JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Increased Funding and Investment as a Panacea for Urban Infrastructure Deficit in Most Nigerian Cities

DOI: **https://doi.org/10.5281/zenodo.15802659**

Brown, Ibama & Ikiriko, Tamunoikuronibo Dawaye
Department of Urban and Regional Planning, Rivers State University, Port Harcourt

Abstract

Nigerian cities such as Lagos, Abuja, and Port Harcourt face significant urban infrastructure deficits due to rapid population growth, unplanned urban expansion, inadequate planning, and chronic underinvestment. This paper examines the urgent need for increased funding and investment in urban infrastructure in Nigerian cities. The study highlights its pivotal role in shaping cities by analysing the multifaceted significance of urban infrastructure through a comprehensive review of literature and insights from experts. The study begins by providing a comprehensive definition of urban infrastructure, encompassing its various physical components and systems, and develops a taxonomy to categorise and understand its diverse elements. The study highlights the diverse roles of urban infrastructure, including driving economic growth, improving quality of life, promoting sustainability, and fostering social interactions. It recognises that urban infrastructure is crucial for cities to thrive and plays a vital role in supporting the diverse needs and aspirations of residents. Based on the analysis, the study advocates for increased funding and investment in urban infrastructure, with a particular emphasis on government support. It presents evidence of the positive impact of adequately funded infrastructure, such as improved transportation networks, reliable water and energy systems, and the creation of accessible public spaces. The study also addresses potential challenges and proposes strategies to overcome funding and investment barriers, including the exploration of public-private partnerships and innovative financing mechanisms. By highlighting the importance of urban infrastructure and advocating for increased funding and investment, this study contributes to the ongoing dialogue surrounding urban planning and development. It provides a basis for policymakers, urban planners, and stakeholders to recognise the critical role of urban infrastructure and prioritise its funding and investment for sustainable and prosperous cities in the future.

Keywords: Urban Infrastructure, Funding, Investment, City Development, Sustainable Cities, Urban Planning

1.0: Introduction

Urban infrastructure provides the physical systems and facilities necessary for the functioning and development of urban areas. From transportation networks to water supply and energy grids to public spaces, infrastructure plays a pivotal role in shaping the dynamics and liveability of cities. The significance of urban infrastructure cannot be overstated as cities grapple with rapid urbanisation, population growth, and a lack of adequate urban planning which are key imperatives for sustainable development. In Nigeria, cities like Lagos, Abuja, and Port Harcourt exemplify this challenge. Lagos, for instance, contends with chronic traffic congestion due to

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



underdeveloped transport systems, while Port Harcourt struggles with erratic power supply and unregulated urban sprawl. These realities highlight the urgency of reimagining urban infrastructure to meet the unique demands of Nigeria's urbanisation trajectory.

This lack of adequate infrastructure has engendered a growing consensus among urban planners, policymakers, and researchers that infrastructure is fundamental to unlocking the potential of cities. This paper will discuss the multifaceted aspects of urban infrastructure, scrutinising its importance and roles. To understand the significance of urban infrastructure, we turn to the works of distinguished authors who have examined this subject. Influential urbanist Jane Jacobs, in her seminal book The Death and Life of Great American Cities, posited that well-designed urban infrastructure is indispensable for fostering vibrant and liveable cities (Jacobs, 1961). Jacobs contended that diverse neighbourhoods, pedestrian-friendly streets, and a harmonious blend of historical and contemporary structures contribute to vitality and community. In the Nigerian context, efforts like the Lagos Pedestrian Bridge Projects and the Akin Adesola streetscape enhancement echo Jacobs' ideals of prioritising human-scale design and walkability, though such projects remain unevenly implemented.

In The Rise of the Creative Class, Richard Florida emphasised the role of urban infrastructure in attracting and retaining talented, innovative workers (Florida, 2002). He argued that cities with robust infrastructure—efficient transport, quality housing, and cultural amenities possess a competitive edge. In Nigeria, Abuja's central district attempts to provide such an edge with its planned infrastructure, including accessible government buildings, residential zones, and the growing tech ecosystem in areas like Jabi and Gwarinpa. However, the disparity between core and peripheral neighbourhoods reveals the incomplete realisation of Florida's theory in practice.

Similarly, Edward Glaeser, in Triumph of the City, explored how efficient infrastructure—reliable transit and accessible urban services—enhances productivity and urban quality of life (Glaeser, 2011). In Port Harcourt, the lack of coordinated transportation and solid waste management services illustrates the consequences of neglecting this principle. Congested roads, frequent flooding, and informal transport options underscore the need for sustainable infrastructure investments,

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



especially in oil-producing urban centres where industrial growth connections often outpaces public infrastructure.

In Cities for People, Jan Gehl highlighted the significance of human-scale infrastructure that encourages pedestrian and cyclist movement, advocating for public spaces that foster interaction (Gehl, 2010). Some Nigerian cities are beginning to recognise this, such as the transformation of some parts of Lagos Island with green spaces and street furniture under the Lagos Urban Renewal initiatives. Yet, these changes remain sporadic and often exclude informal settlements where the majority live.

Saskia Sassen, in The Global City: New York, London, Tokyo, examined infrastructure's role in positioning cities within the global economy (Sassen, 2001). Nigerian cities like Lagos, a regional financial hub, mirror aspects of this global function through its seaport, tech start-ups in Yaba, and its growing international airport. However, inadequate broadband connectivity, inconsistent electricity, and overcrowded roads continue to hinder Lagos's full integration into the global economic hierarchy.

From these valuable insights and Nigerian examples, a profound understanding of urban infrastructure's pivotal role in shaping cities emerges. The works of these global theorists, when placed alongside local realities, shed light on the urgent need for well-designed and adequately funded infrastructure in fostering vibrant communities, attracting talent, driving economic growth, and enhancing liveability.

Therefore, this study aims to emphasise the importance of urban infrastructure and argue for increased funding and investment in urban infrastructure for Nigerian cities. The specific objectives of this study are as follows;

1. Provide a comprehensive definition of urban infrastructure.
2. Develop a taxonomy of urban infrastructure to categorise its components and systems.
3. State the different roles of urban infrastructure
4. To evaluate the need for increased government funding and investment in urban infrastructure.

2.0: Study Methodology

This paper employs a desk-based methodology, combining a comprehensive literature review and data analysis, to emphasise the importance of urban infrastructure and argue for increased funding and investment. The methodology ensures a systematic and evidence-based

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



approach to achieve the study objectives, contribute to the stock of knowledge in the field, and provide insights for policymakers, urban planners, and stakeholders in urban development.

3.0: Results and Discussion

Comprehensive Definition of Urban Infrastructure

Urban infrastructure plays a vital role in supporting economic activities, enabling social interactions, and enhancing the overall liveability of cities. It contributes to mobility, access to essential services, environmental sustainability, and the quality of life for urban residents. Definitions of urban infrastructure vary across disciplines, reflecting different theoretical orientations and developmental priorities. Some of the key conceptualisations are outlined below.

Jacobs (1961) defined urban infrastructure as the physical systems and structures that underpin urban life, encompassing transportation networks, utilities, public spaces, and amenities. She emphasised the importance of diverse and vibrant neighbourhoods and highlighted the role of people-centred design in creating functional and inclusive cities. This vision is partially realised in Lagos, where high-density districts like Yaba have benefited from mixed-use developments and active pedestrian life. However, in Port Harcourt, areas such as Diobu and Mile 3 continue to struggle with overcrowding and deteriorating infrastructure, revealing a stark contrast to Jacobs' ideals. In Abuja, despite its status as a master-planned city, the rapid expansion of informal settlements such as Kubwa and Nyanya has resulted in limited access to basic urban amenities, exposing structural imbalances in infrastructure provision.

Florida (2002) viewed urban infrastructure as a critical tool for attracting and retaining the "creative class." His definition underscored the importance of quality housing, efficient transportation, cultural institutions, and digital connectivity. In Lagos, this is increasingly visible in neighbourhoods like Victoria Island and Lekki, where high-end housing, recreational amenities, and startup-friendly environments are becoming commonplace. Abuja's central business districts, with good road networks and proximity to key institutions, also serve this purpose. However, Port Harcourt, despite being a strategic oil city, faces persistent challenges in talent retention, largely due to inadequate infrastructure such as erratic electricity, congestion, and insufficient waste

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



management especially in areas outside Trans-Amadi and Old GRA.

Glaeser (2011) described urban infrastructure as the physical systems and services that allow cities to function and grow, including transport networks, utilities, and public spaces. He argued that investments in infrastructure are crucial for enhancing productivity and urban quality of life. Abuja demonstrates this through the development of arterial roads and administrative infrastructure. However, in its satellite towns, uncoordinated transport systems and long commute times persist. Port Harcourt continues to grapple with road flooding and ineffective waste systems in areas like Rumuokoro and its peripheral Oyigbo, which undermine urban productivity. Lagos has made significant investments in its Bus Rapid Transit (BRT) system and major roads, though traffic congestion remains a major issue in key corridors like Apapa and Oshodi.

Gehl (2010) advocated for human-scale infrastructure that prioritises pedestrians, cyclists, and social interaction. His work emphasises walkable streets, safe cycling paths, and accessible public spaces. Lagos has made modest gains with pedestrian-friendly projects around Marina and the development of waterfront leisure zones. Abuja incorporates walkable boulevards and parks such as Millennium Park, especially within the central area. By contrast, Port Harcourt remains heavily car-oriented, with limited sidewalks, cycling paths, and public recreational spaces thus reducing opportunities for social engagement and community wellness.

Sassen (2001) approached urban infrastructure from a global economic perspective, identifying it as a system of interconnected networks such as ICT, finance, and transport that facilitate a city's role in the global economy. Lagos, with its international port, financial services, and burgeoning tech ecosystem (e.g., Yabacon Valley), aligns closely with this model. Abuja, while less globally connected economically, leverages digital technologies in governance and administration. In contrast, Port Harcourt's global integration remains largely limited to oil logistics. Its underdeveloped digital infrastructure, weak financial linkages, and limited airport connectivity hinder its evolution into a globally competitive urban centre.

The insights of Jacobs, Florida, Glaeser, Gehl, and Sassen offer critical lenses to understand urban infrastructure. When applied to Lagos, Abuja, and Port Harcourt, it becomes clear that while some progress has been made, there remain glaring gaps and inconsistencies across

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Nigerian cities. Furthermore, the shift toward smart and digital urban systems is reshaping what constitutes essential infrastructure in the 21st century.

Criticism of Key Definitions from the Modern Digital Age Perspective

While classical scholars such as Jacobs (1961), Florida (2002), Glaeser (2011), Gehl (2010), and Sassen (2001) laid a strong theoretical foundation for understanding urban infrastructure, their definitions are largely grounded in the physical and social dimensions of cities. As cities evolve within an increasingly digital and data-driven world, these earlier frameworks show critical limitations.

Jacobs (1961) focused on the physical structures streets, neighbourhoods, and public spaces that underpin urban life. However, her framework does not consider how digital infrastructure such as real-time mobility systems, surveillance networks, and data platforms now shape urban interaction and safety. For instance, while Lagos is increasingly embedding digital technologies into neighbourhood management, such systems were unimaginable in Jacobs' era.

Florida (2002) stressed the role of cultural amenities and the built environment in attracting the creative class. Yet, his model under emphasises the role of digital ecosystems such as broadband infrastructure, tech incubators, and innovation hubs that are now central to creativity and entrepreneurship. In Abuja and Lagos, tech-enabled districts are emerging as magnets for digital talent, beyond traditional cultural spaces.

Glaeser (2011) gave priority to transportation and utilities as essential to urban growth. However, the digital age has seen the emergence of intelligent transport systems, smart grids, and AI-powered utility networks, which redefine how infrastructure is managed. Port Harcourt, for example, still lacks these digital layers, making its infrastructure less efficient and responsive.

Gehl (2010) rightly prioritised human-scale design and pedestrian-friendly infrastructure, but his perspective does not extend to digital way finding, mobile navigation, or shared micro-mobility apps, which are now vital for making cities walkable and accessible. Lagos's e-mobility platforms are examples of such digital enhancements, not captured by Gehl's physical-centric view.

Sassen (2001) connected infrastructure with a city's global economic function, yet her focus on financial systems and transport hubs overlooks the contemporary significance of data

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



centres, digital connectivity, and virtual platforms in enabling global participation. For instance, Lagos's Yabacon tech ecosystem and Abuja's digital governance structures are reshaping how Nigerian cities engage with global networks.

These classical definitions, while insightful, do not sufficiently account for the integrated, digital dimension of urban infrastructure that defines modern cities. The exclusion of broadband networks, IoT devices, urban data platforms, cloud computing, and real-time digital governance creates a theoretical gap that must be bridged to understand and plan for 21st-century urban life.

Thus, a more comprehensive and digitally conscious redefinition of urban infrastructure becomes necessary one that captures both the enduring relevance of physical systems and the transformative potential of digital innovation.

Toward a Modern Digital Definition of Urban Infrastructure

While the classical definitions of urban infrastructure provide valuable foundations, they do not fully reflect the transformative role of digital technology in shaping 21st-century urban environments. Today's cities require infrastructure that not only connects people and goods physically, but also integrates data systems, cloud computing, sensors, and artificial intelligence to support smarter, more sustainable urban living.

A more comprehensive and contemporary definition is therefore necessary one that reflects the evolution of infrastructure from static, hardware-based systems to dynamic, digitally enhanced ecosystems capable of supporting real-time urban operations, inclusive development, and climate resilience.

Modern Definition:

Urban infrastructure refers to the interconnected physical and digital systems, networks, and services that support and enable the functioning, development, and sustainable growth of cities. It includes traditional physical components such as transportation networks, utilities, public spaces, and amenities as well as digital infrastructure, including broadband connectivity, data platforms, cloud computing, intelligent systems, and emerging technologies that facilitate innovation, resilience, citizen engagement, and real-time urban management (Graham & Marvin, 2001; UN-Habitat, 2016; Ferrer, Thomé & Scavarda, 2018; Bassett, 2016; Newman & Kenworthy, 2015).

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



This definition also encompasses smart governance systems that streamline service delivery and policymaking, citizen participation platforms that enhance civic engagement, and IoT-enabled infrastructure that collects and processes urban data for more responsive decision-making. Moreover, it accounts for the critical importance of cybersecurity, digital equity, and climate-smart technologies such as smart grids, adaptive drainage systems, and early warning platforms which are now central to building resilient and inclusive urban futures.

This comprehensive framing captures the multidimensional nature of urban infrastructure in the digital age. It recognises that urban resilience, sustainability, and global competitiveness now depend as much on digital tools, data governance, and networked intelligence as they do on roads, bridges, and water pipes. As such, it provides a more robust foundation for planning, managing, and reimagining cities in the face of rapid technological, social, and environmental change.

Contextualising the Modern Definition in Nigerian Cities

The relevance of this modern definition of urban infrastructure which is integrating both physical and digital dimensions is clearly reflected in the evolving landscape of Nigerian cities. From smart city initiatives to digital governance reforms, Lagos, Abuja, and Port Harcourt each offer unique insights into the opportunities and challenges of implementing contemporary infrastructure systems.

Lagos, Nigeria's commercial capital, demonstrates significant strides in integrating digital technologies into its urban fabric. The state's Smart City Initiative exemplifies a shift towards data-driven governance and service delivery. Innovations such as the Lagos Electronic Geographic Information System (E-GIS), smart traffic cameras, automated toll collection, and digitised tax platforms reflect an increasing emphasis on digital infrastructure. Additionally, districts like Yabacon have become tech clusters, supporting startups and digital entrepreneurship. However, infrastructure gaps still persist in underserved neighbourhoods, where broadband access and digital inclusion remain limited.

In Abuja, the planned nature of the city offers a structural advantage for implementing integrated infrastructure. The digital land administration system and smart surveillance infrastructure in government zones are early signs of digital transformation. The city's central areas are characterised by strong

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



physical infrastructure broad roads, reliable power supply, and administrative complexes. However, its satellite communities, such as Karu and Gwagwalada, suffer from uneven infrastructure development, particularly in transport connectivity and digital service access. This contrast underscores the need for inclusive infrastructure policies that extend digital benefits beyond the central zones.

Port Harcourt, a city of vital economic importance due to its role in Nigeria's oil and gas sector, reflects a different urban narrative. While traditional physical infrastructure such as roads, drainage, and markets dominate planning efforts, digital integration remains limited. Nonetheless, there are emerging efforts driven by the private sector. Tech hubs like Olotu Square are fostering digital skills and innovation among youth. Internet service providers have begun to expand broadband penetration, and there is increasing interest in deploying digital tools for urban planning. Yet, the absence of smart mobility systems, real-time service platforms, and coordinated digital governance mechanisms continues to hinder Port Harcourt's transition into a fully smart and resilient city.

These three cities illustrate the varying degrees of progress in adopting modern urban infrastructure frameworks. While Lagos is taking the lead, Abuja demonstrates potential through policy-driven planning, and Port Harcourt shows emerging potential constrained by institutional inertia and underinvestment in digital systems. Together, they highlight the importance of adopting a context-sensitive, inclusive, and technology-enabled approach to urban infrastructure that aligns with the demands of the digital age.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Taxonomy of the Types of Urban Infrastructure Based on Global Best Practices

The taxonomy of urban infrastructure, categorising its components across different classifications is presented in Table 1.

Table 1: Taxonomy of Urban Infrastructure

Category	Components	Explanation
Transportation Infrastructure	Roads, highways, and streets	Road networks provides intra- and inter-city connectivity. Examples: East-West Road (Port Harcourt), Lekki-Epe Expressway (Lagos), Nnamdi Azikiwe Expressway (Abuja); Interstate-95 (USA).
	Bridges and tunnels	Structures that enable transportation over water bodies or through mountains. Examples: Choba Bridge (Port Harcourt), Third Mainland Bridge (Lagos), Mabushi Flyover (Abuja); Golden Gate Bridge (San Francisco), Holland Tunnel (USA).
	Railways and light rail systems	Systems that facilitate the movement of passengers and goods via trains. Examples: Port Harcourt–Aba–Enugu Railway, Lagos Blue Rail Line, Abuja Light Rail; New York Subway, Tokyo Metro.
	Airports and seaports	Facilities for air and sea transportation, serving as gateways for domestic and international travel and trade. Examples: Port Harcourt International Airport, Murtala Mohammed Airport (Lagos), Nnamdi Azikiwe Airport (Abuja); Port of Shanghai, Heathrow Airport (London).
	Public transportation systems	Systems offering affordable, accessible transport. Examples: Lagos BRT, Abuja Bus Mass Transit; Rea Vaya (Johannesburg), London Underground.
	Bicycle lanes and pedestrian walkways	Designated lanes and pathways for bicycles and pedestrians, promoting active transportation. Examples: Lagos Marina pedestrian zones, Millennium Park paths (Abuja); High Line (New York), bike lanes in Amsterdam.
Utility Infrastructure	Water supply systems	These include facilities and networks for treating and distributing clean water to homes, businesses, and public institutions. Local examples: Lagos Water Corporation's Adiyan Waterworks, Greater Abuja Water Supply Scheme, Rumuola water supply project in Port Harcourt. Global examples: Thames Water (London), New York City Water Supply System.
	Sewage and wastewater treatment	Infrastructure for collecting, treating, and disposing of sewage to protect public health and the environment.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
vOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



	facilities	Local examples: Abuja Greater Sewer Scheme, Lagos State Wastewater Management Office (LSWMO), Port Harcourt septic management in Diobu and Borokiri. Global examples: Singapore Deep Tunnel Sewerage System (DTSS), Hyperion Treatment Plant (Los Angeles).
	Electrical power grids and distribution networks	Systems that generate and distribute electricity to meet the energy needs of urban areas. This includes power plants and electric transmission lines.Local examples: Eko and Ikeja Electric Distribution (Lagos), Abuja Electricity Distribution Company (AEDC), Port Harcourt Electricity Distribution Company (PHED). Global examples: National Grid (UK), PG&E (California).
	Gas supply and distribution networks	Networks that transport natural gas to residential, commercial, and industrial areas, including natural gas pipelines and distribution networks. Local examples: Nigeria Gas Company pipelines in Lagos and Port Harcourt, Gaslink Nigeria Limited (Lagos); gas infrastructure being expanded in Abuja. Global examples: Gazprom (Russia), National Grid Gas (UK).
	District heating and cooling systems	Infrastructure that provides centralized heating and cooling services to buildings and neighbourhoods, such as district heating plants and cooling networks. Local examples: Limited application in Nigeria; pilot initiatives in high-rise estates in Lagos and Abuja. Global examples: Copenhagen's District Heating Network, Seoul's Combined Heating & Power (CHP) Plants.
	Solid waste management systems	Systems and facilities for the collection, disposal, and recycling of solid waste, including landfills and recycling facilities. Local examples: Lagos Waste Management Authority (LAWMA), Abuja Environmental Protection Board (AEPB), Rivers State Waste Management Agency (RIWAMA) in Port Harcourt. Global examples: Zero Waste Program (San Francisco), Tokyo Metropolitan Waste Management System.
Communication / Digital Infrastructure	Telecommunication networks	Networks of communication infrastructure, including fibre optic cables and telecommunication towers, that enable the transmission of voice, data, and multimedia. Local examples: MTN fibre infrastructure in Lagos, Airtel and Globacom towers across Port Harcourt and Abuja. Global examples: AT&T network (USA), BT Openreach (UK).
	Internet service	Organizations that offer internet access to homes,

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



	providers	businesses, and public institutions. Local examples: Spectranet, Smile Communications, IPNX, MTN Broadband (active in Lagos, Port Harcourt, Abuja). Global examples: Comcast (USA), Vodafone (UK).
	Data centres and server infrastructure	Facilities that house servers and storage systems, supporting the storage, processing, and delivery of digital data. Local examples: Rack Centre (Lagos), MDXi data centre (Lekki); proposed expansions in Abuja and Port Harcourt. Global examples: Google Data Centres, Amazon Web Services (AWS).
	Public Wi-Fi networks	Wireless internet networks are accessible to the public and are often provided in public spaces and city-wide areas. Local examples: Lagos Smart City Wi-Fi initiative, Abuja Municipal Area Council free Wi-Fi zones; limited pilots in Port Harcourt malls and tech hubs. Global examples: New York Link NYC, Barcelona Free Wi-Fi.
	Cellular networks and towers	Infrastructure that supports mobile communication, including 2G, 3G, 4G, and 5G cellular networks. Local examples: MTN's 5G towers in Lagos and Abuja, Airtel and Glo towers in Port Harcourt. Global examples: Verizon (USA), Huawei 5G rollout (Asia & Europe).
	Satellite communication systems	Systems using satellites for communication, navigation, and location services. Useful in remote or underserved areas. Local examples: NigComSat (Nigeria's national satellite provider) offering services from Abuja; satellite ISPs serving remote parts of Port Harcourt. Global examples: Starlink (by SpaceX), GPS (USA).
Housing Infrastructure	Residential buildings	These include different types of dwellings such as apartment buildings, duplexes, bungalows, and detached houses that accommodate urban populations. Examples: Lekki Phase 1, Dolphin Estate, Gwarinpa Estate, Presidential Estate, Eliozu Housing, Manhattan high-rises, Tokyo apartment blocks
	Affordable housing developments	Government or privately developed housing schemes aimed at low- and middle-income earners. Examples: Lagos State Rent-to-Own Scheme, Abuja Mass Housing Scheme, RIVCHEM low-income housing, Council Housing, HDB Flats
	Housing complexes	Planned residential communities often equipped with

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



	and communities	shared facilities like parks, shops, and security. Examples: Banana Island, Victoria Garden City, Sunnyvale Estate, Golf Estate, Rainbow Town, gated communities in California, retirement villages in Melbourne
	Homeless shelters and transitional housing	Temporary accommodations for individuals or families without permanent homes, often combined with social services. Examples: informal shelters under Lagos bridges, transitional housing by NGOs in Abuja and Port Harcourt, Covenant House, Crisis UK hostels.
	Supportive housing for vulnerable populations	Examples: National Housing Programme for elderly care, group homes in Lagos and Port Harcourt, assisted living facilities in Canada, disability-inclusive housing in the Netherlands
Public Space Infrastructure	Parks and Green Spaces	Well-known urban parks and green spaces, such as Pleasure Park in Port Harcourt, Central Park in New York City and Hyde Park in London.
	Plazas and Squares	Iconic public gathering spaces, like Times Square in New York City or Red Square in Moscow.
	Recreational facilities	Sports stadiums, swimming pools, and other recreational venues that provide spaces for leisure and physical activity.
	Streetscapes and urban design elements	Pedestrian-friendly streetscapes with features like wide sidewalks, street trees, and bike lanes, as well as urban design elements enhance the city's aesthetic appeal.
	Public seating and street furniture	Benches, bus shelters, and other amenities provide seating and comfort for pedestrians and public transportation users.
	Cultural and Civic Spaces	Museums, theatres, town halls, and other cultural and civic institutions serve as venues for artistic, educational, and community activities.
Social Infrastructure	Healthcare facilities	Hospitals, clinics, and medical centres that provide healthcare services to the community.
	Educational institutions	Schools, colleges, and universities that offer education and training to students.
	Social service centres and welfare agencies	Community centres and organizations that provide social services and support to vulnerable populations.
	Community centres and youth centres	Facilities that offer recreational activities, programs, and resources for community members, particularly youth.
	Cultural and arts institutions	Art galleries, theatres, and cultural centres that promote artistic expression and cultural experiences.
	Religious and worship spaces	Churches, mosques, temples, and other places of worship that cater to the spiritual needs of the community.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Critical Infrastructure	Power plants and substations	Nuclear power plants that generate electricity for the city and substations that distribute the power to different areas. Examples: Afam Power Station, Egbin Thermal Plant, Shiroro Hydro Plant, Jebba Power Station, Fukushima Daiichi Nuclear Plant, Bujagali Hydroelectric Power Station
	Telecommunication backbone networks	National fibre optic backbone that supports high-speed data transmission and connectivity. Examples: Glo-1 and MainOne fibre backbone, Nigeria's National Broadband Plan infrastructure, Google Equiano subsea cable, Trans-African Backbone, Verizon fibre network
	Water treatment and distribution facilities	Water treatment plants that purify and supply clean water to the population and water pipelines that distribute it. Examples: Adiyan Waterworks, Lower Usuma Dam Water Treatment Plant, Greater Port Harcourt Water Supply Scheme, Thames Water treatment facilities, Nairobi's Ruiru Waterworks
	Emergency services and response systems	Fire stations, police stations, and emergency call centres ensure public safety and respond to emergencies. Examples: Lagos State Fire Service, FCT Emergency Management Agency (FEMA), Port Harcourt Area Command Police Station, 112 Emergency Call Centre, New York Fire Department (FDNY), London Ambulance Service
Urban Beautification Infrastructure	Urban parks and gardens	Central Park in New York City, Hyde Park in London
	Streetscaping and landscaping	Tree-lined streets in Paris, flower beds in Singapore
	Public art installations	Sculptures in Millennium Park, murals in Wynwood Walls
	Architectural landmarks	Eiffel Tower in Paris, Sydney Opera House
	Beautification projects	Community gardens in Portland, urban renewal initiatives in Detroit
Green and Sustainable Infrastructure	Renewable energy systems	Solar panels on rooftops, wind turbines in wind farms
	Green building and eco-friendly structures	LEED-certified buildings, green roofs
	Sustainable urban drainage systems	Rainwater harvesting systems, permeable pavements
	Urban agriculture and rooftop gardens	Community gardens, vertical farming installations
	Sustainable	Bike-sharing programs, electric vehicle charging stations

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



	transportation initiatives	
	Energy-efficient street lighting	LED streetlights, smart lighting systems
Industrial and Commercial Infrastructure	Industrial zones and manufacturing facilities	Industrial parks, factories in business districts
	Commercial buildings and office spaces	Skyscrapers, office complexes in central business districts
	Shopping centres and retail spaces	Malls, department stores in commercial areas
	Warehouses and logistics facilities	Distribution centres, storage warehouses near transportation hubs
	Technology and innovation hubs	Research parks, startup incubators in technology clusters
Waste Management Infrastructure	Waste treatment and recycling facilities	Waste-to-energy plants, recycling centres
	Landfills and waste disposal sites	Sanitary landfills, hazardous waste facilities
	Waste collection and transportation systems	Garbage trucks, waste transfer stations
	Composting and organic waste management	Composting facilities, food waste recycling programs
Governance and Planning Infrastructure	City administration buildings	City halls, municipal offices
	Urban planning and zoning departments	Planning offices, zoning boards
	Public transportation planning and management	Transit agencies, transportation departments
	Emergency preparedness and response systems	Emergency management centres, disaster response units
	Data and analytics platforms	Geographic Information Systems (GIS), urban data portals
	Urban development agencies and authorities	Housing authorities, redevelopment agencies
Social and Community Development	Community centres and social hubs	Community centres, youth clubs
	Sports facilities and	Sports complexes, playgrounds

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Infrastructure	recreational spaces	
	Social service organizations and nonprofits	Community outreach centres, food banks
	Community development projects and initiatives	Affordable housing projects, neighbourhood revitalization
	Civic engagement platforms and programs	Citizen participation initiatives, town hall meetings
	Neighbourhood associations and resident councils	Homeowners associations, tenant associations

Source: Authors, 2023; Jacobs, 1961; Florida, 2002; Glaeser, 2011; Gehl, 2010; Sassen, 2001; Spacey 2017; Anofojie, Adeleye & Kadiri, 2014, Graham and Marvin, 2001; UN-Habitat, 2016; Hall, 2002; Joss, et al, 2013; Bassett, 2016; Bhan, Srinivas & Watson, 2019)

Each category of urban infrastructure represents a distinct aspect, and the components listed within each category exemplify specific examples within that aspect.

Transportation infrastructure encompasses various components that facilitate the movement of people, goods, and services within urban areas. Roads, highways, and streets form the backbone of transportation networks, providing connectivity and access to different parts of the city. Bridges and tunnels enable transportation over obstacles such as water bodies or mountains. Railways and light rail systems offer efficient and mass transit options. Airports and seaports serve as hubs for air and sea travel, connecting cities and facilitating international trade. Public transportation systems provide accessible and affordable options for commuters. Lastly, bicycle lanes and pedestrian walkways promote sustainable and active transportation, enhancing mobility and reducing reliance on motor vehicles.

Utility infrastructure comprises essential systems that support the delivery of vital services to urban residents. Water supply systems ensure the availability of clean and safe water for various purposes. Sewage and wastewater treatment facilities manage the proper disposal and treatment of waste materials. Electrical power grids and distribution networks supply electricity for residential, commercial, and industrial use. Gas supply and distribution networks transport natural gas to meet the heating and energy needs of consumers. District heating and cooling systems provide centralised heating and

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



cooling services, improving energy efficiency. Solid waste management systems handle the collection, disposal, and recycling of solid waste, promoting environmental sustainability. Together, these components form the backbone of utility infrastructure, ensuring the availability of essential services in urban areas.

Digital infrastructure facilitates communication, information exchange, and digital services in urban areas. Telecommunication networks, including fibre optic cables and telecommunication towers, enable the transmission of voice, data, and multimedia. Internet service providers provide internet connectivity to users, allowing them to access online resources. Data centres and servers are also the infrastructures that store and process digital data to support various online services. Public Wi-Fi networks provide wireless internet access to the public in specific locations or city-wide areas. Cellular networks and towers ensure mobile communication services across urban areas. Satellite communication systems utilise satellites, such as GPS, for location-based services. These components collectively form the communication infrastructure that enables seamless communication and access to digital services in urban environments.

Housing infrastructure encompasses various components that contribute to the availability and accessibility of housing in urban areas. Residential buildings, including apartment complexes and detached houses, are fundamental components that provide shelter for urban residents. Affordable housing developments aim to address the housing needs of low-income individuals and families by offering affordable housing options. Housing complexes and communities are planned residential areas with shared amenities catering to specific lifestyles or demographics, such as gated communities or retirement villages. Homeless shelters and transitional housing facilities provide temporary accommodation and support services for individuals experiencing homelessness. Supportive housing is designed to meet the specific needs of vulnerable populations, such as group homes for individuals with disabilities or assisted living facilities for the elderly. These components collectively contribute to the housing infrastructure, ensuring the availability of suitable housing options for diverse urban populations.

Public space infrastructure plays a vital role in shaping the quality of urban life and fostering community engagement. Parks and green spaces, such as Central Park or Hyde Park, offer

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



recreational areas for relaxation and outdoor activities. Plazas and squares, like Times Square or Red Square, serve as iconic public gathering spaces for events, performances, and social interactions. Recreational facilities, including sports stadiums and swimming pools, provide sports, fitness, and entertainment spaces. Streetscapes and urban design elements significantly contribute to the overall aesthetic and functionality of the city, creating pedestrian-friendly environments that incorporate features such as wide sidewalks, street trees, and bike lanes. Public seating and street furniture, such as benches and bus shelters, enhance the comfort and convenience of pedestrians and public transportation users. Cultural and civic spaces, including museums, theatres, and town halls, serve as venues for artistic, educational, and community activities, promoting cultural vitality and civic engagement within the city. These components of public space infrastructure enrich the urban experience and contribute to the city's social fabric.

Social infrastructure encompasses the facilities and institutions that contribute to the well-being and development of individuals and communities. Healthcare facilities, including hospitals and clinics, provide essential medical services and promote public health. Educational institutions, such as schools and universities, play a crucial role in providing education and knowledge to individuals, fostering personal growth and societal progress. Social service centres and welfare agencies support vulnerable populations by offering assistance, resources, and community programs. Community and youth centres offer spaces and activities that enable community members, particularly young people, to participate in recreational, educational, and social pursuits. Cultural and arts institutions enrich the community by showcasing artistic expression, hosting performances, and preserving cultural heritage. Religious and worship spaces cater to the spiritual and religious needs of the community, serving as places of worship, reflection, and community gathering. These components of social infrastructure contribute to cities' social fabric and well-being, creating inclusive and vibrant communities.

Critical infrastructure comprises the systems and facilities vital for a city's functioning and resilience. Power plants and substations generate and distribute electricity, ensuring a reliable energy supply for various purposes. Telecommunication backbone networks, such as national fibre optic backbones, provide the infrastructure for reliable and efficient data transmission, supporting communication and

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



connectivity. Water treatment and distribution facilities purify and distribute clean water to meet the population's needs. Emergency services and response systems, including fire stations, police stations, and emergency call centres, ensure public safety and respond promptly to emergencies. Data and analytics platforms, such as Geographic Information Systems (GIS), gather and analyse spatial data to support urban planning and decision-making processes. Urban development agencies and authorities, such as housing and redevelopment agencies, are essential in managing and overseeing the development, revitalisation, and management of urban areas. These critical infrastructure components are essential for cities' overall functionality, safety, and development.

Urban beautification infrastructure enhances the aesthetic appeal and overall quality of urban areas. Urban parks and gardens, such as Central Park in New York City and Hyde Park in London, provide green spaces for recreational activities and relaxation. Street scaping and landscaping efforts, such as tree-lined streets in Paris and flower beds in Singapore, contribute to the visual appeal of urban environments. Public art installations, including Millennium Park sculptures and Wynwood Wall murals, enhance the cityscape with cultural and artistic elements. Architectural landmarks like the Eiffel Tower in Paris and the Sydney Opera House are iconic structures that serve functional purposes and become city symbols. Additionally, beautification projects such as community gardens in Portland and urban renewal initiatives in Detroit, contribute to the revitalisation and improvement of urban areas. These components of urban beautification infrastructure play a crucial role in creating visually appealing and engaging environments, fostering civic pride, and improving the overall quality of life for urban residents.

Green and sustainable infrastructure focuses on promoting environmentally friendly practices and reducing the ecological footprint of urban areas. Renewable energy systems, such as solar panels on rooftops and wind turbines in wind farms, generate clean and renewable energy to power urban environments. Green buildings and eco-friendly structures, including LEED-certified buildings and buildings with green roofs, prioritise sustainable materials, energy efficiency, and environmentally conscious design principles. Sustainable urban drainage systems, such as rainwater harvesting and permeable pavements, help manage stormwater runoff and reduce strain on traditional drainage systems. Urban agriculture and rooftop gardens, such as community gardens and vertical

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



farming installations, contribute to local food production and green spaces within urban areas. Sustainable transportation initiatives, like bike-sharing programs and the availability of electric vehicle charging stations, promote low-carbon transportation alternatives and reduce reliance on fossil fuel-powered vehicles. Energy-efficient street lighting, including LED streetlights and intelligent lighting systems, reduces energy consumption and pollution while ensuring safe and well-lit urban environments. Green and sustainable infrastructure components foster environmental sustainability, resilience, and a more harmonious relationship between cities and the natural world.

Industrial and commercial infrastructure supports economic activities and business operations in urban areas. Industrial zones and manufacturing facilities, such as industrial parks and factories, provide spaces for large-scale production and manufacturing operations. Commercial buildings and office spaces, including skyscrapers and office complexes in central business districts, accommodate businesses and corporate headquarters. Shopping centres and retail spaces, such as malls and department stores, offer a range of retail outlets and consumer services. Warehouses and logistics facilities, including distribution centres and storage warehouses near transportation hubs, serve as storage and distribution points for goods and products. Technology and innovation hubs, such as research parks and startup incubators in technology clusters, provide spaces and resources for technological research, development, and entrepreneurial activities. These industrial and commercial infrastructure components contribute to economic growth, job creation, and innovation within urban areas. They support various sectors of the economy, including manufacturing and retail, as well as technology and innovation, and play a vital role in shaping urban economies.

Waste management infrastructure is responsible for the proper handling and disposal of waste generated in urban areas. It encompasses various components that contribute to waste treatment, recycling, and disposal. Waste treatment and recycling facilities, such as waste-to-energy plants and recycling centres, employ technologies to convert waste into valuable resources or minimise its environmental impact. Landfills and waste disposal sites are designated areas where waste is safely deposited, with sanitary landfills for general waste and specialised facilities for hazardous waste. Waste collection and transportation systems, including garbage trucks

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



and waste transfer stations, ensure the efficient collection and transport of waste from households and businesses to treatment or disposal facilities. Composting and organic waste management facilities focus on processing organic waste materials into compost, which is used for soil enrichment or fertiliser production. These components of waste management infrastructure play a crucial role in promoting environmental sustainability, reducing landfill waste, and minimising the negative impacts of waste on urban ecosystems.

Governance and planning infrastructure are vital in managing and shaping urban areas. It encompasses components that support effective governance, urban planning, and decision-making processes. City administration buildings, such as city halls and municipal offices, serve as administrative centres where government officials and staff work to manage city affairs and provide public services. Urban planning and zoning departments, including planning Boards and zoning offices, are responsible for developing and implementing plans, regulations, and policies to guide the physical development of cities and ensure orderly growth. Public transportation planning and management entities, such as transit agencies and transportation departments, focus on planning, operating, and improving public transportation systems to enhance mobility and connectivity within urban areas. Emergency preparedness and response systems, including emergency management centres and disaster response units, ensure that cities are equipped to handle and mitigate emergencies and natural disasters effectively. Data and analytics platforms, such as Geographic Information Systems (GIS) and urban data portals, provide tools and resources for collecting, analysing, and utilising data to inform evidence-based urban planning and governance decision-making. Urban development agencies and authorities, such as Housing Authorities and Redevelopment Agencies, oversee and facilitate urban development projects, including affordable housing initiatives, neighbourhood revitalisation, and infrastructure improvements. These components of governance and planning infrastructure are essential for effective urban management, sustainable development, and the well-being of urban residents.

Social and community development infrastructure focuses on creating inclusive and vibrant communities by providing essential facilities and fostering social interactions. Community centres and social hubs, such as community centres and youth clubs, serve as gathering places where residents can engage in recreational, educational, and cultural activities,

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



fostering community connections. Sports facilities and recreational spaces, including sports complexes and playgrounds, provide opportunities for physical activities, sports events, and leisure activities for individuals of all ages. Social services organisations and nonprofits, like community outreach centres and food banks, play a crucial role in addressing the community's social needs and providing assistance and support to vulnerable populations. Community development projects and initiatives, such as affordable housing projects and neighbourhood revitalisation efforts, aim to improve the quality of life and create sustainable neighbourhoods. Civic engagement platforms and programs, such as citizen participation initiatives and town hall meetings, encourage residents to actively participate in decision-making processes and contribute to shaping their communities. Neighbourhood associations and resident councils, including homeowners associations and tenant associations, provide a platform for residents to collaborate, voice concerns, and work collectively on neighbourhood-related issues. These components of social and community development infrastructure promote social cohesion, well-being, and community empowerment, fostering a sense of belonging and enhancing the overall liveability of urban areas.

By organising urban infrastructure components into categories, this taxonomy helps provide a comprehensive overview of the diverse elements that constitute urban infrastructure. It highlights the interdependence of these components in supporting the functioning, development, and well-being of urban areas.

Roles of urban infrastructure in supporting and shaping urban areas

Urban infrastructure plays various roles in supporting and shaping urban areas. Different authors in the field have discussed and identified these roles. Here are some key roles of urban infrastructure:

i. Facilitating Economic Activities: Urban infrastructure provides the physical and organisational structures necessary for economic activities to thrive and grow (Jacobs, 1969; Rodrigue, Comtois & Slack, 2013). It encompasses transportation networks, utilities, and commercial infrastructure that facilitate the movement of goods, the delivery of services, and the operation of businesses.

ii. Enhancing Social Interactions: Urban infrastructure creates spaces and amenities that facilitate social

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



interactions and community cohesion (Graham & Marvin, 2001; UN-Habitat, 2016). Parks, public spaces, cultural institutions, and community centres are examples of infrastructure that contribute to social engagement, cultural vitality, and the formation of social networks.

iii. Supporting Public Health and Well-being: Urban infrastructure, including healthcare facilities and sanitation systems, plays a crucial role in ensuring public health and well-being (Gleeson & Low, 2000; Knox & Mayer, 2009). Accessible healthcare, clean water supply, proper sanitation, and waste management systems are essential for maintaining public health and improving the quality of life in urban areas.

iv. Enabling Mobility and Accessibility: Transportation infrastructure, including roads, public transportation systems, and pedestrian-friendly infrastructure, enables the movement of people and goods within and between urban areas (Newman & Kenworthy, 2015; Sassen, 2001). It enhances accessibility to employment opportunities, education, healthcare, and other essential services, contributing to social and economic inclusion.

v. Supporting Sustainable Development: Urban infrastructure promotes sustainable development by incorporating eco-friendly practices and resource-efficient systems (Bassett, 2016; Bhan et al., 2019). Green and sustainable infrastructure, including renewable energy systems, green buildings, and sustainable transportation initiatives, plays a crucial role in promoting environmental sustainability and resilience.

vi. Enhancing Governance and Planning: Infrastructure related to governance and planning, such as city administration buildings, data and analytics platforms, and urban development agencies, supports effective governance and urban management (Hall, 2002; Joss et al., 2013). It provides policymakers with the tools and mechanisms to make informed decisions, implement regulations, and plan for sustainable and inclusive urban development.

vii. Improving Quality of Life: Urban infrastructure has a significant influence on the quality of life experienced by

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



residents in cities (Graham & Marvin, 2001; UN-Habitat, 2016). Adequate housing, access to essential services, well-designed public spaces, and cultural and recreational facilities contribute to a higher quality of life. Factors such as air and water quality, noise reduction measures, and green spaces also impact the well-being and liveability of urban areas.

viii. Promoting Environmental Sustainability: Urban infrastructure can play a crucial role in promoting environmental sustainability by incorporating sustainable design principles and practices (Bassett, 2016; Bhan et al., 2019). This process encompasses infrastructure components, including green spaces, stormwater management systems, renewable energy infrastructure, and waste management systems, which reduce environmental impacts and promote ecological balance.

ix. Fostering Innovation and Technology Adoption: Urban infrastructure can serve as a platform for innovation and the adoption of emerging technologies (Townsend, 2013; Hollands, 2008). Innovative city initiatives, digital infrastructure, and intelligent transportation systems are examples of infrastructure that facilitate the integration of advanced technologies, data analytics, and automation, leading to improved efficiency, sustainability, and quality of urban services.

x. Supporting Resilience and Disaster Preparedness: Urban infrastructure plays a crucial role in building resilience and preparedness for natural disasters and other emergencies (Gleeson & Low, 2000; Knox & Mayer, 2009). It includes infrastructure components such as robust communication networks, emergency response systems, resilient buildings, and infrastructure designed to withstand and recover from disasters, ensuring the safety and well-being of urban populations.

xi. Encouraging Active and Healthy Lifestyles: Well-designed urban infrastructure can promote physical activity and healthy lifestyles (Graham & Marvin, 2001; Hall, 2002). Infrastructure elements such as bike lanes, walkable neighbourhoods, recreational facilities, and access to parks and green spaces encourage active transportation and

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



recreational activities, thereby improving public health outcomes and overall well-being.

xii. Enhancing Social Equity and Inclusion: Urban infrastructure can play a role in fostering social equity and inclusion by providing equitable access to essential services, amenities, and opportunities (Bhan et al., 2019; Joss et al., 2013). It also includes infrastructure components such as affordable housing, accessible public transportation, community facilities in underserved areas, and inclusive public spaces that cater to the diverse needs of urban populations.

Urban infrastructure is crucial in supporting the functioning, development, and well-being of urban areas. Abandoning urban infrastructure would have detrimental effects on various aspects of urban life and hinder the progress of cities.

Evaluating the Need for Increased Government Funding and Investment in Urban Infrastructure

The nexus between urban infrastructure and public investment is critical to achieving sustainable urban development. Urban infrastructure requires substantial financial resources for planning, construction, operation, and maintenance. Without consistent and adequate funding, cities face infrastructure deficits that constrain mobility, accessibility, service delivery, and economic growth. Effective funding mechanisms are, therefore, essential for ensuring the availability, efficiency, and sustainability of urban infrastructure (Ikiriko & Brown, 2024).

In Nigeria, the urgency for increased government funding and strategic investment in urban infrastructure has become more pronounced, especially in rapidly expanding cities such as Lagos, Abuja, and Port Harcourt. These urban centres continue to struggle with decaying or underdeveloped infrastructure in the face of accelerating population growth, uncoordinated urban sprawl, and heightened environmental vulnerabilities.

Governments at all levels play a critical role in mobilising and allocating financial resources for infrastructure development. Adequate and well-directed funding facilitates the implementation of inclusive urban infrastructure projects and secures their long-term viability. Research and policy evidence confirm that adequately funded infrastructure initiatives deliver multiple benefits, including economic competitiveness, improved quality of life, environmental sustainability, and social inclusion.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Strategic Areas Requiring Increased Government Investment

To foster inclusive, resilient, and productive urban growth, Nigerian cities must prioritise strategic infrastructure sectors where increased public investment can yield the greatest impact:

i. Transportation Networks: Congestion, poor connectivity, and inadequate transport systems are prevalent challenges in cities like Lagos and Port Harcourt. Investments in multimodal systems such as BRT corridors, light rail projects, non-motorised pathways, and water transport can improve accessibility, reduce commute times, and enhance productivity, especially for low-income and peri-urban populations (World Bank, 2021).

ii. Water and Energy Systems: Unreliable access to clean water and electricity remains a critical issue, particularly in informal settlements. Investments in modern water treatment plants, solar energy farms, grid upgrades, and efficient distribution networks are essential for health, economic activities, and urban resilience (International Finance Corporation, 2021).

iii. Public Spaces and Social Infrastructure: Community well-being depends on accessible green spaces, healthcare facilities, schools, and libraries. Cities like Abuja and Port Harcourt show disparities in access to these social services. Increased funding can support inclusive urban design that strengthens social cohesion and cultural identity (UN-Habitat, 2016; Ikiriko & Brown, 2024).

iv. Communication and Digital Infrastructure: In the digital age, communication systems are foundational. Investment in broadband infrastructure, fibre-optic networks, smart sensors, and data centres supports smart city development, e-governance, and real-time service delivery. While Lagos and Abuja are advancing digital initiatives, cities like Port Harcourt require substantial investment to bridge the digital divide and boost tech-driven entrepreneurship (Bassett, 2016; McKinsey Global Institute, 2019).

v. Housing and Urban Renewal: A growing urban population demands affordable and safe housing. The proliferation of slums, particularly in Lagos and Port Harcourt, underscores the need for increased investment in housing schemes, slum upgrading, and mixed-income

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



developments that integrate essential infrastructure.

Implications of underinvestment in Urban Infrastructure

Failure to fund urban infrastructure adequately has far-reaching implications:

Vulnerability: Poor planning and underfunded systems expose cities to disasters like flooding and erosion, as seen in many Port Harcourt neighbourhoods (Adedeji, Odufuwa & Adebayo, 2016).

Escalating Costs: Delayed or reactive infrastructure investments result in expensive retrofitting, land acquisition complications, and costly construction overruns (Howe et al., 2016; Idrees & Shafiq, 2021).

Inconvenience and Low Quality of Life: Inadequate transit, housing, and public utilities increase travel stress, reduce comfort, and worsen health outcomes (Giles-Corti et al., 2016; Adeoye, 2016).

Safety and Security Risks: Poor lighting, unplanned road layouts, and weak surveillance infrastructure increase crime and insecurity. Increased funding can integrate smart security systems and safer public environments (Young et al., 2020).

Public Health Hazards: Lapses in sanitation, waste disposal, and healthcare access promote disease outbreaks and degrade public health, especially in dense urban settlements (Barton, 2009).

Broader Justifications for Increased Urban Infrastructure Funding

Additional supports to increase government investment include:

i. Population Growth: As populations continue to increase, additional funding and investment are necessary to accommodate the growing number of residents and their needs (World Bank, 2019).

ii. Ageing Infrastructure: Many cities are grappling with ageing infrastructure systems that require substantial funding for upgrades, repairs, and maintenance (American Society of Civil Engineers, 2021).

iii. Urbanisation Challenges: The rapid pace of urbanisation poses challenges that necessitate increased investment in infrastructure to support the expanding urban areas (United Nations, 2018).

iv. Economic Competitiveness: Robust infrastructure is crucial for attracting

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



businesses, promoting economic growth, and maintaining competitiveness in the global market (OECD, 2019).

v. Job Creation: Infrastructure investment stimulates job creation and boosts employment rates, providing economic opportunities for the local population (International Labour Organization, 2015).

vi. Sustainable Development Goals: Investing in infrastructure aligns with the United Nations Sustainable Development Goals, particularly goals related to sustainable cities, clean energy, and climate action (United Nations, 2015).

vii. Innovation and Technological Advancements: Increased funding can drive innovation, encourage the integration of innovative technologies, and enhance the efficiency and sustainability of urban infrastructure (McKinsey Global Institute, 2019).

viii. Climate Change Adaptation: Additional investment is needed to develop climate-resilient infrastructure that can withstand the impacts of climate change and protect communities (Intergovernmental Panel on Climate Change, 2014).

ix. Social Equity: Adequate funding can ensure that infrastructure projects address the needs of all communities, promoting social equity and reducing inequalities (United Nations Human Settlements Programme, 2016).

The arguments will be exhaustive, showcasing the wide range of benefits and the urgency for increased funding and investment in urban infrastructure to address current and future challenges thereby improving the overall well-being of urban residents.

Overcoming Challenges and Exploring Innovative Financing Mechanisms

While the importance of increased funding for urban infrastructure cannot be overstated, Nigerian cities face significant challenges in mobilising adequate financial resources. Limited public budgets, competing developmental priorities, bureaucratic inefficiencies, and institutional constraints often hinder the timely and effective implementation of critical infrastructure projects. To overcome these challenges and bridge the infrastructure financing gap, a multifaceted approach involving strategic planning, innovation, and cross-sector collaboration is essential.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



i. Public-Private Partnerships (PPPs):

Public-Private Partnerships remain one of the most effective tools for financing urban infrastructure. PPPs facilitate collaboration between government entities and private sector actors, allowing the sharing of capital investment, risks, technical expertise, and responsibilities. This model has proven successful in improving infrastructure service delivery and ensuring long-term operational efficiency. Projects such as the Lekki-Epe Expressway in Lagos and the Abuja-Kaduna Rail line demonstrate the potential of PPPs when supported by clear policies and regulatory frameworks (World Bank, 2021).

ii. Innovative Financing Mechanisms:

Governments must adopt innovative financing tools to mobilise private capital and supplement public funds. These include:

Municipal and infrastructure bonds: Allowing local governments to raise long-term capital for infrastructure projects.

Land Value Capture (LVC): Mechanisms such as development charges and betterment levies recoup a portion of the increased land value generated by public infrastructure.

Tax Increment Financing (TIF): Financing future infrastructure using projected increases in property tax revenues.

These strategies create reliable revenue streams while reducing fiscal pressure on governments (International Finance Corporation, 2021).

iii. International Cooperation and Development Assistance

International partnerships play a pivotal role in providing both financing and technical support for urban infrastructure development. Multilateral institutions such as the World Bank, African Development Bank (AfDB), and International Finance Corporation (IFC) offer concessional loans, grants, and capacity-building resources. Collaborative frameworks with international donors, bilateral partners, and global organisations can help bridge funding gaps and align projects with global best practices and sustainability goals (United Nations, 2016).

iv. Technology-Driven Financial Innovation

In the digital age, technology offers new tools for revenue generation and infrastructure financing. Governments can explore:

Blockchain for secure contract and payment systems.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Geospatial technology to assess property values and improve land-based revenue.

Mobile-based microfinance platforms for housing and utility access in informal settlements. Such innovations enhance transparency, reduce leakages, and promote citizen trust in government-led infrastructure initiatives.

v. Climate and Green Finance

Given the climate vulnerabilities of many Nigerian cities, especially Port Harcourt and Lagos, accessing climate finance is increasingly essential. Instruments like the Green Climate Fund, carbon credits, and climate-resilient infrastructure funds can support eco-friendly projects such as renewable energy, green housing, and sustainable drainage systems. Integrating resilience into infrastructure planning ensures long-term cost-effectiveness and environmental sustainability.

Conclusions

Urban infrastructure is the backbone of city functionality, growth, and long-term sustainability. It underpins economic development, enhances the quality of life, fosters social inclusion, and supports environmental resilience. In Nigeria where cities such as Lagos, Abuja, and Port Harcourt are experiencing rapid urbanisation and demographic pressure the urgency for well-planned and adequately financed infrastructure has reached a critical point.

Increased investment in urban infrastructure is not merely beneficial it is imperative. Strategic, consistent government funding must be directed toward creating cities that are smart, inclusive, and climate-resilient. A holistic approach that integrates physical networks (roads, housing, utilities), social infrastructure (healthcare, education, public spaces), and digital systems (broadband, data platforms, smart city technologies) is essential to effectively meet current urban demands and future challenges.

To actualise this vision, Nigerian cities must overcome the persistent constraints of limited budgets, institutional inertia, and planning inefficiencies. Innovative financing tools—such as infrastructure bonds, land value capture, and tax increment financing—along with stronger public-private partnerships and international cooperation, can significantly expand available resources. However, funding alone is not enough. It must be accompanied by transparent governance, community engagement, data-driven planning, and an inclusive approach that ensures no population group is left behind.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



References

Adedeji, O. H., Odufuwa, B. O., & Adebayo, O. H. (2012). Building capabilities for flood disaster and hazard preparedness and risk reduction in Nigeria: need for spatial planning and land management. Journal of sustainable development in Africa, 14(1), 45-58.

Adeoye, D. O. (2016). Challenges of urban housing quality: Insights and experiences of Akure, Nigeria. Procedia-Social and Behavioural Sciences, 216, 260-268.

American Society of Civil Engineers. (2021). 2021 Infrastructure Report Card. Retrieved from https://infrastructurereportcard.org/infrastructure-categories/

Anofojie, A. E., Adeleye, O. A., & Kadiri, M. A. (2014). Housing quality assessment in selected public residential estates in Amuwo-Odofin LGA, Lagos, Nigeria. International Journal of Research, 2(6), 2311-2484.

Barton, H. (2009). Land use planning and health and well-being. Land use policy, 26, S115-S123.

Bassett, E. (2016). Building sustainable cities: Urban infrastructure and development. Environment and Urbanization, 28(1), 19-34.

Bhan, G., Srinivas, S., & Watson, V. (2019). Planning Infrastructure for All: Participatory Urban Infrastructure Mapping in Gurgaon, India. Journal of Planning Education and Research, 39(1), 89-103.

Brookings Institution. (2019). The Role of Social Infrastructure in Smart Cities. Retrieved from https://www.brookings.edu/wp-content/uploads/2021/04/20210413_brookingsmetro_american-infrastructure-vision_report.pdf

Council of Europe. (2021). Cultural Policy Review of the Council of Europe: Serbia. Retrieved from https://www.coe.int/en/web/culture-and-heritage/cultural-policy-reviews

Ellen MacArthur Foundation. (2019). Completing the Picture: How the Circular Economy Tackles Climate Change. Retrieved from https://emf.thirdlight.com/file/24/cDm30tVcDDexwg2cD1ZEcZjU51g/Completing%20the%20Picture%20-%20How%20the%20circular%20economy%20tackles%20climate%20change.pdf

European Commission. (2019). Accessibility Act: Towards an Accessible Europe. Retrieved from https://ec.europa.eu/social/main.jsp?catId=1202&intPageId=5581&langId=en

Federal Highway Administration. (2021). Intelligent Transportation Systems. Retrieved from https://highways.dot.gov/research/laboratories/saxton-transportation-operations-laboratory/ITS-technologies

Ferrer, A. L. C., Thomé, A. M. T., & Scavarda, A. J. (2018). Sustainable urban infrastructure: A review. Resources, Conservation and Recycling, 128, 360-372.

Florida, R. (2002). The rise of the creative class: And how it's transforming work, leisure, community and everyday life. Basic Books.

Food and Agriculture Organization. (2020). The State of Food and Agriculture 2020. Retrieved from https://www.fao.org/3/cb1447en/cb1447en.pdf

Gehl, J. (2010). Cities for people. Island Press.

Giles-Corti, B., Vernez-Moudon, A., Reis, R., Turrell, G., Dannenberg, A. L., Badland, H., ... & Owen, N. (2016). City planning and population health: a global challenge. The lancet, 388(10062), 2912-2924.

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



Glaeser, E. L. (2011). Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier. Penguin.

Gleeson, B., & Low, N. (2000). Infrastructure and services in the Asia-Pacific region. Routledge.

Global Infrastructure Hub. (2016). Global Infrastructure Outlook. Retrieved from https://outlook.gihub.org/

Graham, S., & Marvin, S. (2001). Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition. Routledge.

Habitat for Humanity. (2021). Global Impact Report 2020. Retrieved from https://www.habitat.org/multimedia/global-impact-2021/

Hall, P. (2002). Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880. Blackwell Publishers.

Hollands, R. (2008). Will the real smart city please stand up? City, 12(3), 303-320.

Howe, C., Lockrem, J., Appel, H., Hackett, E., Boyer, D., Hall, R., ... & Mody, C. (2016). Paradoxical infrastructures: Ruins, retrofit, and risk. Science, Technology, & Human Values, 41(3), 547-565.

Idrees, S., & Shafiq, M. T. (2021). Factors for Time and Cost Overrun in Public Projects. Journal of Engineering, Project & Production Management, 11(3).

Jacobs, J. (1961). Jane jacobs. The Death and Life of Great American Cities, 21(1), 13-25.

Ikiriko, T. D., & Brown, I. (2024). Assessing the adequacy of public primary school infrastructure in Port Harcourt Municipality. Global Research in Environment and Sustainability, 2(9), 9–28.

Intergovernmental Panel on Climate Change. (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Retrieved from https://www.ipcc.ch/report/ar5/wg2/

International Association of Public Transport. (2020). Public Transport for a Green Future. Retrieved from https://www.uitp.org/sites/default/files/cck-focus-papers-files/CCK2020/2020_uitp-cck-transport-for-a-green-future.pdf

International Finance Corporation. (2021). Innovative Financing for Infrastructure: A Guidebook. Retrieved from https://www.ifc.org/wps/wcm/connect/bee837d0-34b5-4703-95bb-ebb8c474f729/IFC-ESG-Guidebook.pdf?MOD=AJPERES&CVID=nXrNOGJ

International Labour Organization. (2015). World Employment and Social Outlook: The Changing Nature of Jobs. Retrieved from https://www.ilo.org/global/research/global-reports/weso/2015-changing-nature-of-jobs/WCMS_368626/lang--en/index.htm

International Renewable Energy Agency. (2021). Global Renewables Outlook: Energy Transformation 2050. Retrieved from https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020

International Transport Forum. (2021). Transport Infrastructure for Sustainable Development. Retrieved from https://www.itf-oecd.org/sites/default/files/docs/integrating-public-transport-maas.pdf

Jacobs, J. (1961). The Death and Life of Great American Cities. Random House.

Jacobs, J. (1969). The economy of cities. Vintage.

John, Spacey. (2017, February 15). Hard Infrastructure vs Soft Infrastructure. Simplicable. Retrieved from:

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



https://simplicable.com/new/hard-infrastructure-vs-soft-infrastructure

Joss, S., Cowley, R., & Tomozeiu, D. (2013). Towards the 'ubiquitous eco-city': An analysis of the internationalisation of eco-city policy and practice. Urban Research & Practice, 6(1), 54-74.

Knox, P., & Mayer, H. (2009). Small town sustainability: Economic, social, and environmental innovation. SAGE Publications.

McKinsey Global Institute. (2019). Smart Cities: Digital Solutions for a More Liveable Future. Retrieved from https://www.mckinsey.com/~/media/mckinsey/business%20functions/operations/our%20insights/smart%20cities%20digital%20solutions%20for%20a%20more%20livable%20future/mgi-smart-cities-full-report.pdf

National Institute of Building Sciences. (2018). Natural Hazard Mitigation Saves: 2017 Interim Report. Retrieved from https://epdmroofs.org/wp-content/uploads/2018/04/ms2_2017interim-report.pdf

Newman, P., & Kenworthy, J. (2015). The end of automobile dependence: How cities are moving beyond car-based planning. Island Press.

OECD. (2019). The Future of Cities: Opportunities, Challenges and the Way Forward. Retrieved from https://publications.jrc.ec.europa.eu/repository/bitstream/JRC116711/the-future-of-cities_online.pdf

Project for Public Spaces. (2021). Outside the box: A Guide for Placemakers. Retrieved from https://www.webjunction.org/content/dam/WebJunction/Documents/webJunction/2015-04/guide-outside-the-box-placemaking.pdf

Rockefeller Foundation. (2015). City Resilience Framework: How-To Guide. Retrieved from https://www.rockefellerfoundation.org/wp-content/uploads/City-Resilience-Framework-2015.pdf

Rodrigue, J. P., Comtois, C., & Slack, B. (2013). The Geography of Transport Systems. Routledge.

Sassen, S. (2001). The global city: New York, London, Tokyo (2nd ed.). Princeton University Press.

Smart Cities Council. (2015). Readiness Guide for Smart Cities. Retrieved from https://www.smartcitiescouncil.com/sites/default/files/2023-01/Smart%20Cities%20Council%20Readiness-Guide_V2%202015.pdf

The Nature Conservancy. (2021). Green Infrastructure for Cities. Retrieved from https://www.nature.org/en-us/about-us/who-we-are/how-we-work/finance-investing/naturevest/green-infrastructure-for-cities/

Townsend, A. M. (2013). Smart cities: Big data, civic hackers, and the quest for a new utopia. WW Norton & Company.

Transportation Research Board. (2017). The Impacts of Transportation Infrastructure Investment on Economic Growth. Retrieved from https://www.nap.edu/read/24864/chapter/1

UNESCO. (2020). Reshaping Cultural Policies: Advancing Creativity for Development. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000377072

UN-Habitat. (2016). Urban Planning and Sustainable Infrastructure. Retrieved from https://unhabitat.org/sites/default/files/2023/05/resolution_on_urban_planning_and_sustainable_infrastructure_resolution-final_draft.pdf

JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS
VOL30, NO 4. JULY, 2025
https://nitpjournals.ng/index.php/jnitp/



United Nations Educational, Scientific and Cultural Organization. (2020). Global Education Monitoring Report 2020. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000375265

United Nations Human Settlements Programme. (2016). World Cities Report 2016: Urbanization and Development – Emerging Futures. Retrieved from https://unhabitat.org/world-cities-report-2016

United Nations Office for Disaster Risk Reduction. (2019). Global Assessment Report on Disaster Risk Reduction 2019. Retrieved from https://reliefweb.int/attachments/c89dfb0c-dd75-37c6-b27e-437862d84fb6/full_gar_report.pdf

United Nations. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. Retrieved from https://sdgs.un.org/2030agenda

United Nations. (2016). The sustainable infrastructure imperative: financing for better growth and development. Retrieved from https://www.un.org/pga/71/wp-content/uploads/sites/40/2017/02/New-Climate-Economy-Report-2016-Executive-Summary.pdf

United Nations. (2018). World Urbanization Prospects 2018. Retrieved from https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf

United Nations. (2019). Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines. Retrieved from https://data.unicef.org/resources/progress-drinking-water-sanitation-hygiene-2017-update-sdg-baselines/

United Nations. (2019). The United Nations World Water Development Report 2019: Leaving No One Behind. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000367308

United Nations. (2020). Policy Brief: COVID-19 and the Need for Action on Mental Health. Retrieved from https://www.un.org/sites/un2.un.org/files/un_policy_brief-covid_and_mental_health_final.pdf

World Bank. (2019). Financing Sustainable Cities: Fiscal Sustainability and Resilience. Retrieved from

World Bank. (2019). Sustainable Cities: A Cross-Sectoral Approach for the World Bank. Retrieved from http://documents1.worldbank.org/curated/en/431331558859111674/pdf/132854-WP-REVISED-PUBLIC-Box394861B-REPORT-Web-1.pdf

World Bank. (2020). Maximizing Finance for Development: Leveraging the Private Sector for Infrastructure Investment. Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/33393/9781464815440.pdf

World Bank. (2021). Public-Private Partnerships in Infrastructure:

World Economic Forum. (2020). The Global Risks Report 2020. Retrieved from http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf

World Health Organization. (2018). Ambient Air Pollution: A Global Assessment of Exposure and Burden of Disease. Retrieved from https://www.who.int/publications/i/item/9789241511353