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Luke Boyle, John Harlow & Lauren Withycombe Keeler

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## (D)evolving smartness: exploring the changing modalities of smart city making in Africa

Luke Boyle <sup>a,b</sup>, John Harlow <sup>b</sup> and Lauren Withycombe Keeler <sup>b</sup>

<sup>a</sup>Urban Real Estate Research Unit, University of Cape Town, Cape Town, South Africa; <sup>b</sup>School for the Future of Innovation in Society, Arizona State University, Tempe, AZ, USA

### ABSTRACT

The paper identifies an under-researched mode of smart city-making in Africa characterized by municipal deployments of ICT-driven innovations. This departs from typical framings that view African smart city development as nationally driven, master planned new city developments. An in-depth analysis of the City of Cape Town's Digital City Strategy provides insights into the mechanisms and processes grounding smart city concepts in African municipalities. Thus, situating Africa's municipal ICT-driven strategies in the context of a global discourse of smart urbanism and local (and continental) processes of decentralized governance reform. In Cape Town, these global and local forces converge to drive ICT-inspired urbanism that reinforce market-oriented logics of urban governance, largely at the expense of transformative and contextually sensitive ICT deployments. By highlighting the multi-scalar production of smart cities inspired by global discourse yet subjected to local dynamics, the findings offer insights into the political realities of municipal ICT deployments in Africa.

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Smart city development; ICT-driven urbanism; decentralization; municipal governance reform; Africa

## Introduction

The production of smart cities in Africa has been heavily informed by a globally circulating model framing smart urbanism as a means of global competitiveness by developing modern infrastructure and institutions (Cinnamon, 2022). What has resulted is a mode of smart city development that has largely followed the form of Vanessa Watson's (2014) "urban fantasies," i.e. nationally driven, master-planned, new city developments that are irreconcilable with the present realities of African cities. These new city developments rely on alliances between global real estate interests, national and municipal politicians, and an emerging African urban middle class (Côté-Roy & Moser, 2019; van Noorloos & Kloosterboer, 2018; Watson, 2014). Examples such as Konza Technopolis in Kenya, the redevelopment of Rwanda's capital Kigali as an "innovation city," Eko Atlantic in Nigeria, and Lanseria Smart City in South Africa have been marketed as "smart cities" offering the

**CONTACT** Luke Boyle  Lboyle4@asu.edu  Urban Real Estate Research Unit, University of Cape Town, Cape Town, South Africa; School for the Future of Innovation in Society, Arizona State University, PO Box 876002, Tempe, AZ 85287-6002, USA

means through which African governments can respond to the challenges of urbanization whilst providing economic opportunities that sustain urban growth. The rationales and logics supporting that argumentation reify a belief that the future of Africa is global and global competitiveness is contingent on constructing “world class” cities that exhibit cutting edge infrastructure and institutions. These framings represent a mode of urban development which typifies what Datta (2015a) describes as “urbanization as a business model,” in which city governance takes the form of technocratic and corporate-oriented strategies to support growth-led development.

Dominant frames grounding smart city concepts on African soil have mirrored scholarly discussions elsewhere, describing smart city initiatives as corporate-led developments and “smart urban fantasies” (Dowling et al., 2019). However, municipal governments in Lagos, Nairobi, Johannesburg, Cape Town, and Kinshasa (among others) have spearheaded ICT<sup>1</sup> – driven urban innovations to support their objectives, making a clear divergence from large-scale, master-planned, new city development that form part of national development agendas. Though analysis of municipal smart city deployments has received much scholarly attention in other parts of the world (see; Angelidou, 2017; Cardullo & Kitchin, 2019; Coletta et al., 2019; Dowling et al., 2019; Joss et al., 2019), few studies provide insights into the processes guiding the implementation of smart city deployments in African municipalities. Despite the foundational contributions of Odendaal (2011, 2015, 2016), Guma and Monstadt (2021), Lawanson and Udoma-Ejorh (2020), and Cinnamon (2022) – who have provided critical analyses of the urban-to-regional politics of municipal ICT-driven strategies, and their implications for the evolving landscape of Africa’s smart city deployments – few studies have addressed the larger-scale processes of decentralization affecting municipal ICT-driven strategies in Africa. To that end, this article serves two primary functions; firstly, to provide insight into evolving smart city practices on the continent through an in-depth analysis of actual plans and implementation strategies in order to gain a more nuanced understanding of how smart city rationalities are being produced and reproduced in specific urban contexts (Kitchin, 2014; Marvin et al., 2015). Secondly, the paper seeks to explore how municipal governance reform, triggered by continental processes of devolving government authority to regional and local governments, has shaped emerging trends in municipal-led smart city making practices on the continent. Further, how do these decentralization processes complicate the dominant framings of smart city development in Africa? In this sense, the study responds to Misuraca’s (2006) call to glean deeper insight into the connections between devolved governance, ICTs, and innovation in local governance for socio-economic development in Africa. Using the City of Cape Town Metropolitan Municipality’s (CoCT’s) Digital City Strategy as a case study, this article documents how smart city discourses are grounded in an African context with the aim of providing insight into evolving municipally-driven smart city making practices in Africa, and how they intersect with broader development discourse regarding decentralized governance (Misuraca, 2006; Slavova & Okwechime, 2016), promoting growth-led development (Odendaal, 2016), and technological deployments (Guma & Monstadt, 2021).

## Background

### *Smart urbanism as a global discourse*

Contemporary urban studies have become increasingly surrounded by a discourse of smartness (Hollands, 2008; Joss et al., 2019). Smart urbanism – broadly defined as a model of urban development predicated on the application of ICT-based applications – has been forwarded as the most effective way of responding to urban issues related to growing populations, climate change and other environmental risks, and enabling efficiencies whilst coping with shrinking public budgets (Batty et al., 2012; Sadowski & Pasquale, 2015). Through its offering of a technological panacea for all urban ills the smart city concept has become a globally mobile phenomenon with significant allure (Joss et al., 2019). Across the globe, smart city principles are becoming the basis for the creation of entire cities which are being built in collaboration with giant technology corporations, financial institutions, real estate developers, and various government agencies (Hollands, 2008). These include Songdo in Korea (Halpern et al., 2013), Masdar in the United Arab Emirates (Cugurullo, 2016), Dholera in India (Datta, 2015a; 2015b), PlanIT Valley in Portugal (Angelidou, 2017), to name a few. Assumed under the banner of smartness is the inherently transformational and positive application of new technologies (Marvin et al., 2015; Shelton et al., 2015). As such, smart cities are presented as pragmatic, non-ideological, apolitical, rational interventions designed to improve social, economic and governance systems (Hollands, 2008; Kitchin, 2014). However, a growing critique of this framing of smart urbanism is beginning to challenge the capabilities of “smartness” and uncover some of the ideologies and politics embedded in smart visions of cities (Marvin et al., 2015).

Through a review of critical scholarship regarding smart urbanism discourse, it is posited that “smartness” is underpinned by three broad, but interlinked visions. Firstly, that ICT-based solutions are capable of solving an assortment of complex urban governance and management challenges, and that such technocratic solutions are considered to be representative of progress and modernity (Cinnamon, 2022; Hollands, 2015; Kitchin, 2014; Kitchen et al., 2015;). These techno-utopian visions represent the ideals of high modernism which have a long history in urban planning (Cugurullo, 2016; Datta, 2015a; 2015b; Guma & Monstadt, 2021; Watson, 2014).

Secondly, embedded in the smart city model are visions of entrepreneurial and corporate forms of urban governance (Datta, 2015a, 2015b; Hollands, 2008, 2015; Shelton et al., 2015). Here, various governance and technological strategies are deployed for “world-city” making (Roy & Ong, 2011) where cities compete to expand their footprint in the global economy by attracting global capital and talent (Datta, 2015a; Hollands, 2008, 2015). Hence, constructing smart cities primarily as sites of economic growth (Datta, 2015b).

And thirdly, the smart city is fundamentally driven by corporate visions of urban futures (Datta, 2015a; Guma & Monstadt, 2021; Hollands, 2015; Sadowski & Bendor, 2019; Shelton et al., 2015). Multinational technology corporations such as IBM, Cisco, Intel, and SAP have offered a vision of smart urbanism that creates new global markets for their systems and services (Datta, 2015a, 2015b; Greenfield, 2013; Townsend, 2013; Sadowski & Bendor, 2019; Shelton et al., 2015). As such, smart city discourse has been largely shaped by corporate interests and free-market ideologies (Greenfield, 2013;

Hollands, 2015; Sadowski & Bendor, 2019). Like in other parts of the South this globally mobile discourse has travelled to Africa.

### ***Framing smart city development in Africa***

Smart city development in Africa is largely framed in terms of the three main elements outlined above. However, more specific comparisons are drawn to Datta's (2015a, 2015b) description of postcolonial smart city making in India. Through an examination of the Dholera smart city, Datta (2015a; 2015b) traces ICT-driven urbanism in India to the postcolonial modernization project of "new town" building (Watson, 2015). Watson outlines how such new town or new city developments have emerged with increasing regularity across the African continent in recent decades. In Africa, new city developments are large-scale, top-down, master planned, projects built on greenfield sites (often gained through dispossession) that are prominently rooted in the country's capital and government offices (Guma & Monstadt, 2021; van Noorloos & Kloosterboer, 2018; Watson, 2014).

Many authors have drawn attention to the ways in which this new city model is linked to the global urbanism trend of "worlding cities" (Brill & Reboledo, 2018; Guma & Monstadt, 2021; Roy & Ong, 2011; van Noorloos & Kloosterboer, 2018; Watson, 2014). These world-city making attempts seek to attract multinational businesses and private equity firms to African cities by subscribing to hegemonic ideals of modernity and world-class materiality (Guma & Monstadt, 2021). Hence, the new city model leads African cities to emulate aspects of iconic cities like Singapore and Dubai in bids to reposition African cities as "world-class metropolises" (Watson, 2014). Africa's national governments thereby look to the new city model to leverage private investment in urban housing, infrastructure, and services (van Noorloos & Kloosterboer, 2018). Through public – private partnerships, and special purpose vehicles that sidestep planning procedures, national and municipal governments across the continent have served as facilitators of private interest enterprises, tertiary sectors, elite and expat residences, and tourism development (Odendaal, 2011). These efforts have been judged highly speculative and consumptive examples of urban entrepreneurialism (van Noorloos & Kloosterboer, 2018) where the main business of government is that of land speculation and the dispossession of those living on land earmarked for private development (Datta, 2015a; Watson, 2014). Hence, new city visions in Africa embody what Datta describes as a postcolonial developmental logic that deploys new cities to drive urbanization and economic growth.

Given that the bulk of the population in African cities is extremely poor and living in informal settlements (Watson, 2014, 2015), critical urban scholars have expressed concerns that the realities of urban publics, and their needs, are completely disregarded in these urban development plans. It is for these reasons that Watson (2014) aptly frames these developments as "urban fantasies," because of the fundamental gaps between their visions of future cities, the realities of poverty in actual African cities, and the improbability that their visions will ever materialize.

At the heart of more recent urban fantasies are important productive elements centered on technology and innovation (van Noorloos & Kloosterboer, 2018; Watson, 2015). This demonstrates a shifting focus from solely residential and consumptive

aspects towards integrating industrial and technological production (van Noorloos & Kloosterboer, 2018). New technology-oriented urban fantasies, demonstrated by Konza Technopolis in Kenya and Hope City in Ghana, illustrate how recent new city projects are marketed as smart cities (Côté-Roy & Moser, 2019; Guma & Monstadt, 2021; Watson, 2015). The universality of these developments is illustrated by the aesthetic and organizational similarities they share with other smart city projects such as Songdo, Masdar and PlanIT Valley. These smart city plans are typically supported by national development plans. For instance, Konza Technopolis is a flagship project of Kenya's Vision 2030 economic development portfolio (Konza Technopolis, 2013). Rwanda, Nigeria, Ghana, Ethiopia, and South Africa have also developed new smart city plans within broader national policy objectives (Siba & Sow, 2017). Implicit in these plans is the belief that becoming "smart" is African nations' only viable point of entry into the global economy in the digital age. Consequently, these cities are framed as innovation hubs focused on technological infrastructure to attract private sector tech companies, tertiary sector skills, and universities and research facilities (Côté-Roy & Moser, 2019; van Noorloos & Kloosterboer, 2018). Here, state entities become key coordinators for the flows of private-sector funding to these smart city projects through "business friendly governance, policy and regulatory frameworks" (Konza Technopolis, 2013) with no guarantee of public value stemming from such funding.

While Africa's "urban fantasies" predate global smart city tropes, the two share roots in the global discourse on "smartness". For urban fantasies and smart cities, smartness reifies: (i) corporate and entrepreneurial forms of governance that seek to compete for global capital and drive economic growth (Cinnamon, 2022; Guma & Monstadt, 2021; van Noorloos & Kloosterboer, 2018; Watson, 2014, 2015); (ii) the modernizing power of technology to catapult Africa into the digital age whilst simultaneously solving a host of urban issues (Datta, 2015a; Guma & Monstadt, 2021; Watson, 2014, 2015); and (iii) models of private-led urbanization that cater to the interests and visions of large corporations (Datta, 2015a, 2015b; Guma & Monstadt, 2021; van Noorloos & Kloosterboer, 2018; Watson, 2014, 2015). Hence, the perception that Africa's smart city development is modelled on globally circulating ideas is supported by a number of scholars. However, these conceptions do little to account for the role of decentralization in driving smart city deployments in African cities. Further, they are also limited in accurately framing the emergence of municipally driven responses to smart city aspirations that are gaining increasing attention on the continent.

### ***Decentralization in African municipalities***

Since the early 1990s, "decentralization" – transferring authority, power, responsibilities, and resources to sub-national levels (Riedl & Dickovick, 2010; Wagana & Iravo, 2017) – has played a prominent role in the design of modern African governance systems (Fombad, 2018; Mookherjee, 2015; Riedl & Dickovick, 2010; Slavova & Okwechime, 2016; Wagana & Iravo, 2017;). Decentralization was rationalized on a variety of grounds: enhancing the state's ability to support local development and economic growth (Atisa et al., 2021; Misuraca, 2007), promoting accountability (Heller, 2001; Mookherjee, 2015), improving service delivery (Atisa et al., 2021; Fombad, 2018; Misuraca, 2007; Mookherjee, 2015; Resnick, 2014), deepening democratic processes

and participation at the local level (Fombad, 2018; Heller, 2001; Misuraca, 2007), and reinforcing democracy and state-building in fledgling democracies (Fombad, 2018). Support for decentralization has been widespread among African nations, as well as from the international development community (Misuraca, 2007; Riedl & Dickovick, 2010). With the intent of driving devolved governance – a deep form of political decentralization characterized by greater local autonomy where municipalities elect their own leaders, raise their own revenue, and exercise authority over their public functions (Bresser-Pereira, 2004; Wagana & Iravo, 2017) – the World Bank and the International Monetary Fund drove such reforms under Structural Adjustment Programs (SAPs) in Africa (Atisa et al., 2021). Beall (2005) explains how decentralization has become a core component of political conditionality in international development cooperation. The SAPs, in particular, have had a complicated impact on decentralization. Many authors note how the reforms driven by SAPs, whilst promoting decentralization and public sector performance, created deep fiscal difficulties which undermined the establishment of sound local governments via the lack of funds and staff needed to support such reforms (Gore & Muwanga, 2014; Wunsch & Olowu, 1996). As a result, attempts to devolve governance in Africa tend to be equated with the rolling back of the state, rather than the devolving of state authority to municipalities.

Results of devolved governance reform on the continent have been modest at best (Gore & Muwanga, 2014). Municipal governments have struggled to establish administrative structures and systems that meet the needs of rapidly urbanizing African cities (Gore & Muwanga, 2014), and there is a gap between existing capacities and demand for services and accountability at the municipal level (Misuraca, 2007). Such capacity deficits have created a belief that decentralization is a technical and institutional endeavor (Koelble & Siddle, 2014). Heller (2001, p. 135) notes that: “... decentralization is equated with the task of designing appropriate institutions, the structure of which can be derived from an accumulated corpus of (mostly Western) knowledge of public administration, finances, and planning.” This mirrors much of what happened in the developing world during the 1990s, when economic liberalization precipitated a shift in governance from state-centric to market-centric organization of social, political, and economic life, driven by processes of urbanization, globalization, and decentralization (Hoelscher, 2016).

Managerial and technical preoccupation with devolving governance in Africa has fostered a reliance on contracting private sector organizations to conduct local administrative functions (Gore & Muwanga, 2014; Heller, 2001). Smith (2004) also notes how state restructuring in favor of decentralization increased private sector participation with municipal governments. As such, decentralization has not shifted the power equilibrium away from African business elites (Atisa et al., 2021). This has undermined efforts to build municipal democratic capacities and engender democratic transformations, instead they have reinforced status quo governance favoring wealth accumulation and growth-led development (Gore & Muwanga, 2014). In essence, decentralization in Africa has had the effect of weakening the central state’s authority without a commensurate strengthening in municipal governments. As a consequence, municipal governments have come to rely on private interests and ICT-based applications to deliver on the promises of decentralization.



## ***The role of ICT in the decentralization in African municipalities***

For African municipalities undergoing devolution, ICT has been adopted to optimize existing government functions, such as managing payments, registrations, rates and taxes, and internal operations (Gore & Muwanga, 2014; Misuraca, 2006). This has coincided with the penetration of foreign technology companies like Cisco, Siemens, Huawei, and IBM in urban governance projects across the African continent (Guma & Monstadt, 2021; Lawanson & Udoma-Ejorh, 2020; Odendaal, 2016). These corporations have largely been tasked with establishing digital revenue management systems, permitting functions, and providing web portals for citizens, which serve as central features of their smart city agendas. For example: Nairobi's eJijipay; Kampala's eCitie; Johannesburg's Maru a Jozi. Consequently – and akin to other parts of the world – the grand transformational narratives regarding municipal ICT innovations, in reality, are typically deployed in unexceptional and quotidian ways, falling under the banner of optimization of municipal government services (Coletta et al., 2018; Dowling et al., 2019). What they don't achieve is the difficult work of deepening democracy and addressing social issues. On the contrary, Misuraca (2007) and Egessa (2016) point out that the services provided by local government web portals are directed to privileged populations, typically native English speaking, tech-savvy, the formally educated, and businesses. Therefore, under a decentralized agenda, ICT deployments in African cities have favored established municipal governments and reinforced existing social hierarchies and their access to municipal services (Misuraca, 2007).

There is an unvalidated assumption that ICTs can enhance devolved governance by improving local government capacity, enhancing decision-making processes, and creating better partnerships with businesses and civil society (Misuraca, 2007). But even this narrower vision for what ICT-based governance can deliver requires technical and institutional infrastructure to be remotely effective. International development institutions working from this assumption have encouraged African city governments to apply ICT strategies (with successful pilot applications in the global North) in African contexts lacking the requisite ICT and governance infrastructure for success (Misuraca, 2007). Lagos, Nairobi, Kampala, Cape Town and Johannesburg have subsequently adopted smart city strategies to drive their municipal objectives. Smart cities were sold as grand visions for the future of African cities, but they have mostly delivered corporatization of African municipal governments made vulnerable by decentralization and semi-functional bureaucratic technologies that serve the privileged few. In this article, we analyze Cape Town's Digital City Strategy (DCS) to illustrate how globally circulating ideas of smart urbanism are filtered through national and municipal governance arrangements, particularly the dynamics of municipal government reform initiated by decentralization. Thus, we provide further nuance to understandings of smart city development on the continent.

## **Methods**

The study adopted a single case study methodology using the City of Cape Town's DCS, and its implementation, as the units of analysis. This approach was employed as it enables analysis of emerging phenomena and allows for an empirically rich, particularistic, and holistic accounting (Yin, 2009). Cape Town was purposefully selected as the single case



because it has a uniquely longstanding policy document linking implementation of ICT-related strategies with an overarching political agenda for urban development. The DCS offers an information-rich context of ICT-driven strategies and public policy in the city, and researchers have reported on the key stakeholders involved (Johansson, 2007).

Making inferences from Cape Town's smart city experience that are applicable to a wider class of phenomena is a complex and difficult matter (Evers & Wu, 2006). Keith and de Souza Santos (2021) deliberate the contested nature of South African urbanism as something that should be seen as particular to, or shared in common with, the rest of the continent. Citing Mamdani (1996, p. 294) who explains that: "there is a historical specificity to the mode of rule" in urban African, they build the case that South African cities are exemplary of, rather than exceptional to, postcolonial trends in Africa. Thereby, examinations of Cape Town's DCS have relevance to other African cities grappling with legacies of colonialism and institutionalized racism, and their attendant spatial, social and economic inequities. The DCS provides a useful opportunity to examine how smart city concepts are reflected in actual city policy and implementation vehicles in a post-colonial African city.

Primary data for this research were collected through 14 semi-structured interviews (Bernard, 2017). Eight interviewees were CoCT government officials, such as high-ranking civil servants from various departments with the Corporate Services and Safety and Security Directorates. All city officials were involved in the development and implementation of some aspect of the DCS. Interviewees represented the CoCT's Mayoral Committee, the Western Cape Government's Department of Economic Development and Tourism (DEDAT), city officials who played critical roles in launching the CoCT's smart city program, a civic tech organization, a business leadership organization, and the chairman of a technology consultancy that advises the public sector. Five interview participants were initially selected purposively based on their knowledge, experience, and involvement in ICT-driven urban strategies in Cape Town (Etikan et al., 2016). These initial informants were used as seeds for a respondent-driven sampling approach through which the remaining participants were recruited (Bernard, 2017). All interviews were recorded with prior consent, then anonymized and transcribed. While all identifying information was removed from interview data, given that many of the interviewees held positions in public office, anonymity could not be guaranteed. Primary data were analyzed qualitatively using Nvivo. Thematic analysis was carried out using an inductive approach based on the participants' perspectives of the development and implementation of the DCS (Bernard, 2017).

Secondary data collected for this research included policy documents (the Digital City Strategy, the Integrated Development Plan, the Open Data Policy, the Municipal Spatial Development Framework), CoCT online resources (SmartCape, Open Data Portal, eServices Portal), and CoCT presentations and press releases regarding its smart city program. Content analysis was carried out on these resources which was, in turn, used to triangulate the thematic analysis of the interview data (Johansson, 2007).

### **A case study of Cape Town as "Africa's First Digital City"**

Former Cape Town mayor Patricia De Lille was committed to "making the City of Cape Town the first truly digital city in our region and the leading digital city in the African

continent” (City of Cape Town (CoCT), 2016a, p. 5). Despite the rather obvious globalizing intentions behind Cape Town’s smart city aspirations (which began in late 2000 when the city’s first “Smart City” strategy was developed (Cinnamon, 2022)), the genesis of its ICT-driven strategies lies equally in political reform that took place following the end of apartheid which irrevocably changed the face of municipal governance in South Africa (Beall, 2005). The transitional period following the post-apartheid regime change was marked by a need to sever ties with the authoritarian apartheid political culture, both symbolically and institutionally. On a symbolic level, this demonstrated a break from the legacy of apartheid planning to usher in a new era of modern urban governance in South Africa. Institutionally, this required the rationalization and integration of fragmented municipalities and the spatial and social injustices they entrenched. In 1994, a newly democratic South Africa established its constitution, proposing a complete transformation of the municipal governance system (Misuraca, 2007). The constitution explicitly sought to empower municipal government, and task it with building democracy and promoting socioeconomic development through redistribution and service delivery (Heller, 2001; Koelble & Siddle, 2014; Misuraca, 2007).

For Cape Town, this started with the transition to a fully representative system of local governance when citizens elected for the creation of a “Unicity” government in 2000 (Jenkins & Wilkinson, 2002). The new “UniCity” government (which later became the CoCT) amalgamated seven fragmented municipalities of the previous regime’s local government system (Jaglin, 2008), with the goal of integrating townships and establishing more equitable distribution of services (Smith, 2004). Misuraca (2007) explains how the regime change provided South Africa with a rare and historic opportunity to try new things to transform local government to meet the challenges of the twenty-first century. This was initially materialized by the implementation of a centralized Enterprise and Resource Planning (ERP) system that rationalized the 150 different IT systems across the city’s various municipalities into a centralized, digital back-office system (IOL, 2002). At the time, the project was the largest ERP implementation and staff training initiative for any municipal government in the world (Misuraca, 2007). According to a manager in the CoCT’s IST department, it was the second biggest capital investment (R300 million) in the CoCT’s history, second only to the International Convention Centre. The digitization of the City’s back-office functions promised to substantially improve digital record-keeping, reporting, and data sharing across City departments (Cinnamon, 2022). In addition, the SAP implementation instilled a sense of stability in a period of immense political volatility and uncertainty (Odendaal, 2016).

This era of restructuring in Cape Town coincided with significant rates of urbanization<sup>2</sup>, placing significant pressure on ever-growing service delivery backlogs, but also on housing and formal job markets, which have been unable to keep abreast with these demographic changes (Odendaal, 2015). The City’s response to these challenges has been increasingly entrepreneurial, promoting regional and international competition, and creating environments that entice the entrance and expansion of corporations (Harvey, 1989). Effectively, Cape Town, like Durban and Johannesburg, adopted corporatization as an alternative service delivery model to meet new constitutional responsibilities (Smith, 2003). This enabled municipal government reform to be subverted by market forces and attendant managerial ideologies, instilling technocratic and bureaucratic visions of municipal government (Heller, 2001; Smith, 2004), and reinforcing

neoliberal policy leanings (McDonald & Smith, 2004). There are also important political ramifications for market-oriented approaches to local government in Cape Town. For the past couple of decades, Cape Town has been governed by the Democratic Alliance (DA) – the leading opposition to the nation’s ruling party, the African National Congress (ANC) – making the city a key site for partisan struggles. Portraying Cape Town as a well-performing, economically thriving municipality characterized by its market-driven approach to governance that promises service delivery efficiencies (Smith, 2004), is a central objective to the party’s objectives of “outperforming” ANC controlled territories (Resnick, 2014).

Building on its national recognition, the CoCT’s (2017) Integrated Development Plan (IDP) – the key development tool of South African municipalities – set out its entrepreneurial intentions for Cape Town as an “Opportunity City” that offers an enabling environment for economic growth, investment, and job creation (CoCT, 2017). This entrepreneurial vision has been mobilized by reimagining the city as a regional innovation hub (CoCT, 2017; Jenkins & Wilkinson, 2002; Lemanski, 2007; Odendaal, 2015), and what has materialized is a bolstering of service-driven economic activities and a tangible shift towards ICT innovation through significant investments by the public and private sectors (Invest Cape Town, 2020). These investments have been specifically targeted at modernizing city administration, improving services to businesses and citizens, and ICT-enabled social and economic development (Odendaal, 2015). The most recent iteration of the smart city strategy, the “Digital City Strategy,” was adopted in 2016 (CoCT, 2016a). From its genesis, the strategy has been developed by the Information Systems and Technology (IST) department, housed in the Corporate Services directorate, one of the 11 directorates that make up the CoCT’s Executive Management Team<sup>3</sup> – the administrative arm of the organization. As illustrated in Figure 1, the current strategy consists of four “digital” pillars: government, inclusion, economy, and infrastructure.

Each pillar is presented with an overarching vision, a breakdown of supporting objectives, and various planned and current initiatives aimed at those objectives (see Appendix for a summary of this). The Digital Government pillar intends to optimize the CoCT’s business processes through the strategic deployment of the ERP system that provides a



**Figure 1.** The four pillars of Cape Town’s digital city strategy (Source: CoCT, 2016b) CC BY 4.0.

“highly integrated transactional capability which underpins service delivery” (CoCT, 2016a, p. 13). The Digital Inclusion pillar intends to “close the digital divide by providing digital access, improving digital skills and promoting digital initiatives that enhance quality of life” (CoCT, 2016a, p. 19) through three principles: (1) creating partnerships with outside (primarily private sector) actors, (2) concentrating digital infrastructure investment in areas of low demand, and (3) driving skills development. The Digital Economy pillar intends to grow Cape Town’s burgeoning digital economy in order to create a globally competitive city that attracts investment and creates opportunities for employment. Initiatives range from supporting tech incubators to marketing the city as an innovation hub. Finally, the Digital Infrastructure pillar intends to scale the provision of the city’s ICT networks and infrastructure by partnering with commercial network operators and expanding the administration’s own Broadband Project connecting municipal buildings to a fibre network.

These plans have three primary activity areas: (1) institutional optimization through investments that digitize their operations, (2) expanding digital infrastructure networks and access, and (3) developing a business-friendly environment and supporting economic development through tech-related sectors. There is no detail in the strategy regarding the overarching responsibilities; who will oversee and coordinate the efforts of various departments, and their mandates, in reference to the strategy. Further, the document makes no mention of the institutional reform required to support many of the objectives presented. For a more detailed overview and analysis of the strategy document refer to Boyle (2019).

## Results

### ***Municipal governance reform and the genesis of Cape Town’s smart city strategy***

The birth of Cape Town’s smart city strategy was centrally influenced by municipal governance reform initiated by national government after the end of apartheid. One interviewee explained how, in Cape Town, this resulted in the consolidation of “... something like 40 little municipalities and made them seven” (Enterprise Architecture Manager, CoCT). The founding CIO sold the idea of using ERP to implement the UniCity restructuring “... on the one leg, and ICT for development on the other side” (Former CIO, CoCT).

“So, we had this ICT-enabled strategy and we kind of called it a Smart City Strategy. As one of the things that basically came out of the UniCity regulations” (Founding CIO, CoCT)

Convinced by the idea of developing an ICT solution for implementing the UniCity restructuring project, the City commissioned German proprietary software company SAP to create the ERP program. This established strong administratively-focused foundations for Cape Town’s smart city visions, which were seen by officials as key to the CoCT’s objectives:

“I think to a large extent the success of the city has been embedded in the new city that made it operate in a certain way. The administration has momentum. That to me is what ICT brought to the city of Cape Town” (Former CIO, CoCT)

The city officials who founded the first smart city strategy in 2000 had a wealth of experience in ERP and corporate IT systems, and clearly understood the municipal government context at the time. Additionally, they demonstrated a commitment to champion the project (with the support of key politicians) and the long-term smart city vision over several election cycles. This was clearly discernable when interviewing the founding CIO, who explained:

“It’s something we drove heart and soul research into ... So, it was something that was driven because we had a vision about what we wanted the place to do, the city” (Founding CIO, CoCT)

This leadership is largely regarded as responsible for the early successes of Cape Town’s smart city journey (Enterprise Architecture Manager, CoCT). The early smart city work also introduced key socio-economic development strategies such as the broadband project and SmartCape. SmartCape aimed at improving computer literacy and digital inclusion by providing free access to the internet through library computers and has received international recognition with over 400,000 users (WeGO, 2022). The broadband project digitally connected all the parts of the CoCT into an ERP system. Various libraries, clinics, planning offices, and other municipal buildings needed to be able to plug into this digital back-office, which required a reliable connection across the city. The CoCT built its own fiber optic network to service its buildings, become a “carrier of carriers” (CoCT, 2016a, p. 7), and lease spare capacity to internet service providers (ISPs) bringing last mile access and improving connectivity in communities affected by market failures. Over 900 km of fiber has been laid down and over 200 municipal buildings are connected to this network. Such integrated solutions that drove multiple municipal objectives typify early experimentations with smart city making in Cape Town.

### ***Administrative restructuring, municipal governance, and impacts on digital city strategy***

Despite strong foundations laid earlier in the 2000s to harness ICT for key urban objectives, the past decade’s progress has been marked by stagnation and a lack of leadership. This is primarily attributed to the wholesale restructuring of the administration that took place between 2012 and 2018. In his revelatory book, *A House Divided*, Crispian Olver (2019, p. 80) painstakingly dissects the re-engineering of the CoCT that led to a “significant weakening of the administrative machinery,” under former Mayor Patricia DeLille. At the time of the bulk of this article’s interviews (2018), the CoCT was in the height of this politically fractious redesign which was characterized by a number of leadership battles (Manager, DEDAT, Western Cape Government) and culminated in the resignation of Mayor DeLille.

State restructuring in Cape Town has been a consistent theme of contemporary Cape Town since the end of apartheid (Olver, 2019), and Smith (2004) argues that it has been deployed as a way to subvert democratic accountability. Olver (2019) describes the restructuring as an attempt by the mayor to centralize her control. Whilst constitutional legislation sought to empower a decentralized municipal governance system, it did not preclude the consolidation of power by executive mayors within municipal governments.

The result was that the administrative branch of the CoCT was reduced to purely implementing the mayor's strategies, and key officials were stripped of any authority to influence CoCT strategy (Olver, 2019). Not only did this result in a lot of frustration (and resignations) from city officials, but it also created wholesale confusion and fragmentation of municipal departments. One interviewee explained how this ultimately resulted in the resignation of the CIO who pioneered the early smart city strategy. He further added that it "... feels like there is a lack of political will now" (Accelerate Cape Town). Other interviewees mirrored this sentiment:

"Part of the problem is there were a lot of strong leaders in IT, who were really driving the Smart City [strategy], [they] left" (Manager, DEDAT, Western Cape Government)

"I mean they [present leadership] don't fully understand, and they are not people who passionately defend it. And the guys who put it in place are gone" (Former CIO, CoCT)

The impact that this has had on the DCS is tangible. Firstly, the key technical and leadership capacity driving the CoCT's smart city agenda either left or had lost its authority. Secondly, the slew of resignations, redeployments, sackings, and power struggles created significant uncertainty and discontinuity that drove institutional paralysis, effectively stalling the program. A third complicating factor was the absence of a political cause attached to the strategy without which the smart city strategy had to compete with other priorities – such as the water crisis – for political support. This resulted in a lack of high-level leadership driving a coordinated DCS. An interviewed Mayoral Committee member stressed the absence of a "cogent driver for it [the smart city strategy] at the moment because of how things have changed." Similarly, a manager in the IST Department explained that a major inhibitor for the strategy is that there is no "single plan, [a] single owner that actually drives it out."

Interview data revealed that there was in fact no formally adopted citywide strategy for ICT-driven solutions. The DCS, which was last updated in 2016, is an internal document that circulates the administration and uptake is contingent on departmental participation. This assertion is supported by the sheer brevity (40 pages) of the DCS which provides no detail regarding how various city portfolios would fit into the strategy's vision. The former Executive Director of Corporate Services at the CoCT believed that the DCS is "is not really substantive at the moment" and is not embedded in the organization or its business processes. His sentiments are supported by the content of the DCS, which contains no mention of the GIS platform or the Emergency Policing and Incident Command – the City's emergency dispatch control – two crucial smart city innovations integrated into the central ERP system. Hence, interview participants highlighted the need to align the various aspects of the CoCT's smart city initiatives into a "comprehensive view" (Radian Consulting). In the absence of a coordinated strategy, the reality of the DCS's implementation is "fragmented and driven in different departments in isolation" (Mayoral Committee Member, CoCT), which the CoCT's Enterprise Architecture Manager describes as the DCS's "single biggest problem." As a result, there is no coordinating force propelling the efforts of various departments and directorates towards a coherent smart city vision.

The disjointed reality of the DCS's application belies the longstanding history at the CoCT of referencing an overarching smart city strategy. Rather than the outcome of a



deliberate and coordinated strategy, many of the initiatives under the DCS materialize as an ad hoc and piecemeal assortment of initiatives seen in other city governments pursuing smart city ambitions (Coletta et al., 2019; Dowling et al., 2019). Further, these piecemeal strategies are often mobilized as outward expressions of being “smart” where disjointed initiatives are cajoled into a narrative of “smart” (Dowling et al., 2019).

Complicating this is the legislative environment of municipal governance in South Africa that enforces strict procurement policies designed to combat corruption (Mayoral Committee Member), which also limit the type of agile project management that many DCS initiatives require (Former Executive Director, Corporate Services, CoCT). Interviewees also stressed that they are bound by strict departmental mandates, which leave few formal mechanisms for horizontal and vertical coordination, and that any ICT initiatives that do cut across multiple departments do not have a defined workstream (Manager, Data Science Unit, CoCT). Thus, at present, the DCS is primarily driven by individual champions “fighting the good fight but it’s [they’re] fighting the organization” (Radian Consulting) in the sense that they are working beyond their limited mandates and influence.

### ***The technocratic nature of smart city making in Cape Town***

To date, the foundation of the CoCT’s smart city journey has been the SAP ERP system (Former CIO, CoCT). The initial smart city strategy spawned out of an administrative need to which an ICT solution was provided. Interviewees note how this set a trajectory for ICT applications “really driven by the IT department” and centered on digitizing administrative functions and internal processes (Manager, Data Science Unit, CoCT). A former CIO lauded the establishment of the ERP system for enabling the administration to operate in a way that leveraged ICT applications in support of administrative efficiencies. In support of this sentiment, the Manager of the newly established Data Science Unit noted how the stable IT backbone underlies Cape Town’s status as the best run municipality in South Africa. This points to the DCS’s role in concentrating smart city interventions towards objectives that improve the corporate functions and efficiencies of the administration. Many interviewees attributed this focus to the role that the IST department plays in devising and implementing the DCS. Concern was expressed that, instead of providing the enabling elements of the smart city vision, the IST department provides the strategic lens through which to devise citywide ICT-driven strategies. Consequently, it was expressed by the Manager of the Data Science Unit that the DCS is “owned” by the IST department.

A further challenge associated with the central role that the IST department plays in implementing the DCS was the lack of authority the department has to implement ICT strategies at the citywide scale.

“The problem is IT sits two levels down in the organization. So, if they develop a solution, it’s not a city-wide solution. It’s an IT solution. And a smart city strategy needs to really sit at the top” (Radian Consulting)

Moreover, interviewees revealed that the IST department “does not have the skillset of driving this [a holistic smart city strategy] on a broader scale” (Advisor to Mayoral Committee Member for Corporate Service, CoCT). The former Executive Director of



Corporate Services of the CoCT stated that over half of the 1,000 personnel in the IST department manage the transactional requests of the SAP system. He noted that, as a result, the IST department is rather one-dimensional. During interviews, another former CIO for the CoCT claimed he unsuccessfully lobbied to limit the size of the IT department to make it less operationally oriented and more agile and strategic. What followed was further consolidation of IT skills around operational aspects of the administration (Founding CIO, CoCT). The manager of the CoCT's data science unit, the first of its kind in a South African municipality, similarly spoke of the frustrations and limitations of having the capabilities to conduct advanced data analytics in the context of an organizational culture that only recognizes the transactional value of data within certain operational domains. As a result, this critical "data culture" dimension of a smart city data ecosystem (which enables an integrated view of city data) is absent (Gupta et al., 2020, p. 8). This limits the transformative capabilities of such smart city strategies, and the city appears to be shackled to its operationally-minded forebearers which have succeeded in developing an administratively smart city, but not an ecosystem smart city able to leverage ICT for meaningful transformations.

### ***The digital city strategy and the entrenchment of corporate forms of governance***

"So [Former CIO, CoCT] drove the Digital City strategy. His focus was to say: "I'm not interested in making a city that is system smart, I'm interested in looking at the corporate systems that we, as IT, run, and digitizing those"" (Manager, Enterprise Architecture, CoCT)

From the outset, key implementers of the DCS understood the smart city as optimizing, "the business of running the city" (Former CIO, CoCT). Other interviewees were equally dogmatic in their views of municipal governance as being confronted with "responding to a business need" (Manager, IST Department), essentializing the need to "have a business solution, an economic solution" (Advisor to Mayoral Committee Member for Corporate Service, CoCT). For them, the nature of ICT-driven strategies was primarily supporting business functions: improving and optimizing revenue generating services, reducing processing costs, streamlining the organization, and providing new value-adding activities. The adoption of private sector values in public sector management in Cape Town has transformed how the city understands its publics. Interviewees routinely referred to "citizens" as "customers" and to "engagement" as a process of attending to service requests and streamlining interactions with civil society and businesses. When interviewed, the Founding CIO revealed that this consumer-oriented mindset within the CoCT served as an impediment to more appropriate smart city solutions and stressed the need to shift toward practices where "citizens are part of this process." Cinnamon (2022) believes that this focus on citizens as customers reveals the neoliberal logics of the CoCT's approach to governance which limits its potential transformation in the smart city space. These logics are justified through the perceived need to adopt private sector modes of management to improve productivity and recover costs that can be leveraged for social objectives (Smith, 2004).

The preoccupation with government as a business, or the focus on the Digital Government pillar of the DCS, has paid dividends. The CoCT is widely regarded as the best run

city in the country, a factor which is inherently linked to the administration's brand and the Democratic Alliance's political objectives. However, amidst the constant rhetoric of organizational innovations, value chains, cost recovery, and business intelligence, a deeper conversation regarding equity and the uneven geographies of technology diffusion has been missing. Few interviewees commented on how the DCS was meaningfully addressing equity issues. This supports Smith's (2004) perspective that technical managerialism at the CoCT has shifted policy away from political processes towards technical interventions that prioritize efficiency over equity. Initiatives such as the Broadband Project, that address access to connectivity, was suspended when it could not strongly justify its "business case" (Former Executive Director, Corporate Services, CoCT). Hence, aspirations to harness ICT to address social concerns have been curtailed by commercial framings and politicians have struggled to lead any agenda lacking justification via corporate values.

One key motivation for the CoCT's ICT-driven strategies is to signal its global ambitions. Over the past two decades, Cape Town has been steadily investing in developing itself as a global tech hub. The DCS has played an instrumental role in demonstrating the CoCT's legitimacy and commitment to their central vision of being an "opportunity city" that creates an enabling environment for economic growth in key industries (CoCT, 2017). Cape Town currently has 550 technology companies that employ over 40,000 people and is the second highest ranked "tech ecosystem of the future" on the continent (behind Cairo) (FDi Intelligence, 2021). However, with the recent entrance of multinational technology companies establishing headquarters in Cape Town, there has been criticism of private sector influence in shaping the CoCT's ICT-driven strategies. A manager at the Western Cape Government's Department of Economic Development and Tourism noted that despite Cape Town's performance as one of Africa's leading tech hubs, there are very low levels of digital adoption by Small, Medium and Micro Enterprises (SMME's), suggesting that the CoCT's priorities gravitate more towards attracting big tech than developing homegrown tech adoption and innovation.

A central feature of CoCT's bid to lure global capital and solidify the DA's political brand is through promoting its image of being a "well-governed" city (CoCT, 2017). This highlights how the DCS, like with ICT-driven strategies elsewhere, provide important levers for political legitimacy (Dowling et al., 2019). The entrepreneurial motives of the strategy are made evident by some of the initiatives outlined in earlier findings, but also through more overt attempts to compete with global cities without much consideration for the realities of the Cape Town's contextual challenges. For instance, the CoCT spent millions providing free Wi-Fi on the MyCiti buses in a mobile broadband environment that is prohibitively expensive (Radian Consulting). The open data portal – which received strong political support from the DA (Founding CIO, CoCT) – has also been subject to criticism for subscribing to globally circulating ideas about data-driven urbanism (Cinnamon, 2022), without considering local challenges such as access to connectivity and devices that enable dataset utility. Sooful (2015) claims that the portal's intentions are little more than "keeping up appearances" with tech hubs in other parts of the world. Hence, the portal is less about fostering smart citizenry and digital enablement, and more about driving competitiveness and entrepreneurialism (Cinnamon, 2022).

## Discussion

Cape Town's digital city journey exemplifies ways in which smart city concepts are being grounded by city making pathways of municipal governments on the African continent. These municipally conceived pathways make a clear departure from what is typically understood by the deployment of smart cities across the continent in terms of their mode of production, scope, scale, and the political actors involved. The CoCT's ICT-driven strategies go beyond urban fantasies to include a broad remit of city-wide interventions which include digitizing city services and processes, developing digital platforms for engagement, investing in metropolitan-wide ICT infrastructure and transport, digital skills development, and supporting tech-related economies (CoCT, 2016a). As such, the findings deepen the framings of Africa's smart city making pathways that are founded upon Watson's urban fantasies. Hence, a more nuanced understanding of Africa's smart cities is advanced where nationally-driven smart city megaprojects coexist with municipalities applying an assortment of ICT interventions that respond to a host of local and global priorities. Findings reveal the technocratic, entrepreneurial, and corporate-driven intent behind many of the DCS's initiatives, revealing the shared rationales between ICT-driven urban innovation in Cape Town and those located in global discourse on smartness that places primacy on economic development (Coletta et al., 2019; Datta, 2015b; Dowling et al., 2019; Hollands, 2015; Kitchin, 2014). On the one hand, Cape Town's municipally led DCS variously complicates established conceptions of smart city production on the African continent, and on the other hand, is still strongly rooted in the central logics of "smart urban fantasies," and by extension, other globally circulating concepts regarding smart urbanism. While these empirical insights add texture to the evolving landscape of state-driven smart city making in Africa, more broadly they explore how the discursive terrain of smart city making is shaped in local and regional contexts and how they dovetail with local and global political economies (Kitchin, 2014).

South Africa's national decentralizing agenda has also significantly shaped digital strategies in Cape Town, demonstrating the way global smart city concepts unfold locally through a set of contingent and relational processes shaped by existing local political priorities, governance practices, institutional settings, and political economic contexts (Coletta et al., 2019; Shelton et al., 2015). The findings demonstrate the CoCT's long history of deploying ICT applications in response to the weak constitutional framework guiding effective institutional responses to the formidable structural and operational demands of decentralized governance (Beall, 2005). Most notably was the deployment of SAP's ERP system which essentially paved the way for corporate IT solutions for urban governance in Cape Town.

Furthermore, decentralization in Cape Town has been characterized by the bolstering of neoliberal leanings; ushering in an increasingly corporate and entrepreneurial remodeling of municipal governance which engendered an environment of techno-managerialism (Beall, 2005; Heller, 2001; Samar, 2011; Smith, 2003, 2004). Here, the logics of improved service delivery were enacted through cost recovery and streamlining bureaucracy (Olver, 2019; Smith, 2003, 2004). In this regard, the findings advance an understanding of decentralization's role in sowing the seeds for corporate interventions for urban governance which predate smart city discourse. These corporate interventions became

increasingly supported by ICT solutions which reinforced the commanding role that the IT department played in driving the CoCT's smart city vision from an internalized Corporate Services perspective. As a result, ICT interventions have primarily been deployed as vendor-driven and internally oriented technological fixes (Kitchin, 2014), aimed at improving "business processes" as a way of using ICT to signal the CoCT's (2017) "well-governed" and "business-friendly" culture to foreign and domestic audiences (Joss et al., 2019). This further highlights the reliance on proprietary software companies (namely: SAP, ESRI and Microsoft) in implementing the CoCT's digital ambitions which ignores the concerns raised by early smart city critics (Greenfield, 2013; Kitchin, 2014; Townsend, 2013) who stressed the dangers of corporate path dependencies for urban governance shaped by vendor platforms that seek technological and skills lock-ins. Not to mention the limitations of using a system designed for an inward-looking corporate environment in a citizen-facing organization like a municipal government (Founding CIO, CoCT).

Hence, despite the grand narratives associated with Cape Town's Digital City aspirations, the findings reveal what other scholars (Coletta et al., 2018; Dowling et al., 2019; Gupta et al., 2020; Shelton et al., 2015) have identified as the prosaic and mundane reality of the processes enacted to make cities smart which primarily fulfil bureaucratic functions and reinforce municipal practices that favor corporate interests. This reality has denigrated more strategic components of the DCS and smart governance in Cape Town is largely reduced to the governance of cost recovery and business solutions. Hence, the strategy embodies a managerial approach to smart city making that recognizes ICTs as promotional and optimization tools, underpinning a technologically-led neoliberal model of urban growth (Cardullo & Kitchin, 2019) that neglects the sociotechnical arrangements of the city. Thus, in line with other well-known critiques of global smart city tropes (Datta, 2015a; Greenfield, 2013; Guma & Monstadt, 2021; Kitchin, 2014; Odendaal, 2016; Townsend, 2013; Watson, 2015), the strategy largely fails to demonstrate an understanding of the human dimensions of smart city-making and how technological innovations can be created by, and for local people. In the case of Cape Town – and in the same way that the technocratic and entrepreneurial logic of municipal governance driven by decentralization has fallen short of instilling genuine democratization across South Africa (Beall, 2005; Heller, 2001) – the mirrored logic of the DCS has not engendered genuine ICT-enabled transformation.

Despite this, through its overarching goal of delivering a range of ICT-based strategies across the city's entire municipal jurisdiction the DCS has been forced to acknowledge, and respond to, local context-based realities. It is worth noting what Odendaal (2015) describes as the "discernable commitment" to social development through improving access to connectivity and providing avenues for digital skills development in Cape Town. This is evidenced by key programs within the strategy such as SmartCape, the Broadband Project and the provision of free Wi-Fi in municipal buildings. There are certainly city officials in the CoCT with a keen interest in driving a strategy that is informed by local barriers and priorities. However, the political commitment in driving social development aspects of the strategy is less apparent and their efforts are often hamstrung by an institutional ethos characterized by corporate perspectives of municipal governance. As a consequence, Cape Town continues a continental and global paradigm of ignoring important contextual considerations when enacting smart city pathways.

## Conclusion

Cape Town's Digital City Strategy demonstrates an under-researched mode of municipal-driven smart city development in Africa. This article expands on the common framing of smart city development on the continent as digitally enhanced "urban fantasies". The DCS reveals a more nuanced picture; an evolving smart city practice that is indelibly shaped by both globally circulating ideas concerning ICT and urban development, and governance reform bound up in national and municipal political processes playing out across the continent. In this regard, the article highlights the multi-scalar production of smart cities (Cinnamon, 2022), foregrounding the emergent role of African municipalities as mechanisms for grounding global imaginaries of future cities in sites of intense local and regional politics. Analysis of Cape Town's DCS demonstrates how decentralization and smart city agendas intersect to drive a form of urban governance that is characterized by an overriding affinity for corporate technological solutions, entrepreneurialism, and private sector principles. What transpires is a set of ICT-driven strategies that fulfil banal functions that fail to engender transformation in a meaningful way. This brings to light another feature of ICT-driven urbanism on the continent where smart city visions are sold as grand narratives that reference the golden city of Wakanda, yet the mundane reality of digitally driven urban transformation is materialized through the provision of free public Wi-Fi and online payment platforms.

## Notes

1. The paper uses the term information and communication technology (ICT) to refer to as a diverse set of tools and resources that transmit, store, create, share or exchange information. (UNESCO Institute for Statistics, 2009).
2. Cape Town's population grew by 57% between 1996 and 2016 (CoCT, 2017).
3. The EMT represents the administrative level of CoCT's organization. Above this sits the Mayoral Committee which is where the political leadership resides. Each directorate has a head at the administrative/EMT level and a political/Mayoral Committee level. The Executive Mayor oversees the Mayoral Committee.

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## ORCID

Luke Boyle  <http://orcid.org/0000-0002-9162-5115>

John Harlow  <http://orcid.org/0000-0002-2896-3373>

Lauren Withycombe Keeler  <http://orcid.org/0000-0003-2665-139X>

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## Appendix

### Summary of digital city strategy objectives and associated initiatives.

Digital Government	Digital Inclusion	Digital Infrastructure	Digital Economy
Objective A	Objective A	Objective A	Objective A
Optimize the City’s business processes through ICT	Enhancing community-level access to digital services	Establish telecommunications infrastructure, network services and devices for use by City departments	Support early-stage entrepreneurship in the tech industry
Initiatives	Initiatives	Initiatives	Initiatives
Develop City’s intranet site; improve digital procurement; and using ICT to optimize business processes.	Providing free wi-fi at City buildings, MyCiti busses and select city parks; expanding digital infrastructure for public internet access at libraries; and exploring options for improving access to devices that enable ICT usage.	Continued roll-out of the Broadband Infrastructure project; investment in the City’s corporate network, telephony, video and internet services; and deploying specialized network services for specific City services.	Providing support for tech-industry incubators; developing a model for the City’s role in facilitating seed funding for tech start-ups; and creating an enabling environment for the venture capital industry.

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Digital Government	Digital Inclusion	Digital Infrastructure	Digital Economy
Objective B	Objective B	Objective B	Objective B
Simplify citizen and business interaction with government through web and mobile services	Improve ICT skills and drive ICT usage	Deploy telecommunications infrastructure and network services that drive down the cost of telecommunications	Promote the City of Cape Town as the leading Digital City in Africa
Initiatives Redesigning the City's website to make it more user-centric; maximizing electronic permit, license and service applications; developing digital channels for public participation; maintaining an efficient open data system; and using online platforms to mobilize business and resident support.	Initiatives Investing in ICT end-user skills through training programs at libraries; and train expanded public works programme as ICT ambassadors.	Initiatives Providing network services for other levels of government; and providing telecommunications infrastructure and network services for commercial telecommunications service providers.	Initiatives Enhancing the investment experience of magnet companies; facilitating engagement between role-players in the ICT sector; provide access to market intelligence; investigating the feasibility of a tech-precinct in Cape Town; and promoting Cape Town as an investment hub for the ICT sector.
Objective C	Objective C	Objective C	Objective C
Create a culture of ICT-enabled innovation	Promote and enable programs that catalyze social transformation through ICT	Deploy application infrastructure, systems and devices to improve service delivery efficiency and government communications	Build a strong human capital base for the ICT sector
Initiatives Establishing an internal platform for ICT-enabled innovation, recognizing excellence in ICT-enabled innovation, innovate around digital services for residents, and lobbying for legislation changes to support City innovation.	Initiatives Using ICT to develop responsive datasets on socio-economic challenges; promoting private sector and community innovation in resolving service challenges; and rewarding the development of tech-enabled solutions for service delivery challenges.	Initiatives Providing the data centres and application servers needed to support the City's digital systems, applications and communications platforms; strengthening the City's web hosting capability; providing the digital infrastructure to optimize City services and infrastructure.	Initiatives Supporting and promoting ICT skills initiatives; and partnering with tertiary institutions and the private sector to grow the pool of ICT professionals in Cape Town.
Objective D	Objective D	Objective D	Objective D
Enhance evidence-based decision-making in the City.	Driving a portfolio of projects that demonstrate how we can use ICT to improve quality of life in Cape Town	Encourage, facilitate and enable the deployment of digital infrastructure by the private sector	Drive industry growth through improved online service provision
Initiatives Establishing effective data management platforms, and harnessing internal and external data sources for evidence-based policy development.	Initiatives Establish Digital Gaming centres for youths; establish paperless primary healthcare clinics; using digital channels to improve the management of the City's historical information and natural assets.	Initiatives Incentivising the development of digital infrastructure by the private sector and cutting red tape that inhibits the private sector development of digital infrastructure; and promoting the use of the City's digital infrastructure by the private sector.	Initiatives Driving demand for digital services by making City services available online; and enhancing access to City of Cape Town datasets for use by the private sector.

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Digital Government	Digital Inclusion	Digital Infrastructure	Digital Economy
			Objective E
			Improve the productivity and competitiveness of businesses
			Initiatives
			Encouraging the adoption/optimal use of ICT through support programs to modernize business systems in private sector.
			Objective F
			Create an enabling regulatory environment for the tech industry
			Initiatives
			Enable economic activity by cutting red tape; and maintaining policy to accommodate new ways of doing business.
			Objective G
			Create a culture of innovation
			Initiatives
			Providing support for external fora promoting ICT-enabled innovation; and encouraging the use of City data for ICT innovation by external stakeholders.