NIGER STATE SMART CITY STRATEGY

NIGER STATE

UN❀HABITAT
FOR A BETTER URBAN FUTURE

Foreword

Niger State is predominantly a rural state that is urbanising at a fast rate. Urbanisation is bringing about so many people into the towns and cities. Knowing fully that urbanisation has many positive effects on the population and development, the State Government has learnt lessons from other more urbanised states. The State would ensure adequate planning of all urban settlements, in advance and at the appropriate scale, to guide new growth and also to remedy the shortcomings of current unplanned development.

Luckily, the fourth industrial revolution has brought about a technological revolution through the ICT. Nigeria has witnessed growth in mobile telecommunications and broadband penetration. Therefore, cities and towns should take advantage of ICT and Technology to strengthen accessibility and delivery of urban services and effectively connect people, space and things in the city. The challenges faced by many human settlements could, therefore, be addressed through ICT-based solutions, especially in urban services such as Smart Government, Smart Education, Smart Mo-bility and Transport, Smart Economy & Jobs, Smart Energy, Smart Environment, and Smart Environment Smart Health, among others.

This document on Smart Cities is a subset of the Niger State Urban Policy. It provides a framework to help towns and cities in Niger state to identify their community needs, potentials and strengths. It will also provide a conducive business environment, improve the residents' quality of life and provide a clean and sustainable environment. It will also serve as a road map for preparing and implementing this component of the Urban Policy.

The Government will ensure that adequate resources are made available for implementation. New methods and funding sources would be explored to achieve this objective adequately. These include a partnership between the Government and the private sector and mobilising funding and expertise from International Development partners.

The Niger State Smart City vision is to build a technology-driven, compact and connected settlements that would promote the well-being of all citizens, provide sustainable livelihoods, improve economic growth and job creation, increase the efficient and sustainable utilization of resources, limit negative impact on the environment and improve the efficiency of basic infrastructure and services. The opportunity to make our cities and towns better is here. Therefore, the Government of Niger State is determined to leave no person or place behind.

Alhaji Abubakar Sani Bello
Executive Governor of Niger State

Chapter One

1.0   INTRODUCTION

The "Africa Urban Agenda" recognises that with more than 80 per cent of global Gross Domestic Product (GDP) generated in cities, urbanisation can contribute to sustainable and inclusive growth if managed well. Managing urbanisation is achieved by addressing inequalities, increasing productivity, and promoting job creation, social well-being, citizen participation, innovation, and emerging ideas. As such, there is a need for a radical change in thinking about how cities and human settlements are planned, developed, governed, and managed. Therefore, the Africa Urban Agenda commits to implementing and appropriate use of new and existing technologies to improve city management. It also aspires to enhance accountability and transparency and the protection of public resources through the implementation of open data standards. While such a commitment will also need adequate infrastructure to become operational, the science, technology, innovation, and capacity-development agenda encourages an improvement in the business environment to make it more attractive to investments. This is achievable through access to digital governance solutions and transparent and predictable policies and regulations. The Agenda highlights the importance of "strong political will, collaborative leadership and new institutional frameworks, including a national ICT policy and e-government strategy, as well as strengthening institutions and building the capacities of the public servants besides ensuring universal access to communications and ICT.

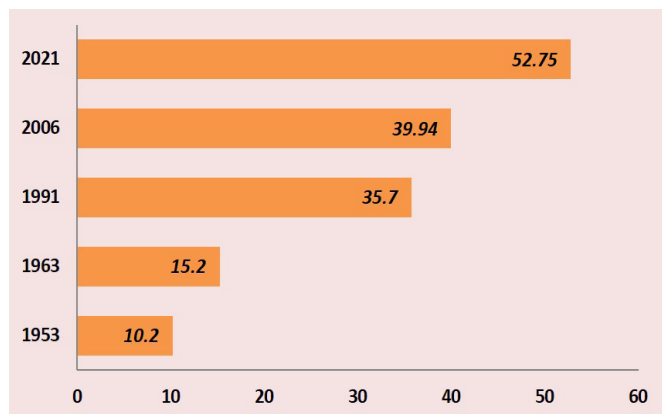## 1.1   URBANISATION IN NIGERIA

Nigeria is the most populous country in Africa. It is estimated to have a current population of about 200 million people. About 51 per cent of the population lives in urban areas. The rate of urbanisation is 3.97 per cent higher than the national population growth rate of 3.2 per cent. The proportion of urban dwellers in the country has risen from 10.2 per cent of the total population in 1953 to 15.2

Night View of Lekki, Lagos - Nigeria

per cent in 1963, 35.7 per cent in 1991, 39.94 per cent in 2006 and 52.75 per cent in 2021. Nigeria's urban population is distributed among several fast-growing cities in the six Geopolitical regions of the country as the number of cities with populations of 20,000 and above rose from 56 in 1953 to 183 in 1963 and 359 in 1991. By 2010, this number had risen to over 1,000. Nigeria has 774 Local Government Areas (LGAs), and each Local Government headquarter is considered an urban area.

Figure 1: Proportion of Urban Population (%)

government headquarters. At the creation of the State in 1976, there were only four urban centres, namely Minna, Bida, Kontagora and Suleja. Currently, the state government has declared the headquarters of all the 25 Local Government Areas as urban centres and the port town of Baro. It is projected that by the year 2050, 11 other towns will have metamorphosed into urban areas. These towns are Mokwa, Lapai, Wushishi, Rijau, Agaie, New Bussa, Shiroro, Kagara, Mashegu and Mariga. Unfortunately, most of the growth and expansion of the settlements is taking place without adequate planning and the provision of basic municipal services. This results in the development taking place informally, posing various issues and challenges such as environmental pollution, congestion in core areas, urban sprawl in peri-urban areas, traffic congestion, and inefficient use of energy and resources (land, space, energy and clean water). These issues have presented both challenges and opportunities to the city authorities in the State. It is an opportunity to use smart city initiatives and new technologies to optimise resource use, adopt sustainable energy management, promote investment in green infrastructure, reduce urban traffic and road congestion, and improve quality of life.
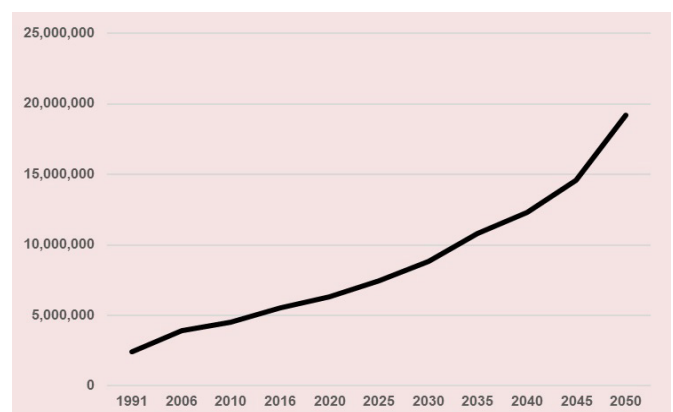
1.2   URBANISATION IN NIGER STATE NIGERIA

Niger State, which is in the early stages of its urbanisation process, is witnessing rapid population and urban growth rates. In 1979, the population of Niger state was 1,745,664 (Niger State Regional Plan) this increased to 2,421,581 in 1991 (1991 National Population and Housing Census), 3,950,249 in 2006 (2006 Nigerian National Population Census) and 5,712,778, in 2017. The State's population is projected to reach 17,219,613 in 2050, based on the annual population growth rate of 3.4 per cent per annum.

As the population is growing in the State, so are the urban centres, especially the primary urban centres and local

Figure 2: Trend Analysis of Niger State Population (1991 -2050)

1.3   SMART CITIES INITIATIVES

In 2017, the Smart Africa Board, headed by President Paul Kagame of Rwanda, produced a Smart Sustainable Cities Blueprint for African Countries to guide African city leaders and officials towards making their cities smart and sustainable. The blueprint demonstrates that the 'smart cities' framework powerfully focuses the attention of African countries on the factors that make a city conducive to growth, health, and sustainability. It also offers a platform to bring all stakeholders together to find the best solutions for each municipality. Crucially, these technologies also provide new ways to track progress toward the goals set and for citizens to contribute actively to the process along the way. According to President Kagame, "transforming Africa's cities will transform Africa. We have the means and the knowledge to do things differently and better — in a word, smartly".

In 2017, the Government of Rwanda prepared a Smart City Master Plan to provide a framework to help Rwandan cities and towns to harness ICTs to offer a higher quality of life to their citizens and businesses. The document, therefore, serves as a road map for the developing smart cities in Rwanda. In Nigeria, the Federal Government has embarked on the Smart City Project to leverage technology solutions to improve the efficiency and sustainability of cities across the country. Federal Government organised the Nigeria Smart City Summit in August 2017 in Abuja, Nigeria. The summit was attended by stakeholders from

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all the three tiers of Government – Federal, State and Local Governments, Financial institutions and ICT companies, among others. At the conference, the then Minister of Communications, Barrister Adebayo Shittu, said , "We know that going smart would not be easy. In fact, it is a huge challenge, given the lack of critical infrastructure in the country. Non-availability of constant power, for instance, is a major challenge for any smart city initiative for the country. A cheap, clean and dependable power supply is the bedrock of any smart city project. So also is effective broadband penetration and affordable data service. The Nigerian ICT Road Map 2017-2020, the National Strategic Plan 2016-2024, the Broadband Policy and the new Power Sector Reforms of this administration are some of the ways government intends to address these challenges." The Minister further said that "there is never a time to be fully ready for a smart city project. It is a process in the wheel of city urbanisation and renewal. Nigeria is ready and eager to embark on that process. This does not mean building only new smart cities. It also means making our existing cities and villages more efficient and more effective, using the technology available at our disposal. Again, doing simple things the smart way, one step at a time!"

One of the strong voices at the Nigerian Smart Cities Summit was the need to recognise population growth as an opportunity; accept rural-urban migration NOT as a threat but reality; the need to use agglomeration, polycentric approach to governance; utilisation of technology to leapfrog development planning; promotion of good governance and Rule of Law; and to build sustainable institutions. Accepting and implementing these suggestions would bring about a paradigm shift in the way the country and city authorities deal with the issues of urbanisation, in particular, and human settlements management in general.

1.4 NIGERIAN NATIONAL POLICY ON SMART CITIES

The Federal Government of Nigeria considers ICT as a means to provide quality service and also to diversify the Nigerian economy. The current Minister of Communications and Digital Economy, Dr Isa Pantami, sees the ICT sector as "the new oil"— a euphemism for a major revenue-generating sector. According to the Minister, "The Gross Domestic Product (GDP) Report has shown how critical the ICT sector is to the growth of our country's digital economy and, by extension, the general economy," In fact, the contributions of ICT to the GDP has been increasing in recent times despite the setback of the COVID 19 pandemic. In the second quarter of 2020 contribution of ICT to the real GDP stood at 17.8 per cent.

The Federal Government has realised the importance and potential of the digital economy in the face of dwindling oil revenue, infrastructural deficit, high unemployment rate and harsh business environment, among others. Thus, the Federal Ministry of Communications was renamed and given additional responsibility for developing ICT and the digital economy. Smart cities in Nigeria will hopefully turn Nigeria's economy in a sustainable positive direction, creating opportunity and efficiency in the next ten years, potentially adding up to $88 billion to the GDP of Nigeria and more than three million jobs.

Early in 2020, the Federal Government of Nigeria launched the National Digital Economy Policy and Strategy (2020-2030), National Broadband plan (2020-2025) and National Policy for the Promotion of Indigenous Content in the Telecommunications sector. The objectives of the Digital Economy Policy and Strategy include the following, among others:

i.   Target 70 per cent broadband penetration in 4 years;

ii.   To accelerate the digitalisation of government processes and improve service delivery, transparency and accountability;

iii.   To improve trust, confidence and security around digital processes and activities;

iv.   To attract and grow digital jobs across all sectors of the economy;

v.   To develop the technology startup ecosystem by actively promoting innovation and entrepreneurship;

vi.   To support the digital literacy of Nigerian Citizens, Business and Government workers and enable them to acquire cutting edge digital skills;

vii.   To achieve a 95 per cent Digital Literacy Level in Nigeria within the next ten years;

viii. To develop a digital education curriculum to meet the current and future needs of the Digital Economy;

ix.   To ensure that indigenous technology companies can participate actively in the government-funded technology programmes; and

x.   To ensure that the policy and regulatory instruments are fit-for-purpose and actually support the digital business environment.

Also, there is a specific provision in the policy. Pillar 7 is precisely on Digital Society and Emerging Technologies. The Digital Society and Emerging Technology pillar will map the development of the digital economy to the attainment of 7 of the Sustainable Development Goals (SDGs) that are most relevant to the digital economy, namely:

1. Poverty Eradication;

2. Good Health and Well-being;

3. Quality Education;

4. Decent Work and Economic Growth;

5. Industry, Innovation, and Infrastructure;

6. Reducing Inequality; and

7. Sustainable Cities and Communities.

The policy also recognised the role Emerging technologies could play to enable the nation to attain these goals. An emerging technology Programme would be introduced to explore options for using emerging technologies to address national challenges. The Federal Government is also embarking on the Smart City Project to leverage technology solutions to improve the efficiency and sustainability of cities across the country. In summary, the Government of Nigeria has clearly shown its support and interest in smart cities development. It takes the necessary steps to deploy the ICT infrastructure throughout the country.

1.5   POLICY REVIEW

A Smart city concept is a new approach to urban development and management in Nigeria. At the National level, the implementation of this new method falls under the jurisdiction of the Federal Ministries in charge of Works, Housing and Urban Development, and Communications and the Digital Economy. These sectors are guided and regulated by policies, laws/legislation, and regulations. A brief review of these instruments is given below:

1.5.1   National Urban Development Policy
The Federal Government of Nigeria promulgated the Second National Urban Development Policy in 2012. The goal of the policy is "to promote a dynamic system of clearly defined, planned and well-managed urban settlements, which fosters sustainable economic growth, promotes ef-

ficient and balanced urban and regional development, as well as ensures equity and improved standard of healthy living and the well-being of all Nigerians". Although the policy did not specifically address the subject matter of "smart cities", it was however covered substantially under the issue of Urban Management Information Systems, climate change, disaster management and institutional coordination. For example, Chapter 13 of the policy aims to "develop a robust, dynamic, relevant, timely, sustainable and standardised urban management information system at all tiers of government that is comparable with international best practices." One of the strategies to achieve the objective (section 13.4 subsection VI) of the policy document is to adopt a Geographic Information System (GIS) and Information Communication Technology (ICT) for information management and urban development throughout the country.

1.5.2   Nigerian Urban and Regional Planning Law
In 1992 the Federal Government of Nigeria promulgated Decree 88 of 1992, or the Nigerian Urban and Regional Planning Law, to replace the Nigeria Town and Country Planning Act of 1946 . The new law spells out the responsibilities of each of the three tiers of government, namely Federal, State and Local Governments, and the types of plans to be prepared at each level. After a landmark court process, the Supreme Court finally declared urban and regional planning, a residual matter, is the responsibility of state and local governments. Niger State Government has domesticated this law by creating the Niger State Urban Development Board. However, the Federal Government can also apply this law in the Federal Government jurisdictions such as the Federal Capital Territory.

1.5.3   National Broadband Plan (NBP)
The NBP addresses three of the eight priorities that the

Federal Government assigned to the Federal Ministry of Communications and Digital Economy, and the parastatals under its purview, for implementation. These priorities are the implementation of broadband connectivity, execution of a plan to deploy 4G across the country and the development and implementation of a digital economy policy and strategy. Broadband supports the development of the digital economy. It focuses on growing the National Digital Economy to improve and diversify the nation's traditional economy. This new broadband plan is designed to deliver data download speeds across Nigeria, a minimum of 25Mbps in urban areas, and 10Mbps in rural areas, with adequate coverage available to at least 90 per cent of the population by 2025 at a price not more than N390 per 1GB of data (2 per cent of median income or 1 per cent of minimum wage). The Plan's implementation will create jobs, improve socio-economic development, and sustain economic growth. However, it is essential to note that the Plan's successful implementation requires synergy between the government and the private sector. The Plan would be driven by the private sector, with the government providing the enabling environment.

1.5.4   Niger State Vision 3:2020

One of the objectives of Niger State Vision 20:2020 was to create favourable human settlements with full opportunities for sustainable growth and development and strong propulsive force to drive the State to one of the three best economies in Nigeria by 2020 - by being a model and leader in agro-based industrialisation where there are employment and wealth creation opportunities for all in an atmosphere of peace. It recognises ICT as a significant driving force for the realisation of its vision, which should be harnessed persistently in all sectors of the economy for the benefit of all social groups to enable the people to meet their basic needs, increase productivity and promote competitiveness.

The Niger State Vision 3:2020 was organised according to the major policy thrusts and development framework of Niger State. The major thrust of the policy was to revitalise the economy of the State and maximise the exploitation of its various potentials to create wealth, empower the private sector and improve the welfare of the populace. The five key thrusts of the policy are:

- Policy Thrust 1: To Move the Niger State Economy up the Value Chain
- Policy Thrust 2: To Raise the Capacity for Knowledge and Innovation and Nurture "First Class Mentality"
- Policy Thrust 3: To Address Persistent Socio-Economic Inequalities Constructively and Productively
- Policy Thrust 4: To Improve the Standard and Sustainability of Quality of Life
- Policy Thrust 5: To Strengthen the Institutional and Implementation Capacity Sectoral Strategies, Action and Implementation Plan

1.5.5   Niger State Blue Print 2019 – 2023

The Development Blueprint of the Niger State Government, under the leadership of His Excellency Alhaji Abubakar Sani Bello, the Executive Governor of Niger State, provided the policy direction of the State administration 2015-2019 and 2019-2023. The document highlighted the priority policy areas, the detailed programmes and initiatives with action plans and activities. This formed the backbone of the State's Medium-Term Development Plan (MTDP). The specific objectives of the blueprint were as follows:

- To serve as a robust framework for the development of Niger State;

- To articulate issues of importance to the people of Niger state towards making her one of the top economies in the country;
- Improve the living condition of the people of the State;
- To serve as a strategy for communicating the government's reforms agenda to relevant stakeholders.

1.5.6 Niger State Geographic Information Systems Agency Law 2013

The Niger State Government established the State Geographic Information System (NIGIS) in 2013 to coordinate and enhance land use administration and documentation processes. This agency remains a central pillar of the land administration and management framework of the NSUP. NIGIS is in charge of issuing land titles and registration of land instruments. The agency has digitised and computerised all land records in the State.

1.5.7 Minna City Data Portal

Minna, the Capital of Niger State, has joined the World Council of City Data (WCCD) to share the data it generated with the general public and other cities worldwide. The city adopted the ISO 37120 indicators, which were also incorporated into the Niger state's Bureau of Statistics data collection template.

However, the city has recognised the challenges of inadequate or the absence of primary city-data necessary for effective planning. By knowing what the urban settlements have or lack, the State can work towards achieving the targets of Goal 11 of the Sustainable Development Goals. The authorities in Minna city intend to extend data collection to other critical areas that are currently not reported upon, such as greenhouse gas emission, modal split and internet penetration and usage, among

others. These are essential indicators of the city's level of development and sophistication. It is also important to emphasise that the relevance of ISO 37120 goes beyond the collection and standardisation of data on the various sectors or indicators. The standard has drawn attention to the absence of basic city-data necessary for effective planning. Correcting this situation is critical to addressing the multiple challenges confronting our sprawling cities.

1.6 INTERNATIONAL INSTRUMENTS

Several international declarations and programmes also guide and regulate urban development in Nigeria. The key ones are discussed below:

1.6.1 Sustainable Development Goals (SDGs)

The global community adopted the 2030 Agenda and its Sustainable Development Goals (SDGs) as the vehicle to guide poverty elimination and sustainable development towards achieving a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice and sus-

tainable cities. The following SDGs are relevant for the application of Niger State smart cities:-

- Goal 3: Ensure healthy lives and promote well-being for all at all ages.
- Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all Quality Education.
- Goal 5: Achieve gender equality and empower all women and girls
- Goal 6: Ensure availability and sustainable management of water and sanitation for all
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovatio
- Goal 10: Reduce inequality within and among countries
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12: Ensure sustainable consumption and production pattern
- Goal 13: Take urgent action to combat climate change and its impacts

1.6.2   The New Urban Agenda

The New Urban Agenda (NUA) is an action-oriented document that provides the global community with principles, policies and standards required to achieve sustainable urban development and transform the way residents construct, manage, operate and live in their cities. It is a plan that provides a new global strategy on urbanisation for the next two decades. NUA was adopted by the mem-

ber states of the General Assembly of the United Nations during the Habitat III Conference in Quito, Ecuador, from October 12 to 20, 2016. NUA covers three main guiding principles:

- End poverty in all its forms and dimensions, including eradicating extreme poverty by ensuring equal rights and opportunities and socio-economic and cultural diversity
- Ensure sustainable and inclusive city and opportunities for all
- Ensure environmental sustainability by promoting clean energy, sustainable use of land and resources in urban development and protecting ecosystems and biodiversity, including adopting healthy lifestyles in harmony with nature.

The main components of the NUA strategic direction are:

- City regulation and legislation: Ensuring results in terms of quality of urban settlements based on established regulatory set; strengthening urban legislation, and providing forecasts and directions to urban development plans to enable social and inclusive development.
- Urban planning and design: Strengthen urban and provincial planning to leverage space dimensions in urban form and provide a good urban design advantage
- Municipal finance: Creating an effective funding framework, enabling municipal finance to be strengthened and local fiscal systems to be created, maintaining and sharing values generated by sustainable urban development

The NUA refers to smart cities as one of the calls of action to achieve the ambitions of the Agenda. "To adopt a

smart city approach, which makes use of opportunities from digitalisation, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery."

1.7 ALIGNING THE NIGER STATE URBAN POLICY TO NIGERIA NATIONAL URBAN POLICY (NUP) AND THE NIGER STATE SMART CITY STRATEGY (NSCS)

The Niger State Smart City Strategy is designed to be a part of the National Urban Development Policy and the Niger State Urban Policy. It is specifically designed to support and complement the two policies using integrated and holistic approaches. NSCS will provide the means, using ICT and establishing an accurate and reliable database to improve the quality of information for decision making. It will also improve access to essential services and the operations and management of these services. The Strategy would also enhance and promote the efficient use of land resources through effective and efficient land information systems and extension of the services of the Niger State GIS to all urban areas in the State.

1.8 CHALLENGES OF SMART CITIES IN NIGERIA

1.8.1 Urban Planning

One author has described urban Planning in Nigeria as having many plans without planning. In essence, Master Plans are prepared for the major urban settlements, which tend to end up on the shelves without actual implementation. In Niger State, for example, Master Plans were prepared for Minna (1979-2000), Kontagora (1980-2000), Bida (1980-2000), and Suleja (1987-2006). Also,

the state government prepared the Niger State Regional Plan (1979-2000). However, all these plans were never routinely implemented on the ground.

Another challenge of urban planning in Nigeria is the lack of a holistic approach to handling issues. Currently, the planning agencies are weak in capacity and ability to co-ordinate urban development and management, and they do not seem to take this function very seriously. The government departments and agencies are sectorally based and biased, resulting in a silo mentality. On the institutional side, there is ineffective coordination between various agencies at the national, state and local government levels. Finally, urban planners generally tend to practice the profession in the old way without much attention or links with contemporary issues such as smart cities, green urban planning, green economy, digital economy, and climate change. This is a setback in the drive of cities and their authorities to embrace the principles of sustainability-driven by ICT.

1.8.2 Inadequate Critical Infrastructure

Smart Cities require adequate support infrastructure to function effectively. Traditionally, there have been two types of infrastructure: physical (such as buildings, roads, transportation and power plants) and digital (such as information technology (IT), Internet of things (IoTs) and telecommunications infrastructure). There is also the concept of service infrastructure that provides services that run on top of the physical infrastructure (e.g. education, healthcare, e-government, and mass transit). Typical physical and service infrastructure include smart energy, smart buildings, reliable Wifi, smart transportation, smart water, smart waste, smart physical safety and security, smart health care and smart education. The digital infrastructure provides the glue that enables the smart city to operate efficiently and optimally.

There are issues regarding the supply of both the physical and IT infrastructure, which manifest in low collection and disposal of municipal solid waste, poor piped water supply coverage, inadequate public transportation, and the lack of reliable and constant electricity supply. Providing a clean and reliable power supply without outages is the bedrock of any smart city development. Despite Niger State being a big power generator (Kainji (960MW), Jebba (540MW), Shiroro (600MW) Zungeru (700MW), under construction.), most of the human settlements in the State suffer from power rationing, outages and unreliability. There is no considerable effort to exploit the potentials of non-renewable energy such as solar energy to generate electricity in small and intermediate urban centres.

1.8.3   Low Broadband Penetration

The lack of connectivity to the Internet rank among the biggest challenges in small and immediate settlements, including rural villages across the world. At the end of 2018, ITU confirmed that only 51 per cent of the world population is online, meaning they have access to the internet. However, the rest who are offline reside virtually in least developed countries and rural regions. In Nigeria, it is estimated that about 30 per cent of the population has broadband access. For inclusive social transformation to occur in all human settlements, access to the internet under appropriate conditions is crucial to meet the SDG goals.

1.8.4   Digital Divide and Literacy

Wikipedia defined Nigeria's digital divide as the inequality of Nigerian individuals, groups, or organisations regarding access to Information and communications technology (ICT) infrastructure or the internet for municipal use within the Nigerian community. Education, lack of electrical infrastructure, income, urban drift, and other social and political factors contribute to Nigeria's growing digital divide. Usually, telephone companies prioritise big cities and other major urban centres in the provision of telecommunications infrastructure. This means that small towns and rural areas are not given priority in providing such services.

The Federal Government is making efforts to reduce the digital divide in Nigeria. Including collaboration between government agencies and technology corporations like Google, Cchub, Andela, StarBridge Africa, Microsoft and Intel, using libraries as E-learning (theory) facilities, and proposing governmental policies such as salary enhancement and social security.

1.8.5   Institutional Issues

The development of Smart Cities will usually involve multiple stakeholders in both the public and private sectors. Stakeholders expected to be engaged with Niger State Smart Cities development include:

- Federal Ministry of Communications and Digital Economy (FMC&DE) with the mandate for the development of ICT and the digital economy;
- Federal Ministry of Works and Housing (FMWH) with the mandate for oversight of works housing and urban development, including policy on human settlements planning
- Federal Ministry of Power.
- Federal Ministry of National Planning with the mandate for implementation of policy, regulation and administration of analysis and forecast of social and economic development as well as coordination of government entities and other subordinate organisations in the area of social and economic development;
- Niger State Government

- Local Governments;
- Academic and Research Institutions

Private sector stakeholders, especially the ICT companies, who will provide the necessary and specialised services, such as internet connection, to implement detailed plans for smart cities development;

- Civil social service organisations that operate in the area of sustainable development and urban (regional) mobility (including transport, environmental NGOs, cycling associations, etc.) and
- Communities, Development, Residents and town associations.

It is essential to establish an appropriate institutional framework with a clear definition of responsibilities, methods of coordination and collaboration between them. This type of arrangement is currently lacking on the ground.

Chapter Two

2.0   SMART CITIES INITIATIVES

2.1   WHAT IS A SMART CITY?

There appears to be no uniform definition of what constitutes a smart city. The International Telecommunications Union (ITU) defined a "Smart Sustainable City" as an innovative city that deploys Information and Communization Technology (ICT) capabilities and other means to improve quality of life, the efficiency of urban operations and services, and competitiveness while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects. Another notion of smart city was coined by Hall (2000) as a self-monitoring and self-responding system through integration of critical infrastructures and technologies. In the context of urban planning, smart city is an ideological dimensions and deliberate directions for Governments and public agencies at all levels to embrace policies and programs targeting sustainable development, economic growth and better quality of life for the citizens.

Smart city strategies aim to improve the quality of life of the populace in urban areas using innovation and high technologies to solve the severe problems caused by rapid urbanization and structural social problems. The application of smart solutions can address issues of environmental pollution, efficient use of land, urban sprawl, transport congestion, energy needs, access to public services and better transportation systems.

The smart city concept heralds a new era in which information and communications technology (ICT) infrastructure will be an enabler. The digital infrastructure comprises wireless devices, data centres and powerful analytics to enable the government to provide more efficient services, maintain a low carbon footprint and create a conducive environment for its citizens, improving the quality of life and living conditions of urban areas through the State-of-the-art infrastructure and facilities. Integration of ICTs into existing urban services in Smart Cities can improve the energy efficiency, operation and transparency of the urban infrastructure, the resilience of road networks, efficiency of water distribution systems, wastewater management, security, citizen participation in their governance, and other services. Also, smart city solutions can positively contribute to better administration through e-governance, e-procurement, better internal revenue mobilisation through e-payments and better public participation through e-surveys, crowdsourcing etc.

Smart cities introduce various new practices and services that impact urban policy-making and planning as they co-exist with urban facilities. There are multiple ways that a smart city framework can help city planners and urban managers to meet the criteria mentioned above and contribute to a better urban life.

The Smart City concept presents opportunities to city authorities to address many urban development and management issues. These include pollution control, transportation management, improved utilities, smart agriculture, improved health, resource management, public security, and safety. It will also present an opportunity to address the perennial flooding of settlements along River Niger and settlements within Suleja Town through an IoT enabled flood monitoring system. Similarly, it will help the

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State Government strengthen its security architect and prevent state security threats (both internal and external threats)

Cities do not have the option to continue functioning as they have done in the past. Hence city decision-makers need to see the handwriting on the wall and decide on a sustainable urban process that promotes economic progress and environmental protection. It should be noted that the transformation of a traditional city into a Smart City is not a simple task. It requires the commitment of both executive leaders and different public management units and departments. A smart city is generally a long-term municipal project, not the assignment of a single administration. It requires having a long-term vision and building strategies that will not be discontinued.

2.2 SMART CITY SERVICES

Cities provide many different services to their citizens, including water management, energy, transport, waste management, healthcare, education and security. The efficiency of these services can be significantly improved with ICT technologies, creating a new set of "smart services" that will lead to improved efficiency and sustainability. The following physical and service infrastructure are mainly the common aspects of a smart sustainable city:

- Smart energy
- Smart buildings
- Smart transportation
- Smart water
- Smart waste
- Smart physical safety and security
- Smart health care
- Smart education
- Open Data

It should be noted that each city would select only those essential and relevant services to develop smart solutions around them.

2.3   ATTRIBUTES OF SMART CITIES

A smart city has four main focuses:

Table 2.1 : Attributes of Smart Cities

ATTRIBUTES OF SMART CITIES		
1	SUSTAINABLE	It uses digital technology to reduce costs and optimise resource consumption so that its current administration does not compromise its use for future generations;
2	INCLUSIVE AND TRANSPARENT	It has direct communication channels with citizens, operates with open data, and allows for the monitoring of its finances;
3	WEALTH GENERATION	It provides an adequate infrastructure to create high-quality jobs, innovation, competitiveness, and business growth;
4	CITIZEN FOCUS	It uses digital technology to improve the quality of life of people and give quick access to more efficient public services

2.4   CURRENT INITIATIVES ON SMART CITIES

2.4.1   Nigeria Smart Cities Programme

Through the Federal Ministry of Communications, the Federal Government of Nigeria embarked on a Smart City Project in 2017. The project aims to leverage technology solutions to improve the efficiency and sustainability of cities across the country. Under this programme, the Federal Government collaborates with states and local governments, the private sector, especially the IT companies and industry experts to achieve its objectives. It appears that the momentum of project preparation and implementation has been slowed down since the former minister's exit.

2.4.2   Niger State Smart Cities Programme

The Government of Niger State would prepare a Smart Cities Programme as a Niger State Urban Policy component. The NSSC strategy is in harmony with the National Urban Policy and other priorities of the National Government.

NIGER STATE'S SMART CITY VISION

To build a technology-driven, compact and connected settlements that would promote the well-being of all citizens; provide sustainable livelihoods; improve economic growth and job creation while increasing the efficient and sustainable use of resources, limiting negative impact on the environment and improving the efficiency of basic infrastructure and services.

NIGER STATE'S SMART CITY GOAL

The goal is to take advantage of the emerging technological solutions to enhance the effectiveness, sustainability and resilience of the cities, towns and rural areas of Niger State.

OBJECTIVES

The objectives of the Niger State Smart Cities are:

- To provide enhanced and inclusive economic growth by creating a conducive business environment, startup ecosystems, attracting people and investments.
- To improve the quality of life of their residents through adequate planning and the provision of core and ICT infrastructure
- To ensure a clean and sustainable environment and application of 'Smart Solutions' that increase the efficient use of resources and limit the negative impact on the environment.
- Achieve a sustainable and resilient development
- Create a sustainable management mechanism for preparing, financing, implementing and managing smart cities in the state.

The strategies for achieving these objectives are in Table

Table 2.2: Objectives and Strategies for NSSC

No.	Objective	Strategies
1	To provide enhanced and inclusive economic growth by creating a conducive business environment, startup ecosystems, attracting people and investment.	• Identify and remove obstacles affecting firms and businesses. • Develop a technology startup ecosystem and encourage innovation and entrepreneurship.
2	To improve the quality of life of their residents through adequate planning and the provision of core and ICT infrastructure	• Prepare and implement appropriate physical development plans. • Upgrade existing urban services through the use of ICT technologies. • Establish new smart urban services such as smart street lights, smart transportation, etc., to improve the residents' quality of life. • Identify and install sensors to monitor identified environmental parameters such as air quality, floods etc. • Establish IoT systems in an integrated fashion. • Design and deploy smart mobile applications for monitoring air quality, energy use, traffic patterns and street lighting, smart parking, crowd management, emergency response and for feedback from city residents. • Integrate intelligent solutions in safety and security plans and programmes.
3	To ensure a clean and sustainable environment and apply 'Smart Solutions' that increase the efficient use of resources and limit the negative impact on the environment.	• Establish smart and adaptive traffic management systems, including intelligent traffic lights. • Introduce smart waste management and smart water treatment systems. • Collect real-time data to help redesign the system for better efficiency and safety.
4	Achieve a sustainable and resilience development	• Promote climate-resilient and environmentally friendly infrastructure and services • Monitor and measure specific risk areas to plan for and prepare for likely disasters such as flooding. • Conduct vulnerability analysis to establish risk-prone areas and Plan for mitigation. • Prepare climate adaptation plans to reduce the risks of climate change issues. • Prepare adequate agriculture and urban-rural linkages plans and programmes.
5	Create a sustainable management mechanism for preparing, financing, implementing and managing smart cities in the state.	• Ensure good urban governance and the provision of basic infrastructure and service in all settlements. • Build a digital system of governance and administration through e-payments, e-procurement etc. • Speed up the digitalisation of government process • Improve urban resource mobilisation and expand sources for finance projects. • Use smart and web-based technologies to improve the capacity of governments to deliver efficient and effective services. • Initiate and mobilise critical stakeholders using smart methods such as crowdsourcing and offline and online platforms. • Mobilise, gather and analyse public data to provide appropriate city solutions and use. • Support digital literacy and capacity building programmes for citizens, businesses and government workers

6	Achieve a sustainable and resilience development	• Promote disaster preparedness and response mechanisms. • Ensure establishment of early warning systems. • Prepare and implement hazard maps.
7	Develop the capacities of urban centres of Niger state to deploy smart city processes and innovative technologies.	• Undertake training and capacity building needs assessment for building smart cities in Niger State. • Develop and conduct training of all stakeholders. • Embark on full-scale digital literacy programmes. • Establish policies and programmes to mainstream capacity building in the operation of government.

2.8   NIGER STATE SMART CITIES STRATEGY

The Niger State Smart Cities Strategy (NSCS) will therefore be an offshoot of the Nigerian National Cities Project promoted by the Federal Ministry of Communications and Digital Economy. Already Niger State has commenced arrangements to establish a new smart city in Suleja. Three other cities – namely Minna, Bida and Kontagora will benefit from replicating the Suleja experience under the Niger State Smart Cities Project (NSSC). Through this policy, the state government looks forward to using IT and automation to deliver better urban infrastructure and services such as smart grid solutions for energy management, intelligent transportation, telemedicine, smart mobility systems, smart and green buildings, smart waste management. Others are smart waste management and smart water management systems. However, it acknowledges that to have the new smart city system in place, the older urban centres will need to undergo a measure of retrofitting to various degrees. The target will be public buildings like the Government House in Minna, the state secretariat housing the MDAs and the local government secretariats.

2.8   CLASSIFICATION OF SMART CITIES IN NIGER STATE

The nature of the smart city project would generally determine how it is grouped or classified.   Three classes identified here are city/urban development, Regeneration or Operation Project. The details are contained in Table 2.3

Table 2.3. Major classes of smart cities

| No.	Category	Attributes
1	City/urban development	Building new city infrastructure to accommodate incoming/increased urban population
2	Regeneration	Upgrading or regenerating the city or its parts to revive underdeveloped areas as well as to improve the residential environment
3	Operation	Integrating advanced technology and applications that enhance the quality of life of the citizens

Chapter Three

3.0   BUILDING A SMART CITY IN NIGER STATE

3.1   THE BUILDING BLOCKS OF A SMART CITY

Each city has specific characteristics in terms of size, built environment, fiscal resources and many other features. Such differences affect the capacity of cities to manage smart technologies and attract smart city investment. Different physical characteristics may also affect the degree of applicability of specific digital technologies. There is, therefore, no digital panacea that fits all cities; smart city initiatives need to match local circumstances to generate benefits.

Niger State Smart Cities would be built around the Goals of the Niger State Urban Policy as aligned with the National Urban Policy. It would consider the objectives, priorities and themes of NSUP. These would be cemented together with enablers and action areas or areas of intervention where smart city solutions would be applied.

Figure 3 Relationship between Urban Policy and the Smart City Strategy
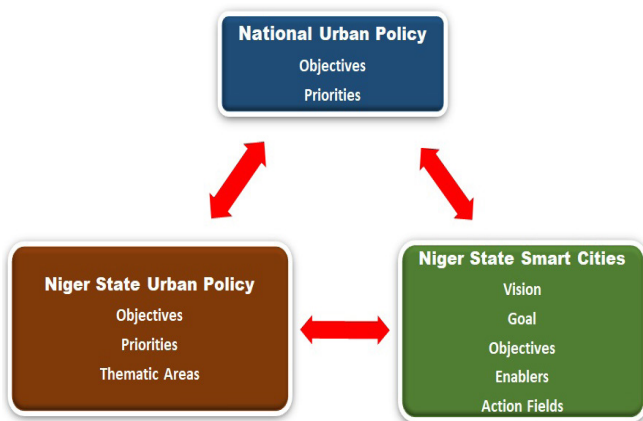
Smart and sustainable cities usually consider factors that align their strategies with the city vision. Niger State Government would take the following measures to ensure adequate support to all participating cities:

- *Institutional Support* – put necessary governance policies, regulations and clear direction for de-

veloping smart cities in the state. These include laws on PPP, programme coordination and programme guidelines.

- *Human Resources Support* – The government would build the knowledge capital in all cities to adequately participate and benefit from the smart cities programme. It would also encourage and support small businesses and startups and promote knowledge, Research and Development in collaboration with local universities and research institutions.

- *Technology* – ICT technology is the backbone and building block of any smart city. It comprises physical infrastructure, smart technologies, mobile and virtual technologies, and digital networks. Technology strengthens and accessibility and availability of the systems providing connectivity among people, space and things in the city. The state government would collaborate with other tiers of government and the private sector to harness the abundant renewable energy sources for improved electricity, public transportation and waste management.

3.2   SMART CITIES TYPOLOGIES

There are three smart city typologies for implementing the Smart City concept in Niger State. They are briefly described below:

3.2.1. Existing Cities/Brown Fields

The existing cities and urban areas in the State have their spatial form, infrastructure, and population services. However, the infrastructure and services are traditional, neither digital nor intelligent. Therefore, retrofitting measures are needed to infuse them with new intelligence. This could be achieved by digitising and connecting them with sensors to sense, analyse and integrate data and

respond intelligently to the needs of their jurisdictions. In this manner, the infrastructure becomes smarter and more efficient.

3.2.2   Green Field Smart Cities

Green Field Smart Cities are generally new projects planned and built using digital ICT technology and smart urban systems. One example is the Suleja Smart City, which is currently in the preparation/design phase. The state government is also preparing the Master Plan for Baro Smart Port City. The State may witness the establishment of many more such cities, especially going by its potential to play host to agro-allied and tourism industries.

3.2.3. Mixture of Green and Brownfield Projects.

As much as possible, Niger State Urban Policy encourages planned development in all human settlements of the State through planned urban extensions. It is possible and feasible to combine the two types of projects. This happens when new urban extension projects are carried out in an existing urban settlement. The new development is based on smart city principles and concepts. In contrast, the old city is based on the traditional planning and infrastructure model.

3.3   SMART CITIES ACTION AREAS

Smart Cities Action Areas and Initiatives are based on the priorities of the NSUP. The list of likely candidate projects for consideration is given in Annex I. The detailed requirements of developing smart cities aligned with the National Urban Development Policy and the Niger

Table 3.1   Smart City Ideas -   Integrated and Balanced Territorial Development

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
a	NSUP Intervention 1: Promote integrated and coordinated planning in the State by mainstreaming urban and regional planning into the state economic planning framework for the rapid socio-economic development of the State.	High	Existing data within Niger state urban development Board and Planning Commission		Ministry of Housing and Urban Development
1	Integrating all dimensions of territorial development into the smart city framework by including smart and intelligent agenda for Schools, SMEs, health, transport and governance.	High	Some existing data within DUHD	NSDF	Planning Commission
2	Set up a central office with responsibility for coordinating and cross-linking digital-isation activities	High			Programme Management Office
b	NSUP Intervention 2: Produce a state regional plan, sub-regional plans and metropolitan plans to coordinate area-wide planning and development efforts	High	Revise the Niger State Regional Plan	NSDF	Ministry of Housing and Urban Development
3	Diagnostic assessment to identify the key issues, priorities and opportunities for core urban services (e.g. water, sanitation, transport)	High	Review of existing master plans	NSDF	Ministry of Housing and Urban Development
4	Develop and adopt operational guidelines and policy documents for joint planning and coordination	High		NSDF	Ministry of Housing and Urban Development
5	Undertake a state-wide multisector and multi-stakeholder consultations to validate the draft Regional plan and analysis report and agree on crucial issues for the Regional Plan	High			Office of the Secretary to the State Government (SSG)
c	NUP Intervention 3: Develop the capacity of state and local government officials to handle the preparation and implementation of integrated plans effectively	Medium	Use existing Establishment and Training programme and budget	NSDF / Urban Planning Law	MHUD / LGS
6	Spatial, temporal and technical coordination of diverse policy areas and planning resources to achieve defined goals using specified (financial) instruments	Medium		JICA study	Planning Commission
7	Digitally integrate all infrastructure networks (transportation, energy) to achieve synergy and complementarity.	Medium		JICA study	Planning Commission
8	Train all technical staff in joint planning, coordination and reporting. Others include data collection, analysis and monitoring.	Medium			Ministry of Housing and Urban Development Planning Commission
9	Mainstream monitoring and evaluation in the process by establishing M&E Units in all cities.	Medium			Ministry of Housing and Urban Development Planning Commission

Table 3.2   Smart City Ideas -   Inclusive, Productive and Competitive Economy

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NUP Intervention 1: Promote Local Economic Development (LED); improve business environment and services for SMEs in all major towns and urban centres.	High	Existing data within Niger state Planning Commission		Planning Commission
10	Create pro-business environments in all the cities and offer advanced services through data and connected technology for small and micro-enterprises.	High	Some existing data within	NSDF	Ministry of Housing and Urban Development
11	Promote the establishment of business and technology incubation centres.	High			Ministry of Commerce
12	Promote Transparent data collection and sharing with the public.	High	Replicate Minna Data Portal in other cities		Ministry of Housing and Urban Development, NIGIS
b	NUP Intervention 2: Transform agriculture into high productivity and value-adding activity to enhance production, processing, storage, distribution and linkages with broader markets along the value chain to facilitate pricing incentive	High	Improve on e-wallet agricultural programme of FG		Ministry of Agriculture, Niger State Agricultural and Mechanization Development Authority
13	Use smart agriculture to save water and energy consumption and increase crop yield.	High			Ministry of Agriculture and Rural Development
14	Provide weather monitoring with IoT monitoring systems in agriculture that helps estimate the exact supply of water, chemicals, and nutrients needed to grow high-quality crop yields. The farming products produced using the monitoring system are also more capable of meeting market specifications	High	This will also include a flood monitoring system.	NSDF	Ministry of Agriculture and Rural Development Ministry of Environment and Forestry, Niger State Emergency Management Agency
c	NUP Intervention 3: Promote investment in large scale farming and irrigation schemes, tourism and extraction of natural endowments for inclusive economic growth and shared prosperity	Medium		NSDF / Urban Planning Law	Ministries of Agriculture and Rural Development and Investment
15	Government to assist farmers in installing and managing smart agriculture sensors acting as important data collecting points for most farmers' powerful, all-encompassing farm management system.	Medium			Ministry of Agriculture and Rural Development
16	Using smart networking Link economic enterprises, industries and farmers with markets.	Medium		JICA study	Ministries of Agriculture and Rural Development, Ministry of Commerce, Investment and Industry

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
d	NUP Intervention 4: Systematic review to ensure sectoral coordination at a local level (city/ town) for project implementation	Long Term			DAs, Local Governments
17	Digitally align plans across sectoral agencies (land use, transport, energy, environment and disaster/resilience), administrative boundaries and spatial levels.	Long Term			Ministry of Housing and Urban Development

Table 3.3   Smart City Ideas -   Strengthening Urban-Rural Linkages

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
a	NSUP Objective 1: Balanced Urban and Rural growth	High			
18	Provide updated data for a planned, integrated and prioritised rural infrastructure development alongside targeted urban infrastructure.	High	New		State Planning Commission State Electrification Board
19	Prioritise local transport development plan with direct impacts on easily accessible agricultural goods and services.	High	ongoing	Rural Access and Mobility Programme (RAMP)	Min. of Agric. and Rural Development
20	Identify possible linkages with national, inter-state highways, railway corridors, and transport facilities (i.e. roads, ports, airports and rail stations) for ease of movement.	High	New		Min for Local Gov. and Chieftaincy Affairs; Ministry of Transport,
b	NSUP Objective 2:	High			
21	Institutionalise the involvement of rural authorities and dwellers in priority project identification and execution.	High			Min for Local Gov. and Chieftaincy Affairs.
22	Encourage community engagement in rural-urban farming through the improved deployment of technology.	High	Ongoing	NAMDA	
c	NSUP Objective 3:	High			
23	Create an online database of state-wide resources updated periodically with locations, quantity and period of availability.	Medium			Planning Commision
24	Establish a database for product-oriented rural-urban markets	Medium		JICA study	MHUD &MOA

Table 3.4   Smart City Ideas -   Effective Urban Governance and Coordinated Management

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NSUP Objective 1: Promote multi-level governance framework by e-governance, e-procurement etc.	High			
25	Create Online websites for all levels of government	High	New	NA	Governor's Office
26	Exploit digital documents between levels of government	High	New		Governor's Office
b	NSUP Objective 2: Coordinate public institutions	High	.		
27	Rationalise overlapping e-government applications and services	High	New		Ministry of Housing and Urban Development
28	Assess and adopt different types of data sharing platforms suitable for existing government ICT architecture	Medium	New		Ministry of Housing and Urban Development
29	Inclusive minority and vulnerable groups through technological communication platforms	High	New		Ministry of Housing and Urban Development
c	NSUP Objective 3: Strengthen Regulatory framework	High			
30	Identify and Recognise key services to be brought in online	High	New		State House of Assembly
d	NSUP Objective 4: Robust citizens and public participation via information disclo-sure and open data from government	High			
31	Publish processes for information requests	High			Ministry of Information and Strategy
32	Publish annual financial statements and budgets on respective government websites	High	New		State Ministry of Finance
33	Utilise electronic procurement architecture	Medium	New		State Ministry of Finance
34	Establish customer satisfaction assessment in e-government	Medium	New		Niger State Bureau of Statistics
35	Publish delivery time of e-government services	Medium	New		Ministry of Information and Strategy
36	Provide platforms to ensure complete transparency	High			Niger State Planning Commission

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
e	NSUP Objective 5: Document and Strengthen Local Governments assets	High			
37	Integrate each local authority into the e-government platform as an important component in multi-level governance.	Medium	New		Governor's office and All 25 Local Governments Councils
38	Upgrade technical and operational assets of local governments for efficient e-governance	High	New		Governor's office and All 25 Local Governments Councils

Table 3.5 Smart City Ideas - Effective Land Governance

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
a	NSUP Objective 1: Promote access to land in towns and cities	High			
39	Establish and offer ICT enabled multipurpose cadastral register system for land registration and records.	High	New		NIGIS, Lands and Housing
40	Complete the digitisation of State and all LGAs land asset in line with the multi-purpose cadastral.	High	Ongoing		NIGIS, NSUDB, Lands and Housing
41	Create and provide digital maps of pilot cities with periodic updates online	High	Ongoing		NIGIS
42	Develop a meta-database to enable interactions between different data to give a short overview of each data set and further information.	High	New		NIGIS, NSUDB, Housing Corporation
b	NSUP Objective 2: Prevent further growth of slums	High			
43	Pursue new integrated land development plans for smart pilot cities	High	New		NSUDB
44	Provide incentives to encourage formalisation of previous informal land transactions.	Medium	New		NIGIS, Ministry of Finance, Ministry of Justice
45	Coordinate spatial planning and zoning with digital cadastral mapping when formalising land transactions	High	New		NIGIS
c	NSUP Objective 3: Integrated and participatory land development planning and management	High			

46	Promote ICT innovations based on open, local data that empower citizens to communicate effectively with public service providers.	High	New		NIGIS, Governor's Office
47	Connect the land registration system to personal mobile phones to allow citizens to use mobile services to locate land and property.	High			NIGIS, Housing and Urban Development
48	Leverage crowdsourcing initiatives such as dataset creation, correction and open data efforts and donations of spatial or real-time information contributed voluntarily by the public.	High			NIGIS
d	NSUP Objective 4: Capacity building at LGAs to manage urbanisation	High	New		
49	Provide regular and periodic training in ICT innovations and the use of various methods to manage urban growth.	High	New		All 25 LGAs
50	Upgrade and provide technical equipment to all LGA offices of Ministries of land for staff training.	High	New		Housing and Urban Development
e	NSUP Objective 5: Strengthen land management and administration	High			
51	Implement service-oriented ICT architecture and e-governance instruments (e.g. online payments) to inter-connect administrative services and authorities in all LGAs.	Medium	New		NIGIS, Housing and Urban Development, NSUDB
52	Gradually migrate land and property registration from manual and paperwork to digital and online-based processes.	High			Lands and Housing
53	Introduction of online land and property registration based on standard registration forms.	High			Lands and Housing, NIGIS, Housing and Urban Development NSUDB
54	Introduce SMS-based monitoring of land administration processes	High			Lands and Housing, NIGIS, Housing and Urban Development NSUDB
55	Develop a mobile application and customised software to improve networking, information flow and daily connection of land offices, surveyors, financial institutions, and citizens	High			Lands and Housing, NIGIS, Housing and Urban Development NSUDB

Table 3.6   Smart City Ideas -   Urban Security and Safety

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NSUP Objective 1: Enhance community security frameworks	High			Cabinet and Security Department
56	Provide ICT communication gadgets to community security committees for effective and real-time communication with local governments, police and neighbourhood corps	High	New		Ministry of Local Government
57	Develop mobile applications and software (e.g. personal alert applications) to operationalise citizen-driven intelligence gathering at the community level.	High			Ministry of Local Government, Cabinet Office
58	Enhance real-time crime mapping and implementation of digital surveillance using sensors and the IoT.	Medium			Ministry of Local Government, Cabinet Office
59	Strengthening the Implementation of Crime Prevention through Environmental Design (CPTED)	High	New		Ministry of Local Government, Cabinet Office
b	NSUP Objective 2: Safety and disaster/emergency management protocols	High			
60	Create an easily accessible online resident registration database with biometric and photograph features.	High	New		Niger State Emergency Management Agency, Niger State Fire Service
61	Develop software for simulation and training on multi-hazard contingency plans at state and local government levels	Medium	New		
62	Upgrade NSEMA EM situation room by developing software and hardware for the three Zonal Disaster Warning Centers and refurbishing equipment	High	New		
	Develop and implement a Real-time mobile rescue application	Medium			
c	NSUP Objective 3: Upgrade urban infrastructure, including transportation and public spaces	High			Ministry of Works and Infrastructure
63	Increase the coverage of solar street lighting to major roads, streets and public buildings across smart pilot cities.	High	Ongoing		
64	Install proactive analytical surveillance by providing real-time cloud server back-ups by CCTV at all crime-prone flashpoints.	High	New		
65	Upgrade the street system to contain multiple but integrated services: smart streetlights, smart CCTV, and smart traffic lights.	High	New		

S/No	Intervention Actions	Priority	Position	Ongoing Programme / Project	MDAs in Charge
d	NSUP Objective 4: Upgrade localised and regional security frameworks	High			
66	Develop secured real-time platform of communication among regional security frameworks	High	New		Governors Office
67	Development of crime early-warning mobile application.	High	New		Governors Office

Table 3.7   Smart City Ideas -   Sustainable Transportation and Mobility

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NSUP Objective 1:				
68	Conclude the arrangement for Niger State Government to procure Electric Buses for its intracity and inter-city mass transportation system	High	Ongoing		Ministry of Transport
69	Concluding the arrangement for Niger State Government to procure Electric Tricycles to compliment the intracity mass transportation system in Minna, Suleja, Bida and Kontagora	Medium	Ongoing		Ministry of Transport
70	Undertake feasibility studies and consultations for the establishment of smart transportation in the state	High	New		Ministry of Transport
b	NSUP Objective 2:				
71	Establish Assembly Plant for Electric Buses	High	New		Ministry of Transport
72	Establish Assembly Plant for Electric Tricycles	Medium	New		Ministry of Transport

Table 3.8   Smart City Ideas -   Resilient Infrastructure and Services

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NSUP Objective 1:				
73	Partnership with the private sector to construct and maintain inter and intra city road networks on a BOT basis. Companies to recover their investment and returns on investment by installing Tollgates and Weigh Bridges	High	New		Ministry of Works and Infrastructure
b	NSUP Objective 2:				
74	Ensure quality standards for public buildings to withstand harsh and adverse conditions.	High			Ministry of Works and Infrastructure

Table 3.9   Smart City Ideas -   Urban Resilience, Climate Change Mitigation and Ad-

S/No	Intervention Actions	Priority	Position	Ongoing Pro-gramme / Project	MDAs in Charge
a	NSUP Objective 1:				
75	Installation of solar panels on building and solar farms to provide clean energy to housing estates	High	New		Niger State Renewable Energy Agency
76	Replace central sewage systems, septic tanks, and soak-away pits in existing houses and housing estates and replace them with Biogas plants. These can generate methane gas to be used as cooking gas or burnt to generate electricity	Medium	New		Ministry of Housing and Urban Development and Housing Corporation, Niger State Water and Sewerage Corporation

Chapter Four

4.0   IMPLEMENTATION

4.1   THE PROCESS OF ESTABLISHING A SMART CITY IN NIGER STATE

Niger State Government is acquiring invaluable knowledge and experience in the planning, designing, and implementing of the Smart City project in Suleja. This is in addition to the retrofitting of the Government House and other public buildings in Minna and other cities of the state.

The strategies and Action Plans would be prepared and implemented by the respective cities and towns. Implementation of action plans would be much more comfortable and successful with committed leadership. It is, therefore, essential for city leaders to be aware of this ingredient for success. Also, there is a need for good collaboration between different agencies of government. Cooperation between the public and private sectors is necessary for successful smart city development. Teamwork and collaboration are needed to carry the stakeholders along, ensuring the inclusion of the majority of the city's population. A smart city will be irrelevant to most of its inhabitants unless they can learn how to use the new technology. Finally, the government needs to ensure better or enhanced urban services to ensure more functional smart cities.

The smart city development process will be implemented in four phases, namely:

   i.   Scoping
  ii.   Planning
 iii.   Financing
 iv.   Implementation, monitoring and evaluation.

The detailed procedure is contained in Table 4.1

Table 4.1 Process of Establishing a Smart City in Niger State

S/No	Phase	Action
1	Scoping	• Profile the city and establish needs and priorities • Identify key stakeholders and their roles and responsibilities in the process. • Establish Task Force for project startup.
2	Planning	• Involve stakeholders in strategic planning and smart city design. • Establish the relevant digital services based on the needs and demands of the residents. • Integrate the design with other requirements, especially the SDG's. • Establish key performance indicators for monitoring and evaluation. • Prepare a Resource mobilisation/Financing Strategy. • Ensure appropriate data privacy and security. • Prepare an institutional responsibilities plan. • Plan for project management. • Prepare and promote a communications strategy and collaboration with international development agencies, ICT Companies etc.
3	Financing	• Discuss and agree on the financing strategy for smart city projects in Niger State. • Establish policy guidelines for sustainable private sector participation in NSSC projects. • Identify and shortlist international partners, including donors, lenders and technical partners
4	Implementation, Monitroiung and Evaluation	• Create a clear and feasible road map/ Implementation plan. • Establish and build partnerships/collaboration to support adequate and timely implementation. • Mobilise financial resources for implementation. • Market the initiative through well-developed communications and marketing plans. • Establish appropriate project management mechanisms. • Establish an appropriate monitoring and evaluation framework. • Establish lessons learnt.

4.2 INSTITUTIONAL ARRANGEMENTS

A dynamic organisational arrangement is needed to deliver smart cities in Niger State successfully. The following model comprising distinct units is recommended:

- *Smart City Steering and Coordinating Unit* – This will be a sub-unit of the Urban Policy Steering Committee. The Unit will have oversight and governance responsibilities. It will also manage partners and stakeholders, coordinate between the three tiers of government, the private sector and service providers. The Unit will prepare budgets and ensure funds are allocated for the purpose. This Unit will have statewide responsibility.

- *Project Management and Implementation Unit* - This Unit would be established in each prospective smart city. Its responsibility is to prepare and implement the smart city project. It will, therefore, have the mandate to undertake the deployment of digital infrastructure, procurement process, project implementation and monitoring.

- *Technical/Professional sub-units:* Technical sub-units will be established in each smart city to ensure seamless project preparation and integration. This is necessary because a smart city development is technological, requiring knowledge and expertise. The following are recommended, among others:

  a. Service Contributors – These are Ministries, departments and agencies (MDAs) responsible for setting the requirements of a sector-specific service such as health, education, and agriculture. Each of the agencies would be responsible the analysing data collected from sensors and domain services and recommending improvements or adjustments.

  b. Systems integrator – A systems integrator is needed to bring together components and solutions into a whole and ensure that those systems function together. The system integrator can create a consortium of domain service providers to ensure integration and interoperability between different solutions based on the application's architecture that should have been developed during the "design and develop" stage of the project.

  c. Service Providers - Private companies that will provide, manage and maintain services using sector-specific applications such as telemedicine, surveillance, advisory services or services, disease management. These applications will require sector-specific expertise and should be managed by local providers who will develop their capacity in specialised areas such as health, agriculture, and education.

  d. A central-local content creation and digitisation unit is essential to establish this unit at the outset. This unit will specialise in the development of local content that can be distributed across all the cities via the national cloud. The Unit will ensure the translation of contents into local languages and adopt them to align with the local conditions.

Other institutional Responsibilities for the NSSC programme is contained in table 4.2.

Table 4.2 Other Institutional Responsibilities

S/No	LEVEL OF GOVERN- MENT/STAKEHOLDER	RESPONSIBILITY
1	Federal Government	• Provide articulate standards and goals that are citizen-centred and responsive to local needs.
2	State Government	• Provide a road map and assist LGAs to assess challenges, engage stakeholders, generate smart proposals and prepare a smart city road map
3	Local Governments	• Prepare proposals on specific issues such as housing, transport, governance etc. Implement and monitor the project.
4	Private Sector	• Participate in the preparation and implementation of the project. • To invest and collaborate with the state and local governments.
5	Research and Academic Institutions	• Undertake research, provide knowledge, train and build the capacity of stakeholders in ICT and development management.

4.2   MONITORING AND EVALUATION

Monitoring would be based on the key performance indicators established during project preparation. It is essential to use the existing arrangements in the Niger State Urban Policy to monitor the programme's implementation. These bodies are:

Urban Policy Steering Committee – Highest policy-making body to be headed by the Secretary to the State Government and comprising key Commissioners and Heads of Parastatals in charge of Urban Development, Budget and Economic Planning, Municipal Services, Agriculture, Commerce, among others.

State Technical Committee on Urban Policy – the Committee is the central working group comprising operations and technical staff to ensure coordination and efficient policy implementation. In addition to all the identified key institutions, representatives of the private sector and civil society organisations should be included. The project support office will provide the Secretariat of the Committee.

Ad hoc Committee comprising of mainly the private sector, academic and research institutions to monitor the implementation of the policy.

CANDIDATE PROJECTS FOR SMART CITIES PROJECT IN NIGER STATE

AREAS	MAIN FACILITATING ELEMENTS
Planning and Development of a Pilot Smart City in Suleja, with the following components: • Establishment of an Assembly Plant for Renewable Energy Systems and Components; • Establishment of a Training School Product Assembly, Marketing and Repair	**On-site Assembly of:** • Solar Panel, • Solar Water Heaters • Micro and Smart Grids • Compact fluorescent and LED bulbs • IoT powered Household Appliances • Solar fans, Refrigerators and Air-conditioners • Wind Turbines **Training School to train and Certified: (trainees Youth)** • Component Assemblers • Marketers • Repairers of the systems
Facilities required to Retrofit buildings and facilities in Minna and other cities • Phase1-Government House, Minna; State Secretariat; General hospital, Minna; Emir's Palace • Phase2-Local Government Secretariat, Chanchaga and Bosso LGAs; State Agencies • Phase 3- Important Public Buildings in Bida and Kontagora; Palaces of the Emirs; Hospitals	Smart City components to be provided by the Niger State Government in partnership with Service Providers or Investors or by Corporate Organisations discharging their Corporate Social Responsibility (CSR) to the residents of the beneficiary cities or as a service to be paid for the users: • Smart Government • Mobility/wifi • Smart/Digital Citizen • Open Data • Smart Health • Smart Grid/Energy/Utilities • Smart Transportation • Smart Buildings • Smart Manufacturing • Smart Farming/Agriculture State Government to promote the provision of off-grid solar power supply to ensure the reliability of the Smart City project
Phase 4-Retrofitting the Police and Fire Stations adjacent to the Smart City project site in Suleja	Making the Police and Fire Stations adjacent to the site Smart will enhance their ability to contribute to crime prevention and fighting fires within and around the Smart City
Phase 5-Suleja Smart City Company to carry out a survey of the villages within the project site to be integrated into the project	Seek grants and concessional funding to: • Plan and carry out the upgrading/resettlement of the existing villages within the project site as part of the effort to integrate them into the Smart City. The Company should also promote a comprehensive urban renewal of Suleja, Izom and Maje towns in the immediate vicinity of the mart City; • Develop capacity with a focus on entrepreneurship training towards the provision of alternative means of livelihood; • Establish microenterprises to operate Greenhouse, Hydroponic and Aquaponic farms to provide fruits, vegetables, fresh fish etc. for the consumption of the residents of the city, Suleja, Minna and Abuja;
Niger State Government to take advantage of the Ambassador of the Republic of Korea to Nigeria to organise an Exchange Programme between the Doctors and Medical staff of Niger State with those in South Korea.	• This is to be expanded to cover Benchmark visits and Exchange programmes between Niger State Government staff in charge of the development and management of Smart City Programme and those in South Korea

Innovation, entrepreneurship and the generation of economic activity	• Provide necessary ICT facilities and infrastructure in all major human settlements in the State • Promote and develop entrepreneurial projects. • Ensure Financial inclusion and flexible financing mechanisms. • Support for R&D and, in particular, support in generating patents and prototypes. • Capacity Building, Mentoring and technical support for entrepreneurs.
Knowledge and talent	• Develop a partnership between the universities, the administration and the private sector. • Give priority to the training of children and all school-going Youth in ICT-with focus on Artificial Intelligence (AI), robotics etc. to build a critical mass of citizens that will enjoy the Smart city facilities and services • Provide incentives to attract skilled ICT practitioners to the State
Digital society and economy	• Put in place a planning strategy aimed at promoting entrepreneurship on different levels. • Support the establishment of open data to enhance citizen participation in their governance • Encourage cooperation and institutionalise collaboration between different public agencies on data generation and smart city development.
Others	• Encourage knowledge exchange and collaboration between Niger state and other smart cities. • Encourage collaboration with international agencies such as UN Habitat

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