacerbate the situation since, perplexingly, taught individuals experience these psychological ill-treatment considerably more than others. The informed individual knows significantly more doubtlessly than every other person that it is absolutely intolerable out of this colonial infected dynamic, but we should be resilient to build the South Africa we need for ourselves now. There truly real way to decolonize is to apostatise from hegemonic constitution inside the compromise worldview. It is highly unlikely, but to get out: a resurgence of legitimate land-based Indigeneity. Our livelihood should be shown that they have the ability to determine the essential nerves and mental dissensions tormenting them by perceiving and regarding the amazing endowments that are there in their hereditary memory. The best approach to

battle colonization is by enculturating ourselves, by encentring ourselves in our country and retain the wealth of the nation to continuous improvement, our homeland South Africa.

The above is critical to repeal the existing Expropriation Act 63 of 1975 and its abolishment.

Chapter 2 – Security Concerns

The built environment is the considerable actual structure that empowers society to work in its social, political, financial and institutional directions (Geis 2000). In its plan, development and activity, an immense number of contemplations should be made, some of which are administered for, some of which are not; political, social, monetary, mechanical, natural and moral, lawful, framework engaged, underlying, and key variables are largely characteristic in the plan and retro-fitting of the built environment (Allan and Davis 2006). Framework contemplations incorporate security, and facing the challenge of normal dangers for instance, an immense range of characteristic perils represent a danger to the constructed environment and each require an inside and out comprehension of their inclination and relief to decrease their probability and diminish their effects adequately and proportionately. While the distinguishing proof of each danger may not be attainable, it has been recognized that the weakness and assurance of the built environment influences everybody, as everybody associates with it (Bosher and Humble 2011). The decrease in weakness of the assembled environment to such dangers is, consequently, of critical significance.

The created environment is the impressive real design that engages society to work in its social, political, monetary and institutional points (Geis 2000). In its plan, improvement and action, a huge number of thoughts ought to be made, some of which are managed for, some of which are not; political, social, financial, mechanical, regular and good, legal, system drew in, basic, and key factors are generally trademark in the arrangement and retro-fitting of the created environment (Allan and Davis 2006). Structure considerations join security, and confronting the test of typical risks for example, an enormous scope of trademark hazards address a threat to the built environment and each require an all-around appreciation of their tendency and alleviation to diminish their likelihood and lessen their belongings sufficiently and proportionately. While the distinctive evidence of every threat may not be feasible, it has been perceived that the shortcoming and confirmation of the manufactured environment impacts everyone, as everyone partners with it (Bosher and Humble 2011). The decline in shortcoming of the amassed environment to such risks is, thusly, of basic importance.

For human-computers interaction to be useful, the computers must be able to communicate with each other and send information back and forth between them. The computers can connect with other computers in the local area to form a LAN (via copper line connection). Computers found at large distances from one another can connect (via copper line connection) to form a WAN.

The Internet we use today is a WAN. The Internet was not built for security, thus it has serious security issues. On the internet, information moving from one computer to another can be intercepted, allowing hackers to have access to people's private information. Governments have attempted to protect personal information through laws like the [POPI Act 4 of 2013](#), but they need technocrats to make WAN effectively secure.

Going further, if the 5I framework is implemented using WAN, then a hacker can take control of the 5I systems, endangering personal, communal, societal, provincial, national or regional security.

Chapter 3 – Ethical Concerns

Mass information collection comes with a dilemma of ethics. This ethical dilemma challenges the very structure of the internet. We shall tackle this ethical dilemma by asking the difficult questions.

1. What types of information are there?
2. Who owns this information?
3. How much information can be collected?
4. How is this information used?
5. Who has access to this information?
6. How is the information protected?
7. How do we ensure accountability?

Due to this there has been a creating design towards the union of real mediations into the built environment so the normal impacts of threats, perils and critical disasters happening are avoided or lessened. While the point of the framework is to generally take a peek at or gain incredible data with respect to the lightening, taking everything into account, threats and huge accidents, there is

evidently a need to expect, hinder and prepare for, and respond to and recover from, their idle limit impacts comparatively as is reasonably practicable

Intelligent Built Environment an enormous scope of trademark hazards address a threat to the built environment and each require an all-around appreciation of their tendency and alleviation to diminish their likelihood and lessen their belongings sufficiently and proportionately.

Chapter 4 – Solutions

Henceforth, the people who design, construct and work the created environment have a colossal undertaking to complete in the evading and reduction of disasters and their belongings, additionally, more noticeable conversation and appreciation concerning the security of the built environment from the a lot of risks, perils and critical incidents that address a threat to it is required.

Starting with our central principle of Batho Pele we begin with a people centered approach. Taking into consideration our definition of smart and the fact that the basic unit of humanity is the family, thus the house is the basic unit of a Batho Pele inspired built environment. Next is the village, then the squatter camp, then the town, then the township, then the city. These are the territorial groupings of the Batho Pele inspired built environment.

For the sake of Economy the public sector must connect these territorial groupings with water, ICT (basic connection, ie fibre), transportation (rail), electricity and regulation. Private sector must provide housing, food, ICT (devices and accessories), transportation (roads, vehicles and accessories), education, textiles and entertainment. Civil society must provide education, moral guidance, tradition guidance, societal security, societal belonging and traditional housing. The individual is fundamentally responsible for their own self-actualisation (with the help of civil society, public sector and private sector).

In order to solve the problem of disconnected spacial planning between different spheres of government, public sector, private sector and civil society requires the centralisation of the electronic spacial planning system. This will force all spheres of government, public sector, private sector and civil society to co-ordinate and have one plan when it comes to the built environment.

In order to solve the problem of working in silos requires a change at the source of the problem, in the education system. This can be done through a change from an individual marking system to a collective marking system (in primary, secondary and tertiary educational institutions), meaning students only pass as teams. This will teach young South Afrikans how to work together.

Now to address the security and ethical concerns of the 5I framework we suggest a code of conduct governed by the 5 Pillars of Intelligence and the 6Ds, namely *Disruptive*, *Delink*, *Decolonise*, *Decentralise*, *Decommodify*, *Deglobalise*.

Chapter 5 – Solutions continued: Code of Conduct regulating both digital and physical technologies.

The 6D approach to the Intelligent built environment guided by the 5Is and the principle of Batho Pele is as follows:

1. Embrace *Disruptive* technologies;
2. *Delink* the technology from the outside world, this also means forbidding the use of technology that cannot be maintained without foreign assistance;
3. *Decolonise* the technology through indiginisation (adaptation to local conditions);
4. *Decentralise* the technology through copyleft licences and anti-copyright laws;
5. *Decommodify* the technology through forbidding it's sale or the listing as a utility;
6. *Deglobalise* the technology while allowing reglobalisation.

In order to establish and maintain a mutually beneficial relationship between man, machine, built environment and natural environment, WE must:

Embrace *Disruptive* technologies like (IKS, Blockchain, IOT, Big data, AI, Robotics, etc) but restrict them to only doing **3D** jobs, that is **Dirty** jobs, **Dangerous** jobs and **Difficult** (Boring) jobs.

Delink our intelligent built environment by developing a new Linux based operating system (called Azania) for both desktop and mobile on which all the soft infrastructure that will operate the intelligent built environment's physical infrastructure and service delivery platforms.

Release Azania under a [General Public Licence version 3](#).

Initially only network Azania using LAN.

Only allow technologies that can be maintained without foreign assistance can be used as part of the intelligent built environment.

Release all physical technologies, schematics and plans used in the intelligent built environment with an open source licence like the [General Public Licence version 3](#).

Decolonise the traditional myths through the adherence to Afrikan moral standards stated in the SA constitution and NDP into the workings of the operating system and its applications. Bantu is better known as Ubuntu or Botho in the South of Afrika.

Build technologies to adhere to the principles of Ubuntu which are as follows:

- Humbleness
- Community
- Encouragement of diversity
- Tolerance
- Redemption
- Harmony
- Interdependence
- Self-love
- Hospitality
- Collaboration
- Compassion
- Generosity
- Warmth
- Collective prosperity
- Collective responsibility
- Mutual support
- Peace
- Dignity
- Mutual respect
- Sharing
- Reciprocity
- Empathy
- Morality
- and Self-respect

Build Azania and it's applications to work in indigenous languages.

Decentralise natural resources and its applications (which is a security measure) through democratisation, meaning that all information collected will be available to all the people on the LAN (who register their true identity).

Use distributed data bases, block-chain and encryption (using both symmetric and asymmetric keys) to maintain data integrity, prevent data loss, prevent data theft and the hijacking of vital infrastructure (like water systems, transport systems or power systems).

Label verified and unverified information.

Label the source of the information.

Provide for full tracking on Azania and it's applications of who accessed what information, this information also must be visible to all the people on the LAN (who register their true identity) to incentivise collective responsibility.

Provide for reciprocity within South Africa and it's applications meaning you only get access to the personal information of others if and only if you make public your personal information (e.g. one can only see the address of another if they provide their address, with verification).

Decommodify the unilateral exploitation through the prohibition of commercialisation (or through their listing as a public utilities).

Deglobalise by restricting foreign rejects and it's applications to initially network using multivariate connectivity. Allowing for reglobalisation by consensus decision of the people who use that platform, thus they will decide which information is allowed to pass though WAN.

Make sure all information passing through WAN is encrypted.

Chapter 6 – Prognosis

1. The Council of Built Environment Youth Forum shall take its decisions by consensus of youth participation and involvement.
2. The identification of conducive land that will provide high quality structures for the community.
3. Corrective and preventive action against degradation of the built environment being everyone's job in the country.

Conclusion

We, The Council of Built Environment Youth Forum, now embark on a journey to provide a model smart village with an intelligent built environment based on the principle of Batho Pele for expropriation. The 5Is and the 6Ds as an example of an integrated approach to achieve inclusive planning, the building of infrastructure, using resources properly (building the economy), creating jobs and nation building to pave the way to smart squatter camps, smart towns, smart townships, smart cities, smart South Africa and to achieving Vision 2030.

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