

Cape Town: A Smart City for African Socio-Economic Development

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Dates:

Received: 21/02/21
Accepted: 14/09/21
Published:

How to cite this article:

Alvin N Arnardu, Errol Francke, Cape Town: A SmartCity for African Socio-Economic Development, *Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie* 40(1) (2021).
<https://doi.org/10.36303/SATNT.2021.40.1.843>

'n Afrikaanse vertaling van die manuskrip is aanlyn beskikbaar by <http://www.satnt.ac.za/index.php/satnt/article/view/843>

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The modelling of smart cities introduces a shifting focus from static e-government policies to pragmatic IoT (Internet of Things) solutions that are constantly dynamic in response to citizens and the environment. The purpose of this study is to determine how Cape Town, as a smart city, can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative.

Inspired by the call from Smart Africa, this socio-technical study extends the view that Information Communication Technologies (ICT) and the knowledge-driven economy could increase Africa's competitiveness in the global economy.

Africa has managed to stay abreast with technology trends particularly in telecommunications, however the implementation of 5G calls for more than just delivering connectivity as it presents vast opportunities for smart cities. This study proposes that the foundation of Smart Africa lies with a veracious policy and regulatory environment that will inspire job creation, sustainable entrepreneurship and knowledge sharing.

This study applied the triangulation of theory, compiling data sources, and data collection methods based on the principles of the Smart Africa Manifesto. In the empirical phase, key ICT officials of the City of Cape Town and the Western Cape Government were invited to participate in in-depth interviews conducted in June 2019.

This study supports the view which proposes that Cape Town, as a smart city, can contribute to the socio-economic development of Africa by adopting the Smart Africa Manifesto principles for socio-economic development. The recommendations serve to guide ICT strategies, policies and city officials in their transformation towards smart cities particularly in Africa.

Kaapstad: 'n Slimstad vir sosio-ekonomiese ontwikkeling in Afrika: Die modellering van slimstede stel 'n verskuiwing in fokus voor, vanaf statiese e-regeringsbeleid tot pragmatiese Internet van Dinge (IoT)-oplossings wat voortdurend dinamies op burgers en die omgewing inwerk. Die doel van hierdie studie is om vas te stel hoe Kaapstad as 'n slimstad tot die sosio-ekonomiese ontwikkeling in Afrika kan bydra en die *Smart Africa*-inisiatief kan bevorder.

Aangemoedig deur 'n versoek van *Smart Africa*, is hierdie sosio-tegniese studie van mening dat inligtings- en kommunikasietegnologie (IKT) en die kennisgedrewe ekonomie Afrika se mededingendheid in die globale ekonomie kan verhoog.

Afrika het daarin geslaag om op hoogte te bly van tegnologiese tendense, veral in telekommunikasie. Die implementering van 5G verg egter meer as om bloot aansluiting te lewer, aangesien dit 'n magdom moontlikhede vir slimstede bied. Hierdie studie stel voor dat die grondslag van *Smart Africa* in 'n geloofwaardige beleid en regulerende omgewing gesetel is wat die werkskepping, volhoubare entrepreneurskap en die uitruil van kennis sal aanvuur.

Hierdie studie het triangulering van teorie, die opstel van databronne en data-insamelingsmetodes toegepas wat op die beginsels van die *Smart City*-manifeste gebaseer is. In die empiriese fase is sleutel-IKT-beamptes van die Stad Kaapstad en die Wes-Kaapse Regering (WKR) genooi om deel te neem aan die indiepte-onderhoude wat in Junie 2019 gevoer is.

Dié studie ondersteun die siening dat Kaapstad as 'n slimstad deur middel van die *Smart Africa*-beginsels vir sosio-ekonomiese ontwikkeling tot die sosio-ekonomiese ontwikkeling van Afrika kan bydra. Hierdie aanbevelings dien as riglyne vir IKT-strategieë, beleid en stadsbeamptes in hulle transformasie tot slimstede, veral in Afrika.

Introduction

A number of cities such as Barcelona, Dubai, Shanghai and Kigali in Rwanda have embarked on the smart city journey and much can be learned from their experiences (Ferreira, 2020; Ojasalo et al., 2016). This study identified three categories of city-oriented Internet of Things (IoT) applications, namely, Smart Living, Smart Safety and Smart Sustainability. Based on these three categories, San Francisco, Moscow and Porto have initiated smart city projects across smart, sustainable and safe areas (Shamsuzzoha et al., 2021). Cape Town was identified as being in the initial phases of rolling out smart city projects (Booyens et al., 2016). Located in the Western Cape of South Africa, Cape Town strives to strategically become known as the opportunity city; the safe city; the caring city; the inclusive city; and the well-run city (CoCT, 2012). What remains inconclusive though, is how Cape Town, as a smart city, can contribute to the socio-economic development of Africa.

Defining a smart city

A smart city is a city development concept incorporating ICT and its potential for economic development and sustainability by facilitating its management. It is the creation of intelligent urban spaces that are able to make the city more sustainable and friendly enough for individuals and collective prosperity (Ferreira, 2020). The Smart Africa Secretariat (2016) introduces the Smart Africa initiative which strives to accelerate sustainable socio-economic development in Africa through the use of ICT. In 2014 it adopted the Smart Africa Manifesto which is supported by five principles to ensure smart implementation and application of ICT.

The United Nations Economic Commission for Europe (UNECE) formulates key performance indicators based on the application of big data, cloud computing, cyberphysical systems, networks of communications, sensors and artificial intelligence to steer the development of an internationally agreed definition of Smart Sustainable Cities (SSC). However, this has only provided a guide that proposes best use of embedded systems to become a "smart city" by meeting certain criteria (UNECE, 2017). Mhangara et al. (2017) regard these concepts as futuristic in approach, lacking any proposed ideological framework.

The strategic need for smart cities in Africa

The growth of urban settlements in African cities has led to population growth and resultant economic growth. This growth, however, often results in congestion and other challenges that need to be alleviated through effective planning and provision of infrastructures by economies of scale and technology innovation (Centre for Cities, 2014). The general consensus is that smart cities should use ICT to shape their liveability and sustainability. ICT is, therefore,

regarded as integral to align with diverse instruments, techniques, organisational structures and initiatives that build upon online engagement, to solve the key problems of cities. This study shall adopt the definition of a smart city as "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 operations and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects" (ITU, 2017). This research suggests that smart cities in Africa need to be strategic in their deployment of their smart city initiatives so as to contribute to the socio-economic development of its citizens.

Research problem

In 2014, African Heads of State initiated the "Smart Africa" project to fast-track sustainable socio-economic development and in so doing steer Africa into a knowledge economy by means of affordable access to broadband and ICT (Smart Africa Secretariat, 2019). Green (2016) selected a group of cities of varying sizes, geographies and levels of progress in terms of 'smartness' to investigate the key parameters and lessons involved in becoming smart. While some attention has been given to Cape Town being regarded as a smart city, less attention has been given to its potential contribution to advance the Smart Africa initiative.

The purpose of this study is to determine how Cape Town as a smart city can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative.

Research aim and questions

The aim of this study is to determine how Cape Town, as a smart city, can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative. The following questions were formulated from the research aim:

- What are the characteristics that typify Cape Town as a smart city?
- Which factors could enable Cape Town, as a smart city, to contribute to the socio-economic development of Africa?
- How can Cape Town contribute to the Smart Africa initiative?

Literature review

This study reviews literature on smart cities and smart city initiatives in Cape Town, a major tourism destination in Africa. Cape Town possesses the potential to contribute significantly towards the socio-economic development of South Africa and the African continent (UNWTO, 2018). Herzog (2018) asserts that in the near future, the main advances of city agglomerations will occur in Africa

coupled with immense growth rates of African cities. These advances can only be guided by planning for Smart City agglomerations to effectively improve citizens' lives and preserve the environment in spite of industrialisation. According to Boyle et al. (2019), Cape Town implemented a large Enterprise Resource Planning (ERP) based Digital City strategy that aimed to reduce the digital divide and improve internet connectivity in 2000. Although the digital strategy recognises the benefits of ICT interventions, it was found to be lacking substantive content and grounding based on smart city models (Boyle et al., 2019). In assessing the development of a Smart City, Hamzah et al. (2016) proposed using a pragmatic framework to compare the stakeholder needs and planned development.

The Smart City concept lacks standard definition, approach, regulation and implementation standards. African cities are faced with more complex challenges in distinguishing smart city frameworks and applying other smart city initiatives applied in developing countries due to different socio-economic backgrounds. This research acknowledges the socio-economic challenges in Africa and the potential benefits of smart city development efforts to Africans and assesses how future smart city development efforts could enhance the lives of citizens. Green (2016) is regarded as presenting seminal work with pivotal research on smart cities, the findings of which have presented great importance and influence within this discipline. The author carefully selected 22 cities of variable sizes, geographies and stages of development in terms of 'smartness' so as to examine the main parameters and lessons undertaken in becoming smart.

Figure 1 illustrates the five drivers for cities to become smart (as adapted from Green 2016). One such driver is "demographic pressures" which include the expansion of numerous cities, because of population growth and inward migration. As some cities are experiencing a decline of industrialisation (Romão, 2018), other cities, such as Shanghai in China, are experiencing the phenomenon of

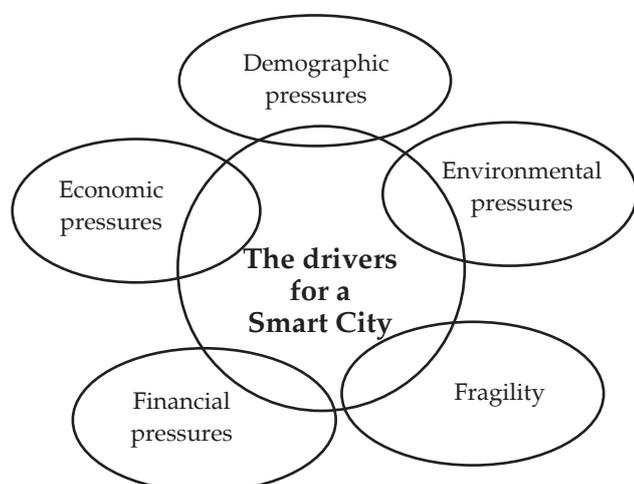


FIGURE 1: The five drivers for cities to become smart (adapted from Green, 2016)

changing age structure where their citizens are living longer (UN, 2019). The next driver is "environmental pressures" which, in many ways, emanate from the "demographic pressures". Contributing factors are population growth, 'motorisation' and the cities' battle to keep abreast of expansion. These factors, together with the added consciousness of human-created climate change, weather patterns and air quality have become major political issues for city authorities.

Leading on from the previous two drivers, "fragility" considers the vulnerability to natural disasters as well as the need to survive the cities' brisk social and economic changes. Cape Town has recently faced many socio-economic challenges such as a recent drought, and more recently, the COVID-19 pandemic (Botha, 2018; Stiegler et al., 2020). City managers should set priorities to implement solutions to help them manage these fragility factors in a sustainable way (Stiegler et al., 2020).

The "financial pressures" driver stems from the fact that many city managers have experienced an immense reduction of funds available to manage their cities in the past decade (Boyle et al., 2019). Tighter budgets have led to the need to establish private-public partnerships for the formation and operation of infrastructure (Wang et al., 2017).

The fifth driver, "economic pressures", arises from inter-city rivalry to become the city of choice where international and affluent citizens will choose to live. It is generally accepted that cities with stable connectivity and a positive attitude to technology will be more successful in attracting such citizens (Kim et al., 2017; Leorke et al., 2018).

The five drivers for cities to become smart, as proposed by Green (2016), are key to this study as these could assist in determining how Cape Town could contribute to the socio-economic development of Africa as proposed by UNWTO (2018).

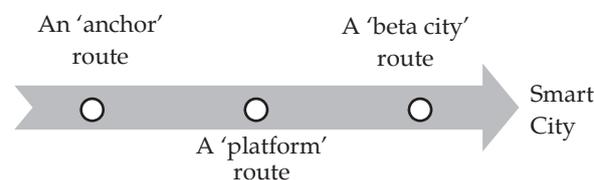


FIGURE 2: The three routes towards becoming a smart city (adapted from Green, 2016)

Figure 2 depicts the three routes towards becoming a smart city as adapted from Green (2016). The 'anchor' route occurs when a city augments functioning ICT applications in series as urgencies occur. The 'platform' route ensues when the city implements infrastructure first so that several ICT applications can be subsequently dispensed. The 'beta

city' route means that the city remains with various applications in experimental mode without a confirmed blueprint to fully operationalise deployment. They accept that prevailing technologies and business models are merely temporary.

Of significance to this study is to ascertain exactly which 'route' Cape Town finds itself in towards becoming a Smart City.

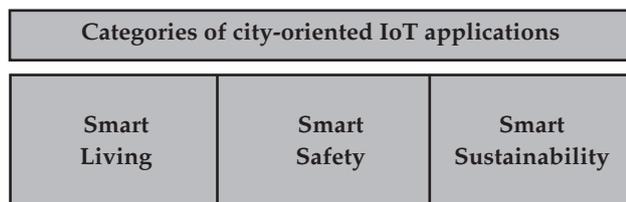


FIGURE 3: Three categories of city-oriented IoT applications (adapted from Green, 2016)

Figure 3 illustrates the three categories of city-oriented IoT applications. In the first category, referred to as Smart Living, IoT applications aim at improving the quality of life of citizens and supporting economic development. In this way, cities become more desirable places in which to reside. The second category, Smart Safety, uses IoT applications to prevent, or reduce the risks and impact of adverse events such as crime, accidents, environmental pollution and natural disasters. The final category, Smart Sustainability, uses IoT applications to limit the environmental impact by reducing energy consumption and lowering carbon emissions of businesses and its citizens (Green, 2016). Although Green (2016) ranked Cape Town as the smartest city in Africa, several gaps and unutilised opportunities

were identified. In its quest to improve its smart city status, the Cape Town government has made a request for ideas [RFI] to the public to submit papers or contributions towards the attainment of a smart city. The smart city initiatives include public Wi-Fi in buildings and public buses, smart grid technology, CCTV cameras, e-government services and open data policy. The City of Cape Town seeks to address the modern-day urban challenges by using technology-based solutions. The city regards it vital to assess the degrees of success and the challenges in the realisation of the milestones and targets of the envisaged infrastructure projects in Cape Town (Abrahams, 2016).

Cape Town could possibly learn from the advancements towards a smart city by observing the developments of Shanghai in China. As depicted in Figure, 4 China has a large internet-enabled local market that has risen fast, owing to integrated payment systems which have revolutionised how business is carried out (Koo et al., 2017). The latter has further been echoed by Savills Research (2019) as the key focus of Shanghai's smart city planning by extending the application of the internet to provide more convenience to the daily lives of its residents. Shanghai city was graded as an average smart city by Nokia on the Cities Smartness Scale using a holistic evaluation indicator framework. Shanghai is regarded as one of the fastest growing cities in the world and dynamic in its use of technology to improve its citizens' lives (Wang et al., 2016). Amongst other smart city components, Shanghai boasts open data exchange platforms for application developers; smart parking to ease congestion and an initiative known as Citizen Cloud (Yu et al., 2019). The cloud-based platform can be accessed via an application and provides more than 100 government services to the residents of a smart city.

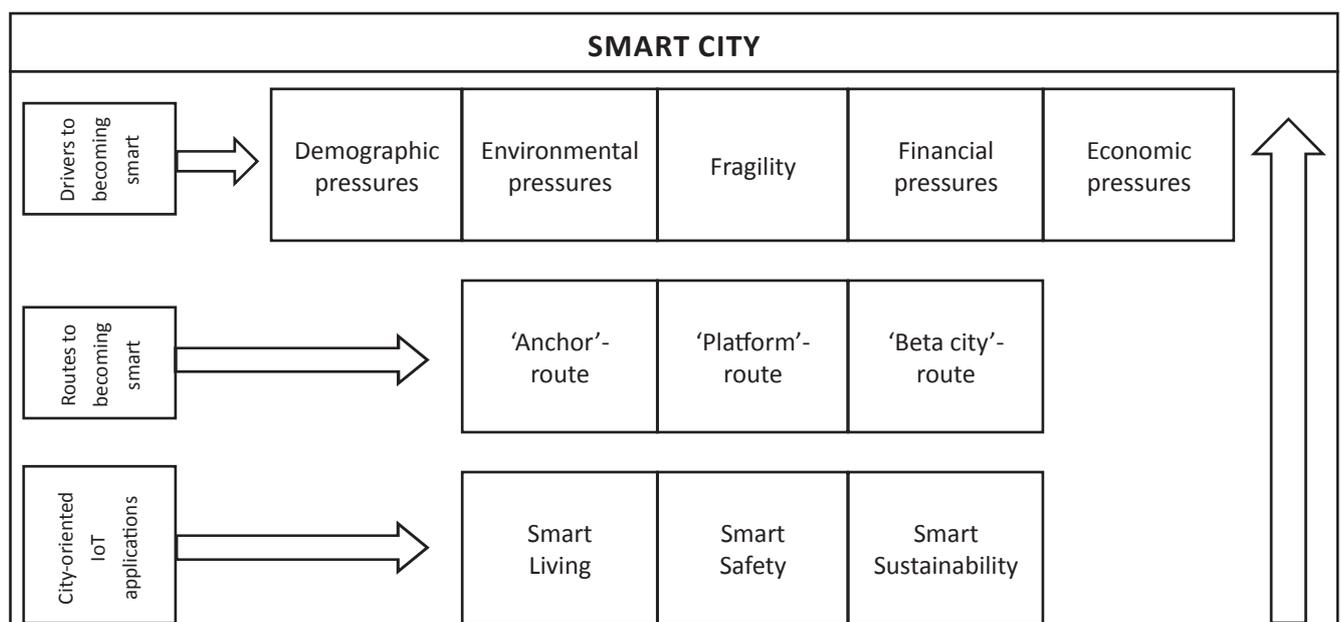


FIGURE 4: The journey towards a smart city (adapted from Green, 2016)

The evolution towards digitalisation of smart city agglomerations, Smart Transportation, Smart Logistics, and other smart city initiatives will be enabled by intensely improving communication bandwidths and lowering latency to support new technologies facilitating Virtual Reality/Augmented Reality/Gaming/Holograms, real-time traffic control, among other smart applications (Herzog, 2018). In its quest to become a dual-giga band city China Mobile launched a 5G network in Shanghai's Hongqiao Railway Station, becoming the first railway station providing a 5G Digital Indoor System (DIS). China Mobile Shanghai chose Huawei's 5G DIS, which according to Patzold (2019) was the industry's only commercially available solution (as of June 2019) for 5G indoor providing a tested speed of 1.2-Gb/s (Patzold, 2019).

Africa a Smart Continent

The notion of the Smart Continent originated at the Transform Africa Summit in 2013 and led to the espousal of the Smart Africa Manifesto by seven African Heads of State. In so doing, Rwanda, Kenya, Uganda, South Sudan, Mali, Gabon and Burkina Faso pledged to offer leadership in fast-tracking socio-economic development through ICT (Smart Africa Secretariat, 2016). The manifesto consists of the five principles as indicated in Table I below.

TABLE I: Five principles of the Smart Africa Manifesto

#	Principle
1	To put ICT at the centre of our national socio-economic development agenda
2	To improve access to ICT especially Broadband
3	To improve accountability, efficiency and openness through ICT
4	To put the Private Sector First
5	To leverage ICT to promote sustainable development

Principle 1 strives to utilise ICT to reduce poverty, create prosperity and increase productivity in Africa. Opportunities shall be created to deliver social and economic benefits in sectors such as Education, Health Care, Business, Agriculture, etc. In so doing, Africans should become role-players in the ICT-driven economy and society.

Principle 2 aims to improve access to ICT especially Broadband in underserved areas by investing in the necessary infrastructure. To support this, policies shall be enablers rather than constraints to universal access.

Principle 3 endeavours to improve accountability, efficiency and openness through ICT by developing and implementing national e-Government policies. This will manifest in government-to-citizens, government-to-business and government-to-government services online. Open Data ventures shall spearhead accountability, improved decision making and transparency.

Principle 4 aims to put the Private Sector First as economic transformation is commanded from this sector via job creation, productivity and competitiveness enabled by technology and innovation. By increasing access to markets and information business can become a producer of ICTs instead of a passive consumer. To achieve this, local innovation hubs with the necessary business development, financial and technological abilities will be established.

Principle 5 shall strive to leverage ICT to promote sustainable development for women, youth and people with disabilities. ICT shall also tackle climate change, clean energy, e-waste, urbanisation, disaster management and other environmental risks. To ensure sustainable achievements innovations in cybersecurity, cloud computing, mobility, shared infrastructure and shared services shall be embraced.

Since the adoption of this manifesto, Smart Africa has supported initiatives which strive to accelerate sustainable socio-economic development via ICT, the necessary infrastructure and skills in Africa (Smart Africa Secretariat, 2016). Recently South Africa was assigned to take the lead in the 4th Industrial Revolution (4IR): Innovation and Artificial Intelligence Initiative by the Smart Africa Manifesto (Rukundo, 2020). Economic transformation and prosperity of the continent lies in the collaboration of African countries and digital transformation is hinged on the mastery of technology (Smart Africa Secretariat, 2019). African governments, businesses and citizens are urged to collaborate and adopt technology as their foundation. President Uhuru Kenyatta reveals that the Kenyan government is altering the school curriculum to prepare its citizens for the careers that will emanate from digital technologies. The Kenyan government articulates how, since they have embraced ICT, it has enabled market expansion and assisted in the expansion of different products and services (Lai et al., 2020). This has also transformed the way current products and services are able to be delivered. This evolution of conducting business in the digital economy has prompted the need for a Single Digital Market for Africa (Smart Africa Secretariat, 2019).

The economic potential of Cape Town

As a world-class tourism destination, Cape Town could contribute to the economy of South Africa and the continent. By means of tourism policies, innovation programmes, and social media, tourism in Cape Town has managed to make significant progress towards the attainment of their market growth goals [UNWTO - World Tourism Cities Federation (WTCF), 2018]. Cape Town has capitalised on the business potential of tourism with a fair amount of success. The Cape Town Tourism Department and the City of Cape Town have set targets to increase the economic gains from tourism in sustainable ways by encouraging innovation

through responsible tourism (WTCF 2018; SA Tourism, 2018). One example of this is the innovative design of the Kirstenbosch tree canopy walkway which has managed to increase visitors to the world-renowned botanical gardens. This has resulted in the return of the R5 million investment in only eight months (UNWTO, 2015). Despite hosting one of the seven wonders of the world in Table Mountain, the City of Cape Town has established another major tourist attraction – the V&A Waterfront Shopping Mall which now consistently attracts more visitors than Table Mountain (Strategy Insights and Analytics, 2018). These examples exemplify how Cape Town has accepted that tourism can be a significant contributor to the socio-economic development of South Africa.

Wesgro (2019) reports that China was the world's top tourism spender between 2013 and 2017. During these years, Chinese tourists spent \$257.7 US billion worldwide. Total foreign direct spend from tourists in Cape Town was R23.1 billion in 2017 which was 28,6% of the total spend in South Africa. The top tourism spenders in Cape Town, however, were tourists not from China but from the United Kingdom.

Of great significance and concern is that despite the fact that China is the world's top tourism spender (Wesgro, 2019), Chinese tourists to Cape Town do not make the top ten list of nationalities visiting Cape Town. It would appear that Cape Town is not appealing to Chinese tourists and subsequently missing out on the tourism spend from the world's largest tourism market. It would therefore be interesting to determine whether Cape Town's continued transition towards becoming a smart city would make itself more appealing to the Chinese tourist market given that Shanghai (along with Beijing, Shenzhen, Hangzhou, Chongqing, Chengdu, Wuhan and Guiyang) are regarded as smart cities.

In conducting the literature review of the body of knowledge and in particular the seminal works of Green (2016); UNWTO (2015 & 2018); and the Smart Africa Secretariat (2016 & 2019) this study has identified the potential to make a contribution to this body of knowledge. It has identified a particular gap in the body of knowledge on smart city initiatives in Cape Town, a major tourism destination in Africa. It suggests that Cape Town, as a smart city, possesses the potential to contribute significantly towards the socio-economic development of the African continent.

Research methodology

The purpose of this study is to determine how Cape Town, as a smart city, can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative. With this in mind, this study investigated aspects of the smart city as recommended by various research studies. Cape Town, as a major tourism destination in Africa, and Shanghai, as the largest city in the world by population, were adopted, along with other cities, to support the exploration and reflection of multidimensional factors of the concept of a smart city.

Drawing on two frameworks, this study applied the triangulation of theory, data sources, and data collection methods. Figure 5 shows how triangulation was applied in smart city research.

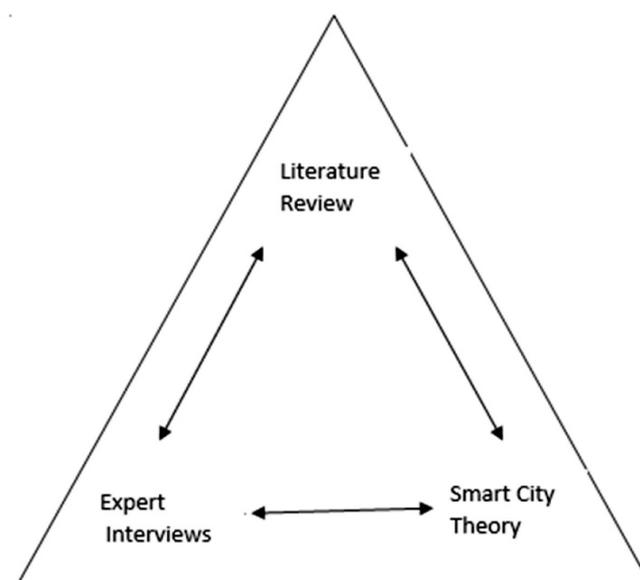


FIGURE 5: Application of triangulation in smart city research (source: Author)

These frameworks are Nokia's taxonomy of smart city applications and the principles of the Smart Africa Manifesto. Triangulation collates dissimilar but corresponding types of data in quantitative and qualitative forms of evidence (Shoab and Mujtaba, 2016). In the empirical phase, the research method for data collection is a purposeful sampling technique which is expansively utilised in qualitative research for the identification and selection of information-rich cases related to a pertinent topic (Palinkas et al., 2015). In this manner, key ICT officials of the City of Cape Town and the Western Cape Government were invited to participate in in-depth interviews. Table II depicts the interview questions which were adapted from the five principles of the Smart Africa Manifesto.

Table II: Interview Questions

#	Question
1	How is the City of Cape Town positioning ICT at the centre of its socio-economic development agenda?
2	How is the City of Cape Town improving access to ICT especially Broadband?
3	How does the City of Cape Town improve accountability, efficiency and openness through ICT?
4	How does the City of Cape Town put the Private Sector First?
5	How does the City of Cape Town leverage ICT to promote sustainable development?

Results

This section summarises the findings from the interviews conducted with key ICT officials of the City of Cape Town and the Western Cape Government. The contributions of Green (2016) and the Smart Africa Secretariat (2016) were used as the theoretical lens in conducting the interviews and the analysis of the results. The interviews therefore homed in on the Five Principles of the Smart Africa Manifesto as well as the 'Drivers to becoming smart'; 'Routes to becoming smart'; and 'City-oriented IoT applications' of Green (2016).

The following findings summarise information from responses gathered from four strategic ICT officials of the City of Cape Town and the Western Cape Government (WCG).

Cape Town's efforts to positioning ICT at the centre of its socio-economic development agenda (*Principle 1 of the Smart Africa Manifesto*)

The respondents identified with the need to support the growth and development of the ICT sector in Cape Town and the value of an enabling environment for the ICT sector to thrive in Cape Town. The Cape Access initiative offers computers and internet access at e-Centres located in communities with limited access to ICT. Through research and benchmarking the WCG discovered that a positive relationship exists between gross domestic product (GDP) growth and internet adoption and therefore designed a Digital Opportunities Implementation Framework based on the Broadband Strategic Framework.

The Digital Skills Development initiative is driven via the Digital Marketing Implementation policy with the main focus on job creation and economic development. Through job creation and promoting skills development it seeks to stimulate innovation and growth.

Development of Broadband to improve access to ICT (*Principle 2 of the Smart Africa Manifesto*)

The City of Cape Town has been enabling the environment through the provision of over 848 km of broadband

infrastructure in Cape Town that will help to reduce the costs of telecommunication in the near future.

The SmartCape initiative is designed to help residents access the internet, free of charge, at 105 community libraries. In conjunction with a private company, Liquid Telecom SA, the Western Cape Government will expand the number of free Wi-Fi hotspots at government buildings to deliver broadband connectivity to government offices, libraries, schools and clinics.

With its provincial Broadband Strategic Framework, the Western Cape is able to improve telecommunications and technological infrastructure across the provincial and local government spaces (via the Connected Government strategy).

The Department of Economic Development and Tourism (DEDAT) is pushing for a more regional approach on the skills side with strategies that drive the economy on a regional basis via local economic development strategies.

City of Cape Town efforts to improve accountability, efficiency and openness through ICT (*Principle 3 of the Smart Africa Manifesto*)

The City of Cape Town supports the ICT sector through financial and non-financial support of the ICT ecosystem through annual funding and non-funding collaboration with the various clusters in the ecosystem.

Through the Digital Government Strategy, all provincial ICT initiatives should optimise and transform existing public services and create new public services for citizens through digital empowerment of residents and employees. In turn, the Digital Transformation Plan has provided an ePortal feature with educational videos, apps, ebooks, courses and eHealth etc. The broadband roll-out started in DEDAT out of the need for solutions to the financial crisis a number of years ago. The strategy was to address the financial crisis through ICT and in so doing DEDAT created a plan to invest in infrastructure. This resulted in the establishment of a network to remote areas with fibre capacity for public access to Wi-Fi.

DEDAT's main focus is on the citizen and business digital adoption, prioritising their access to broadband infrastructure, information and opportunities thus broadening their participation in the economy (via the Connected Citizen strategy).

How the City of Cape Town puts the Private Sector First (*Principle 4 of the Smart Africa Manifesto*)

The City of Cape Town collaborates with the Western Cape Government, Cape IT Initiative (CITI) and the private sector stakeholders in regard to supporting skills

development in the ICT sector that enables companies to source appropriately skilled young people. The City of Cape Town has been collaborating with the private sector through these initiatives with key stakeholders like Western Cape Government, CITI, Wesgro and the private sector.

There is a focus on red-tape reduction and becoming a business-friendly city. Private sector development is supported through agencies like Wesgro which is the tourism, trade and investment promotion agency for Cape Town and the Western Cape. Broadband diffusion focuses on Connected Leadership, Connected Citizens and Connected Business aiming to harness leadership and vision across all sectors of society.

The Western Cape Government accepts that the internet provides citizens and businesses with access to options and possibilities through information, services, resources, and opportunities. It strives to increase access to new opportunities and markets, by generating novel service-oriented businesses in the local, national and international space.

How the CoCT leverages ICT to promote sustainable development (Principle 5 of the Smart Africa Manifesto)

The City of Cape Town supports enterprise development programmes that target small businesses in the ICT ecosystem including the women in business programmes (these programmes target women in business with the aim of helping them to grow their businesses).

The Western Cape Broadband Initiative proposes that by 2030, every citizen will have access to affordable high-speed broadband infrastructure and services. Along with this, they will have the necessary skills to be able to effectively utilise this infrastructure and is actively using broadband in their day-to-day lives. The Cape Access project provides less privileged and rural communities access to computers, cell phones and the internet, as well as the various services and applications associated with them. The WCG has recognised broadband as key to the future growth of the Western Cape. The Provincial Strategic Plan categorically states that the provincial government has committed to encouraging the growth and development of the provincial economy through the support of broadband usage.

Main programmes include the Cape IT Initiative, Wesgro, intellectual property (IP) regulation – Coordination and management in the regulatory environment, and the development of models for government (as appropriate).

Discussion

This section presents an analysis of the findings of the interviews in relation to the five principles of the Smart Africa Manifesto.

Principle 1 of the Smart Africa Manifesto

The City of Cape Town puts ICT at the centre of its socio-economic development agenda, with the view of impacting poverty alleviation as well as creating prosperity and productivity through the provision of an enabling environment for the ICT sector to thrive.

Principle 2 of the Smart Africa Manifesto

The City of Cape Town has improved access to ICT, especially broadband through the provision of over 848 km of broadband infrastructure and nearly R5 billion investment over 10 years.

Principle 3 of the Smart Africa Manifesto

The City of Cape Town has improved accountability, efficiency and openness through ICT via the Connected Citizen strategy which broadens their participation in the economy.

Principle 4 of the Smart Africa Manifesto

The City of Cape Town puts the private sector first by being business friendly, providing the necessary skills and enterprise development.

Principle 5 of the Smart Africa Manifesto

The City of Cape Town leverages ICT to promote sustainable development through collaboration with key stakeholders to market Cape Town as a competitive destination and ICT hub for Africa.

This study aimed to determine how Cape Town as a smart city can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative. In response to the research questions the findings reveal that Cape Town has embarked on a significant journey towards becoming a smart city based on the attributes thereof as identified in Green (2016). The views and comments of the interviewees are consistent with the body of literature. There is alignment with the theoretical propositions of key authors and what is taking place in practice.

An analysis of the results indicate that Cape Town has key economic, financial and demographic 'drivers to becoming smart'. It has also established the 'platform route to becoming smart' by establishing the necessary infrastructure, and has instituted 'city-oriented IoT applications' as it uses ICT to shape its liveability and sustainability. The city is committed to encouraging the growth and development of the economy through the investment in and support of ICT. The city's primary focus is to provide access to ICT for its citizens and business, and in so doing provide opportunities for economic growth. The initiatives in Cape Town show an alignment with other such models in developing smart cities suggesting that Cape Town can contribute to the Smart Africa initiative.

Conclusion

While Cape Town draws most of its tourists from the United Kingdom, further investigation is warranted to explore the potential of whether Cape Town as a smart destination could attract more tourists from China and in so doing, benefit from the lucrative international tourism spend. Although the tourism industry presents opportunity, smart city developments now need to take into account restrictions in trade and travel that are brought about by the COVID-19 pandemic.

This study intimates that Cape Town, as a smart city, can contribute to the socio-economic development of Africa and the advancement of the Smart Africa initiative. It supports the prevailing body of knowledge which proposes that Cape Town implements best practices towards becoming a smart, safe and sustainable city. Through capital investment, government policies and support, the city continues to develop and implement smart city initiatives with distinct objectives aligned to the Smart Africa principles. The respondents overwhelmingly agree with the extant body of knowledge that ICT is indeed an enabler for socio-economic development of the citizens of Africa.

The value proposition of the study is a commentary on smart cities and the socio-economic development of Africa. This would advise ICT strategies, policies and city officials in their transformation towards smart cities particularly in Africa. Further studies in the advancement of a smart city development framework for implementing pragmatic smart city initiatives for socio-economic development is recommended.

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