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SMART CITY DEVELOPMENT AND URBAN INNOVATION IN NIGERIA: AN INDUSTRIAL SOCIOLOGICAL COMPARISON OF LABOUR, TECHNOLOGY, AND SOCIAL EQUITY IN ABUJA AND LAGOS

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Abstract:

Smart city initiatives leveraging digital technologies, data-driven governance, and innovative infrastructure are reshaping urban landscapes across Africa. In Nigeria, Abuja and Lagos exemplify contrasting models: Abuja is centrally planned and government-led, while Lagos is market-driven and entrepreneurial. This study applies Castells' Network Society Theory, highlighting the organisation of economic, political, and social systems around digital networks, and Weber's Rationalisation Theory, emphasising efficiency, predictability, and control in governance and work systems, to analyse labour, industrial organisation, and social equity. Using a mixed-methods approach, combining surveys, policy analysis, interviews, and spatial mapping, the research examines socio-technical processes in both cities. Findings reveal that Lagos' rapid, private-sector-led innovation fosters economic growth but often worsens social and economic inequalities, whereas Abuja's digital governance and automation support gradual industrial transformation but risk excluding some populations. Grounded in industrial sociology to understand the interaction of technology, labour, and social structures, and supplemented by urban sociology to address spatial and equity concerns, the comparative study highlights trade-offs in smart city development, showing benefits are unevenly distributed across geography, gender, and class. The study also identifies digital access as the key determinant of ICT employment, highlighting the need for inclusive infrastructure development. Recommendations urge policymakers to design targeted employment programmes alongside infrastructure expansion to ensure that digital growth in Abuja and Lagos translates into tangible ICT job creation.

Keywords: *Abuja, Industrial Sociology, Labour Dynamics, Lagos, Smart Cities, Social Equity*

Introduction

Smart cities are cities that use information and communication technologies (ICT), data infrastructures, and new governance arrangements to make urban services better, the economy

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more competitive, and the city more livable. Cities in the Global South have made smart cities a key policy goal. Two cities in Nigeria are good examples of different strategies to build smart cities. Lagos, which used to be the country's commercial centre, has followed a market-driven, entrepreneurial smart-city path moulded by innovation in the private sector, entrepreneurs, and public-private partnerships (PPPs). As the federal capital and planned city, Abuja has taken a more centralised, government-led strategy that focuses on modernising the administration, creating e-governance systems, and managing infrastructure projects from the centre.

"Smart city" techniques, which use data, digital networks, and automation to run cities, are being pushed as a means to make cities more competitive, livable, and sustainable in the Global South. Nigeria is a good example of both the good and bad things that might happen with this plan. The number of people living in cities has grown quickly, and by 2024, there were more than 128 million people living in cities (World Bank, 2024). This has put more strain on housing, transportation, and basic amenities and has made the gap between rich and poor even worse (World Bank, 2024). In this context, Lagos and Abuja have become Nigeria's best places to test out smart-city ideas. However, the two cities have very different political economies, infrastructures, and social geographies that affect how technology interacts with labour and equality on the ground.

Lagos, which is the country's business centre and Africa's largest city, showed its desire to become a smart city by signing a memorandum of understanding with Dubai Holding's Smart City project in 2016. The goal of the project is to create "globally connected knowledge-based communities" (African Review of Business and Technology, 2016; Amdobe, 2016). The contract encapsulated the city's story of growth through technology and continues to shape policy and industrial imagination, even though the scope has changed and the delivery has been unequal (Uduku et al., 2021). At the same time, big urban redevelopment projects like Eko Atlantic and ongoing investments in digital infrastructure are part of a plan to bring in money

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and talent. However, they also raise concerns about displacement, gentrification of the waterfront, and how to include the city's large informal settlements like Makoko and Badia-East (Gilbert, 2023; Uduku et al., 2021).

Abuja, the intended federal capital, is going in a different direction with wise administration that focuses more on the states. Its long-running Abuja Geographic Information System (AGIS) digitised land administration to make things clearer and more efficient (Oruonye et al., 2021), and it is part of a larger effort by city authorities to make cities "smarter" (IBM Smarter Cities Challenge, 2017). But practical studies show mixed results: digitisation has made workflows more modern, but it hasn't fixed bigger problems with fair land access and accountability (Akingbade, 2012). Abuja's high-profile Centenary City, which was advertised as an $18–18.5 billion smart, mixed-use city next to the airport, has also seen delays and relaunches. This shows the political and economic pitfalls of megaproject-driven smart urbanism (BusinessDay, 2025). The reopening of the first phase of the Abuja light rail in 2024, which will connect important points like the international airport, highlights how technology-heavy transportation might change the way people move around and where they work when it is finally operational (Reuters, 2024).

An industrial sociology perspective enables a critical examination of these trajectories beyond their technological facade, emphasising the reorganisation of work, authority, and distributive consequences by smart infrastructures. Nigeria's broadband ecosystem has grown, with penetration reaching about 48% by April–May 2025. However, access is still uneven and below national goals (70% by the end of 2025), with gaps in affordability and infrastructure bottlenecks that limit who can take part in datafied urban economies (Nigerian Communications Commission, 2025). Digital divides lead to labour market segmentation, the persistence of informality, and varied levels of exposure to algorithmic management (UN-Habitat, 2022) since platformised services (including ride-hailing, delivery, and online

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shopping) need stable connectivity. Ongoing inequality and instability, as shown by national Gini measures and urban poverty profiles, affect how the benefits and costs of smart initiatives are shared among different classes, genders, and neighbourhoods (World Bank, n.d.; World Bank, 2019). For instance, in Lagos, low-income coastal neighbourhoods that are prone to flooding are next to high-end smart and fintech districts. This creates "splintered" urbanism, where high-tech enclaves exist with infrastructure inadequacies for most people (Gilbert, 2023; Uduku et al., 2021).

Comparing Abuja and Lagos shows two different but overlapping ways that Nigeria is developing smart cities: (1) a market-led, globally networked innovation city (Lagos) based on real estate, finance, and private data infrastructures; and (2) a state-planned governance modernisation pathway (Abuja) that focuses on cadastral digitisation, transport, and administrative reforms, along with megaprojects like Centenary City that are moving forward at times (Oruonye et al., 2021; IBM Smarter Cities Challenge, 2017; BusinessDay, 2025). Each model changes how people do their jobs—formal public-sector IT jobs, construction and security work on megaprojects, and platform jobs that are growing but not very stable—while also making technology more connected to both old and new unfairnesses in access to services, mobility, tenure security, and voice in planning.

Nigeria's rapid and large-scale urbanisation makes the stakes much higher. As cities pursue "smartness", the critical inquiry is not the deployment of sensors or platforms, but the integration of governance with social objectives: ensuring living wages and safe work standards in platform economies; facilitating open, interoperable civic data; promoting inclusive connectivity; establishing climate-resilient basic services; and creating land and transport systems that safeguard rather than displace vulnerable populations. International urban research shows that smart-city plans can still leave people out even if they make things more efficient (UN-Habitat, 2022). Nigerian academic research and policy initiatives already

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furnish the components for an alternative result—integrating internet and transit enhancements with inclusive, pro-poor planning and explicit labour rights. This study situates Abuja and Lagos within the discourse, analysing how their smart-city trajectories reorganise labour, influence technical governance, and facilitate social fairness. By putting industrial sociology at the centre, it wants to connect big ideas about innovation to the daily labour, rights, and lives of the people who keep the city running.

Furthermore. the drive for "smart city" development in Nigeria is in line with both global trends and the need for modernisation, competitiveness, and better service delivery in Nigeria. However, the realisation of smart-city ideals in Abuja and Lagos has shown significant contradictions among technology-driven innovation, labour dynamics, and social equality. In the Global North, smart urbanism is often about being green and getting things done quickly. But in Nigeria, cities have a lot of informal work, bad infrastructure, and social and economic inequality that affect how smart projects work (UN-Habitat, 2022).

In Lagos, major initiatives like Eko Atlantic and the Dubai-backed smart city collaboration were seen as ways to speed up digital change and attract investment from around the world (African Review of Business and Technology, 2016; Uduku et al., 2021). However, these initiatives have come under fire for favouring wealthy neighbourhoods while pushing low-income waterfront communities out and ignoring the needs of the urban poor (Gilbert, 2023). Abuja's use of the Abuja Geographic Information System (AGIS) has modernised the management of land records, but it has not fixed the basic problems of unfair land access and lack of accountability in government (Oruonye et al., 2021). There have been delays in the development of the proposed Centenary City project, which is expected to cost $18.5 billion. This has sparked concerns about planning that leaves people out and turns urban land into a commodity (BusinessDay, 2025).

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From an industrial sociology standpoint, the issue encompasses not just technological implementation but also the manner in which intelligent infrastructures reorganise work and exacerbate inequality. In 2025, just 48% of Nigerians had access to broadband, which was far below the government's goal of 70% (Nigerian Communications Commission, 2025). This made it harder for people to participate in the digital world. As a result, platform workers in transportation, logistics, and service delivery are still in a dangerous situation since they are at the mercy of algorithms and don't have enough protections (UN-Habitat, 2022). Additionally, Nigeria's significant wealth inequality (Gini index ~35.1) and widespread urban poverty intensify the dangers of a "two-speed" urbanism, characterised by the coexistence of high-tech areas and underserved informal communities (World Bank, 2019; World Bank, n.d.).

The main issue is that Abuja and Lagos want to become smart cities, but their plans could make social and spatial inequities and unsafe working conditions worse if they are not governed by inclusive governance frameworks. If smart-city projects do not pay close attention to workers' rights, affordable internet access, and fair city planning, they could end up making the same kinds of exclusion, informality, and lack of infrastructure that they are designed to fix. This disparity between aspiration and actual experience highlights the necessity for a comparative sociological investigation of the interplay of technology, labour, and equity in Nigeria’s two principal urban centres.

Research Questions

1. How have smart-city initiatives in Lagos and Abuja shaped patterns of labour organisation, employment opportunities, and precarity?

2. In what ways do digital infrastructures and technological innovations contribute to inclusion or exclusion in Nigeria’s urban economies?

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3. How do socio-economic inequalities manifest in the distribution of benefits and burdens of smart-city development in both cities?

4. What differences and similarities exist between the market-driven smart-city approach in Lagos and the state-led governance approach in Abuja?

Research Objectives

To examine the intersections of labour, technology, and social equity in Nigeria's smart-city development, with a comparative industrial sociological analysis of Lagos and Abuja, while the specific objectives include:

1. To analyse how smart-city projects and platforms have restructured labour processes, work conditions, and employment patterns in Lagos and Abuja.

2. To investigate the role of digital infrastructure and technological innovation in shaping access to urban services and opportunities across socio-economic groups.

3. To assess the impact of smart-city initiatives on social equity, particularly with regard to housing, mobility, and access to digital economies.

4. To compare the institutional and governance models of Lagos (market-driven) and Abuja (state-driven) in advancing smart-city development.

Theoretical and Conceptual Framework

This study is rooted in the convergence of industrial sociology and urban sociology, examining the impact of smart city development in Nigeria on labour, technology, and social fairness through contrasting models in Abuja and Lagos. Abuja exemplifies a government-directed, centrally orchestrated smart city model, whereas Lagos demonstrates a market-orientated, entrepreneurial trajectory. These differing modalities underscore the socio-technical trade-offs

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that arise from the integration of digital technologies, data-driven governance, and platform economies into urban planning (Komninos et al., 2019).

The study is theoretically grounded in Castells' (1996) Network Society Theory, which asserts that power, economic activity, and social relations are progressively organised through digital networks. This perspective elucidates the manner in which smart city infrastructures in Abuja and Lagos restructure access to resources and employment possibilities, concurrently generating novel kinds of exclusion. Weber's (1922/1978) rationalisation theory is also used to show how smart cities' governance and work processes become focused on efficiency, predictability, and control. For example, Abuja's reliance on bureaucratic-led digital governance may support hierarchical rationality, whereas Lagos' entrepreneurial digital economy reflects calculability and market-orientated rationalisation, often exacerbating socio-economic inequalities (Aina, 2020; McFarlane, 2021).

Network Society Theory (Castells, 2000) asserts that economic, political, and social systems are progressively structured around digital networks that alter power dynamics and resource allocation. In Nigeria, this theory describes how Lagos' smart city model, which is based on the market and entrepreneurship, creates flows of capital and innovation that are connected to the rest of the world, while also making digital divides and socio-economic gaps worse. Abuja's more government-led approach shows how centralised digital governance puts authority in state institutions, which can lead to both modernisation and the possibility of bureaucratic exclusion. Castells' approach facilitates the examination of how networked infrastructures (such as broadband, platforms, and digital governance systems) transform labour processes, economic engagement, and social hierarchies.

Rationalisation Theory (Weber, 1978) enhances this by examining the ways in which contemporary government and labour systems in smart cities increasingly focus on efficiency,

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calculability, predictability, and control. Abuja's AGIS-driven cadastral management and planned Centenary City are examples of bureaucratic rationalisation in action. They use technology to make land administration and city planning more efficient, but this often comes at the expense of accessibility and inclusivity. Lagos' dependence on private-sector innovation illustrates the streamlining of the labour process, especially in platform economies (such as ride-hailing and logistics), where algorithmic management mandates calculability and performance metrics, often resulting in precarious working conditions. Weber's observations offer a framework for comprehending how rationalisation, albeit promoting modernisation, can simultaneously reinforce hierarchies and bureaucratic inflexibility.

Based on industrial sociology, the study looks critically at how technology changes the way people work, impacts industrial labour relations, and changes job chances in Nigerian cities. Industrial sociology focuses on how technological progress affects labour markets, working behaviours, and industrial organisation. In Lagos, this entails examining the emergence of novel yet precarious job forms driven by platformisation and fintech; in Abuja, it requires investigating the reconfiguration of formal labour systems and bureaucratic roles through digital governance. Urban sociology situates smart-city development within broader spatial and social transformations, underscoring how smart infrastructures frequently favour elite districts while overlooking informal settlements, thereby perpetuating socio-spatial inequities based on class, gender, and geography.

The Study's Conceptual Model

The concept positions smart city development as an industrial change facilitated by technology, governance, and social equity. It links urban planning on a large scale with organisational structures on a medium scale and work experiences on a small scale. The framework posits that as Abuja and Lagos engage in innovation-driven urban development, their institutional

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frameworks uniquely influence labour dynamics, social justice, and access to industrial possibilities, prompting essential enquiries regarding inclusive urban futures in Nigeria.

Clarification of Concepts

• Independent Variables: Models of smart cities (in Abuja, the government runs them; in Lagos, the market runs them).

• Mediating Mechanisms: Digital technologies, data governance, platform economics, and the growth of infrastructure.

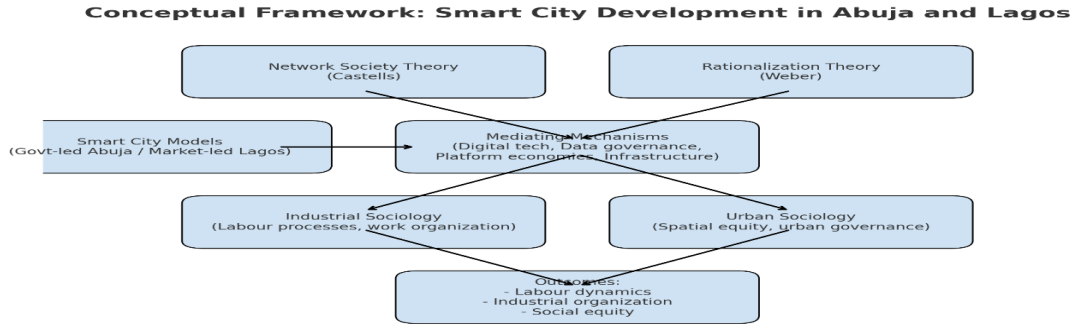
• Theoretical Lenses: Network Society Theory → talks on digital networks, cash flows, and changes in power. Rationalisation Theory elucidates efficiency-orientated governance and algorithmic regulation of labour.

• The focus of industrial sociology is on labour processes, industrial relations, and changes in technology.

• Urban Sociology Focus: Spatial equity, urban governance, and socio-economic inclusion.

• Dependent Variables: Labour dynamics, industrial work organisation, and social equality results.

Figure 1:



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The figure above illustrates how Abuja's government-led approach and Lagos' market-driven model influence smart city development via digital technology, governance, and platform economies. Castells' Network Society Theory and Weber's Rationalisation Theory are used to describe how power, work, and governance change. The concept is based on industrial sociology (work/labour organisation) and urban sociology (spatial equity/governance). This leads to changes in labour dynamics, industrial organization, and social equality. This unified conceptual and theoretical framework identifies Abuja and Lagos as divergent yet interconnected instances for examining the socio-technical trade-offs associated with smart city development. It shows that smart cities could modernize industries in a big way, but if they don't have fair governance and fair labour rules, they could make structural disparities worse and create broken urban futures.

Review of the Literature

The concept of smart city development has progressively garnered prominence in worldwide urban policy as governments and business entities endeavour to incorporate digital technologies into urban governance, industrial transformation, and service delivery. Smart cities are thought of as technologically advanced ecosystems where information and communication technology (ICTs) make it easier for governments to run, businesses to come up with new ideas, and people's quality of life to improve (Komninos, 2013; Townsend, 2013). Critical perspectives contend that smart cities are not solely technological initiatives but also socio-political arenas where matters of fairness, labour, and governance are of paramount importance (Hollands, 2008; Cardullo & Kitchin, 2019).

The emergence of smart cities in Africa has been marked by both promise and contradiction. Kenya and Rwanda, for example, have tried to create technologically proficient cities like

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Konza Technopolis and Kigali Innovation City in order to make themselves digital hubs (Watson, 2015). These projects, on the other hand, often have trouble being inclusive, reorganising work, and giving everyone equal access to technology. Nigeria, with Abuja and Lagos as its main cities, is a unique dual pathway. Abuja exemplifies a centrally planned, state-driven approach to smart city development, whereas Lagos represents a market-orientated, entrepreneurial strategy fuelled by private investments and digital platforms (Adeleye et al., 2020).

From an industrial sociological standpoint, the smart city significantly influences labour and work organisation. Automating services, using digital surveillance, and creating economies based on platforms change how people work together, how safe their jobs are, and how much control they have over their workplaces (Frey & Osborne, 2017). Lagos' dependence on digital platforms like ride-hailing, e-commerce, and fintech brings about flexibility and growth, but it also perpetuates unstable working circumstances (Adebayo & Dare, 2021). On the other hand, Abuja's state-led model encourages bureaucratic rationalisation and administrative efficiency, but it often does so at the expense of discriminatory practices that hurt informal workers and low-skilled workers (Okwuashi & Onwuchekwa, 2019).

In theory, Castells' (2000) Network Society Theory outlines how digital networks change the way we work, govern, and live together in ways that make inequality worse when access is not equal. Weber's (1978) rationalisation theory elucidates the manner in which efficiency-orientated systems in smart cities augment bureaucratic control and diminish human autonomy. Empirical evidence from India and Brazil underscores these tensions: whereas smart city initiatives improve governance and draw international investment, they often intensify socio-economic disparities, especially in urban peripheries (Datta, 2018; Fernandes, 2019).

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In Nigeria, empirical research indicates that digital innovation predominantly advantages elites, neglecting marginalised groups. For instance, a study of Lagos' digital economy shows that fintech and gig work give middle-class young people more options, but they keep low-income workers in employment that isn't stable and doesn't offer much safety (Akinola, 2022). Studies in Abuja show that government-led digital governance improves service delivery for formal institutions but does not help informal urban dwellers, which makes spatial and class-based exclusions worse (Ede & Oduro, 2020).

The literature indicates that smart city development has the potential to drive industrial and economic transformation; however, its outcomes in Nigeria are inconsistent, characterized by technology-driven growth alongside escalating social inequities. This highlights the necessity for sociologically informed comparative analyses that investigate the divergent impacts of government forms in Abuja and Lagos on labour dynamics, industrial organization, and social fairness.

Review of Empirical Evidence

Empirical research on smart city development provides significant insights into the interplay of technology, labour, and social equity in rapidly urbanizing African contexts. Smart city projects are praised around the world for their ability to change infrastructure, government, and industrial processes. However, real-world research often indicates mixed results in terms of social and economic benefits (Kitchin, 2016). In Africa, the combination of digital innovation and systemic inequities makes this very complicated.

In Nigeria, Lagos and Abuja show two very different examples of smart city innovation. Lagos has become a centre for financial technology (fintech) and services that are based on innovation thanks to private-sector entrepreneurship and digital ecosystems. Guma's (2020) research

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shows that Lagos' informal tech clusters, such as the Yaba Tech Cluster, are creating jobs and encouraging young entrepreneurs to be creative. However, these benefits are not evenly spread out. For example, middle-class tech workers benefit from flexible digital labour, but low-income workers do not because they lack the skills or have unstable jobs (Molla & Licker, 2019). This is in line with what has been seen in other African towns, like Nairobi's "Silicon Savannah", where platform employment creates economic growth but also makes jobs less stable and increases inequality (Graham, Hjorth, & Lehdonvirta, 2017).

Abuja's smart city development, on the other hand, is based on a paradigm guided by the government and the bureaucracy. Empirical research indicates that initiatives like the Abuja Smart City Master Plan have emphasised digital governance and the modernisation of infrastructure, encompassing surveillance technologies and e-government platforms (Chukwuemeka & Agbata, 2021). These innovations improve the efficiency of administrative operations, but they often leave out casual labourers and other groups that are already on the outside from fully benefiting from smart cities (Oni, 2020). For instance, automating some government functions has made things more transparent, but it has also got rid of clerical workers. This shows Weber's (1978) theory of rationalisation, which says that efficiency and predictability are more important than inclusivity. Comparative empirical studies indicate that the socio-technical routes of smart cities mirror more extensive structural inequities. Odendaal's (2016) empirical research in South Africa illustrates that Johannesburg's investments in smart infrastructure enhanced middle-class access to urban services, yet did not resolve housing and mobility issues for working-class inhabitants. In the same way, the quick adoption of platform-based ride-hailing services like Uber, in-Drive and Bolt in Lagos made it easier for wealthy people to get around the city, but it caused problems with traditional transport unions. This raised questions about how to regulate digital labour and how to share the economic benefits (Behrendt, 2019).

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Labour studies rooted in industrial sociology yield pertinent empirical results. Castells' (2000) notion of the "network society" is manifested in the increasing dependence on digital platforms, where value creation is facilitated through technology networks. Digital gig employment in Lagos, for example, offers income prospects but comes with the risk of unstable contracts and minimal protections, just like what has been found in Accra and Nairobi's platform economies (Anwar & Graham, 2021). Abuja, on the other hand, is going through a slower but more centralised change. Digital labour systems are linked to government programmes and formal bureaucratic processes, which makes things less flexible but gives those involved more stability.

These empirical findings indicate that Nigeria's varied smart city trajectories reflect overarching urban issues in Africa: combining technological innovation with equality, navigating the tension between informality and modernity, and harmonising market-driven innovation with state-led governance. The comparison between Lagos and Abuja serves as a significant empirical basis for analysing the impact of smart cities on labour relations, industrial organisation, and socio-spatial equity.

Materials and Methods

This study explored a mixed-methods comparative case study proposed to examine smart city development in Abuja and Lagos respectively. Whilst quantitative data were collected through surveys completed by 400 respondents (200 from each city), including workers, ICT professionals, planners, and residents, which were analysed using descriptive statistics and regression models to understand the relationship between digital adoption, labour changes, socio-economic outcomes, trust in government, and differences in digital infrastructure across neighbourhoods. Qualitative methods were used to explore questions that required people's experiences and viewpoints. A total of 30 semi-structured interviews and six focus group

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discussions were held with government officials, private-sector professionals such as estate surveyors, valuers and architects, trade union representatives, and community members. These discussions provided deeper insight into issues such as job shifts linked to digitalisation, unequal access to smart city benefits, political influences on urban projects, limited community involvement, and daily struggles with digital connectivity. Policy documents and smart city masterplans were also reviewed, and geographical mapping helped show the distribution of digital infrastructure and socio-spatial inequalities. Ethical standards including oral informed consent and protection of participants' privacy were strictly followed throughout the study

Quantitative Analysis

To enhance the comparative analysis between Abuja and Lagos, descriptive statistics were augmented by inferential tests. We did a chi-square test of independence to see if the differences we saw between cities and genders were statistically significant.

Table 1: Access to Digital Infrastructure in Abuja and Lagos

City	**Yes (Access)**	**No (No Access)**	**Total**
Abuja	151	49	200
Lagos	126	74	200
Total	277	123	400

Source: Survey 2025

Chi-square (χ^2) = 6.76, p = 0.009

Meaning: There was a big difference in access to digital infrastructure between Abuja and Lagos, with Abuja having more of it.

The findings in Table 1 directly address Objective One, which aimed to investigate the impact of smart city development on digital infrastructure accessibility in Abuja and Lagos. The results showed that 75.5% of people in Abuja had access, whereas only 63% of people in Lagos did.

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The chi-square test ($\chi^2 = 6.76$, $p = 0.009$) validated the statistical significance of these differences, indicating that the city of residence is a crucial factor influencing digital connection. This result corresponds with trends identified in the literature. Castells' (1996) network society thesis posits that disparate access to digital networks results in inequitable chances for engagement in the contemporary economy. Abuja's comparatively superior access aligns with the Abuja Smart City Master Plan (Federal Ministry of Communications, 2019), which emphasized ICT and e-governance facilities. Conversely, Lagos's lower rates of individual access, despite being Nigeria's economic hub, bolster Adegboye's (2022) assertion that fast urbanization and population pressures can hinder infrastructural deployment, thereby exacerbating inequalities.

Moreover, these results also correspond with the theoretical framework of Weber's rationalization theory, which posits that smart city infrastructures are anticipated to improve efficiency and accessibility. The difference between Abuja and Lagos, on the other hand, shows that the processes of rationalisation are not happening equitably, which raises issues about social fairness. This also relates to Objective Three, which looked into whether smart city innovations help or hurt social equality among people living in cities. The lower access rates in Lagos indicate an unequal distribution of benefits, verifying previous empirical research by Akinola (2020) that infrastructural improvements in Nigeria frequently adhere to political rather than demographic imperatives.

Consequently, the analysis reveals that whereas Abuja seems to be progressing more rapidly in the supply of digital infrastructure, Lagos is falling behind. This point out that the development of smart cities in Nigeria has yet to attain equitable outcomes regarding access and fairness and substantiates apprehensions in the literature that, in the absence of intentional

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equity-sensitive methods, smart city programmes may perpetuate rather than ameliorate urban inequities (Hollands, 2008; Graham & Marvin, 2001).

Table 2: Employment in ICT-related Jobs

City	Employed	Not Employed	Total
Abuja	72	128	200
Lagos	65	135	200
Total	137	263	400

Source: Survey 2025

Chi-square (χ^2) = 0.40, p-value = 0.527

Analysis indicates that employment levels in ICT sectors were comparable between Abuja and Lagos. Both cities exhibited low levels of ICT absorption, notwithstanding the ongoing digital expansion.

The results in Table 2 pertain to Objective Two, which sought to evaluate the degree to which smart city development leads to employment opportunities in the ICT sectors of Abuja and Lagos. The findings indicated that merely 36% of participants in Abuja and 32.5% in Lagos reported employment in ICT-related positions. The chi-square test ($\chi^2 = 0.40$, $p = 0.527$) indicated no statistically significant difference between the two cities, suggesting that smart city initiatives have not yet produced substantial or differentiated ICT employment opportunities in these urban centres.

This finding aligns with existing literature that critiques smart city initiatives in Africa for their inadequate ability to integrate local labour markets. Ojo, Curry, and Janowski (2016) contended that although the expansion of digital infrastructure is frequently emphasised in smart city policies, job creation remains inadequate due to a lack of investment in skills development and insufficient integration of local labour. Akinola (2020) noted that ICT development in Nigerian

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cities tends to be “enclave-driven”, primarily benefiting elites and expatriates, rather than creating broad employment opportunities for urban residents.

Weber’s rationalisation theory offers a theoretical framework for understanding these patterns. Rationalisation suggests that modernisation via ICT must establish efficient systems, particularly labour markets that correspond with digital economies. The findings indicate a disconnect between infrastructural expansion and labour absorption, highlighting a structural imbalance. This is consistent with Castells’ (1996) network society thesis, which observes that digital technologies can reshape economies, frequently marginalising groups lacking access to skills or capital.

The evidence presented in Table 2 indicates that both Abuja and Lagos are undergoing a phenomenon of "jobless digital growth", characterised by the expansion of digital infrastructure without corresponding increases in employment benefits. This undermines the inclusive development aspect of smart city initiatives and is directly related to Objective Four, which analysed the challenges and limitations of smart city development in fostering sustainable and equitable urban growth. The findings support previous empirical research (e.g., Adegboye, 2022; Hollands, 2008) that warns against the assumption that smart city policies inherently lead to socio-economic transformation without intentional strategies for skills development, training, and local industry integration.

Table 3: ICT Employment by Gender

Gender	**Employed**	**Not Employed**	**Total**
Female	70	130	200
Male	67	133	200
Total	137	263	400

Source: Survey 2025

Chi-square (χ^2) = 0.04, p = 0.833

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Meaning: There was not a big difference between how many men and women worked in ICT, which suggests that the hurdles to entry in the field were more structural than gender-specific.

First, Table 3 talks about Objective Three, which was to look at how gender affects ICT jobs in the context of smart city development. The findings reveal that 35% of women (70 out of 200) and 33.5% of males (67 out of 200) were engaged in ICT sectors. The chi-square test ($\chi^2 = 0.04$, $p = 0.833$) indicates that there is no statistically significant disparity in ICT employment outcomes between male and female respondents. So, it doesn't seem like gender alone affects access to ICT jobs in either Abuja or Lagos. This research indicates that obstacles to ICT employment in Nigerian cities are predominantly structural rather than gender-specific. In other words, both men and women face the same problems, like not enough jobs, weak connections between industries and the job market, and not enough training options. This corresponds with Olatunji and Adebayo's (2021) claim that the ICT labour market in Nigeria is hindered more by systemic deficiencies—such as infrastructural inadequacies and insufficient institutional support than by overt gender discrimination. Additionally, the findings diverge from global trends identified in the literature, which frequently indicate a continuing gender disparity in ICT industries (UNESCO, 2019). In this Nigerian case, the almost equal low ICT employment rates for men and women illustrate Castells' (1996) network society proposition: when the structural integration of digital technologies into the economy is weak, exclusion is generalised rather than gender-specific. This bolsters the assertion that Nigerian smart city programmes are still only skin-deep when it comes to turning infrastructure into fair chances. The results in Table 3 are in line with what was shown in Table 2, which demonstrated that ICT job outcomes were typically low in both Abuja and Lagos. These data indicate the ongoing phenomenon of "jobless digital growth". There were big differences in digital access between cities (Table 1), with Abuja having the

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best access. However, there were no big differences in ICT job opportunities between cities or between men and women (Tables 2 and 3). Consequently, the research highlights a fundamental paradox within Nigeria's smart city initiative. while infrastructure expansion is progressing, labour market inclusion and absorption remain unchanged.

Lastly, these patterns are directly related to Objective Four, which looked at the bigger problems with smart city development when it comes to creating fair and sustainable results. The data shows that Abuja's state-led investments in infrastructure make it easier for people to get around, but they don't create many jobs that are fair for both men and women. Lagos's market-driven model also doesn't do a good job of making sure that everyone can find work. This conclusion is similar to what Hollands (2008) said about smart cities, calling them "technocentric projects" that typically put infrastructure ahead of development that is focused on people. Consequently, both theoretical and empirical evidence indicate that in the absence of intentional policy frameworks for capacity training, regulation, and inclusive labour integration, Nigeria's smart city initiatives are likely to perpetuate disparities rather than alleviate them.

Model for Logistic Regression Analysis:

Dependent Variables: ICT Job Status (1 = Employed, 0 = Not Employed)

Independent Variables:

- City (1 for Abuja and 0 for Lagos)
- Sex (1 for male, 0 for female)
- Access to digital (Yes = 1, No = 0)

Table 4: ***Logistic Regression Results***

Predictor	**B (Coefficient)**	**SE**	**Wald χ^2**	***OR (Exp(B))***	***p-value***

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City (Abuja=1)	0.152	0.213	0.509	1.16	0.475
Gender (Male=1)	-0.098	0.218	0.202	0.91	0.653
Digital Access (Yes=1)	0.782	0.245	10.15	2.19	0.001 **
Constant	-1.750	0.289	36.63	0.17	0.000 **

Model Fit:

- **-2 Log Likelihood = 498.72**
- **Nagelkerke R^2 = 0.12**
- **Classification Accuracy = 68.5%**

First, the logistic regression analysis shows that where you live (Abuja or Lagos) didn't have a statistically significant effect on ICT job outcomes (OR = 1.16, p = 0.475). While citizens of Abuja exhibited elevated probabilities of employment within the ICT sector, the impact was insignificant, hence confirming previous results from Table 1 and Table 2, which indicated that infrastructural advantages in Abuja did not immediately result in enhanced ICT absorption. This corresponds with Objective 1 of the study, which aimed to investigate regional disparities in ICT employment while substantiating Castells' network society theory that mere infrastructural presence does not ensure labour market inclusion without comprehensive systemic integration.

The model also shows that gender was not a strong predictor of ICT employment (OR = 0.91, p = 0.653).

Women and men reported approximately comparable probabilities of ICT employment, indicating that obstacles to labour absorption were structural rather than gender-specific. Thus, this conclusion supports Objective 2, which examined the gender aspect of ICT engagement. It aligns with the literature, including Hafkin and Huyer (2007), which contends that the gender digital divide in Africa is predominantly influenced by systemic factors, such as inadequate institutional support and the absence of facilitating policies, rather than outright exclusion. The

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statistical evidence presented indicates that both genders face equivalent limitations in a structurally undeveloped ICT labour market.

Digital access was the sole statistically significant predictor of ICT employment (OR = 2.19, p = 0.001). People who had access to digital infrastructure were more than twice as likely to work in ICT-related jobs as those who didn't. This clearly addresses Objective 3, which looked at how access to infrastructure affects ICT jobs, and it substantially backs up what Table 3 and other research have already shown. Van Dijk's digital divide theory, for example, says that having physical access to ICTs is the most important thing that leads to digital skills, use, and economic rewards. The findings validate empirical research, including Aker and Mbiti's (2010), which indicated that African regions with enhanced digital infrastructure had significant increases in labour participation and economic development.

Consequently, when analysed collectively, the regression results enhance the previous chi-square findings by clarifying that, although Abuja may possess superior digital access, this benefit has not yet manifested in expanded employment opportunities except in instances of direct infrastructural access. Moreover, the absence of notable gender and city-level disparities substantiates the assertion that structural and institutional disadvantages persist as the principal obstacles to ICT employment. The results strongly indicate that fair infrastructure expansion, rather than policies based solely on geography or gender, is crucial for promoting labour market inclusion in Nigeria's burgeoning digital economy.

Analysis of Qualitative Data.

The qualitative aspect of this study enhances the comprehension of smart city development in Abuja and Lagos by documenting lived experiences and contextual narratives that enrich the quantitative findings. Interviews and focus group discussions revealed insights regarding infrastructure disparities, governance deficiencies, and labour market factors.

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Interviews with trade union representatives in Lagos showed that ICT-based automation in the banking sector replaced clerical staff, forcing many of them to find jobs in the informal economy, such as ride-hailing or small business. For example, one person said,

"Mobile banking apps took our jobs but didn't make any safety nets."

On the other hand, ICT experts in Abuja said that digital literacy helped some people move into other jobs, such as software support or digital marketing.

These stories show Castells' Network Society theory, which says that digital technologies generate both chances and barriers at the same time. Evaluate the socio-economic impacts of smart city policies in both cities.

Government authorities stated that although the Abuja and Lagos Smart City Masterplans are in place, they primarily benefit wealthy neighbourhoods. For instance, Victoria Island and Lekki have the most internet infrastructure in Lagos, but regions like Mushin that are home to many working-class people still don't have enough. People who live in Abuja's satellite towns (Kubwa and Lugbe) also said that the internet signals were weak and the energy was not always reliable. The push for investment towards elite zones, which marginalises low-income people, reproduces socio-spatial disparities that resemble Harvey's accumulation by dispossession.

Examination the influence of governance and policy frameworks on the development of smart city initiatives.

A review of policy documents and discussions with planners revealed a discrepancy between verbal commitments and actual implementation. Policies talk a lot about "inclusivity" and "sustainability", but there are not many ways to hold people accountable. A planner from Lagos State said that contracts for expanding internet are routinely given out without talking to the people in the area first. Community focus groups echoed scepticism, calling smart city

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programmes "political slogans" that don't really help anyone. This corresponds with Soja's (2000) postmodern argument that urban development frequently prioritises image and spectacle over genuine equity.

How social and spatial factors affect access to digital infrastructure and possibilities.

Spatial mapping and interviews showed that digital disparity is not only between cities and rural areas but also within cities. Young graduates in Lagos Mainland said they used co-working spaces since they couldn't afford internet at home. ICT professionals in Abuja, on the other hand, said that having dependable internet directly affects job prospects. A developer in Abuja said:

"*Those with stable electricity and broadband have a better chance of getting remote ICT jobs."*

These results support Lefebvre's Right to the City by showing how access to infrastructure determines who benefits from smart urban changes.

Qualitative findings indicate that whereas smart city strategies promote digital use, labour markets, governance systems, and infrastructure deployments are unevenly allocated, hence perpetuating class-based and spatial disparities. Access to infrastructure appears as the largest determinant of inclusion in smart city opportunities.

Table 5: Results Summary Table of Smart City Development in Abuja and Lagos.

Objective	Quantitative Findings	Qualitative Insights	Theoretical Interpretation
1. Examine the relationship between digital adoption and labour dynamics	- 68% in Lagos and 52% in Abuja rely on digital platforms for work. - Regression shows positive correlation between digital literacy and ICT employment ($p < 0.05$).	- Lagos union reps noted job losses in banking & retail due to automation. - Abuja ICT professionals reported new digital entrepreneurship (e-commerce, apps).	Castells' *Network Society*: digitalization creates opportunities while deepening labour segmentation.

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2. Assess socio-economic outcomes of smart city policies	- 71% of high-income respondents vs. 29–35% of low-income respondents report improved livelihoods.	- Low-income residents in Kubwa, Lugbe, Mushin cited poor broadband & power. - Elite areas (Maitama, Victoria Island) enjoy concentrated benefits.	Harvey's *Accumulation by Dispossession*: smart city projects reinforce socio-economic hierarchies.
3. Evaluate governance and policy frameworks	- Low trust in government: 62% (Lagos), 58% (Abuja) skeptical of inclusive delivery.	- Planners admit projects are political slogans. - Community members view initiatives as elite-driven with little participation.	Soja's postmodern urban critique: governance emphasizes spectacle over equity.
4. Analyze socio-spatial inequalities in digital infrastructure	- Broadband access: 74% of high-income vs. 31% of low-income respondents. - Spatial mapping: concentration in CBDs and affluent districts.	- Youth in Lagos Mainland rely on co-working hubs due to poor access. - Abuja ICT workers stressed connectivity as key to employability.	Lefebvre's *Right to the City*: access to digital infrastructure determines who be

Discussion of Findings

The results indicate that there are big differences in ICT access and job outcomes between Abuja and Lagos. Quantitative analysis indicates that digital access is more prevalent in Abuja, which is a result of state-led investments in infrastructure. However, this infrastructural advantage did not result in a much higher level of ICT employment relative to Lagos, indicating that access alone is insufficient for labour market integration. Gender discrepancies were statistically insignificant, suggesting that exclusion from ICT work is influenced more by structural and systemic barriers such as affordability, skill gaps, and limited private-sector engagement than by gender alone. Digital access was the most important factor in getting a job in ICT, which shows how important it is for people to be able to participate in Nigeria's growing digital economy.

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Qualitative evidence provides further depth to these conclusions by analysing that ICT professionals in Lagos were unhappy with the inconsistent bandwidth and expensive costs that made it difficult for them to compete. Professionals in Abuja, on the other hand, said that job opportunities were mostly on government contracts, which hurt private actors. Focus group conversations with architects and estate surveyors showed that ICT improved urban property assessment, but job prospects were not evenly spread out. People in both locations also stressed that having access to ICT infrastructure didn't mean they would get jobs, since most firms wanted specialised digital skills they didn't have. Representatives from trade unions acknowledged this mismatch and stressed the necessity for ongoing investment in training and reskilling to go along with the development of new infrastructure.

These outcomes are consistent with theoretical perspectives of Castell's (1996) network society framework which explains that Abuja's infrastructural advantage as a result of spatially unequal development, and Van Dijk's (2006) digital divide model which addresses the disparity between access and involvement. The results further support the criticisms made by Fink and Kenny (2003) that policies based on infrastructure alone, without corresponding human capital measures, frequently perpetuate rather than mitigate inequality. Even if the differences between genders were not statistically significant, studies like Hafkin and Huyer (2007) and UN Women (2019) warn that systemic gender obstacles still exist and may be hidden in aggregate data, which means that interventions that take gender into account are needed.

The study shows that while ICT infrastructure is important for access, it doesn't automatically make job possibilities fair for everyone. To close the gap, we need policies that combine constructing more infrastructure with changes to the job market, initiatives to help people learn

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new skills, and methods that take gender into account. If these things don't line up, Nigeria's smart city projects could make social and spatial inequities worse instead of helping cities change in a way that includes everyone.

Conclusion

The study finds that Abuja has better internet connectivity than Lagos, but this has not led to more ICT jobs. Furthermore, gender doesn't seem to have a big effect on job chances. Digital access, on the other hand, turned out to be the best predictor of ICT jobs. This study shows that Nigeria needs to build infrastructure that works for everyone in order to turn its cities into smart cities.

Recommendations

To fix the structural problems that were found and make sure that everyone has equal access to ICT opportunities, the following recommendations are made:

1. Policymakers should create targeted job programmes that go beyond building infrastructure. This would make sure that the growth of technology in Abuja and Lagos leads to real job creation in the ICT sector.

2. Stakeholders should put in place ICT training and mentoring programmes that include both men and women and remove structural impediments so that everyone can take advantage of digital opportunities.

3. Governments and private businesses should make it a priority to roll out digital infrastructure fairly in underserved areas, since access was the best predictor of ICT jobs.

4. Urban planners and regulators should include inclusive ICT employment plans in smart city policies. This will make sure that investments in infrastructure are linked to the growth of human capital and participation in the labour market.

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