

# The Routledge Companion to Smart Cities

*The Routledge Companion to Smart Cities* explores the question of what it means for a city to be 'smart', raises some of the tensions emerging in smart city developments, and considers the implications for future ways of inhabiting and understanding the urban condition. The volume draws together a critical and cross-disciplinary overview of the emerging topic of smart cities and explores it from a range of theoretical and empirical viewpoints.

This timely book brings together key thinkers and projects from a wide range of fields and perspectives into one volume to provide a valuable resource that would enable the reader to take their own critical position within the topic. To situate the topic of the smart city for the reader and establish key concepts, the volume sets out the various interpretations and aspects of what constitutes and defines smart cities. It investigates and considers the range of factors that shape the characteristics of smart cities and draws together different disciplinary perspectives. The consideration of what shapes the smart city is explored through discussing three broad 'parts': issues of governance, the nature of urban development and how visions are realised, and includes chapters that draw on empirical studies to frame the discussion with an understanding not just of the nature of the smart city but also how it is studied, understood and reflected upon.

The Companion will appeal to academics and advanced undergraduates and postgraduates from across many disciplines including Urban Studies, Geography, Urban Planning, Sociology and Architecture by providing state of the art reviews of key themes by leading scholars in the field, arranged under clearly themed sections.

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# The Routledge Companion to Smart Cities

*Edited by Katharine S. Willis and Alessandro Aurigi*

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# 10

## How smart is smart city Lagos?

*Taibat Lawanson and Olamide Udoma-Ejorh*

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### Introduction

The 'smart city' concept has gained prominence in global urban discourse in recent times. Though coined in the 1990s with a focus on the role information and communication technology (ICT) can play in modern infrastructure within cities, it is largely being promoted as the key to Africa's third revolution (Huet, 2016). Smart cities are envisioned as the response to the challenges of rapid urbanization across the continent and an opportunity for African cities to leapfrog into the mid-21st century (Deloitte, 2016).

Even though a universal definition of the concept remains elusive, the notion has been substituted with several analogies: digital city, creative city, intelligent city, knowledge city, sustainable city, virtual city, learning city, hybrid city and information city (Pérez-Torregrosa, Martín and Ibáñez-Cubillas, 2017), many of which predate the use of the term 'smart' in describing urban processes (Batty, 1995; Willis and Aurigi, 2017). However, a city can be defined as 'smart' when investments in human and social capital, and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources (Deloitte, 2014).

Various cities all over the world have been designated as 'smart cities' for a variety of reasons (Caragliu, Del and Nijkamp, 2011). In Nigeria, the concept of 'smart city' is subject to various interpretations ranging from utopian visions of modernist infrastructure to the infusion of technology into public policy and practice. Nowhere is this more apparent than in Lagos – Nigeria's commercial capital which is currently on a mission to transit 'from a megacity to a smart city' (Dina, 2017). The Lagos state government has instituted and/or supported various programmes and projects to achieve this transition.

A review of literature on the smart city concept revealed the dominance of studies with geographical emphasis on cities of the Global North (Graham and Marvin, 2001; Kitchin, 2015), Europe (Caragliu, Del and Nijkamp, 2011) and South East Asia (Moe, 2011) theorizing about the emergent smart city as a socio-technical process. Cities investigated include Dubai (Khan *et al.*, 2017), Singapore (Foo and Pan, 2016) and Barcelona (Bakici *et al.*, 2012). Research on African smart cities is less prevalent and includes the work of Watson (2015) as well as focal studies on South African cities (Du Plessis and Marnewick, 2017),

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Nairobi (Sen *et al.*, 2016) and Kigali (Doherty, 2013). Slavova and Okwechime (2016) who attempted a synthesis of the smart city concept and the African Union's Agenda 2063 recommended faster technology adoption across the continent. Olokesusi and Aiyegbajeje's (2017) study on e-democracy as a pathway for inclusive development discovered that the poor electricity infrastructure constitutes an impediment to the success of e-democracy in Lagos, while Soyinka *et al.*'s (2017) study of smart infrastructure in Lagos concluded that the development of smart power solutions is critical to the development of a smart city.

However, the studies have not considered the linkages between the global narrative on the smart city concept and its framing vis-à-vis urban development in Lagos. What is the smart city agenda for Lagos? Who benefits? Specifically, this chapter will interrogate the deployment of smart city principles in urban infrastructure, economic development and governance efforts and the effects of these changes on everyday experiences of residents of the city. It will begin by correlating global narratives and local institutional interpretations of the smart city, and then examine three case studies of how local residents are responding to the emerging smart city paradigm.

### African smart cities and the pressures of globalization

The 'Africa Rising' narrative is gaining currency around the world, with smart urbanization being touted as a veritable means of achieving this (Huet, 2016). In fact, according to Deloitte (2016), Africa is the next big market for technology, and African cities can through the successful adoption of the ideology and technology of the smart city agenda become globally competitive. The smart city concept and its relevance to the African urban context will be dissected along its three major framings: technology, people and systems (see: Alabi, 2018; Mejer and Bolivear, 2016).

Through the lens of technology, a smart city is an intelligent and interconnected city which has the competence to collect and link real-life data through the use of meters, personal devices, sensors and appliances (Kitchin, 2015) and Vanolo (2014). This position is promoted by international technology corporations such as IBM, Huawei, Siemens AG and Cisco Systems, who are aggressively seeking to expand their product uptake to the emerging African market (MoUD, 2014). However, Greenfield. (2013) has argued that solely viewing and designing smart cities from technological lens shuns the real knowledge on how cities function and the 'people' factor in a city.

The 'people' factor as emphasized in the creative city concept claims that for a city to be smart, education, knowledge and learning all have central roles to play (Thuzar, 2011). Thus the smart city is defined as a city with advanced education, better educated people, skilled and trained labour force (Comunian, 2010; Florida, 2002), and that the more educated and skilled people are in a city, the smarter the citizens and the city itself. This perspective has been adopted by many international consulting firms such as McKinsey & Company (2013) and Deloitte (2014) who posit that Africa is growing economically and thus is set to urbanize rapidly with an emerging middle class. Hence, marketing strategies of international property development corporations (such as Rendeavour, the promoters of Alaro and Tatu smart cities) target Africa's creative class and urban elite (Datta, 2015a; Rappoport, 2015; Wiig, 2016). A criticism of this approach has been on the emphasis on providing elitist luxury housing that does not respond to the intense demand for low-cost housing and infrastructure, hence engendering exclusionary development, gentrification and urban inequality (Ravindran, 2015; Lawanson., 2017). In fact, Florida (2017) articulated this position, effectively rebuking his earlier (Florida, 2002) one about the potentials of the creative class.

The third category of smart city visioning is the systems perspective, which synthesizes the smart city as a series of actions which cities undertake towards innovation in management, technology and policy (Gil-Garcia, 2012; Gil-Garcia *et al.*, 2015; Anthopoulos, 2017). Through this approach, the smart city ecosystem comprises of eight defining components: economy, people, services, governance, infrastructure, mobility, environment and living (Giffinger *et al.*, 2007) that establish a cyber-physical integration of urban life. Other definitions within the systems approach combine smart services with smart government, while smart infrastructure is combined with smart environment. This framing of smart urbanization brings together two problematic neoliberal urban visions – first that the use of ICT will drive economic growth and urban prosperity; second that the use of ICT can make urban governance more efficient, manageable, transparent and hence equitable (Kitchin, 2015).

This systems view of the smart city notion aligns with the growing world-class and global city rankings (Yadav and Patel, 2015), in tandem with the neo-liberal underpinnings of city categorizations (Robinson, 2002). In fact, the network theory of smart cities (Komminos, 2006) emphasizes that the success and prosperity of a city are highly dependent on its virtual position within global networks, in which urban areas are linked via several globalized flows including foreign direct investments, information, knowledge, ideas and people (Sassen, 2011; Söderström *et al.*, 2014; Wall and Stavropoulos, 2016). IESE 2018 Cities in Motion project (Centre for Globalization and Strategy, 2019), which is sponsored by the University of Navarra's Center for Globalization and Strategy, and IESE Business School's Department of Strategy analyzed the level of development of 165 cities, across nine dimensions considered key to being a smart, sustainable city. In the 2018 IESE Smart City index, all African cities ranked poorly from Tunis (134), Cape Town (143), Casablanca (148), Rabat (155), Johannesburg (156), Cairo (157), Nairobi (161) to Lagos (164). Among the variables included are the number of terrorist attacks and the number of Apple stores in each city. A similar scenario played out in the AT Kearney Global Cities Index in which Lagos placed 133 on the global city outlook index among 135 cities ranked. Some indicators include human capital (foreign born population, international schools), business activity (Fortune 500 companies, global service firms), information exchange (broadband subscribers, online presence), cultural experience (museums, international sporting events) and political engagement (embassies, political conferences and international organizations).

While some of these smart city indicators are important, and even necessary to track development progress, the reality is that there is a clear disjuncture between the perception and reality of what a smart city should be between proponents in the Global North and South. For example, according to Nakiguli (2015), in the Global North perceptions of smart cities include the availability of digital infrastructure, robotic assistance, human-robot discussions and systems working with systems; while in many cities of the Global South, more fundamental challenges of access to basic services, infrastructure and governance determine how smart and/or sustainable a city is. Yet scholarship on smart cities is dominated by a 'one-size-fits-all' critique where broader theoretical arguments are seen to stand for and reveal the discursive and material realities of actually existing smart city developments (Kitchin, 2015). For example, studies have shown that many of these projects are fundamentally flawed and others are often incomplete (Cugurullo, 2013; Wiig, 2015). Furthermore, the fact that many of these smart city initiatives in Africa are backed by investment and technology corporations in the Global North corroborates the positions of scholars like Datta (2015b) and Watson (2014), who argue that smart cities represents a techno-utopian fantasy driven by corporate interests in Western contexts (Pollio, 2016).

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There is therefore a need to explore differential expressions across the Global North and South, thus the next section will consider how the institutional interpretation of the smart city concept in urban development projects and programmes in Lagos, Nigeria. They will be discussed within the three major dimensions – technology, people and systems. It will go further to examine through case studies how residents of the city are responding to the emerging paradigm.

### Smart city Lagos? Institutional interpretations

There is no specific government policy on smart city in Nigeria, either at national or sub-national levels. The first formal acknowledgement was at the 2016 Intercessional Panel of the United Nations Commission on Science and Technology for Development where Nigeria's contribution to the panel as stated by Tukuma (2016) was:

Smart cities no doubt are money spinning avenues for government at all levels, the opportunity must be explored to address the problems of slums in our cities. Presently, Nigeria is making efforts at developing its own smart cities in some states of the Federation including the Federal Capital Territory (FCT), Abuja through coordinated and concerted opportunities by the government in partnership with the Private Sector. Prominent amongst the cities being developed is the Eko Atlantic City and that of Lekki which is jointly being handled by the Lagos State Government, Commercial Banks and Private Investors. In the FCT, one of such smart city being constructed is the Centenary City currently being built by the Federal Capital Development Authority in collaboration with the Private Sector.

This framing of the federal government's narrative on smart cities aligns with the commercial undercurrents of the *creative city* context. Both Eko Atlantic and Centenary cities are promoted by foreign investments, with no provision for lower middle-class and low-income earners in the layout, thus contradicting the '*smart cities provide the opportunity for addressing the problem of slums in our cities*' notion.

The Nigerian minister of Science and technology in aligning with the technology framing of smart city concept stated at the Nigeria 2017 Smart City Summit that

More people now have access to smart phones. Experts said that smart phones users in Africa will increase from 75 million in the first quarter of 2016 to 512 million 2018. Smart Cities would promote open data is one of the advantages of smart city. Smart City helps to manage government resources. It also helps to get more revenue for the government. In order to encourage healthy competition among Cities and States, the Ministry in collaboration with its Partners, will soon launch '*The Smart City Challenge*'. The idea is to encourage Local Governments, Cities, States Governments, and the built industry to take revolutionary steps to go to the level of digital technology.<sup>1</sup>

Interestingly, the minister also announced a partnership between the federal government and Huawei (a major smartphone technology conglomerate) during the event. The fact that the Smart Cities Summit was sponsored by Huawei lends credence to the submissions of Datta (2015b) and Watson (2014) on the intense international interests influencing emerging techno-utopian fantasies of African smart cities



## How smart is smart city Lagos?

Likewise, the Lagos State Development Plan (LSDP) (2012–2025) (Lagos State Government, 2013), while not explicitly mentioning ‘smart city’, prioritizes technology, global competitiveness and economic growth in its projects and programmes, across various ministries and public agencies. This aligns strongly with the ‘systems approach’ to smart cities. The Lagos State Ministry of Science and Technology (2017) is the coordinating agency for implementing smart city initiatives across the state, identified the priority areas for technology deployment: public security, emergency responses, waste management, e-governance, smart energy and integration of the public service, as well as revenue generation. An assessment of how much progress Lagos has made in the context of the defining components of the smart city ecosystem,<sup>2</sup> global indicators of smart city development<sup>3</sup> and the targets of the LSDP appears in Table 10.1.

An overview of the institutional manifestation of the various dimensions of the smart city in Lagos has shown the state government has instituted programmes and projects across them all. There has been significant mobile phone penetration across the city, and the extent of the population of the city with tertiary education has been due to the contribution of over ten different higher education institutions owned by the Lagos state government. The e-government platforms still lean heavily on freely available social media platforms, while the CODE Lagos and Lagos State Employment Trust Fund (LSETF) programmes have contributed significantly to the entrepreneurship and innovation thrusts of the economic dimension of smart city. Extensive deployment of smart city technology has been introduced in the transport and mobility sectors, though with low performance due to lack of integration with existing emergency management and security systems. Furthermore, many of the personnel responsible for its implementation are yet to be trained. Regarding environment and infrastructure, green energy initiatives have been largely through the installation of solar power systems in local schools and health centres funded by international aid, though poor maintenance has stifled impact. Smart urban planning has also resulted in many model city and regional development plans being developed, however there is yet to be considerable impact on the environment as implementation of the provisions of the plans is not prioritized.

### Smart city Lagos? Residents responses

Residents of Lagos continue to interpret and appropriate the concept of smartness in a variety of ways to suit their needs as they navigate the city. Some of these are discussed below under the broad contextualization of smart infrastructure, smart economy and smart mobility in contradistinction to smart government and services. The thread of smart people runs through the three sub-topics.

#### *Smart infrastructure: the rise of new cities*

A seeming solution to the housing challenge in Lagos has been the proliferation of smart city urban development projects across Lagos. One example is the Imperial International Business City (IIBC), a commercial luxury real estate development on the Lekki Peninsula. It is tagged as the first ‘eco-friendly, smart business city in Africa’, with the anticipation of becoming a popular tourist attraction (Channeldrill Resources Limited, 2017). It is heavily reliant on foreign consultants such as Cisco, Mott MacDonald, Royal Haskoning DHV and Cordros. It is a partnership between the Elegushi Royal Family (the land owners) and Channeldrill Resources, an infrastructure company set up in 2014 to deliver

Table 10.1 Smart city assessment of Lagos

Component of smart city	Global indicators of smart city development	Target of Lagos state government	Remarks
1	People	<ul style="list-style-type: none"> <li>• 21st century education</li> <li>• Inclusive society</li> <li>• Embraced creativity</li> </ul>	<ul style="list-style-type: none"> <li>• The state-owned Lagos State University founded in 1983 has about 35,000 students in three campuses. There are about ten other state-owned higher educational institutions including polytechnics and colleges of education</li> <li>• 85% have smartphones; 76% have internet access; 66% use computers (Idowu, 2018)</li> <li>• 79% = of internet connections in Nigeria were from a mobile phone; 25% of all mobile phones sold in Nigeria were in Lagos, mostly low-cost smartphones (Jumia, 2018)</li> <li>• The most active apps are WhatsApp and Facebook</li> <li>• 12% of the population use mobile banking apps</li> </ul>
2	Government and services	<ul style="list-style-type: none"> <li>• Increased efficiency in public services such as e-government, open data and transparency</li> <li>• Dependent on customer data and intelligent processes</li> </ul>	<ul style="list-style-type: none"> <li>• E-government platform for government–citizen interaction</li> <li>• Deploying 10,000 high definition cameras to support traffic management and emergency management services</li> <li>• The state government maintains an active Facebook page and many agencies interact with the public via Twitter</li> <li>• The state government and many agencies have websites, though information is often outdated</li> </ul>

3	Economy	<ul style="list-style-type: none"> <li>Services are connected to products through technology</li> <li>Connecting different urban spaces and actors to create inclusive and sustainable cities</li> </ul>	<ul style="list-style-type: none"> <li>The state publishes official statements and news via its websites</li> <li>Close circuit cameras have been deployed across the state for real-time traffic and security surveillance; integration with emergency services – 50% completed. Integration with policing network is not operational yet</li> <li>There are many smart boards providing timely traffic information</li> <li>Some toll gates have unmanned points with e-card enabled access</li> </ul>
3	Economy	<ul style="list-style-type: none"> <li>Entrepreneurship and innovation</li> <li>Smart financing</li> <li>Local and global connectedness</li> <li>E-commerce</li> <li>Employment in technology services</li> <li>Circular economy</li> </ul>	<ul style="list-style-type: none"> <li>Setting up of the Lagos State Employment Trust Fund for micro, small and medium enterprises</li> <li>Setting up of CODE Lagos project to train 1 million young people to code by 2030</li> </ul>
4	Mobility	<ul style="list-style-type: none"> <li>Mixed-modal access</li> <li>Intelligence traffic management</li> <li>Clean and non-motorized options</li> </ul>	<ul style="list-style-type: none"> <li>As at 2018, 10,000 beneficiaries of loans from Lagos State Employment Trust Fund</li> <li>As at 2017, 60,000 people have been trained in CODE Lagos centres</li> <li>Many public schools do not have ICT laboratories or power to support the CODE Lagos</li> <li>Tech-hubs are growing but none are supported by state funding</li> <li>Government provides free WiFi services in some public parks</li> </ul>
4	Mobility	<ul style="list-style-type: none"> <li>Auto Inspector – online system with vehicle data</li> <li>E-platform for verification of vehicle status</li> <li>Central Billing System</li> </ul>	<ul style="list-style-type: none"> <li>The state government runs Bus Rapid Transit and skeletal ferry services</li> <li>Auto Inspector, e-platform and the Central Billing System have been installed but hardly function due to</li> </ul>

(Continued)

Table 10.1 (Cont.)

Component of smart city	Global indicators of smart city development	Target of Lagos state government	Remarks
5 Environment and Infrastructure	<ul style="list-style-type: none"> <li>• Integrated ICT</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle inspection service centres</li> <li>• Lagos Bus Rapid Transit app</li> <li>• Traffic cameras installed</li> <li>• Traffic management system</li> <li>• Growth of e-hailing and commuting apps</li> </ul>	<ul style="list-style-type: none"> <li>• challenges with decentralization of the technology and lack of adequately trained personnel</li> <li>• 10 out of 57 vehicle inspection centres are operating</li> <li>• Bus Rapid Transit app is not widely used</li> <li>• E-hailing apps such as Uber and Taxify dominate the private taxi services</li> </ul>
	<ul style="list-style-type: none"> <li>• Green buildings</li> <li>• Green energy</li> <li>• Green urban planning</li> </ul>	<ul style="list-style-type: none"> <li>• Establish independent power projects across the state using a standardized and sustainable framework for power</li> <li>• Use best practice for the design, execution, maintaining and improving public lighting projects in Lagos state</li> <li>• Integrate independent power projects with public lighting schemes using innovative approaches</li> <li>• Energy smart meters and smart grids</li> </ul>	<ul style="list-style-type: none"> <li>• There are two LEED (Leadership in Energy and Environmental Design) rated buildings in Lagos</li> <li>• Recycling is championed in the private sector with many small and medium enterprises emerging</li> <li>• Energy from the grid is largely erratic and petrol- and diesel-powered generators are the main alternative to grid supply</li> <li>• Renewable energy – solar energy and energy banking (inverters) are slowly penetrating</li> </ul>

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- UK government/Department for International Development supported the Lagos Solar Power Project to provide solar electrification in schools, hospitals and local communities. Many are currently non-functional due to poor maintenance
    - Model city and sub-regional master plans have been commissioned though level of compliance and public uptake is still quite low
    - Less than 30% have access to primary healthcare
    - Most citizens access basic services such as water, sanitation and health services through the informal economy
    - In 2017, informal employment accounted for 65% of employed citizens
    - Gini coefficient of 0.64 is reflective of high inequality
  
  - % penetration of primary health care
    - % penetration of basic education
    - % of slum like condition
    - % gini coefficient
    - 60% skilled formal employment by 2020
    - youth unemployment
    - Public service provision for healthcare, safety, housing and education
  
  - 6 Living
    - Enhanced quality of life through healthcare and safety
    - Quality of housing
    - Culturally vibrant and happy/social cohesion
-

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aspirational luxury infrastructure. According to the managing director of Channedrill Resources, Femi Akioye:

The Head of Elegushi Royal Family wanted a legacy project that will redefine the real estate sector. Channedrill Resources on its part wants to be the face of the next century when it comes to real estate in Africa and beyond.<sup>4</sup>

The marketing brochure sells the idea as:

The IIBC is a city for forward-thinkers, by forward-thinkers. It is a city designed for those no longer satisfied with the status quo but yearn for the next-level. It is designed for those who do not just want to experience history being made but want to make history. This is a city for makers, creators, designers, thinkers, leaders, and visionaries. This is a city for the greats.

It claims to be self-sustaining, climate proof, smart, secure and eco-friendly. In fact, IIBC boasts in its marketing plan of world-class infrastructure and smart technology, including a water treatment plant, independent electricity (gas generated), fibre optics cabling, cloud-enabled communication network, smart city/house infrastructure, a smart shopping mall, cloud-enabled 24 hour spy security connected to a central security centre and a world-class hospital within a dedicated healthcare zone (Vanguard, 2017).

Apart from the shiny packaging of being a technology-enhanced island, the island is being sold as a solution for the housing crisis in Lagos, albeit catering to the high-income market (SEO Properties Limited, 2017). It is designed as an 'exclusive private island'<sup>5</sup>, currently selling at N125,000 (US\$350) per square metre<sup>6</sup>. In reality however, IIBC will only serve to exacerbate the already evident socio-spatial segregation being experienced in Lagos. According to Akioye (cited in Ojiako, 2018: 31):

'We were also quite passionate about bringing luxury living to Lagosians by creating a serene environment that connects work, living and recreational environments of Lagos in a wholesome mix'. The word affordable is relative, but I can tell you that hard working Nigerians and international firms will be able to make IIBC their abode.

While the land that IIBC sits on presently used to be a Otodo-Gbame community of 36,000 low-income inhabitants who were forcefully removed through a series of violent eviction exercises between 2015 and 2017 (Emeka, 2017), the project is simply unaffordable to most Nigerians. The price of land at IIBC ranges from N64,350,000 to N429,000,000 (US\$177,356 to \$1,182,370). There is an incremental payment plan with an initial deposit of N10,725,000 (\$29,541) for the smallest plot size (SOE Properties Limited, 2017). Furthermore, the design ideas are borrowed from the Middle East and Europe and therefore not a reflection of local realities and culture. In fact, all the design and development consultants are European, with a track record of similar projects executed in the Middle East. The Dutch engineering firm on IIBC Project – Royal Haskoning DHV – has delivered similar projects in Thua Thien Hue, Jordan, Qatar, Myanmar and Indonesia.<sup>7</sup>

IIBC and other emerging new city developments across Lagos do not adequately contribute to resolving the housing crisis in Lagos. Lagos has a population of 23 million people and a housing deficit of about 3 million units, mainly in the low-income sector (UNHABITAT, 2017; PISON, 2016). Local community-based smart solutions being practiced are more

impactful in improving housing and infrastructure outcomes. Cooperative societies have been able to provide contextualized housing solutions for many residents, while residents associations have also pooled resources to provide neighbourhood security services, solar-powered street lights and drainage infrastructure (Lawanson, 2017, 2018). This is in addition to many households installing energy storage (inverter) systems homes as a response to endemic power shortages.

### *Smart economy: from markets to malls*

The Lagos State Ministry of Physical Planning and Urban Development, under the 2005 Lagos State Regional Planning Laws, is mandated to plan, facilitate and organize a safe, green, dynamic, economically and culturally vibrant and sustainable city (Filani, 2012). The major milestones support optimal land use and market redevelopment. In the last decade market regeneration and development have become an important part of urban renewal and traditional markets have become collateral damage. It is necessary to note that many of the market men and women consist of Lagos' working poor. The working poor, earning less than \$1.9 daily make up 79.4 percent of the population, while middle-income (earning \$2–10 daily) and high-income (earning above \$10 daily) earners are 18.7 percent and 1.8 percent of all Lagos residents respectively (AfDb, 2017). According to the Lagos State Waste Management Authority (LAWMA) there are 425 markets in Lagos state and Komolafe (2016) estimates that 5 million people, of which 70 percent are women and their children, primarily engaged in informal sector economic activities.

However, under the pretext of urban renewal, market redevelopments have occurred to establish what have been named malls or 'ultra-modern' markets, often through public-private partnerships (PPPs). The Lagos state government has actively supported the construction of malls, with former Governor Babatunde Fashola quoted as saying in 2011, 'The number of new small businesses that are opening or expanding their outlets are the measures of real growth in any economy. Everywhere you see a mall opening; it is a positive sign for that economy'.<sup>8</sup> What is left unsaid is that these market redevelopments in fact hurt existing small businesses, and that major international retail chains are found in these places. For example, some affected markets such as Oyingbo and Tejuosho, which used to serve the entire West African sub-region with items ranging from foodstuffs, local crafts and fabrics to household materials (Lawanson, 2014) are now a shadow of themselves.

Built in the early 1970s, Tejuosho market was gutted by fires in 2004 and 2007. It was redeveloped during the tenure of Governor Fashola in 2014 as a 'world-standard ultra-modern market' and renamed as the Main Tejuosho Shopping Complex. What used to be a local market with fewer than 800 shops is now a five-storey complex of over 4,000 shops, underground parking, elevators, a mini-power plant and waste disposal and water systems. The design of the market is also such that the shops back the street, rather than the conventional market design where shops face the street in order to attract customers. By 2018, less than 40 percent of the shops were inhabited, due largely to exorbitant rates (Alabi, 2018). New occupants in the market are largely formal sector operators such as banks, offices and the international retail chain, Spar. Many of the former occupants who are not able to afford shops in the market have relocated to cheaper stores in adjoining streets. The smaller vendors who used to rent stalls in the former market now operate in the thriving informal market in the open space in front of the market, which attracts daily rental fees for a 1 square metre floor space (Figure 10.1). Others have left the market area entirely, resorting to leveraging the internet for performing their commercial transactions.

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Figure 10.1 Left and right: informal market in the compound of Tejuosho market  
blackandyellowurbanism.com

The rise of the online market is a clear indication of a citizen-led emerging smart economy, in which small businesses are responding to the challenges of accessible and affordable space for commercial activity. Online businesses require minimal infrastructure: regular internet access, a social media handle and an active manager to drive content and activity on the handle. For those selling tangible items, a storage space (usually home based) and a delivery service (usually local commercial motorcycle) are also required. While some vendors utilize their social media platforms (WhatsApp, Instagram and Facebook), digital platforms such as Jumia, Konga, Iso and Deal-Dey are alternative marketplaces that enable sellers and buyers to interact (Figure 10.2). In fact, Jumia<sup>9</sup> reports an estimated number of 700,000 visitors weekly, with 57 percent accessing the platform via mobile web and 18 percent via mobile app. Customers prefer the digital platform because of convenience and affordability.

According to Jumia, 25 percent of all mobile phones sold in Nigeria were in Lagos, mostly low-cost smartphones, with the most active apps being WhatsApp and Facebook. The 2018 report by Terragon Group (Egenuka, 2019) estimates about 22 million active social media users in Nigeria, which is a huge and immediate client base for the numerous entrepreneurs who utilize social media as a digital marketplace (Figure 10.2). Even though there are not much data on the pattern of these businesses and their contribution to the economy, there is growing reliance on them across all sectors. For example, while specialized professional service pitches are on LinkedIn and Twitter, product sales thrive more on Facebook, Instagram (Figure 10.3) and WhatsApp (Figure 10.4).

Ultra-modern malls are not fulfilling their intended purpose of improving the economy and/or supporting small businesses. In fact, many erstwhile occupants of local markets are now reduced to street trading (mobile and stagnant), while new malls springing up around the city are mostly utilized for recreational purposes. cursory observations across various malls in Lagos reveal that only the cinemas, entertainment centres and food courts generate significant patronage. Conversely, the mobile marketplace is thriving, with many small businesses preferring the convenience and affordability it provides.

In order to move towards a smart economy, it is important that market redevelopments are done in a manner that enhances the welfare and opportunities accruable to small businesses. A functional market with a growing customer base is the primary objective and therefore the



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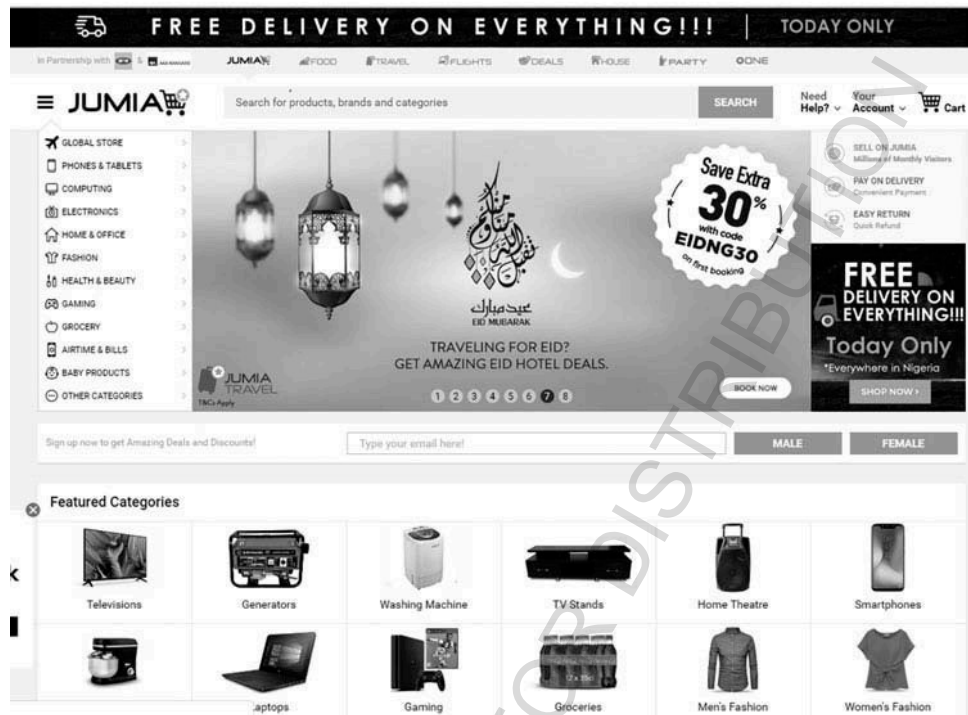


Figure 10.2 Product sales on digital market place, Jumia  
Screenshot

needs and perspectives of the users of the market must be incorporated into the redevelopment process. The vision of modernity has led to a government push of ‘ultra-modern’ malls which are failing to meet the needs of the communities they are situated in and instead push people to innovate and find new ways to sell. Whether online or offline, traders contribute to the formal economy (through taxes and fines), though they are still described as informal and are yet to be captured in the governments vision of a ‘smart city’. A vision of Lagos needs to capture and enhance what already exists and not eradicate to build from scratch because as can be seen from the Tejuosho example, it is not likely to succeed.

### *Smart mobility: integrated transport and traffic management*

The transport system in Lagos is such that available infrastructure is grossly inadequate. Road continues to be the primary mode of transport, with 90 percent of total passengers and goods moved by the road network (Lawanson, 2018). The state-owned Bus Rapid Transit (BRT) scheme is only able to move 1.5 percent of traffic along Lagos roads, while informal mini buses (known as danfos) and private cars account for 45 percent and 11 percent, respectively. The continuous increase of private vehicles and the reliance on informal public transport have led to extreme traffic congestion in the city. Despite the clear need to

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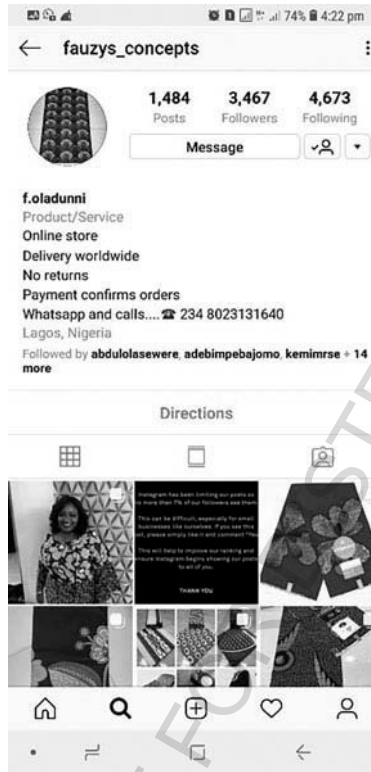


Figure 10.3 Product sales on Instagram  
Screenshot

diversify and the Lagos state government's integrated and multi-modal transport aspirations, the use of rail and water transport modes is minimal.

The Lagos State Development Plan 2012–2025 aims to 'create a safe, reliable and efficient integrated and multimodal transportation system, that included rail, bus and ferry, for sustainable socio-economic development of Lagos State' (Oshodi and Salau, 2016, p. 77). The Lagos Strategic Transport Master Plan (STMP) was developed by the Lagos Metropolitan Area Transport Authority (LAMATA) as a long-term plan focused on integration of the mass rapid transit system, developing the waterways and rail networks, installing a modern intelligent transport system and introducing walking and cycling facilities (Oshodi and Salau, 2016, pp. 83–84). The modern intelligent transport system proposed in the STMP project includes an electronic integrated fare and ticketing system and a unified information system for all modes of transport that uses and manages real-time events efficiently. As of 2019, the Blue Line which is the first of six rail lines and one monorail planned for the city is yet to be completed, seven years after the initial take off date of 2012, thus stalling the integrated multi-modal transport integration.

The BRT system is highlighted in the Lagos State Development Plan 2012–2025 and stretches across 35km, carrying an estimated 120,000 passengers per day. It is the first on the African continent and is projected as a smart transport solution for Africa, and has been

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Figure 10.4 Product sales on WhatsApp  
Screenshot

introduced into the mass transit systems of cities such as Cape Town, Addis Ababa and Dar es Salaam.<sup>10</sup> However, due to operational challenges, the system suffered several setbacks. The BRT is estimated to carry 150,000 passengers daily. However, many buses of the initial fleet have been grounded due to poor maintenance. The ongoing Lagos bus reform initiative seeks to correct some of these errors by the construction of 13 bus terminals, 100 bus stops and 5,000 new commercial buses to replace the informal 'danfo' buses. These new buses, 800 of which were launched in May 2019, will be maintained in dedicated maintenance yards that are currently being installed.

According to Lagos state Governor Akinwunmi Ambode, the danfo bus drivers will be absorbed into the new bus system.<sup>11</sup> However, there is no official documentation as to how this will be done. The major option culled from some press releases of the government is for danfo drivers through their union – the Nigerian Union of Road Transport Workers – to apply for a franchise and purchase buses (minimum 50 buses) in order to participate in the new bus system.<sup>12</sup> As such, it has increased the livelihood vulnerabilities of danfo drivers who are faced with an uncertain future and possible transition from small business owner to employee status. Furthermore, the environmental consequences of discarding or repurposing 145,000 danfo buses are yet to be considered.

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The Lagos BRT mobile phone application was launched in 2017 as a journey planner offering real time, up to the minute information on arrival and departure times of various buses. However, as of March 2018, on the APP Store it is not rated because there are ‘not enough ratings or reviews to display a summary’, therefore suggesting that not many people use it. Even though Lagos has a large population of over 20 million, the BRT mobile phone application has a low download rate (about 1,000 as of October 2018),<sup>13</sup> probably because many BRT passengers are among the many Nigerians who have no access to the internet. In 2018, Nigeria had 92.3 million internet users and an internet penetration rate of 47.1 percent of the population.<sup>14</sup> Moreover, the cost of smart phones and data is still out of the financial reach of many, according to Jumia. While Infinix is the highest selling budget smart phone, the cheapest brand costs \$95 (N32,900),<sup>15</sup> way higher than the national minimum wage of \$51 (N18,000).<sup>16</sup>

Some other smart initiatives have also been introduced into the transport system, though they are largely private sector (international investor) driven. The Lagos state government, through the Motor Vehicle Computerized Inspection Service (LACVIS), introduced the ‘Auto Inspector’ in 2011 to provide computerized vehicle diagnostics, as well as real-time vehicle information and driver identification for police checks and traffic offender apprehension. The technology, though available, is hardly utilized by LACVIS, primarily because the training of operators as well as fitting of supporting devices in police vehicles and integration with other agencies is yet to be done. As such, the smart solution is not being decentralized and is not being used effectively or efficiently. Similar to the Auto Inspector initiative, in 2017 a technology billing system was created using Automatic Number Plate Recognition (ANPR), Radio Frequency Identification (RFID) and Central Billing System (CBS) technologies. The e-platform was to allow the Vehicle Inspection Service to perform on-the-spot verification of vehicle status. The aim was for defaulters to have bills automatically raised by the CBS and delivered to their registered address. However, neither the billing system nor the auto-check technology is yet to fully operationalized. Furthermore, as of February 2019, only 10 of the 57 proposed computerized vehicle inspection service centres have been built.<sup>17</sup>

There have also been some citizen-led interventions in providing smart transport solutions for the everyday challenges faced by Lagos residents. These include Lara.ng, Shuttlers and Max.ng. Lara.ng is a crowdsourced online journey planner that helps Lagosians plan their journeys using both informal and formal transport. Data are collected from the informal commercial buses, tricycle and motorcycles (danfo, keke maruwa and okadas) as well as the formal (BRT) modes of transport. The advantage it has over the BRT app is the fact that it adopts a holistic view to the solution it provides for travelling around the city, acknowledging the limitations of the BRT as a sole mode of travel for the average Lagosian. Another private company that is attempting to ease commuting in Lagos is Shuttlers. This is a company that provides mass transit services for individuals and companies between the central business areas of Ikoyi, Victoria and Lagos Islands and residential areas, including the peri-urban areas of Ikorodu and Ibeju Lekki via a mobile phone application.

### **Smart people: social media and governance**

Worldwide, social media is increasingly being used as a way to bring decision-makers closer to their constituents and allow for a more transparent relationship. If used efficiently, social media can drive citizen engagement with limited resources and budgets. It allows for real-time data collection and instant feedback. This could lead to improved services within cities and communities. Social media can also be used as a tool to transform public perception,

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maximize awareness of agency goals and gain the trust of citizens by becoming more authentic and transparent. During elections or when implementing a project, social media can also help test messaging and ideas.

There is yet to be a structured e-governance framework in Nigeria, though Lagos state government and some of its agencies leverage the beneficial roles of social media primarily for information dissemination. The Lagos State Emergency Management (LASEMA) and Traffic Management (LASTMA) agencies both have active Twitter handles that interact with citizens, providing timely information and responding to distress calls. Thus, they are able to mobilize citizen support to effectively perform their duties. By contrast, the Lagos state government's official social media handles barely respond to posts from citizens, practicing uni-directional communication and highlighting the fact that technology does not necessarily enhance governance as being promoted by the systems view of smart city. Victoria Okoye stated that 'If governments are not interested in listening to citizens in the first place, internet and open data won't change this'.<sup>18</sup>

Social media has also been used in Nigeria as a tool for citizen mobilization. Though the threat of fake news persists (Hitchen *et al.*, 2019), examples such as the Occupy Nigeria protest of 2012 in which over 20,000 Nigerians were mobilized through social media to stand against petrol price increases and the 2018 ENDSARS campaign which resulted in police service reforms are indicative. More recently, social media outrage regarding the Lagos waste management sector played a major role in escalating the matter to one with political implications (Lawanson, 2018).

## Conclusion

The chapter so far has revealed that the notion of smartness goes beyond the incorporation of technology into urban systems and processes. In the case of Lagos, there are glaring differences between the formal institutional (government, technology companies, urban developers) conceptualizations of what a smart Lagos should be, and how citizens are appropriating technology for solving everyday challenges. While the institutional approach is top-down and guided oftentimes by aspirational modernist aspirations that seek to position Lagos as a world-class city, that of citizens is bottom-up and often geared towards survival and adaptation to the everyday challenges of Lagos life. An amalgam of both will put Lagos on the path to becoming a truly smart city, which has been defined as a city with sustainable, people-centred governance and administrative systems that are supplemented by technology (Nsibidi Institute, 2016). In reinforcing the truly smart Lagos is the need to promote both hi-tech (institutional, international) and low tech (citizen led, local) contextualized solutions which are co-created in response to the urgent challenges of a complex city.

In order to achieve this, there is an urgent need for improvements in the public governance and administrative systems. The introduction of technology does not translate to smart urbanism when the human element capacity to operate the technology is lacking. The cases of the Auto Inspector and the CBS are smart solutions which are yet to be operationalized due to bureaucratic challenges and capacity gaps. The BRT system is also operating sub-par due to poor maintenance of vehicles and a failure to recognize the contribution of informal systems in the current transportation value chain, while the struggles of the Tejuosho market redevelopment can be attributed to a failure to take into consideration the lived experiences of traders in the redesign of the market. Furthermore, true civic engagement can only be achieved when the uni-directional approach to interaction with the public is lifted in favour

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of the bi-directional approach being practiced by LASEMA and LASTMA. Evidence points to increased public confidence in both agencies due to such interactions.

While citizen-led approaches to smart urbanism are not without challenges, they have to a large extent responded positively to the challenges of urban life, including those resulting from the modernist aspirations of urban smartness. The lara.org app is more useful to the average commuter than the BRT app due to its recognition of the various ways everyday citizens navigate the city.

Therefore, in conclusion, the quest for smart city Lagos can only be achieved when both human and material efforts are deployed to meet everyday challenges of Lagosians and technology is utilized as a means to a more sustainable society, and not an end in itself.

## Notes

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- 2 The components of the smart city ecosystem are economy, people, services, governance, infrastructure, mobility, environment and living (Giffinger *et al.*, 2007).
- 3 Indicators of global smart city development in this context are extracted from McKinsey Global Institute 2018 Smart Cities Report: Digital Solutions for a more liveable future, IESE 2018 Smart City Index and AT Kearney 2018 Global Cities Index.
- 4 [www.thisdaylive.com/index.php/2018/08/10/imperial-international-business-city-is-a-legacy-project-akioye/](http://www.thisdaylive.com/index.php/2018/08/10/imperial-international-business-city-is-a-legacy-project-akioye/).
- 5 The phrase exclusive private island is used twice and the word exclusive is used six times in The Investors' Brochure (SOE Properties Limited, 2017).
- 6 [www.nigeriapropertycentre.com/for-sale/land/mixed-use-land/lagos/lekki/lekki-phase-1/185441-imperial-international-business-city-lekki-1](http://www.nigeriapropertycentre.com/for-sale/land/mixed-use-land/lagos/lekki/lekki-phase-1/185441-imperial-international-business-city-lekki-1).
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- 16 <https://tradingeconomics.com/nigeria/minimum-wages>. The federal government announced a new minimum wage of N30,000 which is yet to be operationalized.
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