

A guide to establishing

A MUNICIPAL SMART CITY INITIATIVE



Steve Tshwete
Local Municipality



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ACRONYMS

AA MCPP	Anglo American Municipal Capability and Partnership Programme
STLM	Steve Tshwete Local Municipality
SCF	Smart Cities Framework
ICT	Information and Communication Technologies
4IR	4th Industrial Revolution

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The STLM contributed to the development of this guide as a result of its involvement in the MCPP. The guide was informed by the STLM smart city journey and the learning the municipality has gained in the process. The January 2017 STLM Strategic Lekgotla Vision 2040 prioritised smart infrastructure and smart economic initiatives as important to the future of the municipality.

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PART A

BACKGROUND



A.1 Purpose and structure of this guide

South African cities and towns are increasingly pressured to become smarter. The intention with this guide is to assist municipalities with the process of establishing a smart city initiative. The focus is on the early stages of the journey of a city or town to become smarter. It provides practical guidance to support municipal officials and councillors with initiating and planning the process.

In addition to the learning from the STLM smart city initiative, the guide is also informed by A South African Smart Cities Framework (SCF). The SCF was developed by the Department of Cooperative Governance to guide decision-making and provide all role players with a structured approach to identifying, planning and implementing smart city initiatives that are appropriate to the local context. The SCF is available on the uKESA¹ website.

This guide aims to localise the SCF by identifying actions that could be taken to incorporate the principles outlined in the SCF at municipal level. At the core of the SCF "...is the belief that the South African understanding of a smart city should be based on the notion of inclusivity. In essence, this means that a smart city initiative should ultimately benefit all people and all communities in the city and improve the well-being of the entire city."

Cities and towns involve a complex system of systems, and a smart city should not be viewed as an end product in a state of completion. A smart city is constantly evolving and on the way to becoming ever smarter, rather than reaching the point of perfect smartness. Given the inconsistent interpretation of the concept of a smart city, the term 'smart city initiative' is used in this guide. It describes the combination of smart projects or interventions that, in combination, contribute to the continuous development of a smarter city.

Smart city initiative ⇒ smart project / intervention
 ⇒ smart project / intervention
 ⇒ smart project / intervention

Continuously developing
SMART CITY

¹ <https://www.ukesa.info/library/view/a-south-african-smart-cities-framework>

This guide consists of two parts. The first part introduces this guide and provides some background to smart cities. Part two describes the process to establish a smart city initiative. The process involves the following three overlapping phases:



Phase 1 (start the journey) explains how to initiate the process to establish a smart city initiative. Phase 2 (gather information) deals with the research required to help with making informed decisions, and phase 3 (prepare for implementation) provides guidance with planning the smart city initiative.

Annexure A contains a decision-making framework to assist with assessing the smart-readiness of a municipality.

Text boxes:

Speech bubbles:

Practical experiences shared by the Steve Tshwete Local Municipality

Blue boxes:

Information extracted (or adapted) from *A South African Smart Cities Framework*

Grey boxes:

Information from the Steve Tshwete Local Municipality, and general information

A.2 Introduction to smart cities in South Africa

There is no universally accepted definition nor a common understanding of the concept of a smart city. However, a wide range of definitions has been developed by various people and organisations. For instance, the STLM defines the STLM Smart City as “...a city that makes decisions and governs through technologically enhanced engagement with its citizens who have universal access to services and information where socio economic development and efficient service delivery is at its core” (STLM IDP 2017–2022).

The Smart Cities Strategic Advisory Group of the International Standards Organization defines smart cities as follows:

A “smart city” is one that increases the pace at which it improves social, economic and environmental sustainability outcomes, responding to challenges such as climate change, rapid population growth and political and economic instability by improving how it engages with society, how it applies collaborative leadership methods, how it works across disciplines and city systems, and how it uses data, information and modern technologies in order to provide better services and quality of life to those in, and involved with, the city, now and for the foreseeable future, without unfair disadvantage to others or degradation of the natural environment.

The United Nations specialised agency for information and communication technologies (International Telecommunication Union) analysed nearly 100 definitions of smart cities to develop the following definition:

A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects.

The terms ‘smart’ and ‘city’ should be understood clearly, and should not be defined in a narrow sense. They could be interpreted as follows:

Smart

The term ‘smart’ is commonly associated with a range of technological and digital concepts and interventions, especially information and communication technologies (ICT). Concepts

and technologies of the 4th Industrial Revolution (4IR) often feature strongly in smart city initiatives, e.g. the Internet of Things, 3D printing, blockchains, autonomous vehicles, facial recognition, big data, and artificial intelligence. However, the understanding of the term 'technology' could be expanded to also include innovative approaches, techniques and processes, as well as non-conventional interventions and scientific innovation.

City

The word 'city' has multiple meanings in the smart city discourse. It is a catch-all phrase that includes various types of settlements, or parts of settlements (cities, towns and villages of any size). It could refer to a 'new city' (a custom-built greenfield development), or it could be an existing city that implements a smart city initiative to transform into a smarter city (retrofitting). Such initiatives could focus on certain aspects (e.g. transportation or connectivity), or on certain neighbourhoods or precincts (e.g. educational, commercial). In some cases, large new precinct developments linked to an existing city (e.g. business parks), or new residential, commercial or mixed-use developments, e.g. 'lifestyle' communities are marketed as smart cities.

"[A] Smart City approach requires a combination of smart efforts to improve inhabitants' quality of life, promote economic growth, and protect the environment from degradation. Key systems of smart and sustainable cities include: smart energy, smart buildings, smart transportation, smart water, smart waste, smart physical safety and security, smart health care, and smart education. ICT based concepts such as big data, open data, Internet of Things (IoT), data accessibility and management, data security, mobile broadband, ubiquitous sensor networks are essential in smart and sustainable cities and are predicated on an ICT infrastructure to improve Quality of Life and promote overall sustainability."

Steve Tshwete Local Municipality IDP, 2017–2022

Smart cities involve a combination of various smart components. These components could refer to, for instance, infrastructure elements, or they could be different operational areas that are central to a city's functioning, such as the economy, people, governance, mobility and the environment. Examples of possible smart initiatives that could be implemented in support of each of these areas are illustrated in Figure 1.

For more information on smart cities go to the uKESA smart cities resource collection²

² <https://www.ukesa.info/library/view/smart-cities-resources-collection-for-african-cities>

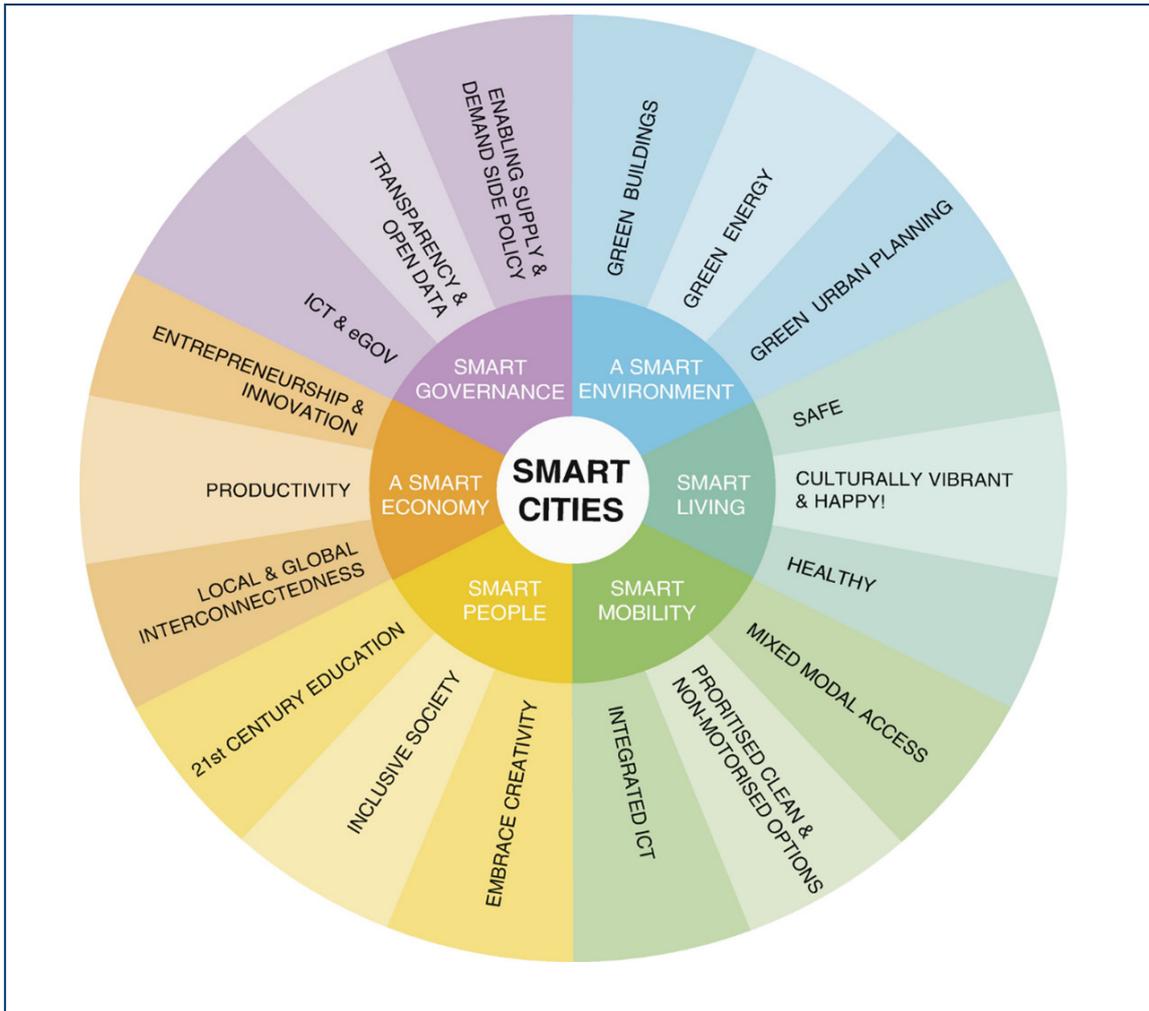


Figure 1: Examples of possible smart city components and initiatives

Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., Meijers, E. 2007. Smart cities Ranking of European medium-sized cities. Centre of Regional Science, Vienna UT.

PART B:

THE PROCESS TO ESTABLISH A SMART CITY INITIATIVE



The identification of city-wide smart initiatives – an incremental approach

There are many aspects to consider when a smart city initiative is established. Choices may have to be made regarding the focus of a smart city initiative. For instance, the initiative could focus on a particular theme or aspect of the city. The focus could be on becoming a connected city by, for example, providing free Wi-Fi to all communities, or the focus can be on becoming a 'green' city by, for example, limiting greenhouse gases through an upgraded and smart transportation system. In choosing a theme, aspects that need to be considered include the availability of capacity, resources, and capabilities to implement and maintain such an initiative.

Since cities and towns involve complex systems and components, smart city initiatives could not be implemented all at once. They should be implemented incrementally according to a longer-term strategy. Needs and opportunities should be prioritised, and interventions should be planned and implemented over an extended period of time.

A South African Smart Cities Framework

The process to establish a municipal smart city initiative is presented in three phases, namely:

1. Start the journey
2. Gather information
3. Prepare for implementation

B.1 Start the journey

INITIATE THE PROCESS TO ESTABLISH A SMART CITY INITIATIVE

It is important for a municipality to be very clear on the reasons why it wants to become smart. Being smart should be the means to an end; it should not be an end in itself. A smart city initiative should be aimed at improving the lives of the people residing in the city and improve the well-being of the entire city. The following steps will assist you in starting the process with these aims in mind.

i Gather basic information about smart cities

- If you would like to introduce the concept of a smart city to your municipality, a good starting point would be to gather reliable information and basic facts about smart cities to gain a general overview of the phenomenon. Access a wide range of sources to ensure you get a balanced, unbiased view of the various claims made about the value, benefits and pitfalls of smart cities.

Smart city opportunities and limitations

Ways in which a smart city initiative could be of benefit include the following:

- More effective, data-driven decision-making
- Reduced environmental footprint/impact
- New economic development opportunities
- Improved quality of life
- Creating safer communities
- Enhanced engagement between municipalities and residents
- Cost savings.

Concerns about smart cities include the following:

- Interventions are not appropriate to the context
- Vested corporate interests
- Technology as a starting point and not an enabler
- Ethical concerns.

A South African Smart Cities Framework

- It is important to gain an understanding of smart cities in the context of developing countries. Information about the application of smart city principles in South Africa is available in *A South African Smart Cities Framework*.

Guiding principles to create inclusive smart cities

For a smart South African city to be inclusive, it should adhere to six interdependent principles. These principles provide guidance when decisions have to be made regarding the identification, planning and implementation of smart initiatives and technologies.

Each principle is expressed in the form of an objective that should be achieved to enhance the inclusiveness of a smart city initiative. Decisions regarding the nature and purpose of a smart initiative or technology should be guided by the following principles:

- It should be smart for all
- It should use technology as an enabler rather than a driver
- It should be shaped by, and respond to, the local context
- It should be informed by the real needs of the community
- It should embrace innovation, partnerships and collaboration
- It should be sustainable, resilient and safe.

A South African Smart Cities Framework

- Once you have equipped yourself with sufficient knowledge about smart cities and your local context, you should be able to prepare a convincing and informed motivation for a smart city intervention appropriate to your particular situation.

ii Develop a clear motivation for a smart city initiative

- It is important to get the support for a smart city initiative from all decision-makers in the municipality. This may require you to prepare a submission to EXCO and/or Council that clearly and concisely outlines your proposal. Provide information about the concept of a smart city, the rationale for your proposal and the proposed nature of the initiative.
- When preparing a motivation for a smart city initiative, consider the following:
 - Are the people living in our city or town satisfied with the services we as local government provide? If not, would a smart city initiative detract us from satisfying people's most pressing needs, or channel funding away from improving the delivery of basic services?
 - Why do you want to introduce a smart city initiative? What are the purpose and objectives of the initiative? Ideally, your smart city initiative should address the most critical problems faced by your city or town to make a

meaningful contribution to improving the quality of life of all the people in your municipal area. The smart initiative needs to respond appropriately to your specific challenges rather than being based on generic models that may not be suitable to local conditions.

- To define the intention with the smart initiative, identify the challenges you need to address and the results you would like to achieve. Then consider the various responses that could be implemented, including adjusting a process or procedure, or adopting new ways of dealing with challenges. Decide if a smart technology intervention would be the most appropriate.

Decisions regarding any smart city initiative should be guided by a clear understanding of the nature and purpose of the proposed intervention. As far as possible, no smart city initiative should have an adverse effect on certain communities or certain areas of the city. Smart city initiatives should first and foremost be aimed at improving the lives of the people residing in the city. To achieve this, a shared understanding of the aims and objectives of a smart city initiative is critical. A useful start is to agree on the interpretation of 'smart' and 'city'.

- In collaboration with all relevant role players, develop a shared understanding of what 'smart' means for your municipality. Different stakeholders may not have the same motivations for participating in a smart city initiative, and it may sometimes be difficult to reconcile, for instance, the purely commercial intentions of some entities with more altruistic intentions of others.
- Agree on the meaning of the word 'city' for a specific smart city project or initiative. Smart city interventions can be aimed at a part of the city, the city as a whole or a greenfield development outside of an existing city. Whether an initiative will be implemented municipality-wide, within a neighbourhood or precinct or outside of the city, it is essential to determine how the initiative will relate to other (smart or conventional) projects and to the different components of the city.

A South African Smart Cities Framework

iii Designate a champion and team to drive and coordinate the smart city process

- Identify a person who could take overall responsibility for the coordination of the process to establish a smart city initiative. This person should be motivated and committed to the process of establishing a smart city initiative.
- Identify an appropriate committee that could take responsibility for the planning of

the smart city initiative. If feasible, establish a committee that would be dedicated to the smart city initiative. In some cases, it may be better to incorporate the smart city initiative in the work of an existing committee to reduce the need for another committee to be established and managed.

Many officials are members of multiple municipal committees and find it difficult to attend all meetings. Adding another committee specifically for the smart city initiative may add more strain on these officials. Incorporating the smart city initiative into an existing committee makes sense.

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- Involve all municipal stakeholders and start securing the support of key individuals. This requires clear communication and information sharing to allow colleagues to gain a shared understanding of the nature of the smart city initiative proposed.
- Secure the support of colleagues for this initiative. This could be a challenging and ongoing process, since the concept of a smart city may not be clearly understood, or misunderstood, by some. To deal with more sceptical colleagues, consider the following:
 - Provide them with clear, factual information about the nature of your proposed smart city initiative. The concept could be a bit daunting and difficult to digest, so break it down into smaller concepts. Identify the benefits the initiative would have in their particular domains or departments.
 - Involve them in workshops and capacity building events (e.g. visits to other smart city initiatives).
 - Involve them in the decision-making process from the start. They should identify the potential smart city projects that could benefit their areas of responsibility.
- An important role of the coordination team is to communicate with colleagues regularly and clearly. In addition to reporting on progress, information should be provided regarding the smart city initiative in general to enhance synergy and develop a common understanding.

The successful implementation of a smart city initiative requires the buy-in of all stakeholders. Sometimes, some municipal colleagues may be sceptical about the idea of a smart city. It is important to share information with these colleagues that demonstrates the benefits that smart projects could have in their domains. Involve them in learning events, especially visits to smart city initiatives in other municipalities.

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iv Share learning

- A capacity building programme to empower local government officials, councillors and other role players would be of value to ensure everyone understands the purpose and nature of the smart city initiative. This will assist in developing a shared understanding of the initiative and contribute to securing support.
- It could be useful to provide opportunities for the sharing of information and experiences among colleagues and across municipalities, e.g. by arranging workshops or seminars.

v Involve your community from the outset

- Ensure the active participation of the community in the identification, development and implementation of smart city interventions. This could contribute significantly to the success of the initiative.

vi Identify potential collaborators

- Collaborators are often key to the success of a smart city initiative. Start early on in the process to identify potential collaborators and to establish partnerships.
- Partners could represent a range of interest groups, including the ICT industry, business (often technology companies and business consultants), academia, the research fraternity, donors and non-governmental organisations.

B.2 Gather Information

CONDUCT RESEARCH TO HELP YOU MAKE INFORMED DECISIONS

Once a formal decision has been made to establish a smart city initiative, more information should be gathered about smart cities and your local context to guide the development of an appropriate smart city initiative. If you do not have the capacity, an independent consultant could be appointed to conduct studies and prepare a research report.

i Consult with smart city specialists

- Access information from experts and share learning and experiences.

A useful way to gain a better understanding of the concept of a smart city and the process of establishing a smart city is to host a workshop with various experts, including academics, researchers, built environment professionals and practitioners, technology companies, and other municipalities.

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- The information gathering process could involve desktop studies, interviews, and attending workshops/seminars/conferences on smart cities in South Africa. You could also visit other municipalities in South Africa that may be able to share some learning.

ii Assess your municipality

- Access existing information about the characteristics of your municipality from documents such as the IDP to gain an understanding of the context within which the smart city initiative would be implemented.
- Assess the smart-readiness of your municipality according to the two-stage process outlined in the SCF (See Annexure A). It involves the following:
 - The first step is to consider the pre-conditions for becoming smarter. This involves assessing the municipality and the current situation to gain an understanding of the ability of the municipality to provide services under current conditions. The intention is to establish whether there is a strong foundation on which to build a smart city initiative, or, phrased differently, whether the basics are in place.
 - Secondly, consider the enablers for implementing a smart city initiative.

This involves assessing where the municipality could improve its ability to deliver services. The purpose of this assessment is to establish whether the municipality has the means and ability (or can acquire the ability) to harness and leverage smart technologies and initiatives to improve the effectiveness and efficiency of the services delivered.

iii Prepare a report to inform the implementation process

- Present the research results in a user-friendly report and explain smart cities in the simplest way possible. Smart cities could be a confusing and daunting concept, and it is important to describe it in a way that everybody will understand.
- Include examples of smart city initiatives and projects appropriate to the South African context in the report. This will assist in bringing the concept to life and demonstrate what a smart city could involve in practice.

The concept of a smart city could be daunting. It could be difficult to explain the complexities of your smart city initiative to your colleagues. It could help to use practical examples of smart projects to help them to understand their roles in the process.

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B.3 Prepare for implementation

PLAN THE SMART CITY INITIATIVE

Based on the information gathered during phase two, a plan should be developed to guide the implementation process of the smart city initiative.

i Prepare a smart city strategy / roadmap / plan of action

- Based on the research conducted, prepare a strategy / roadmap / plan of action (whichever is appropriate) to guide the implementation of the smart city initiative.
- Such a document should outline the programmes and projects and map out the implementation process.

ii Identify and prioritise smart projects

- Assess potential intervention areas to identify projects that would be most suitable for implementation.
- Use a structured process to ensure that proposed projects would be viable. The decision-making framework described in the SCF (see Annexure A) will be useful to prioritise investment in smart projects.
- Prepare project plans for the selected projects.
- Where needed, prepare the brief (Terms of Reference) for each project and procure service providers.

iii Align the smart city initiative with existing planning and operational processes

- A smart city initiative should complement existing municipal planning outcomes and objectives, rather than placing the municipality on a different trajectory to the one agreed upon. If the smart city initiative supports the vision created for the city or town, it will have a higher likelihood of success.
- Incorporate the smart city initiative and the associated projects into the core business of the municipality. By linking the initiative and projects to established processes and existing municipal functions, interventions and strategies, it may be easier to get support, access resources and ensure sustainability.

Smart city interventions could be intentionally disruptive and challenge the status quo or the conventional way of doing things, but smart city initiatives should ultimately be supportive of the planning outcomes as agreed on in existing municipal plans and strategies.

A South African Smart Cities Framework

- Smart city projects should be incorporated into the IDP to ensure they form part of the municipal priorities and are eligible for funding. If the smart city initiative is mainstreamed and projects are implemented in the conventional way, it may be easier to get support from various departments, including those responsible for procurement, finances, operation and maintenance.

STLM smart city programme

STLM smart city initiative outcomes

- Enhanced institutionalised technological competency
- Increased service delivery efficiency and productivity
- Reinforced smart and effective service delivery which is maintained as a norm
- Augmented quality of the STLM's ICT systems and services to support and enhance citizens' active involvement and engagement
- Sustained provision of municipal services to households utilising the broadband infrastructure.

STLM smart city initiative key outcomes

- STLM as a technologically competent institution
- STLM as a smart city with enhanced service efficiencies and productivity
- Smart and effective service delivery maintained as the norm
- Quality STLM ICT and services to support and enhance citizen's active involvement and engagement
- Municipal services provided to households utilising the broadband infrastructure.

Steve Tshwete Local Municipality IDP, 2017–2022

- The mainstreaming of smart projects requires an understanding of the complexity of a city as a system of systems. Cities and towns involve a range of interlinked functions and components, and smart city initiatives could link to one or more of these in various ways. The potential components are presented in Figure 2.

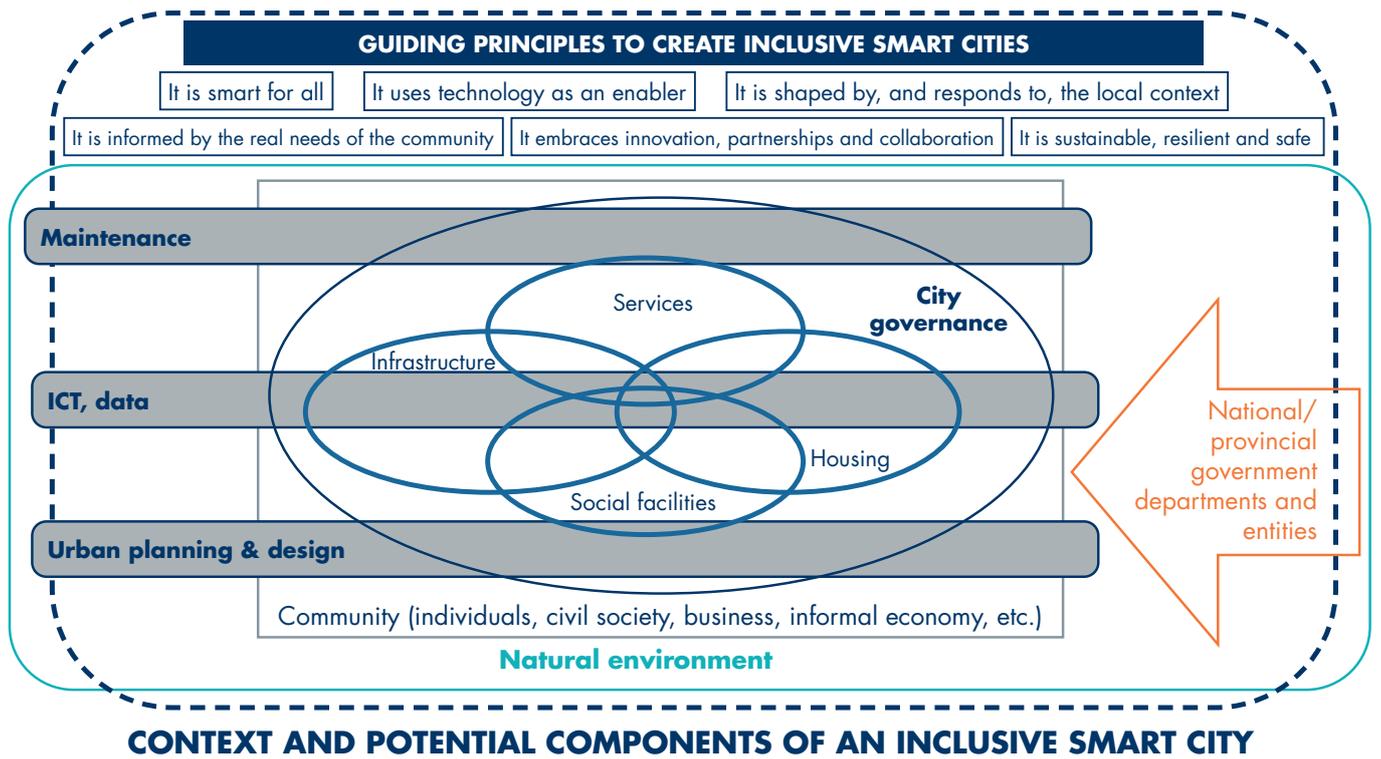


Figure 2: Context and components of an inclusive smart city

ANNEXURE A

Assessing the smart-readiness of a city: a decision-making framework

The following decision-making framework is a summary of the framework described in *A South African Smart Cities Framework*. It provides municipalities and other role players with guidance on the planning of smart cities. The framework is structured as a two-stage process to determine the readiness of a municipality to establish a smart city initiative, involving the following:

Stage 1: Consider the pre-conditions for becoming smarter

Assess the current state of the municipality to establish whether there is a strong foundation on which to build a smart city initiative. Gather information about current conditions with respect to, for instance, the existing engineering infrastructure, the facilities, amenities and housing available to residents, the ability of the municipality to deliver services, the governance structures and the available financial resources. These aspects could be grouped into three interlinked clusters:

- Institutional and organisational arrangements
- Existing infrastructure
- Capacity of government officials and communities.

i Institutional and organisational arrangements

Aspects to consider include the robustness of current governance structures, levels of cooperation within the municipality, levels of cooperation between the municipality and role players outside the municipality, compliance with legal requirements and sectoral policies, existence and scope of internal policies and by-laws, the effectiveness of business processes, and vacancy levels.

ii Existing infrastructure

This step involves an assessment of existing municipal infrastructure, facilities, amenities and housing with respect to, for instance, their quality or condition, quantities or the number per population (where appropriate), their age, their distribution across the city, backlogs and the planned future developments.

iii Capacity of government officials and communities

In addition to an assessment of physical infrastructure, an assessment also needs to be conducted to establish if the human resources are available to utilise the infrastructure. People are required to provide services and maintain infrastructure. Factors to consider include people's knowledge, skills, competencies, experience, qualifications, attitudes, values and past performance, as well as possible re-skilling and training programmes that may be required when implementing a smart city initiative. Another critical aspect to consider relates to the capacity of communities to participate in and contribute to smart city initiatives.

Stage 2: Consider the enablers

The assessment of the pre-conditions will assist in reaching an understanding of where a municipality's challenges or 'pain points' are. This will guide the direction of the second component, which involves the assessment of the following enablers:

- A smart city plan
- Digital infrastructure
- Skilled people
- Partnerships
- Community involvement.

i A smart city plan

The drive to become smarter should be a coherent effort across the municipality and it is dependent on partnerships with the business sector, communities and other spheres of government. There are different ways to coordinate, plan and implement smart city initiatives, such as developing a plan, strategy or roadmap, or designing programmes and projects. It would be useful to follow a sound project management approach where there are programmes linked to projects to allow for effective planning, budgeting and resourcing. Any of these approaches should be informed by a thorough understanding of the local context. Questions that should be answered include the following:

- Should a city-wide strategy be developed, or should sector-specific strategies be developed dealing with specific smart city initiatives, e.g. a strategy focusing on smart water initiatives?
- What is the intention with the smart city initiative (vision, purpose, impact)?
- How do we link our intended interventions with existing plans (e.g. the IDP) and policies (such as the Integrated Urban Development Framework and the National

Spatial Development Framework)?

- Do we need to develop a focused implementation plan for smart city initiatives or do we incorporate these initiatives into other plans?
- How do we ensure that our smart city initiatives contribute to the development of a sustainable and resilient city and also address climate change and natural resource challenges?
- Can the strategic intent and vision be translated into reality by those responsible for implementation? In other words, are the strategic / management decisions synchronised with the realities at an operational level?
- How do we link smart city initiatives to a budget, especially if such initiatives are cross-cutting and involve various departments and role players?
- How does a smart city strategy relate to line functions, and how would progress and impact be monitored and measured across the city?
- How is synergy across the city strengthened to enable the smooth implementation of a smart city initiative?
- How can we exploit 4IR technologies, and what are the challenges?
- What are the risks and unintended consequences linked to the implementation of smart initiatives and technologies?
- How do we plan for monitoring and evaluation of the smart city initiative?

ii Digital infrastructure

The availability and quality of digital infrastructure are important for smart cities. In this instance, digital infrastructure refers to the physical assets required to operate technologies such as digital communication, computing or data storage. To enable smart city development, digital infrastructure is required to collect data, bring the data to a central point, and then analyse the data to make it useful. The following should be considered:

- What types of instrumentation do we need (meaning a network of sensors that can detect, sense, measure and record real-time data)?
- What type of interconnected and integrated systems do we need (i.e. a system that can communicate and interact with users, operators and managers)?
- What type of systems do we need that can analyse the situation, enable quick responses and optimise solutions (how do we gain useful intelligence)?

iii Skilled people

To enable smart city implementation, people with the right skills and abilities in the right places are critical. It is the people, not just the technology, that makes a city smart and therefore municipalities will have to extend investments beyond technology and data to investment in human resources. In some instances, it may be possible to upskill or retrain existing staff, but in other instances people with specific competencies may have to be employed. The possibility of certain skills becoming redundant as a result of implementing smart technologies should be carefully considered. Decisions need to be made regarding the following:

- Would we need to employ people with specialist skills and experience to implement a particular smart city initiative?
- Would we be able to upskill existing staff to operate and maintain technologies associated with a smart city initiative?
- What skills/competencies would we require in future to support and maintain smart interventions?
- Do our politicians and officials have the willingness and ability to embrace change and accept innovations and smart interventions? Do all involved share the same vision?

iv Partnerships

Collaborating with appropriate partners could play a significant role in the success of smart city initiatives. The key is to establish partnerships that will contribute to the success of the initiative and support the overall aim of creating an inclusive smart city. It is therefore important to identify reliable partners that share the same values and objectives. Partners would have different motivations for participating in a smart city initiative, and it may sometimes be difficult to reconcile, for instance, the purely commercial intentions of some partners with more benevolent intentions of others. Partners could represent a range of interest groups, including the ICT industry, business (often technology companies), academia and the research fraternity. The following need to be resolved:

- Who should take ultimate responsibility for the coordination of our smart city initiative?
- How do we ensure that all relevant departments participate meaningfully in such initiatives?
- How do we measure the performance and impact of cross-cutting smart city initiatives?

- How do we improve synergy between various role players with different mandates and performance indicators to ensure the success of smart city initiatives?

v Community involvement

The active participation of the community in the identification, development and implementation of smart city initiatives could contribute significantly to the success of the initiative. The term 'community' could refer to all role players, stakeholders and affected parties relevant to the proposed initiative. These include residents, the business community (formal and informal), universities, schools and youth organisations, research organisations, government departments and industry. Smart city initiatives allow city citizens to co-create their living environments by becoming active role-players that provide data that feed into the smart city system and contribute to better decision-making. However, it is important to consider the fact that many people may not be able to make use of ICT-based initiatives because they do not have the financial means, they are not IT literate, they do not have access to ICT services and equipment, etc.

