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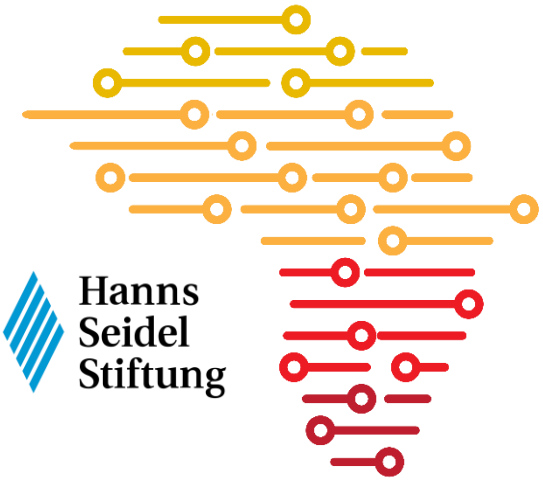

Governing African smart cities: The role of digital citizenship in municipal e-participation

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Governing African smart cities: The role of digital citizenship in municipal e-participation

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Abstract

The rapid urbanisation, combined with the proliferation of information and communication technology (ICT), has driven cities across Africa to adopt smart city strategies to manage urban development. As the adoption of smart city strategies increases across varied contexts, a call for a citizen-centric approach to smart cities has emerged – an effort to address the needs of citizens in smart city projects. While citizen-centric approaches are being adopted in smart governance, the role of citizens in a digital era are thinly explored in relation to their impact on the participation of citizens in smart cities across Africa. Drawing upon case studies from three cities, Cape Town, Nairobi and Rabat, this paper explores the role played by the emerging digital citizenship in smart governance, with a focus on e-participation. Using a three-dimensional framework of e-enabling, e-engaging and e-empowering, the paper identifies two factors that impact negatively on citizens' participation through e-participation platforms. First is the citizens' poor sense of belonging in terms of digital access and participation rights. Second, the paper identifies low political efficacy among citizens, coupled with high corruption levels among municipal officials; citizens have a poor perception of the utility of participating through e-participation platforms. The paper argues that it is crucial to consider the spatial characteristics of a city, the social-cultural factors and the political climate of a city to predict the role of citizens in smart governance – citizens' sense of belonging and their political efficacy.

Keywords: smart cities, smart governance, e-participation, digital citizenship, African cities

Introduction

The concept smart city has grown in importance significantly across the world. It has become a key paradigm in urban planning, development and urban policy. Debates on the future of cities are dominated increasingly by notions about smart cities (Odendaal, 2021 Watson, 2015). Other than being an emerging idea in policy formulation, smart cities are also being implemented in cities globally. In Africa, municipalities have joined the adoption of smart cities, partly in efforts to brand their cities in what Muzenda (2020) regards as an age of 'world-class cities'. The fundamental motive for the adoption of smart cities across Africa, however, has been to address pressing challenges of improving service delivery and governance. In the implementation of smart city strategies, the Covid-19 pandemic accelerated the adoption of smart city initiatives across the world. Cities such as Cape Town, Rabat and Nairobi have implemented leading smart city technologies to manage their urban systems.

Foundationally, smart cities are driven by the deployment of technologies to address various urbanisation issues. However, various scholars argue that the imposition of technological determinism under smart cities seldom factors in economic, socio-cultural and political factors (for example, Cowley et al., 2018; Joss et al., 2019). The success of smart city technological deployments is influenced significantly by individual city contexts such as socio-economic factors, institutional characteristics, cultural factors and territorial characteristics (Santos and Mota, 2019). These factors have influenced the emerging call for a citizen-centric approach to smart cities. Overall, the transition of cities towards smartness represents a socio-economic and organisational transformation. Such transformation benefits greatly from the collaboration of various urban actors in addressing urban challenges with the support of ICT.

To address the societal variations that exist across contexts where smart city strategies are being implemented, there is an increasing call for a 'citizen-centric approach' to the implementation of smart city strategies (for example, Bandauko and Arku, 2022; Odendaal, 2015; Watson, 2015). The participation of citizens in smart cities empowers citizens to

exercise their democratic citizenship duties, which changes the relationship dynamics between the citizens as passive actors and the local government as the active actor. Citizen participation as it applies to citizen-centric smart cities has changed significantly under digitalisation. In traditional participation, citizens are required to participate in person, attend public hearings, briefings, citizen boards, participate in focus groups in person, and travel to vote in municipal elections. In smart cities, however, forms of e-participation have emerged that are powered by the use of information and communication technologies (ICT) as communication channels to connect citizens and their respective local governments. E-participation platforms enable citizens to deliberate on various issues, as well as e-participate in decision-making, service design and public service delivery through digital platforms (Macintosh, 2004; Welch, 2012). The e-participation tools improve the nature and extent of citizen participation by making it easier, faster and more transparent (Yeh, 2017). Several authors acknowledge the benefits of e-participation in cities. Pereira et al. (2018) sum up the benefits as enhancing the engagement and interaction of citizens and their local government; moving beyond service-driven participation into decision-making and co-creation on wider societal issues. Under e-participation, citizens also provide their local government with valuable new information that would otherwise be unavailable through traditional participation.

This paper explores the role played by the emerging form of digital citizenship in citizen participation in selected African smart cities. It identifies and discusses contextual factors that shape and influence e-participation under digitalised citizenship or 'digital citizenship'. To understand the role played by digital citizenship in the governance of smart cities, the paper advances a two-dimensional concept of citizenship: a *human rights* perspective, which explores the citizens' sense of belonging in smart cities, and a *sociological* and *anthropological* perspective, which brings out the political efficacy of citizens to participate in municipal affairs. The paper argues that digital citizen rights, actions and participation in smart cities are facilitated significantly by the emerging digital infrastructures whose provision is contextual, and derived from socio-economic factors as well as cultural and embedded power relations in the city (Emmer and Kunst, 2018; Oyedemi, 2012). The paper's approach to smart city governance explores how digital citizenship is shaped through reproduction and

transformation of socio-spatial dynamics of (in)equality, inclusion/exclusion and empowerment/deprivation based on how digital infrastructures are deployed and used by citizens (Cardullo, 2020).

The concept of smart cities

Smart cities are dynamic socio-economic systems within urban environments that are driven by technological innovation. Smart cities emerged as solutions to the complex challenges and opportunities facing cities. Regardless of the growth of the smart cities paradigm over the years, several disagreements exist as to what constitute a city as 'smart'. Several thematic developments also exist regarding the conceptualisation of smart cities, such as those focusing on education, social innovation, intellectual capital: *knowledge city* (Carrilo, 2006) or ICT-based applications; *cyber-city* (Komninos, 2019) or environmental focused technological innovation, *eco-city* (Roseland, 1997). In spite of the heterogeneous approaches to defining smart cities, there are key dimensions that offer a more effective definition.

Defining a smart city

This paper adopts Giffinger et al.'s definition of smart city. Giffinger et al. (2007) define a smart city from both a technological and a human perspective. The scholars identify six dimensions that make up a smart city. The efficiency and the effectiveness of the following six dimensions make up a smart city: smart economy, smart environment, smart living, smart people, smart mobility and smart governance (participation). For a city to be defined as smart, it needs to meet the following characteristics (Giffinger et al., 2007):

- *Smart Economy* where commercial activities benefit from online business and trade as ICT is applied to support the movement of goods, services and knowledge within an economy.
- *Smart Mobility* where communication and transportation are supported by ICT-based applications in mobility and information to citizens.
- *Smart Environment* which involves the application of ICT technologies to the management of energy resources, buildings, infrastructures and monitoring of the environment.

- *Smart People* where a city comprises people with e-skills and who work with ICT creatively and innovatively, using data to make decisions, create commodities and manage the city.
- *Smart Living* which is understood as the style of life, behaviour and consumption that takes advantage of ICT, and hospitable environments, including socio-cultural cohesion within a city.
- *Smart Governance* of a city in which ICT tools and technologies are used in promotion of governance attributes such as transparency, citizen participation and co-creation of services.

Giffinger et al.'s definition constitutes citizen participation as a structural element of a smart city strategy in two ways. First, regarding citizen participation in the city's governance and, second, citizen participation in public life (such as participation in municipal elections or in volunteer work). The perspective delves beyond the technological perspective of smart cities which enables this paper to explore the concept of smart governance beyond technological deployments.

Citizen participation in smart governance

The advocacy of a citizen-centric approach to governing smart cities has witnessed citizen participation becoming central to smart governance. Smart governance creates the basis for a successful city through improvement of public services, transparent information policy and citizen participation in municipal decisions. The collaborations in smart city governance demonstrate that citizen participation is not limited to the political domain of municipal affairs, but also includes economic, cultural and social affairs.

Citizen participation in smart cities is supported increasingly by e-participation platforms. Classifying e-participation technologies can be a difficult task, however, given variations in composition and application of such technologies. Several authors have tried to create a framework for systematically classifying the various types of e-participation (for example, Bagui and Bytheway, 2012; Macintosh, 2014). In all the classifications, Linders (2012)

formulates a three-part classification that is clearer; a classification based on who is the recipient and who is the provider. In this classification, Linders (2012) classifies e-participation into G2C (government to citizen), C2G (citizen to government) and C2C (citizen to citizen). In G2C e-participation, the activity of citizens is not directly required; the government disseminates information and data to citizens informing them on issues of concern. In the C2G e-participation, citizens have a higher degree of participation in municipal affairs and are actively involved through various platforms such as discussions, surveys, elections and forums. Citizens provide feedback to the local government on various issues, from reporting on service delivery, designing, defining and prioritising to offering solutions. The C2C is the do-it-yourself class of e-participation. In this form of e-participation, the participation of local government is not necessarily required; citizens organise themselves into digital communities that improve their communities.

While smart cities can apply any of the three classifications of e-participation, this paper focuses on C2G e-participation as an implemented practice. As defined by Steinbach et al. (2020), in implemented practice, the government intentionally supports citizen participation through adoption and deployment of digital technologies. To qualify as implemented practice, the e-participation needs to ensure active engagement of citizens (for example, through communication, cooperation, co-decision or co-creation). The local government also needs to deploy the e-participation technologies for them to qualify as implemented practice (Steinbach et al., 2020). By focusing on implemented practice, the paper excludes e-government tools that facilitate only passive participation of citizens – only disseminating information to passive citizens. It requires active citizen engagement, enabling them to exercise their democratic citizenship rights.

Citizenship under digitalisation

The emergence of smart cities has ushered in significant digitalisation of urban processes pertaining to urban governance. This digitalisation has also transformed the concept of citizenship as it relates to urban environments. In traditional understanding, citizenship is a complex concept with various interpretations. Fundamentally, citizenship entails *membership*

within a self-governing political community (Joppke, 2010). To relate this to the way in which digitalisation has reshaped citizenship and influenced the role played by citizens in smart cities, the paper explores the two perspectives of citizenship identified by Hirschl and Schachar (2019): the *human rights* perspective and the *sociological* and *anthropological* perspective.

Human rights perspective: Citizens' sense of belonging in smart cities

The first dimension of traditional citizenship is a *human rights* perspective. This dimension focuses on the internal role of citizenship – the rights of citizens within a polity – which have increased over the years, from civil rights and political rights to social rights (Marshall, 1950). The increasing rights of citizens, such as the right to private property, voting rights, right to housing and the right to the city, are tied to the citizens' sense of belonging in an urban environment as a polity. To enjoy the rights ascribed to a specific territory, such as a city, however, one has to have the legal status of citizenship attached to the membership of such a territory. The human rights perspective of citizenship relates to the citizens' sense of belonging, defined by Tully (2002) as the attitude by which individuals express their identification with, attachment to and support of a territory. Territorial identity and characteristics play a crucial role in determining the citizens' sense of belonging within a city. For a smart city to incorporate citizen participation in its governance, it requires considering the citizens' sense of belonging in both the traditional participatory structures and the emerging digital spaces. Using Tully's (2002) definition of sense of belonging, the paper highlights the spatial dimension that equates the citizen's access to a space and the cognitive dimension that entails the individual's identification with the place.

The digitalisation of cities has transformed citizens' sense of belonging as it relates to the human rights perspective of citizenship. In the implementation of smart cities, digital technologies are transforming the *space* of citizenship. Digital technology is promoting both citizen connectivity and systemisation (Morozov and Bria, 2018). The connectivity under smart cities reshapes citizens' sense of belonging, and the extent to which they are controlled, regulated and participate in the political affairs of their communities. As Varnelis and

Friedberg (2008) argue, the space for citizenship is shaped by emerging geospatial connectivity and smart city technologies that rely on cyberspace – the digital space where citizens connect with their institutions. Digitalisation has challenged the traditional boundaries of citizenship. As Rejers et al. (2022) term it, 'cybernetic citizenship,' digitalisation has produced cyberspace, a new dimension of existence, which exists beyond the territorial-based borders of nation-states. In this cyberspace, a new sense of belonging has emerged – a wave of new citizen rights, such as digital access, digital privacy and data control (Rejers et al., 2022). The digital tools and technologies that are deployed have a significant influence on the role played by citizens in urban governance.

Social and anthropological perspective: Citizens' political efficacy

The second dimension of citizenship, the *sociological* and *anthropological* perspective, comprises various interrelated components, such as rights, obligations and identities (Joppke, 2010; Reijers et al., 2022). This perspective focuses on the relationship between institutions and citizens, the state and the people. Other than characterising citizenship as a legal right, the *sociological* and *anthropological* perspective also considers the socio-cultural reality of belonging (Antenucci and Tomasello, 2022). Barnes et al. (2004) describe the *sociological* and *anthropological* perspective of citizenship as 'citizenship in practice'. This view of citizenship relates to citizens' political efficacy as it influences significantly their participation in the political affairs of their polity.

Mahlangu and Schulz-Herzenberg (2021) define political efficacy as the way in which citizens perceive the impact of their political action on the political processes – their regard for the possibility of political and social change and recognition of the role they can play in bringing about such change. From Mahlangu and Schulz-Herzenberg's definition, political efficacy can be classified into two: internal and external political efficacy. Internal political efficacy refers to the individual's political enlightenment – that they can understand political decisions, processes and politics in all its forms (Cicatiello et al., 2018). External political efficacy entails the individual's belief that political actors and institutions are attentive to the needs and concerns of citizens. Citizens with low external political efficacy believe their political actors

and institutions do not consider their participation; they believe they are not in a position to act on decisions made by their political actors (Craig et al., 1990).

Under digitalisation, the political efficacy of citizens to participate in smart cities is influenced by the changing relationship between citizens and institutions (Mahlangu and Schulz-Herzenberg, 2021). Algorithmic technologies deployed in smart cities are automating the relationship between citizens and institutions. The algorithms measure, quantify and evaluate behaviours of individuals. Rejers et al. (2022) call it 'cybernetic citizenship.' The internal and external political efficacy of citizens is now influenced by the statistical methods applied as institutions learn citizens' behaviour, such as predicting and modulating individual behaviours (Fourcade and Johns, 2020). As cities digitalise under the smart city movement, understanding political efficacy is crucial in the new regime of digital citizenship where internal political efficacy expands to constitute citizens' belief that they are technologically innovative and can understand various forms of e-participation. To be effective digital citizens in smart cities, citizens need to have high political efficacy to be able to participate meaningfully.

Methodology

The research adopted a descriptive case study approach. Three case studies were selected to establish an in-depth understanding of e-participation and its relationship to digital citizenship (Yin, 2009). A purposeful sampling approach was used to select cases that were most likely to yield appropriate and useful information. The selected cases were Cape Town, Nairobi and Rabat. The selection was based on their ranking on the Smart City Index (SCI) developed by IMD World Competitiveness Center in collaboration with Singapore University of Technology and Design (IMD-SUTD). The e-participation initiatives of the cases also qualified as implemented practice, which was the focus of this study. Findings from the IMD-SUTD data were complemented by document analysis from each city, such as official policy documents (for example, reports, journals and research project deliverables).

Theoretical framework

The paper adopts a theoretical framework premised on three theories: Arnstein's Ladder of Public Participation (1969), Wang et al.'s Cognitive Engagement theory (2004) and Tocqueville's Equity-Fairness theory (2003). In Ladder of Public Participation, Arnstein proposes that redistribution of power determines the success of citizen participation and distinguishes between various levels of participation from non-participation to degrees of tokenism and ultimately, degrees of citizen power (Arnstein, 1969). Each level has a different level of impact on the decision-making process. The Cognitive Engagement theory by Wang et al. (2014) proposes that effective citizen participation is associated with the availability of information on government affairs. The Equity-Fairness theory posits that when citizens trust institutional leaders this is an indicator of effective citizen participation (Tocqueville, 2003).

Data sources and definition of variables

The study uses the IMD World Competitiveness Center–Singapore University of Technology and Design Smart Cities Index data (IMD-SUTD, 2019, 2020, 2021). The survey data had a sample size of 12 240 participants surveyed in 108 cities across the world in the years 2019, 2020 and 2021, hence 120 participants per city. Of the 108 cities that were surveyed and ranked, six of them were African cities: Abuja, Cairo, Cape Town, Nairobi, Rabat and Lagos. This study selected data from three of the African cities: Cape Town in South Africa; Rabat in Morocco and Nairobi in Kenya. These cities were purposefully selected based on the extent of their citizen participation as implemented practice.

The IMD-SUTD mapped perceptions of residents on issues related to structures and technology applications within their cities. Under the Structures pillar, the survey referred to existing infrastructures supporting participation in a traditional way while the Technology pillar referred to the technological provisions that made up the smart cities available to residents. Each pillar was evaluated over five key areas of the city: health and safety, mobility, activities, opportunities and governance. This study focused on the data from the area of governance as it related to public participation. The governance perceptions focused on the five most common e-participation tools: (i) tools for reporting service delivery issues, (ii)

online voting – decision-making in the municipality, (iii) citizens' satisfaction questionnaire, (iv) discussion forum on the municipal websites and (v) participatory budgeting tools for the municipality.

Dependent variable: successful implementation of e-participation

Using IMD-SUTD surveys, the research assumed that the dependent variable, successful implementation of e-participation, was the best measure of the role of digital citizenship in smart governance. Based on the survey questions, the dependent variable reflected the citizens' satisfaction with the degree of participation through e-platforms in the three selected cities.

Independent variables: citizen sense of belonging and political efficacy

Citizen sense of belonging: Citizens' sense of belonging, such as their right to municipal information, their right to participate in decision-making and ability to access e-participation platforms, influences their extent of participation in municipal affairs. The IMD-SUTD survey asked citizens how difficult it was to access information on municipal decisions and on municipal finances. The survey also asked citizens if access to public Wi-Fi had improved access to e-participation. Therefore, the paper hypothesises that

- **H_1** Difficulty accessing information on municipal decisions and finances reduces the extent of citizen e-participation in municipal affairs.
- **H_2** Difficulty accessing e-participation platforms reduces the likelihood of citizens' participation through e-participation platforms.

Political efficacy: Low levels of political efficacy are attributed to poor citizen participation in municipal affairs as they regard their efforts and input as not appreciated in the decision-making process. Citizens' perception of corruption in the municipality also influences their participation. The IMD-SUTD survey asked how participants felt their feedback, participation in decision making and reporting of service delivery challenges led to actions that improved the quality of life in their city. Citizens were also asked how they perceived corruption and if

they believed that data transparency under e-participation had reduced corruption. Therefore, the paper hypothesises that

H_3 Difficulty influencing municipal decisions reduces the extent of citizen e-participation in municipal decision-making processes.

H_4 High perception of corruption of municipal officials by citizens reduces their extent of e-participation in municipal decision-making processes.

E-participation in African smart cities

This section provides evidence of the role played by digital citizenship in the governance of three African smart cities (Cape Town, Nairobi and Rabat) through e-participation. The section discusses the influence of citizens' sense of belonging and political efficacy as dimensions of digital citizenship that can influence the nature and extent of e-participation.

Cape Town

Cape Town, the city that is known synonymously as 'Silicon Cape' in the tech entrepreneurship community, has made huge strides to becoming one of the smartest cities in Africa (Pollio and Cirolia, 2022). Since 2000 when the 'Smart City Strategy' was launched, the city of Cape Town has been on a drive to transform towards smart urbanism. In early 2000, Cape Town also implemented the Unicity project, which became foundational for digital infrastructure implementation and e-government platforms. In 2001, the city implemented an Enterprise Resource Planning (ERP) system which became key to digitalisation of data, reporting and information sharing with citizens. The system became the 'digital backbone of the organisation and its smart city aspirations' (Boyle and Staines, 2019: 10). Under the system, each citizen in the city was assigned a record that integrated information, such as employment history, income levels, criminal records, tax records. In 2002, under the Smart Cape Access Project, Cape Town extended digital access to disadvantaged communities through installing free-access computers in public libraries in marginalised communities and township areas. Digital infrastructure, particularly optic fibre for broadband internet, was installed across the city to provide infrastructure for the proposed free public Wi-Fi hotspots.

A digital infrastructure was rolled out, the city of Cape Town began strengthening citizen engagement and, in January 2015, it launched an open data portal. The renaming of the previously Smart City Strategy to Digital City Strategy comprised four pillars dedicated to strengthening the role of digital technology in urban governance: digital government, digital inclusion, digital economy and digital infrastructure.

Citizen perceptions on e-participation

In the IMD-SUTD Smart City Index, Cape Town has been ranked as one of the top smart cities in Africa. In 2019, it was ranked 93 out of 102 cities, declining to 103 out of 109 cities and eventually, in 2021, Cape Town ranked 105 out of 118 cities. The changes in ranking have been associated with citizens' ranking of citizen engagement as a top five priority among 15 other issues. In 2019, only 13.8% of surveyed citizens believed citizen engagement was a top five priority in their city. This percentage has dropped over the years to 10.9 % in 2020 and 8.9% in 2021. To understand the prioritisation of citizen engagement, Table 1 below demonstrates citizens' responses on participation issues.

Table 1: Citizens' responses on the structures and technologies of participation in Cape Town

Traditional Participation Structures	**2019**	**2020**	**2021**	**E-participation technologies**	**2019**	**2020**	**2021**
Basic sanitation meets needs of poorest areas	47.83	45.3	41.6	Online reporting of city maintenance problems provides speedy solutions	50.27	51.5	51.5
Information on municipal decisions is easily accessible	57.99	59.5	53.4	Free public Wi-Fi has improved access to information	52.03	56.7	54.9
Corruption of municipal officials is an issue of concern	68.02	73.9	77.7	Online public access to city finances has reduced corruption	41.60	41.4	36.9
Residents contribute to municipal decision-making	40.79	39.4	36.6	Online voting has increased citizen participation	46.75	47.0	43.6
Residents provide feedback on municipal projects	52.71	50.9	46.3	Online platforms for citizens to participate has improved city life	45.26	50.1	46.8

Source: Data from IMD-SUTD (2019, 2020, 2021)

The high percentage of respondents (52.03% in 2019, 54.9% in 2021) who affirmed the positive role of free public Wi-Fi access, particularly to marginalised groups, demonstrates that the city's digital infrastructure projects has improved access to e-participation platforms. The majority of respondents (53.4%) also believed that information on municipal decisions was easily accessible which is crucial for e-participation. Cape Town also improved its response to reporting on the city's maintenance problems as noted by 51.1% who affirmed the improvement. While huge strides have been made in terms of digital infrastructure, most respondents demonstrated low political efficacy. Respondents ranging from 68.02% in 2019 to 77.7% in 2021 believed corruption was a key issue in the city where most did not believe the online budgetary transparency had reduced the corruption. As corruption perception increased from 2019 to 2021, residents participating in decision-making and giving feedback on municipal projects also declined, regardless of the provision of e-participation platforms.

Nairobi

In the IMD-SUTD Smart City Index, Nairobi has been ranked among the lowest cities globally. It dropped its rankings from 100 out of 102 cities in 2019, to 108 out 109 in 2020 and in 2021, it ranked 11 out of 118. The changes in ranking have also been associated with the ranking by citizens of citizen engagement as a top five priority among 15 other issues. In 2019, only 12.2% of surveyed citizens in Nairobi believed citizen engagement was a top five priority in their city. This percentage dropped in subsequent years to 11.3 % in 2020 and 9.3% in 2021. To understand the prioritisation of citizen engagement, Table 2 demonstrates citizens' responses on participation issues.

Table 2: Citizens' responses on the structures and technologies of participation in Nairobi

Traditional Participation Structures	2019	2020	2021	E-participation technologies	2019	2020	2021
Basic sanitation meets needs of poorest areas	29.67	31.9	34.5	Online reporting of city maintenance problems provides speedy solutions	42.14	40.4	38.0
Information on municipal decisions is easily accessible	50.27	49.7	48.8	Free public Wi-Fi has improved access to information	45.93	45.93	41.4
Corruption of municipal officials is an issue of concern	92.5	89.8	88.8	Online public access to city finances has reduced corruption	27.24	27.3	28.4
Residents contribute to municipal decision-making	22.22	23.9	25.0	Online voting has increased citizen participation	26.83	27.3	28.2
Residents provide feedback on municipal projects	40.65	40.1	38.1	Online platforms for citizens to participate has improved city life	40.38	39.5	37.4

Source: Data from IMD-SUTD Smart City Index Survey (2019, 2020, 2021)

Digital infrastructure, such as the provision of broadband internet and free Wi-Fi hotspots, has played a considerable role in Nairobi where 41.4 % of respondents in 2021 believed in the positive role of public free Wi-Fi connectivity. A significant number of respondents, 48.8%, also believed that information on Nairobi's municipal decisions was easily accessible and aided successful participation. Nairobi's response to citizens' reports on city maintenance problems has gradually declined from 42.14% in 2019 to 38.0% in 2021. Nairobi's residents also demonstrated low political efficacy to e-participate effectively. Corruption of Nairobi county officials is a big concern. In 2021, 88.8% expressed corruption concerns, slightly down from 92.5% in 2019. The respondents also reported that online budgetary transparency had not reduced corruption; only 28.4% of the participants believed the transparency had reduced corruption. The number of residents who contributed to municipal decision-making was significantly low in Nairobi at 25% , and only 28.2% of the respondents believed that online voting improved participation.

Rabat

Rabat, the capital city of Morocco, has been on a trajectory of becoming one of the top smart cities in Africa and in the Mediterranean. Rabat is one of the African cities that improved its

ranking in the IMD-SUTD Smart City Index. In its rankings, Rabat has moved from being ranked 101 out of 102 cities in 2019, to 105 out of 109 cities in 2020. In 2021, Rabat was ranked 103 out of 118 cities. The improvement in ranking has been associated with Rabat residents' regard for citizen engagement as a top five priority among 15 other issues. In 2019, 16.3% of surveyed citizens in Rabat believed citizen engagement was a top five priority in their city. This percentage, while it dropped in 2020 to 10.4%, was 16.1% in 2021 – marginally higher in percentage when compared to other African smart cities. Table 3 below demonstrates the residents' perceptions that influenced Rabat's improvement in ranking as a smart city.

Table 3: Citizens' responses on the structures and technologies of participation in Rabat

Traditional Participation Structures	**2019**	**2020**	**2021**	**E-participation technologies**	**2019**	**2020**	**2021**
Basic sanitation meets needs of poorest areas	44.85	51.2	47.4	Online reporting of city maintenance problems provides speedy solutions	38.62	44.3	48.1
Information on municipal decisions is easily accessible	41.06	51.7	55.4	Free public Wi-Fi has improved access to information	37.67	44.1	47.1
Corruption of municipal officials is an issue of concern	69.11	68.6	73.1	Online public access to city finances has reduced corruption	35.77	41.5	40.8
Residents contribute to municipal decision-making	32.52	37.6	34.4	Online voting has increased citizen participation	34.01	39.8	40.5
Residents provide feedback on municipal projects	37.13	45.4	46.0	Online platforms for citizens to participate has improved city life	36.99	41.9	44.7

Source: Data from IMD-SUTD Smart City Index Survey (2019, 2020, 2021)

Rabat has made huge progress to become one of the top smart African cities on the IMD-SUTD Smart City Index. The city has made progressive improvements in the provision of digital infrastructure, such as broadband internet, where respondents believed that free public Wi-Fi had improved access to e-participation and e-services, from 37.67% in 2019 to 47.1% of the respondents in 2021. Respondents in the survey believed that corruption was of big concern in Rabat, as noted by 73.1% of the respondents in 2021. The respondents also believed relatively that online public access to the city's finances had reduced corruption with 40.8% of the respondents affirming this. Partly due to their perception on corruption, Rabat

respondents had lower contributions to decision-making in the municipality with 34.4% of the respondents affirming this. Their participation in giving feedback on municipal projects was relatively higher than before at 46.0% in 2021. The citizens in Rabat demonstrated higher internal political efficacy. However, because of the corruption levels among officials, they also demonstrated lower external political efficacy which led to their relatively lower participation in municipal affairs.

Discussion

This section presents an assessment of the role played by digital citizenship in the smart governance of African cities through e-participation. The section demonstrates that under digitalisation, the role of citizens in governance of smart cities has changed significantly. The cities are experiencing three major patterns: (i) reproduction of traditional spatiality in e-participation, (ii) increasing political apathy among citizens and (iii) the rise of digital activism in efforts to have rights to e-participate. These three patterns can be understood as the outcomes of implementing e-participation in a developing region where digital governance wrestles with contextual factors which shape citizenship, urban governance and the political discourse.

The reproduction of traditional spatiality in e-participation

African cities have a history of spatial inequality that has its roots in the colonial planning of racial segregation which, in the post-independence era, has turned into income-based segregation. For example, the cities have uneven provision of basic sanitation services. The deployment of digital infrastructure in cities such as Cape Town, with a history of apartheid planning, has followed the line of infrastructure distribution that marginalises township areas where the majority of the residents reside. This has created corresponding digital boundaries to the already existing physical boundaries, a reproduction of traditional spatiality which digitalisation sought to break. ‘Smartest zones’ are spaces that have exclusive access given their high securitisation. The three cities; Cape Town, Nairobi and Rabat, have made considerable efforts to improve internet access to marginalised communities of the city through installation of broadband network, free public Wi-Fi hotspots and free-access

computers in public libraries. There still exists a huge task to improve access to digital technologies, as citizens who continue to lack access are significantly high in number which creates differential *access* to digital citizenship. While traditionally African citizens may have equal political rights to participate in smart governance of their cities, the exercising of their rights is limited by their access to the digital space where their digital citizenship is operational. Citizens who have poor or no access to digital technologies of smart governance are restricted in their political rights to participate in the affairs of their city.

Increasing political apathy

The poor administration of municipalities in Africa, as evidenced by rampant municipal corruption and poor service delivery, has eroded the citizens' perceptions of their municipalities' responsiveness to their concerns. This has also undermined how citizens perceive the utility of their participation in municipal affairs. In the study, cities experiencing higher cases of corruption also witnessed correspondingly lower participation of citizens in municipal affairs. Coupled with this declining external political efficacy is the complexity and poor user-friendliness of e-participation platforms, which has hindered participation from digitally marginalised communities who were to gain experience in using e-participation platforms. The rolling out of e-participation platforms has not been accompanied by campaigns to educate the citizens on how to use such platforms. This has contributed to low internal political efficacy, as citizens are not clear on digital privacy and how the data is used.

Digital activism: The right to have rights

The increasing digital divide in cities where marginalised communities struggle to access digital platforms for e-participation has led to a call by citizens for their rights to participate. As a result, citizens in cities such as Cape Town and Nairobi are resorting to physical protest as a form of participation amid increasing emphasis by municipalities to embrace e-participation. Cape Town has been a hotbed of digital activism that combines digital platforms and physical participation to fulfil the role of urban citizens in a digital world. Several grassroots organisations, such as Social Justice Coalition, have been using digital platforms to organise their physical participation in affairs of the city, what Nancy Odendaal (2015) calls

'smart city from the bottom up.' The limitations of e-participation as implemented practice, where municipalities are driving consultation as a form of participation more than co-creation, in terms of Arnstein's Ladder of Citizen Participation, has led citizens to regard e-participation platforms as platforms of tokenism. Odendaal (2015) regards this limitation as one of the generic models of smart urbanism that has been implemented without contextualisation. The generic nature of smart urbanism is evidenced in Cape Town, which has moved from smart city strategy focusing on digital enablement and smart citizenry to embracing digital technology for entrepreneurialism and global competitiveness. This has also partly contributed to marginal decline in its ranking on thematic areas of smart governance.

The study highlights how citizen e-participation in smart governance is influenced strongly in dimensions of digital citizenship (human rights perspective of citizen's sense of belonging, social and anthropological perspective of political efficacy). Exploring the role of digital citizenship in smart governance in Africa offers novel contributions to literature on smart cities. The complementary dimensions of political efficacy and citizen's sense of belonging also explain the drive behind 'smart activism', the 'smart city from the bottom up (Odendaal, 2015), in which citizens resort to activism through protests to exercise their digital citizenship rights in smart cities. On strategic implications of this research, three recommendations can be suggested. The first concerns citizens' sense of belonging. The paper recommends that smart city initiatives consider the traditional identity of the city, the values of its communities and that they make efforts to incorporate them in the design as they influence significantly the nature and extent of their new form of citizenship under digitalisation. The second recommendation concerns satisfaction with municipal administration. Based on the results, citizens' political apathy is worsening due to corruption and poor service delivery by municipalities, which is negatively affecting citizens' e-participation. It is crucial to get residents to contribute to projects on the improvement of municipal public service through better consultation and co-creation. The third recommendation concerns embracing the bottom-up approaches, as citizens fail to exercise their digital citizenship rights because of differential access to digital technologies. Low political efficacy attests to the failure of e-participation as an implemented practice. Municipalities must involve citizens and devise

smart city projects which address issues that are close to citizens' daily realities to enhance their sense of efficacy as active actors in smart governance.

Concluding remarks

Through exploring the role played by dimensions of digital citizenship – sense of belonging and political efficacy – the paper enriches the understanding of the role played by the emerging digital citizenship in smart governance. Given the historical background of African cities, the spatial characteristics and the political environment in which African smart cities operate, the paper highlights the importance of factoring in spatial context when deploying digital technologies. The paper also identifies political efficacies that need to be considered in relation to municipal performance. By showing the role played by citizens' digital rights to access to e-participation through digital infrastructure, the paper answers some of the questions asked by Desdemoustier et al. (2019) on how spatiality of cities impacts on the success of smart cities. It also answers some of the questions raised by Mahlangu and Schulz-Herzenberg (2022) on the role played by political efficacy in local governance. The paper suggests that it is not adequate to formulate smart city projects focusing on citizens' participation; it is crucial to explore the spatial characteristics of the city, the historical resolve and the political climate that characterises the city to predict the role of citizens in smart governance – citizens' sense of belonging and their political efficacy.

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