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The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS

Review of Policy and Legal Framework for Smart and Sustainable Cities in Kenya

Humphrey Njogu, Betty Kaibung'a, Victor Bulimwa, Abdirizack Kesane and Derrick Ondari

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Research and Analysis

KIPPRA in Brief

The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research leading to policy advice. KIPPRA's mission is to produce consistently high-quality analysis of key issues of public policy and to contribute to the achievement of national long-term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well-researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the Government and the private sector may obtain information and advice on public policy issues.

Abstract

Cities across the world are facing unprecedented difficulties in terms of sustainability, efficiency, and quality of life as urbanization continues to increase. Utilizing technology and data-driven solutions, popularly known as "smart and sustainable cities", has evolved as an effective strategy for dealing with urban-related challenges. Reflection on the key pillars that define smart and sustainable cities – smart people, smart living, smart economy, smart environment, smart mobility, smart infrastructure, and smart governance – is an important subject that this paper is focusing on. Smart and sustainable cities matter because they symbolize a future in which technology and creativity address challenges in urban areas by enhancing the quality of life and generate sustainable, resilient, and prosperous urban settings. This paper adopted a policy review framework that critically analyzes policy efforts and best practices from the benchmark city Zurich, noting its achievements and potential in each of the seven pillars while making a comparison to the policy initiatives across four Kenyan cities - Nairobi, Mombasa, Kisumu, and Nakuru to identify the policy gaps and make recommendations.

Smart people: Key policy issues include low digital literacy, low information and awareness levels, inadequate community caring facilities, and inclusive education. In this regard, the county governments need to fast-track the implementation of the new CIDPs to provide more resources to fund digital literacy, and information awareness initiatives and provide caring community facilities to cater for the needs of vulnerable individuals. There is a need to enhance access, equity, and education in the cities.

Smart living: Cities face insecurity, poor provision of basic urban utilities including housing conditions, water and sanitation, poor health conditions, and inadequate cultural facilities. Therefore, the Boards of cities could establish a legal framework to coordinate the implementation of national and county security initiatives. Other key considerations include fast-tracking the approval and implementation of the National Building Codes 2022 to ensure quality buildings are put up and avoid cases of buildings collapsing including financing elements. Prioritizing investment in healthcare accessibility, education, clean water, cultural and recreational initiatives will contribute to increased life expectancy. The provision of incentives to promote smart urban and home applications will enhance the smartness and sustainability of cities.

Smart economy pillar: Key issues include low digitization and digitalization, low digital literacy skills, slow uptake of e-commerce, and leakage of revenue collection in cities. In this regard, there is a need to develop a comprehensive policy framework to support essentials for digitization and digitalization including digital skills, innovations and infrastructure. Fast-tracking the implementation of national addressing system in all cities will unlock digital economy potential in all cities.

Smart environment: Among the key policy issues include air and water pollution, waste management, traffic congestion and energy consumption. Therefore, there is a need to promote the use of clean energy sources and implement stricter emission standards for industries, vehicles, and power plants to reduce air pollution in addition to adoption of clean energy sources. Implementation of comprehensive waste management system that includes recycling, composting and waste-to-energy

initiatives. Imposing penalties for littering and dumping of waste including e-waste and enforcing waste disposal regulations is a key consideration. Other priorities include investing in modern sewage treatment facilities and promoting water conservation practices in cities.

Smart mobility: Key issues include inefficient transportation, poor non-motorized accessibility, low level of smart urban infrastructure for parking and intelligent transportation, low use of electric vehicles and autonomous vehicles. In this regard, there is need to develop a comprehensive policy framework to support non-motorized accessibility along major roads. Further, developing a policy framework to support initiatives such as the use of smart infrastructure for intelligent transport and parking is instrumental in enhancing mobility in cities. Public -Private Partnerships are essential in building infrastructure for electric and autonomous vehicles.

Smart infrastructure: Cities experience inadequate resources to support the planning, designing, implementation, maintenance and upgrading of essential infrastructure. Consequently, cities have inadequate infrastructure including digital infrastructure leading to poor access and distribution of essential services. In this regard, there is need to a comprehensive policy framework to support allocation of adequate resources, design and implementation of essential infrastructure. Tapping on the Universal Service Fund will support the implementation of digital infrastructure in the unserved and underserved populations in cities. Further, formulation and implementation of a comprehensive policy framework for innovation hubs and technology centers is paramount.

Smart governance: Among the key issues include barriers to public engagement and digital democracy, inefficient data sharing and bureaucratic bottlenecks to e-government services delivery. Therefore, formulation and implementation of a comprehensive policy framework that guides that serve as roadmap for the implementation of e-government services. The framework to cover the public services, public engagement, digital democracy, digital literacy and digital tools for inclusive civic engagement in cities.

Abbreviations and Acronyms

AML	Anti Money Laundering
ASAL	Arid and Semi-Arid Lands
CBK	Central Bank of Kenya
CEQ	Computers and Electronics Equipment
CIDP	County Integrated Development Plan
COMESA	Common Markets for Eastern and Southern Africa
CTF	Counter Terrorism financing
EAC	East African Community
EPZ	Export Processing Zones
EU	European Union
FPE	Free Primary Education
FSD	Free Secondary Education
GDP	Gross Domestic Product
ICT	Information and Communication Technology
KeNHA	Kenya National Highway Authority
KGS	Kenya Gazette Supplement
MSMEs	Micro and Small Medium-sized Enterprises
PPP	Public Private Partnership
REDD	Reducing Emissions from Deforestation and Forest Degradation
ST&I	Science Technology and Innovation
TVET	Technical and Vocational Training Authority
UN	The United Nations
UNDAF	United Nations Development Assistance Framework
UNEP	The United Nations Environmental Programme

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1. Introduction

Cities are home to most of the world's population and are centres of economic growth and innovation. By 2030, two thirds of the world population (5 billion people) is expected to live in cities. Most of these people will be in Africa and Asia, where low-income countries are concentrated (UN, 2014). Unfortunately, rapid urbanization has brought enormous challenges, including growing numbers of slum dwellers, increased air pollution, inadequate basic services and infrastructure, and unplanned urban sprawl, particularly for the nearly one billion urban poor who live in informal settlements. A high concentration of people exerts pressure on urban infrastructures, housing, and economic activities. Building smart and sustainable cities is crucial to avoid human, social, and economic losses while improving the livability in urban areas.

The concept of smart and sustainable cities has gained significant attention in recent years due to the growing recognition of the need to address environmental, economic, and social challenges in urban areas. Smart and sustainable cities are cities that are designed and developed to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. Policy and legal frameworks are crucial in promoting sustainable urban development, as they provide guidelines and regulations for urban planning and management.

According to the UN-Habitat Report on World Cities (2020), urban economic development will serve as a platform for countries to make their commitments. The international community has recognized the importance of smart and sustainable cities and has developed several frameworks to guide the development of sustainable cities. The Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 include Goal 11, which aims to make cities and human settlements inclusive, safe, resilient, and sustainable. The New Urban Agenda (NUA) adopted in 2016 by the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) outlines a global strategy for sustainable urban development. These international frameworks emphasize the importance of sustainable urban planning, resource efficiency, and the provision of affordable housing, infrastructure, and services.

At the continental level, the African Union (AU) has developed the African Union Agenda 2063, which includes a vision for sustainable cities in Africa. The agenda emphasizes the need for sustainable urbanization, which includes the provision of affordable housing, infrastructure, and services, as well as sustainable urban planning and management. The East African Community (EAC) has also developed a regional policy framework for sustainable urbanization to promote sustainable urban development in the East African region.

In the recent past, Africa has been urbanizing at a high rate. In particular, the rapid urbanization in Kenya has led to significant environmental degradation, social inequality, and economic challenges. The Kenyan government has made considerable efforts to promote smart and sustainable cities by implementing various policies and legal frameworks. For instance, the Constitution of Kenya

(2010) provides a legal framework for the promotion of sustainable development, including the provision of basic services such as housing, water, and sanitation. Similarly, the National Land Policy (2009) provides guidelines for land use planning and management, which are critical components of sustainable urban development. The policy aims to promote sustainable use and management of land resources, including urban and peri-urban land. Other key policy frameworks for smart and sustainable cities in Kenya include the National Urban Development Policy (2016), which provides guidelines for sustainable urban development, including land use planning, infrastructure development, and service provision. The policy emphasizes the need for integrated urban planning, which involves the participation of all stakeholders, including the private sector, civil society, and local communities. The policy also emphasizes the need for affordable housing and the provision of basic services such as water, sanitation, and healthcare.

With the rapid urbanization, Kenya and its peers in the continent are positioning themselves as a hub for smart and sustainable cities projects. The Kenyan government has implemented various sustainable development policies aimed at promoting smart and sustainable cities with plans such as the Konza Technopolis. Kenya is among the nations that signed the Paris Agreement of 2015, which advocated for the building of smart cities that are sustainable to address the problem of climate change for a safer future. Kenya has attracted investors globally who intend to impact the economy in terms of development. The country has a few smart cities that are coming up including Tatu City, Konza Technopolis, Northlands City, and Athi River Smart Green City. Other notable projects in the continent include Vision City in Rwanda and Hope City in Ghana.

Although developing countries such as Kenya have made significant policy efforts in embracing smart and sustainable city projects, the effectiveness of these policies in achieving smartness and sustainability goals is often hindered by gaps and weaknesses in the policy and legal frameworks. Some of the key challenges include inadequate coordination and cooperation among different government agencies responsible for urban development, weak legal frameworks, and enforcement mechanisms, limited financial resources and incentives, and limited capacity and technical expertise of government agencies. The review of policy and legal frameworks for smart and sustainable cities is critical to ensure that urban development is economically, socially, and environmentally sustainable.

This research paper aims to comprehensively review the policy and legal frameworks for smart and sustainable cities in Kenya. The paper analyzes the existing frameworks to identify their strengths and weaknesses and make recommendations for improvement. The study is useful to policymakers, urban planners, researchers, and stakeholders in the urban development sector in Kenya. The research contributes to the development of effective and sustainable policy and legal frameworks that promote sustainable development in Kenya's urban areas.

The rest of this paper is organized as follows: Section two provides a detailed literature review, Section Three outlines the research methodology, Section Four provides a discussion of key findings and interpretations, and Section Five provides the conclusion and key recommendations.

2. Literature Review

2.1 Introduction

This section provides a solid introduction to the concept of city smartness and sustainability and outlines the existing theoretical literature on policy perspectives for smart and sustainable cities, which were reviewed in support of this study.

2.2 Theoretical Literature

2.2.1 *The Eco-City Theory*

The Eco-City Theory is an urban design and planning theory that focuses on creating cities that are ecologically sustainable and able to support a high quality of life. The theory emphasizes the use of natural systems and renewable resources to create cities that are both resilient and self-sufficient. It also emphasizes the importance of social equity and the need for citizens to be involved in decision-making about the city's future. In terms of policy review, the Eco-City Theory encourages cities to develop policies that focus on sustainability. These policies should be tailored to a city's particular needs and should be designed to reduce their environmental impact. Cities should develop policies that promote efficient transportation, green infrastructure, and renewable energy sources. Additionally, cities should reduce their carbon footprint by increasing their use of renewable energy sources and decreasing their reliance on fossil fuels. Furthermore, cities should aim to reduce waste production and promote urban green spaces. Finally, cities should promote social equity by implementing policies that provide access to affordable housing and other basic services. Overall, the Eco-City Theory is a valuable tool that cities can use to promote sustainability and reduce their environmental impact. Policymakers should review and consider the Eco-City Theory when developing policies to ensure that their cities are as sustainable and environmentally friendly as possible.

2.3 Main Areas of Intervention for Smart and Sustainable Cities

2.3.1 *Affordable housing*

Affordable housing is a critical area of intervention in the realization of sustainable cities. According to the United Nations (2018), over one billion people globally live in inadequate housing or are homeless. The lack of affordable housing is a widespread issue in both developed and developing countries, leading to the proliferation of informal settlements, homelessness, and poor living conditions.

Affordable housing is a fundamental building block of sustainable cities, as it promotes social equity, economic growth, and environmental sustainability. It can reduce social inequalities by providing safe, secure, and affordable housing options for all, regardless of income level. It can also improve the health and well-being of residents, increase educational attainment, and reduce crime rates. Moreover, affordable housing can promote economic development by attracting businesses and creating jobs, leading to increased productivity and improved access to markets. Sustainable housing design and construction practices can also reduce greenhouse gas emissions and energy consumption, contributing to environmental sustainability.

However, there are challenges to realizing affordable housing in sustainable cities, such as the lack of adequate financing, inadequate land use policies, and the lack of coordination among stakeholders. These challenges can be addressed through innovative financing mechanisms, such as public-private partnerships, and the development of comprehensive land use policies that promote the construction of affordable housing. Additionally, partnerships between the government, the private sector, and civil society can foster collaboration and coordination to achieve affordable housing goals.

2.3.2   Inclusive transportation systems

An inclusive transportation system is a crucial component of smart and sustainable cities as it promotes social equity, economic growth, and environmental sustainability. By providing safe, accessible, and affordable transportation options for all, an inclusive transportation system can reduce social inequalities and promote social inclusion. It can also improve the mobility of people and goods, leading to increased productivity, improved access to markets, and increased trade, which can contribute to economic development. Additionally, it can reduce greenhouse gas emissions and air pollution by promoting sustainable transportation options such as public transportation, cycling, and walking. Despite the benefits of an inclusive transportation system, there are challenges such as the lack of infrastructure and resources to support sustainable transportation options, lack of awareness and education about sustainable transportation, and cultural barriers to the use of sustainable transportation options. However, there are also opportunities such as public-private partnerships and new technologies like electric vehicles and ride-sharing platforms that can promote sustainable transportation options. Overall, an inclusive transportation system is essential in realizing sustainable cities.

2.3.3   Inclusive public spaces

Inclusive public spaces are a critical component of smart and sustainable cities as they promote social equity, economic growth, and environmental sustainability. Inclusive public spaces can create opportunities for social interaction, community

building, and cultural expression. They can also promote physical activity and mental health, reduce social isolation, and increase social cohesion. Additionally, they can provide economic benefits by attracting businesses, tourists, and residents, contributing to the local economy.

However, there are challenges to realizing inclusive public spaces in sustainable cities, such as inadequate access to public space for marginalized groups, inadequate infrastructure and amenities, and insufficient participation and engagement in the design and planning of public spaces. These challenges can be addressed through participatory planning processes that engage diverse stakeholders, the development of universal design principles that ensure accessibility for all, and the provision of amenities and services that meet the needs of all users.

2.4 Smart and Sustainable City Projects

Rwanda, which is the headquarter of the Smart Africa initiative is believed to be the leading country in the continent with regards to smart city initiatives. It has a department headed by a minister that focuses on ICTs and Youth. This has seen most of the government services offered online. The main objective ensures efficiency in the operations of delivering basic services while being environmentally friendly. They engage in public-private partnerships, academia, and environmental protection movements to make implementation a success. For instance, the connection of optic fibers across the country increases connectivity. Similarly, public buses are fitted with free internet in Kigali, the capital city, while manual conductors have been replaced with smart cards, and passengers simply swipe to pay fares for bus trips (Mathane and Gumbo, 2022; Nzakizwanimana, 2021).

In Luanda, Angola, building smart cities aims at creating sustainable livelihoods, reducing inequalities, and educating the people. One of the projects in Luanda is the "smart wall" project. This initiative supports the green city agenda, which involves using solar energy roof gardens and vegetable plots to promote sustainable livelihoods. This project ensures that citizens have access to energy, water, sanitation, and communication among other services. This has created opportunities for people to raise their incomes, as well as providing local authorities with data that helps them observe consumption patterns (Ammann and Förster, 2018).

Kenya is referred to as Africa's Silicon Valley with the Intelligent Community Forum naming Nairobi Africa's most intelligent city (Nkabinde,2016). The mobile money concept, which was first popularized in Nairobi in the form of M-Pesa has enhanced payment of bills for the poorest people and improved their quality of life (Mbassi,2017). ICT development in Nairobi has seen government service payments made electronically. Similarly, the transport system and waste collection are also digitalized. In the Central Business District (CBD), citizens use electronic services to pay for daily and/or monthly parking fees. The city also introduced the Intelligent Transport System, driven by technology whose objective is to ease traffic congestion. Nairobi has also introduced e-learning tools

for first-time learners in its Early Childhood Education centres. Digital systems have also been installed to improve the efficiency of electricity transmissions in slums such as Mathare. ATMs have been installed, water connection applications are done electronically, and water vending machines are also electronic (Guma and Monstadt, 2021).

In Senegal, there is a poor rate of banking system prevalence, especially in the rural areas, and thus the economy has been predominantly cash. The introduction of money transfer systems such as the Orange one-stop-shop money booth has seen many young graduates become service providers and tellers and thus earn a living, despite the high level of unemployment in Senegal. Similarly, in Ibadan, Nigeria, smart technologies have facilitated financial transactions through mobile phones in households. For example, the use of mobile payments for school fees among other things. Still, others use ICT to monitor the academic progress of their children even before they return home. Some schools are running parental check apps that communicate messages to parents when a child enters or leaves the school premises. Other advancements in the city are increased connections to smart banking, e-commerce, electronic shopping, and apps that check traffic flows and congestion, to help local people commute efficiently. (Katz and Jung, 2020; Lawrence and Fakuade, 2021).

A study conducted by Price Waterhouse Coopers in Australia identified several success factors for smart city enablement. These factors include technology, strategy and planning, data and analytics, partnerships, social literacy, and digital literacy. Another study conducted in Argentina found that there were different factors explaining citizens' commitment to smart cities, for instance, education, age, labour participation, and other subjective factors such as trust and awareness of the smart city concept. A factor that mediates these factors is e-readiness, also referred to as digital readiness, or the level of preparedness to exploit internet opportunities such as e-government and e-commerce (Alderete, 2021). Another study conducted in Australia by Yigitcanlar et al. (2022) revealed that several factors influence smart city transformation readiness. These factors include diversity in culture (this implies language and country of birth or origin), high population density, low level of remoteness, high levels of labour productivity, low unemployment levels, and proximity to international airports, domestic airports, seaports, state capital cities, and global universities.

Several studies have revealed the challenges of smart city construction. One of the challenges is the lack of plans and goals before and while constructing. Building cities involves many different stakeholders such as governments, enterprises, and residents. As such, cities and residents that have a high level of integration need huge investments in terms of capital, technology, and human resources. Elaborate plans and executive designs are needed before beginning construction. This process is usually spearheaded by technology-driven construction firms where, often, there is a lack of understanding of local needs and the challenges involved. In addition to these, the construction goals are vague, and the decision makers lack understanding of smart cities. Other times the government lacks the administrative capabilities and ends up duplicating roles, which causes the overlapping of projects and thus lack of reciprocity between cities (Wang

et al., 2020). Inadequate planning leads to vague smart city content, which consequently leads to wastage of resources, inefficiency and hidden dangers of information security. In Kenya, smart city infrastructure is insufficient particularly infrastructure that enhances people's health and urban equity. Smart cities should aim at making people's lives better and improve their development. For instance, infrastructure should be aimed at providing citizens with clean air, water, and safe food. Therefore, public infrastructure prioritizes ecological needs and the health of the residents (Cairns et al., 2022).

While building cities, environmental protection has been neglected. Efforts must be made to build sustainable cities. The concept of sustainability implies ensuring development that is inclusive, safe, resilient, and sustainable (Shen et al., 2018). Environmental issues not only endanger the health of the residents but also hinder the efficiency of economic operations. Smart cities, in their construction process, should consider sustainability and environmental protection. Rapid urbanization puts pressure on the environment and causes severe hindrances to sustainable development. Globally, cities produce less than 10 per cent of their total food needs, consume 70 per cent of the world's total energy, and produce more than 75 per cent of the garbage, which puts heavy pressure on the environment (UNEP, 2019). China, a country with a large population in cities is the largest carbon emitter in the world. China, under the Paris Agreement of 2015, committed to increasing its share of non-fossil fuel energy responsibility to more than 20 per cent by 2030 and to achieving carbon neutrality by 2060 (UNEP, 2019). Carbon neutrality implies having net zero carbon dioxide emissions. Globally, increased urbanization has increased pressure on transportation and housing needs in cities. This further worsens energy consumption, air and water pollution, and toxic waste emissions, which increases the burden on the environment (Yao et al., 2020).

Governments also lack homogeneity in construction content. The construction of smart cities rarely considers the local economic and cultural differences in the pursuit of urban development. Usually, these differences impact technology and systems (Bronislaw, 1960). Similarly, geographical location, culture, and knowledge environs shape the ability to innovate and adopt technological advancements greatly. This consequently affects the effectiveness of these smart cities. Therefore, when constructing smart cities, governments and other stakeholders should consider schemes that are suitable for local characteristics. For instance, a country has different regions that have different endowments in terms of population, per capita income, and industrial base among other characteristics (Pellicano et al., 2019).

The theory of comparative advantage postulates that prices of capital, labour, and technology vary across different regions. When considering development models, different cities with different economic structures choose what works best for them. For instance, areas that are more economically developed acquire models that are more capital and technology-intensive, with higher implications on the cost of labour. The opposite is also true for poor areas. In the construction of smart cities, experts should consider these factors in endowment structures as well as the developmental experiences of other successful cities. Otherwise, construction will lead to resource wastage, and operational inefficiencies as well as hinder economic development (Nam and Pardo, 2011; Yao et al., 2020).

3. Methodology

3.1 Introduction

This section describes how the study was conducted and how data was collected and analyzed into useful information. The section also describes the conceptual and analytical frameworks for the study.

3.2 Smart and Sustainable City Pillars

Smart and sustainable cities encourage community engagement, digital connectivity, and equal access to services to build a sense of belonging. These cities make use of technology to close gaps, give citizens more authority, and build thriving, socially responsible urban ecosystems. In the context of smart and sustainable cities, this study has comprehensively investigated seven building blocks or pillars that lead to the smartness and sustainability of each of the four cities (Nairobi, Mombasa, Nakuru, and Kisumu) in Kenya while making a comparison to Zurich, the leading smart city in the world. The seven pillars are smart people, smart living, smart economy, smart environment, smart mobility, smart infrastructure, and smart governance.

Figure 3.1: Conceptual Framework
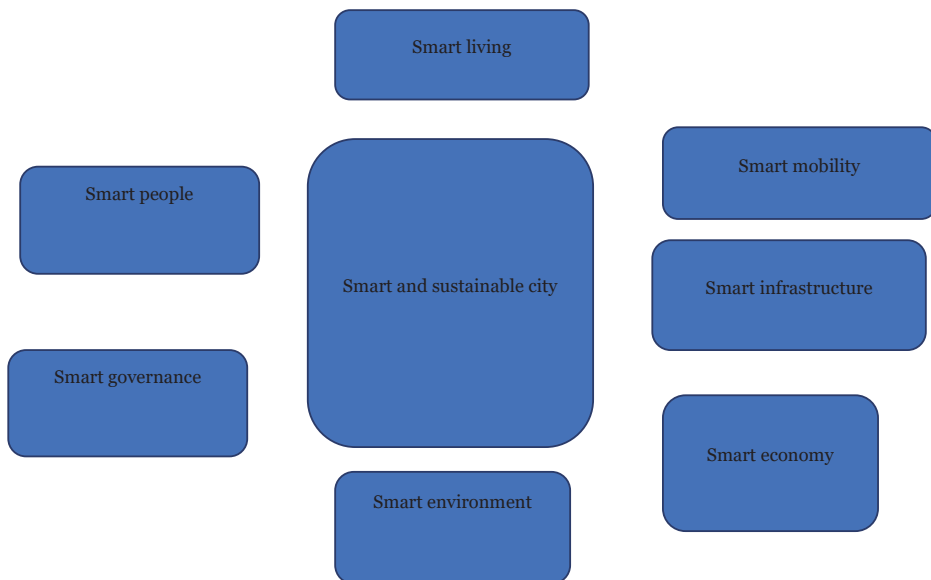
3.3   Description of Pillars and Policy Elements

The study identified relevant policies/laws/strategies using secondary data from different policy documents and policy reviews (national level and cities level – Nairobi, Kisumu, Mombasa, and Nakuru cities) based on the seven pillars for smart and sustainable cities. A detailed description of policy elements considered along the seven pillars is provided in Table 3.1.

Table 3.1: Policy elements

Pillar	Policy elements	Description
Smart people	Digital literacy initiatives	These are efforts or programmes aimed at teaching citizens digital technologies and navigating the internet.
	Information/awareness initiatives	These are initiatives aimed at educating and informing the public on various issues on digital initiatives.
	Academia and research institutions	These are institutions that provide higher education to the members of the public and facilities to conduct scientific investigations.
	Digital culture	These are behaviours and norms that emerge from the interaction between individuals and technologies.
	Caring community facility	These are facilities designed to aid and care for individuals in need of care.
	Skilled and talented human capital initiatives	These are programmes aimed at developing an individual's expertise to effectively contribute to the economic progress of a community.
	Values and ethics	These are the moral guidelines for the behaviour of individuals.
	Access and equity of education	These are initiatives or policies that ensure all individuals have access to quality education.
	Inclusive education	These are initiatives that integrate individuals with disabilities to acquire equal education.
	Early childhood education	Early childhood education is the formal and informal educational experiences and activities offered to young children before they entre primary school, usually focused on socialization and developmentally appropriate abilities.
	Educational infrastructure	These are structural and administrative elements, such as facilities, technology, and support systems, that make it possible to offer education and promote learning.
	Education financing	These are initiatives, policies, or guidelines on how to facilitate the provision of resources to ensure learning takes place.
	Digital inclusion and equal opportunities	These are initiatives that ensure that every individual has equitable and unrestricted access to digital technologies, skills, and online resources. This promotes a level playing field in the digital era.
Smart living	Safety, security/crime prevention	Measures to control and reduce crimes in cities. These controls are community-based, law enforcement, and any measure for safety and security.
	Housing quality	Refers to the physical conditions of a person's home and the quality of the social and physical environment in which the home is located.
	Educational quality	Refers to outcomes that encompass knowledge, skills, and attitudes, and are linked to national goals for education and positive participation in society.
	Health conditions/ health facilities	Health facilities are places that provide health care. They include hospitals, clinics, outpatient care centres, and specialized care centres while health conditions refer to characteristics of health status.
	Cultural facilities and budget allocation	Refer to resources provided to support the renovation, restoration, preservation, or acquisition of an arts facility, and the purchase.

Pillar	Policy elements	Description
	Tourist/recreational attractiveness and entertainment	Refers to a place of interest that attracts visitors because of its inherent or shown cultural or natural value, historical significance, natural or man-made beauty, or ability to provide leisure, entertainment, and adventure.
	Application of smart water meters and power meters and other smart home applications	Refers to internet-connected devices that enable the remote monitoring and management of appliances and systems, such as water, power, lighting, and heating.
	Livability (initiatives to enhance quality of life/ life expectancy initiatives)	Refers to the degree to which a place is suitable for living in. Livability for all is an equitable distribution of housing, jobs, health care, education, and respect.
	Provision of urban basic utilities	Refers to basic infrastructure services in areas such as power supply, water, transportation, telecommunications, and waste management, which form the basis for sustainable economic growth.
	Provision of affordable housing	Refers to priority initiative under the government, which is geared towards facilitating the provision of decent, safe, and affordable housing for citizens of Kenya.
	Social housing and vulnerable populations	Refers to accommodation that is provided at affordable rates, on a secure basis to people on low incomes or with particular needs. Social housing properties are usually owned by the State, in the form of councils, or by non-profit organizations such as housing associations.
	Financing and funding mechanisms for affordable housing	Refers to financing options to build or own affordable housing.
	Slum upgrading and informal settlements	Refers to initiatives to remove the poor living standards of slum dwellers and largely focuses on removing slum dwellers altogether.
	Community engagement in crime management	Refers to an approach to policing that recognizes the independence and shared responsibility of the police and the community in ensuring a safe and secure environment for all citizens.
	Rehabilitation and reintegration	Refers to helping inmates grow and change, allowing them to separate themselves from the environmental factors that made them commit a crime in the first place.
	Health promotion and disease prevention	Proactive efforts to enhance wellbeing and avoid illness through education, lifestyle changes, and community interventions.
Smart economy	Tax incentives	Refers to government-authorized reductions or exemptions in taxes that are designed to encourage specific economic activities, behaviours, or investments. They are used as a tool to promote certain activities that are considered beneficial for the economy, society, or specific industries.
	Digital economy initiatives for enterprises and startups	Refers to a wide range of strategies, technologies, and policies aimed at leveraging digital technologies to drive economic growth, innovation, and efficiency. For enterprises and startups, these initiatives are crucial for staying competitive, adapting to changing market dynamics, and capitalizing on new opportunities.
	Smart services delivery	Refers to the application of advanced technologies, data analytics, and innovative approaches to improve the delivery of services across various sectors. This concept leverages digital transformation to enhance efficiency, customer satisfaction, and overall effectiveness of service delivery processes.

Pillar	Policy elements	Description
	Poverty reduction initiatives	Poverty reduction initiatives are programmes, policies, and strategies implemented by governments, non-governmental organizations (NGOs), international agencies, and other stakeholders to alleviate and ultimately eradicate poverty within a specific region or population. These initiatives aim to improve the economic, social, and overall wellbeing of individuals and communities living in poverty.
	Own source revenue initiatives	Refers to efforts made by a government, organization, or entity to generate revenue from their resources, assets, or activities. This revenue is generated internally rather than being sourced from external funding, taxes, or grants. Such initiatives can be diverse and tailored to the specific context of the entity in question
	Smart processing and manufacturing	Refers to the integration of advanced technologies and digital systems into various stages of the manufacturing process to enhance efficiency, quality, and overall productivity. This approach leverages cutting-edge technologies such as the Internet of Things (IoT), artificial intelligence (AI), data analytics, robotics, and automation to create interconnected and intelligent manufacturing systems.
	Digital jobs (employment)	Digital jobs, also known as digital employment or online jobs, refer to various types of work that are conducted using digital technology and the internet. These jobs have become increasingly popular in recent years due to advancements in technology and the rise of remote work. Digital jobs cover a wide range of industries and skill sets, offering opportunities for people with various backgrounds and expertise.
	Digital entrepreneurship culture	Digital entrepreneurship culture refers to the set of attitudes, values, practices, and norms that characterize the environment in which digital entrepreneurs operate. It encompasses a range of behaviours, strategies, and mindsets that are associated with individuals and organizations engaged in creating, scaling, and growing digital businesses in the modern, technology-driven landscape.
	Licensing and authorization on mobile money operators	Licensing and authorization for mobile money operators are regulatory processes that govern the operation of mobile financial services, allowing them to offer various financial transactions through mobile devices. Mobile money operators typically fall under the purview of financial regulatory authorities in their respective countries.
	Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF)	Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF) are regulatory frameworks and practices designed to prevent illegal activities such as money laundering and the financing of terrorism. These frameworks involve various laws, regulations, and procedures that financial institutions, businesses, and individuals must follow to detect and report suspicious financial activities.
	Business efficiency	Business efficiency refers to the extent to which a company can optimize its operations, resources, and processes to achieve maximum output with the least amount of input. In other words, it's about doing more with less and improving overall productivity. Business efficiency can have a significant impact on a company's profitability, competitiveness, and sustainability.

| Pillar	Policy elements	Description
	Economic growth	Economic growth refers to the increase in the production and consumption of goods and services in an economy over a period. It is often measured by the growth rate of a country's Gross Domestic Product (GDP), which represents the total value of all goods and services produced within a country's borders. Economic growth is a key indicator of the overall health and vitality of an economy, and it is a fundamental goal of most countries' economic policies
Smart environment	Clean environment	Refers to the state of the natural surroundings that is free from pollution, litter, contaminants, and other harmful substances. It encompasses various aspects, including air quality, water quality, waste management, land condition, and overall ecological balance. Maintaining a clean environment is essential for the wellbeing of both humans and the planet.
	Collaboration, cooperation, and partnerships	Collaboration involves actively working together, drawing on diverse skills to achieve shared goals; cooperation is coordinating efforts for mutual benefit; partnerships are strategic alliances formed to achieve common objectives.
	Climate financing	Refers to the allocation of funds and resources to support projects, initiatives, and policies aimed at mitigating and adapting to the impacts of climate change, fostering sustainable development, and transitioning to a low-carbon economy.
	Combustion of fossil fuel	Combustion of fossil fuels is a chemical reaction where hydrocarbons react with oxygen, releasing energy in the form of heat and producing carbon dioxide and water vapour as byproducts.
	Emission limits and target	Refers to specific legally or voluntarily defined thresholds for the maximum number of pollutants or greenhouse gases that can be released into the environment, aiming to mitigate environmental impact and achieve specific reduction goals.
	Water harvesting and storage	Refers to the practice of collecting and retaining rainwater or runoff for later use, promoting sustainability and resource conservation.
	Protection of water catchment area	Preserving the integrity of water catchment areas to ensure a sustainable and clean water supply for communities and ecosystems
	Afforestation and reforestation	Afforestation involves planting trees in areas where there were no trees before, while reforestation involves replanting trees in areas that were previously deforested or cleared. Both practices contribute to restoring and enhancing forest ecosystems.
	Biodiversity conservation	Biodiversity conservation is a proactive effort to protect and sustainably manage the variety of life on earth, from genes and species to ecosystems, to ensure their continued existence for future generations.
	Natural disasters	Natural disasters are catastrophic events triggered by natural processes, causing widespread and often devastating damage to the environment, infrastructure, and human populations.
	Energy conservation	Energy conservation is the effort to reduce wasteful energy consumption by using fewer energy services. This can be done by using energy more effectively (using less energy for continuous service) or changing one's behaviour to use less service (for example, by driving less).

Pillar	Policy elements	Description
Smart mobility	Efficient road accessibility	This element entails the provision of convenient and smooth circulation of vehicles, people, and products while minimizing travel time and congestion in the road networks.
	Efficient public transportation	Refers to initiatives that facilitate the provision of well-organized and reliable systems for convenient and timely movement of passengers within a city or region, reducing congestion and promoting sustainable mobility.
	Non-motorized accessibility	This element entails policies that facilitate the movement of pedestrians and other non-motorized road users.
	Availability of ICT infrastructure (for transport including smart parking)	This element entails the provision of fundamental infrastructure that facilitates mobility.
	Electric vehicles	This element entails the provision of vehicles powered by electricity and are rechargeable.
	Autonomous vehicles	This element entails the provision of vehicles that are self-driven and powered by highly sophisticated technology.
	Smart lighting	Refers to an intelligent lighting system that can be controlled, adjusted, and automated remotely using technology such as sensors, connectivity, and data analysis to enhance energy efficiency and user experience.
	Intelligent transportation	Intelligent transportation involves the integration of technology and data analytics to optimize and manage transportation systems, improving safety, efficiency, and traffic flow.
Smart infrastructure	Planning for infrastructure	This entails deliberately managing the construction of physical and administrative systems to satisfy the present and future demands of a community or organization.
	Implementation for infrastructure	Refers to the building, establishing, or deploying organizational and physical systems in accordance with predetermined designs and strategies.
	Maintenance and upgrading of infrastructure	Refers to the continual activities of conserving, repairing, and improving the functionality and quality of current physical and organizational systems.
	Automation of infrastructure systems	Refers to the integration of cutting-edge technology and procedures in the usage and management of infrastructure.
	Access, usage and distribution of infrastructure services	Refers to the equitable availability, efficient utilization, and fair distribution of the necessary infrastructure.
	Investment in infrastructure	This entails allocating resources to establish, maintain, and improve infrastructure.
	Design for infrastructure	This element entails developing detailed plans and specifications that describe the organization, characteristics, and functionality of the infrastructure.
	Internet connectivity at households and offices	This element entails the provision of internet facilities to enable access to global computer networks.
	Tech hubs and innovation centres	These are technological centres that foster creativity, entrepreneurship, and technological development by bringing together individuals, resources, and expertise to generate and incubate new ideas and projects.
Smart governance	Public engagement/ digital democracy	Refers to how technology and digital platforms are used to involve citizens in the decision-making processes of government and other public institutions. These concepts leverage technology to enhance participation, transparency, and collaboration between citizens and their governing bodies.

Pillar	Policy elements	Description
	E-government models, platforms, and services	Refers to the use of information and communication technologies (ICTs) to enhance and streamline the delivery of government services, improve interactions between governments and citizens, and promote transparency and efficiency in governance. There are various models, platforms, and services associated with e-government.
	Provision of efficient public and social services	The provision of efficient public and social services is a critical aspect of governance in any society. These services are essential for the wellbeing, development, and overall quality of life of the population. Efficient public and social services ensure that citizens have access to necessities, opportunities, and support systems that contribute to their personal growth and the advancement of the community as a whole.
	Public Private Partnership (PPP) initiatives	PPP initiatives are collaborative arrangements between government entities and private sector organizations to jointly deliver public infrastructure projects or services. These partnerships are designed to leverage the strengths and resources of both the public and private sectors to achieve shared goals. PPPs are common in various sectors such as transportation, healthcare, energy, education, water supply, and more.
	Digital civil and registration systems	Refers to the computerized systems that manage and maintain vital records and civil registration processes electronically. Civil registration involves the recording of vital events such as births, deaths, marriages, and divorces, as well as the legal documentation associated with these events. The transition to digital systems from traditional paper-based methods offers numerous benefits including efficiency, accuracy, accessibility, and data security.
	Transparent governance	Refers to a system of governing where decision-making processes, actions, and information are made visible, accessible, and understandable to the public, stakeholders, and relevant parties. The goal of transparent governance is to promote accountability, trust, and active participation in government activities.
	Urban innovations	Refers to creative and novel solutions that address various challenges faced by cities and urban areas. These challenges can include issues related to sustainability, transportation, infrastructure, housing, public services, and quality of life. Urban innovations aim to make cities more efficient, livable, and resilient by leveraging technology, design thinking, and community engagement.
	Open data initiatives	Refers to efforts made by governments, organizations, and institutions to make data they collect and generate available to the public in a structured and easily accessible format. The goal of these initiatives is to promote transparency, accountability, and collaboration while enabling citizens, researchers, developers, and businesses to use the data for various purposes, such as analysis, research, and application development.
	Multi-sector collaboration	Multi-sector collaboration refers to the cooperation and partnership between various sectors of society, including government, private businesses, non-profit organizations, and academia, to address complex and interconnected challenges. These challenges often extend beyond the capabilities of any single sector to solve effectively. Multi-sector collaboration involves pooling resources, expertise, and perspectives from different sectors to develop comprehensive solutions that have a broader impact.

3.4   Policy Review Framework

This paper addresses concerns that are centred on establishing the gaps in existing policies, laws, regulations, strategies, and guidelines on the development of smart and sustainable cities in Kenya. The study first identified the existing policies, laws, regulations, strategies, and guidelines on the development of smart and sustainable cities based on the seven pillars. The comparison was made across four cities in Kenya namely Nairobi, Mombasa, Nakuru, and Kisumu while benchmarking with Zurich, which is the leading smart and sustainable city globally. The study developed the metrics/scope of reviewing the identified policies as indicated in Table 3.1, that is, when the policy was developed, the importance of the policy, the contribution of the policy in the development of smart and sustainable cities, the challenges, and the actors of the policies. The study engaged the use of gap analysis approach by checking the presence and extent of coverage by elements along each pillar. The study also reviewed laws, regulations, strategies, and guidelines for Zurich to identify the best practices and areas for policy. The study provides recommendations based on the identified gaps. Figure 3.2 outlines the policy review framework adopted in the study.

Figure 3.2: Policy review framework
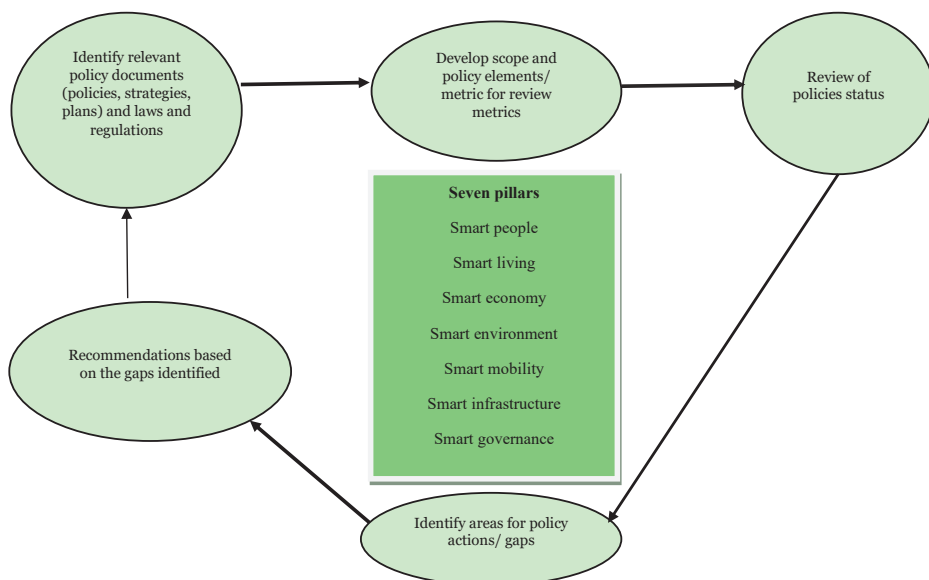
4. Key Findings and Discussion

4.1 Introduction

This section presents the key findings and discussion. Sections 4.1-4.7 outline the discussion of policy efforts.

4.2 Smart People

Smart cities have emerged as a transformative future vision in the fast-changing terrain of urban development. Smart people, who personify creativity and intelligence, are central to this paradigm shift. These great minds play a crucial role in determining the future of smart cities since they have a deep understanding of sustainability, technology, and urban dynamics. Smart individuals ignite a harmonious symphony between technology and urban life via their inventiveness, creativity, and forward-thinking mindset, ushering in a new era of efficiency, connectedness, and improved quality of life for urban dwellers globally. In the context of this study on smart cities and sustainability, thirteen elements were identified and critically studied from a policy framework perspective that help individuals to emerge as smart people.

Table 4.1: Summary of policies for smart people pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Digital literacy initiatives	✓	✓	✓	✓		✓	✓		✓			✓
Information/awareness Initiatives		✓		✓	✓	✓	✓	✓	✓			✓
Academia and research institutions	✓	✓	✓	✓	✓	✓	✓	✓				✓
Digital Culture	✓	✓	✓	✓	✓	✓	✓					✓
Caring community Facility	✓		✓	✓			✓	✓	✓			✓
Skilled and talented human capital Initiatives	✓	✓	✓	✓	✓	✓	✓	✓				✓
Values and Ethics	✓					✓	✓	✓				✓
Access and Equity of education	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Inclusive Education	✓	✓	✓	✓	✓	✓	✓	✓				✓
Early Childhood Education	✓	✓	✓	✓	✓		✓	✓	✓			
Educational Infrastructure	✓	✓	✓	✓	✓	✓	✓	✓				✓
Education Financing	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Digital Inclusion and equal opportunities						✓	✓					✓

✓=present/available

4.1.1 *Digital literacy initiatives*

Initiatives to promote digital literacy are the basis for enabling individuals to thrive in the dynamic environment of smart cities. This is achieved through the acquisition of the skills and knowledge needed to successfully traverse

the complex network of digital information, encouraging a new generation of proactive learners and problem solvers. A review of Kenyan policies reveals that significant efforts have been made to facilitate the provision of digital literacy initiatives. To begin with, the Constitution of Kenya 2010, provides for access to education through the Bill of Rights for basic, primary, and secondary level education. Other key laws that facilitate the acquisition of digital literacy initiatives from a national perspective include the Kenya Gazette Supplement on Education, the Kenya Information and Communication Act, the Computer Misuse and Cybercrime Act, the Data Protection Act, the TVET Act 2013, the Basic Education Act and the Universities Act of 2010. Key policies include the Kenya Vision 2030, the Digital Economy Blueprint, the National Digital Masterplan, the National ICT Policy, and the Competency Based Curriculum. Kenyan cities and their administrative units have also made significant efforts to facilitate the provision of digital literacy initiatives through policy framework. In Nairobi City County, the policies that facilitate the provision of these initiatives include Nairobi County's CIDP. In Mombasa City County, the policy documents include the Mombasa County Education Development Act and the Mombasa County CIDP. In the County of Kisumu, the policies include the Kisumu County CIDP and the Kisumu County ICT Policy. In Nakuru, the county CIDP has facilitated the provision of these initiatives. Across Zurich, the benchmark smart city, the policies that have facilitated the provision of these initiatives include the Federal Act on Data Protection, the Federal Act on Vocational and Professional Education and Training, the Swiss Higher Education Act, the Federal Act on the Elimination of Discrimination Against People with Disabilities, Federal Act on Funding and Coordination of the Swiss Higher education Sector, Digital Education Action Plan (European Union), E-government plan, The Digital Switzerland Strategy, Swiss Action Plan 2019-2020, and the Strategies Zurich 2035. Based on the comparison with Zurich, it is noted that the ECDE level is decentralized through the Constitution of Kenya. In addition, the Kenyan education system has inadequate policies to facilitate the decentralization of Basic and Lower Secondary education. Further, Kenya's digital learning has not leveraged the use of emerging technologies including Artificial Intelligence in learning as compared to Zurich's E-government plan that facilitates the same. It is observed that Kenyan cities are yet to develop laws and regulations on digital literacy initiatives. Lastly, Kenya is yet to fully implement the National Digital Masterplan that entails building capacity for 20 million citizens, 10,000 ICT professionals with high-end skills, 300,000 public servants, and 350,000 teachers with the necessary digital skills to deliver services effectively to the citizens.

4.1.2   *Information/ awareness initiatives*

Information /awareness initiatives are critical to the context of this study. These initiatives enable smart people to make informed decisions, adjust to quick changes, and use their insights to significantly enhance their urban areas by giving them access to accurate and current information. Kenya has made significant progress in policy framework to facilitate the provision of information and awareness initiatives. The Constitution of Kenya 2010 through the Bill of Rights ensures the freedom to information and serves as a policy foundation for these

initiatives. Other national policies and laws that facilitate the provision of these initiatives include the Kenya Information and Communication Act, the Computer Misuse and Cybercrime Act, the Data Protection Act, the TVET Act 2013, the Early Childhood Education Act, the Basic Education Act, the Universities Act of2010, the Kenya Vision 2030, the Digital Economy Blueprint, the National Digital Masterplan, the National ICT Policy, the Basic Education Policy Framework, the Pre-Primary Education Policy 2017, Free Primary Education (FPE) and Free Secondary Education (FSDE) and the Competency Based Curriculum. Kenyan cities have also made substantial progress in the provision of these initiatives through policy framework. In Nairobi City County, the policies put in place include the Nairobi Early Childhood Development and Education Bill of 2021 and the Nairobi City County Integrated Development Plan. In Mombasa, policies put in place include the Mombasa County Education Development Act. In Kisumu, the policies that facilitate the provision of these initiatives include the Kisumu City County Integrated Development Plan and Kisumu County ICT Policy. While the Nakuru CIDP serves as the only policy that facilitates the provision of information and awareness initiatives. Across Zurich, the benchmark city, the policies that facilitate the provision of these initiatives include the Switzerland Federal Act on Data Protection, Federal Law Against Unfair Competition (LCD; RS 241), Federal Act on Data Protection, Federal Act on Vocational and Professional Education and Training, Swiss Higher Education Sector Higher Education Act, Federal Act on the Elimination of Discrimination Against People with Disabilities, Federal Act on Funding and Coordination of the Swiss Higher education Sector, Digital Education Action Plan (European Union), E-government plan, the Digital Switzerland Strategy, Swiss Action Plan 2019-2020, and Strategies Zurich 2035. The policy gap in Kenyan cities when compared with Zurich, is the insufficient allocation of resources to support information and awareness initiatives.

4.1.3 *Academia and research institutions*

Academia and research institutions provide centres for knowledge acquisition to facilitate learning and innovation. A review of Kenyan policies reveals significant efforts to facilitate the establishment and implementation of these institutions. The Constitution of Kenya 2010 through the Bill of Rights has made it mandatory for basic, primary, and secondary education leading to the building of academic institutions across the country. Further, the Constitution has delegated the role of ECDE level education provision to the counties and their administration leading to substantial effort in the provision of early childhood education. Other policies that have facilitated the implementation of these institutions include the Kenya Gazette Supplement, the Computer Misuse and Cyber Crime Act, TVET Act of 2013, the Basic Education Act, the Universities Act of 2010, Kenya Vision 2030, Digital Economy Blueprint, the National Digital Masterplan, National ICT Policy, Competency Based Curriculum, the Basic Education Policy Framework, the Pre-Primary Education Policy of 2017, Free Primary Education (FPE) and Free Secondary Education (FSDE). The Kenyan cities through the county administration have made substantial efforts in facilitating the provision of education facilities. The Nairobi Early Childhood Development and Education Bill (2021), Nairobi City County Integrated Development Plan, the Mombasa County

Education Development Act, Mombasa City County Integrated Development Plan, Kisumu County Integrated Development Plan, Kisumu County ICT Policy, and the Nakuru County Integrated Development Plan from Kenyan cities have facilitated the provision of these facilities. In Zurich, the policies that have facilitated the provision of these institutions include the Swiss Higher Education Sector Higher Education Act, Federal Act on the Elimination of Discrimination Against People with Disabilities, Federal Act on Funding and Coordination of the Swiss Higher Education Sector, Digital Education Action Plan (European Union), E-government plan, and the Digital Switzerland Strategy. The gap in Kenyan cities in comparison with the benchmark city, Zurich, is the limited allocation of resources to facilitate the operations of these institutions.

4.1.4   *Digital culture*

Digital culture entails norms and values that result from the incorporation of technology into every aspect of contemporary life. The aspect of digital culture is important in facilitating the digital landscape, leveraging its vast resources to drive innovation, enhancing efficiency, and addressing urban challenges. In Kenya, various national policies have facilitated the development of a digital culture including the Kenya Information and Communication Act, the Computer Misuse and Cyber Crime Act, the Data Protection Act, 2019, the TVET Act of 2013, the Universities Act of 2010, Kenya Vision 2030, Digital Economy Blueprint, the National Digital Masterplan, National ICT Policy, and the Competency Based Curriculum. Kenyan cities have also made significant efforts in policy framework that facilitates the development of a digital culture including Nairobi City County's CIDP, the Mombasa City CIDP, the Kisumu County's CIDP, and Nakuru County's CIDP. In Zurich, the policies include the Switzerland Federal Act on Data Protection, the Swiss Higher Education Sector Higher Education Act, the Digital Education Action Plan (European Union), the E-government plan, the Digital Switzerland Strategy, and the Strategies Zurich 2035. Both Kenya and Switzerland have put digital initiatives and plans to facilitate digital learning, and provision of digital services from the government to facilitate digital culture. The gap, however, is insufficient policies in Kenyan cities. Nairobi, Mombasa, Kisumu, and Nakuru have few initiatives and policies to facilitate digital culture as compared to Zurich. Another gap is the limited resources allocated to facilitate initiatives that would lead to developing a progressive digital culture. Nairobi City has recently established a smart Nairobi sub-sector to develop and manage strategic systems including shared services and infrastructure, data, information security, data centres, and electronic services in the county. The sub-sector is responsible for the development and enforcement of strategic ICT security initiatives within the county including oversight of incident response. It is noted that Mombasa, Kisumu, and Nakuru cities do not have explicit policies to facilitate digital culture.

4.1.5 *Caring community facilities*

Caring community facilities in the context of smart and sustainable cities help to cater for individuals who are vulnerable within a community and those that have disabilities to have an inclusive environment and society. Kenya has various policies put in place to facilitate the provision of such facilities including the Constitution of Kenya that recognizes rights of individuals termed vulnerable and people with disabilities. Other policies and laws include the Kenya Gazette Supplement (learners with disabilities), TVET Act 2013, Early Childhood Education Act, the Basic Education Act, the Kenya Vision 2030, Competency Based Curriculum, the Basic Education Policy Framework, and the Pre-Primary Education Policy, 2017. At the Kenyan cities level, the Mombasa City and Nakuru Counties' CIDP have facilitated the establishment of caring community facilities. At Zurich, the policies that have facilitated the provision of caring community facilities include the Federal Act on Vocational and Professional Education and Training, the Swiss Higher Education Sector Higher Education Act, and the Federal Act on the Elimination of Discrimination against People with Disabilities. The Federal Act on the Elimination of Discrimination Against People with Disabilities ensures the provision of caring facilities for people with disabilities. In Kenya, the Basic Education Act provides for the establishment of special schools for children with disabilities. It is noted that Kenyan cities do not provide adequate resources to facilitate the provision of these caring community facilities as provided in Zurich.

4.1.6 *Skilled and talented human capital initiatives*

Skilled and talented human capital initiatives in the context of smart people represent exceptional skills, expertise, and creative aptitude. These initiatives are strategically designed to identify, nurture, and harness the full potential of these individuals, who possess a remarkable blend of intellect, ingenuity, and a deep commitment to advancing urban wellbeing. In Kenya, a review of the policies that facilitate the same include the TVET Act, the Universities Act, the Kenya Vision 2030, the Digital Economic Blueprint, the National Digital Masterplan, the National ICT Policy, and the Competency Based Curriculum. Kenyan cities have also made significant progress in policy framework to facilitate the provision of skilled and talented human capital initiatives. The Nairobi City County has implemented the Nairobi Early Childhood Development and Education Bill, 2021 and the Nairobi City County Integrated Development Plan to facilitate the same. The Mombasa, Kisumu, and Nakuru CIDPs have also been implemented to facilitate the provision of skilled, talented, and human capital initiatives in Mombasa, Kisumu, and Nakuru counties respectively. In Zurich, the policies include the Swiss Higher Education Sector Higher Education Act, the Zurich Dual Training System, the Federal Act on Funding and Coordination of the Swiss Higher Education Sector, the Digital Education Action Plan (European Union), E-government Plan, the Digital Switzerland Strategy, and the Strategies Zurich 2035. In Zurich, the Higher Education Act comprises formal and technical education while the TVET Act in Kenya only facilitates the acquisition of technical education hence a policy gap in Kenya.

4.1.7   *Values and ethics*

Values and ethics serve as the moral compass that directs intelligent people's behaviours, choices, and contributions within the framework of smart and sustainable cities. Smart individuals exhibit not only academic prowess but also a deep dedication to the values that support societal wellbeing, inclusion, and sustainability in the dynamic nexus of technological growth and urban expansion. A review of Kenyan policies reveals significant efforts in policy framework to facilitate values and ethics in the dynamics of smart cities. Chapter six (6) of the Constitution of Kenya 2010 provides the national values and ethics to be observed by individuals. Other key laws and policies include the Kenya Gazette Supplement, the Kenya Information and Communications Act, the Computer Misuse and Cyber Crime Act, the Data Protection Act, 2019, the TVET Act, 2013, the Basic Education Act, the Kenya Vision 2030 social pillar, National ICT Policy, Competency Based Curriculum, the Basic Education Policy Framework, and the Pre-primary Education Policy, 2017. Kenyan cities have also made significant progress in promoting values and ethics through policy framework including Kisumu City through the Kisumu County CIDP. Mombasa, Nairobi, and Nakuru cities are yet to implement a proper policy framework on the same. In Zurich, the key laws and policies include: the Federal Act on Data Protection, and the Swiss Higher Education Sector Higher Education Act, and the Federal Act on the Elimination of Discrimination against People with Disabilities promote values and ethics, as well as the European Digital Education Action plan lay foundation for ethical values on the use of artificial intelligence (AI) in schools to ensure facilitation on acquisition of knowledge. In Kenya, there is an absence of policy framework and ethical guidelines to facilitate the use of AI in learning, research, and production.

4.1.8   *Access and equity of education*

Access and equity in education represent foundational pillars through which smart individuals contribute to the realization of inclusive and empowered smart cities. It is an important element that facilitates breaking down barriers, and bridge divides, and ensures that every citizen, regardless of their background or circumstance, has equal access to quality educational opportunities. A review of national policies reveals that significant efforts have been implemented in policy frameworks to facilitate access and equity of education. The Constitution of Kenya 2010 guarantees equal rights of education for every citizen from basic to secondary level. Other key policies include the Kenya Gazette supplement no. 24, the Basic Education Amendment Bill of 2021, the TVET Act 2013, the Early Childhood Education Act, the Basic Education Act, the Universities Act 2010, Kenya Vision 2030, Digital Economy Blueprint, the National Digital Masterplan, Competency Based Curriculum, the Basic Education Policy Framework, the Pre-Primary Education Policy 2017, and Free Primary Education (FPE) and

Free Secondary Education (FSDE). Kenyan cities and their administrative units have also made significant progress to facilitate access and equity of education through various policies including the Nairobi Early Childhood Development and Education Bill, 2021, Nairobi City County Integrated Development Plan in Nairobi City, the Mombasa County Education Development Act, Mombasa City County Integrated Development Plan in Mombasa City, Kisumu City County Integrated Development Plan in Kisumu City, and the Nakuru County Integrated Development Plan in Nakuru City. In Zurich, the policies include the Swiss Higher Education Sector Higher Education Act, the Federal Act on the Elimination of Discrimination against, People with Disabilities, the Federal Act on Funding and Coordination of the Swiss Higher Education Sector, Digital Education Action Plan (European Union), the Digital Switzerland Strategy, and the Strategies Zurich 2035. The Federal Act on the Elimination of Discrimination Against People with Disabilities ensures people with disabilities are educated for free in Zurich. In Kenya, there are insufficient policies to facilitate the acquisition of education for people with disabilities. In addition, there are insufficient policies and laws in Nairobi, Mombasa, Kisumu, and Nakuru cities regarding the financing of education for vulnerable individuals.

4.1.9   *Inclusive education*

Inclusive education in the context of smart and sustainable cities includes equitable access to education, holistic growth, and diverse perspectives in learning that include individuals from all groups to facilitate intellectual capabilities. In Kenya, a review of the national policies reveals substantial progress has been made in policy framework to facilitate the provision of inclusive education. The Constitution of Kenya 2010 through the Bill of Rights Chapter four (4) guarantees the right to education for members of vulnerable groups including people with disabilities. Other national policies include the Kenya Gazette Supplement Learners with Disabilities Act, TVET Act 2013, the Early Childhood Education Act, the Basic Education Act, the Kenya Vision 2030 social pillar, the National Digital Masterplan, Competency Based Curriculum, the Basic Education Policy Framework, the Pre-Primary Education Policy 2017, and the Free Primary Education (FPE) and Free Secondary Education (FSDE). Kenyan cities have also made significant progress in facilitating the provision of inclusive education. In Nairobi City, the city county administration has implemented the Nairobi Early Childhood Development and Education Bill, 2021, and the Nairobi City County Integrated Development Plan to facilitate the provision of inclusive and quality education. In Mombasa City, the county has implemented the Mombasa CIDP to facilitate the provision of inclusive education. In Kisumu City, the county government has implemented the Kisumu CIDP to fast-track the provision of quality inclusive education. Similarly, in Nakuru City, the county government has implemented the Nakuru CIDP to facilitate the provision of inclusive education. Across Zurich city, the policies and laws implemented to provide inclusive education include the Swiss Higher Education Sector Higher Education Act, the Federal Act on the Elimination of Discrimination Against People with Disabilities, the Digital Education Action Plan (European Union), and the Strategy Zurich 2035. The Federal Act on the

Elimination of Discrimination Against People with Disabilities ensures people with disabilities are educated for free in Zurich at all levels of education. It is noted that there is insufficient policy framework in Kenya to facilitate the acquisition of education for people with disabilities at all education levels.

4.1.10 Early childhood education

Early childhood education is crucial in fostering the creation of bright and capable people in the context of smart and sustainable cities. The experiences and educational opportunities provided during these formative years have a significant impact on a person's capacity to think critically, solve problems, communicate effectively, and adapt to new situations as it builds a crucial basis for cognitive, social, and emotional growth. A review of the national policies reveals substantial progress has been made to facilitate the provision of early childhood education. The Constitution of Kenya 2010 has devolved the function of ECDE to county governments to facilitate the provision of quality education. Other policies and laws that facilitate the provision of quality early childhood education include the Basic Education Act, the Kenya Vision 2030 social pillar, the Competency Based Curriculum, the Basic Education Policy Framework, the Pre-Primary Education Policy 2017, and the Free Primary Education (FPE) and Free Secondary Education (FSE). Kenyan cities have made significant efforts to facilitate the provision of early childhood education. In Nairobi City, the Nairobi Early Childhood Development and Education Bill, 2021, and Nairobi City County Integrated Development Plan fast-track the provision of quality early childhood education. In Mombasa City, the county government has adopted the Mombasa County Education Development Act and the Mombasa City County Integrated Development Plan to facilitate the provision of early childhood education. Similarly, in Kisumu City, the county government has adopted the Kisumu City County Integrated Development Plan to provide quality early childhood education. In Nakuru City, the county government has also implemented the Nakuru County Integrated Development Plan to provide early childhood education. While Kenya has made significant efforts to facilitate the provision of early childhood education, the education is offered at a fee, and scholarship and bursary incentives are considerably few compared to the needy urban population. This is unlike Zurich, which offers free early childhood education. Zurich allocates more resources to finance early childhood education hence better quality in Zurich than in Kenyan cities.

4.1.11 Education infrastructure

Educational infrastructure is essential because it fosters an environment that is favourable to successful learning, innovation, and skill development. Modern facilities, cutting-edge technology, and well-kept campuses enable comprehensive educational experiences, empowering intelligent people to explore their potential, engage in critical thinking, collaborate on challenging projects, and gain practical experience that will help them succeed in school and their careers. There are various national policies to facilitate the development of educational infrastructure

including the Constitution of Kenya, 2010, which guarantees the right to education and serves as a policy framework for the provision of educational infrastructure. Other policies and laws that facilitate the provision of education infrastructure include the Computer Misuse and Cybercrime Act on public policy education, TVET Act, 2013, Early Childhood Education Act, the Basic Education Act, the Universities Act, 2010, Kenya Vision 2030, Digital Economy Blueprint, and the National Digital Masterplan. There are tremendous efforts that have been made by Kenyan cities to facilitate the provision of education infrastructure. The Nairobi County government has implemented the Nairobi Early Childhood Development and Education Bill, 2021, and the Nairobi City County Integrated Development Plan to facilitate the provision of education infrastructure. In Mombasa, the county government has implemented the Mombasa CIDP to fast-track the development of education infrastructure. In Kisumu, the county government has initiated the Kisumu County Integrated Development Plan to facilitate the provision of Education infrastructure. In Nakuru City, the county government has implemented the Nakuru CIDP to facilitate the same. Across Zurich, the policies and laws that facilitate the provision of education infrastructure include the Federal Act on Vocational and Professional Education and Training, the Swiss Higher Education Sector Higher Education Act, the Federal Act on the Elimination of Discrimination Against People with Disabilities, Federal Act on Funding and Coordination of the Swiss Higher Education Sector, Digital Education Action Plan (European Union), and the Strategies Zurich 2035. The Swiss Higher Education Sector Higher Education Act, Federal Act on Vocational and Professional Education and Training, and the Federal Act on Funding and Coordination of the Swiss Higher Education Sector facilitate the Financing of educational infrastructure. Similarly, the Universities Act, TVETs Act, and Basic Education Act in Kenya facilitate the financing of educational infrastructure. The counties' CIDPs also facilitate the provision of educational infrastructure. The gap is the difference in infrastructure availed to facilitate learning as Switzerland has better infrastructure for learning compared to Kenya. Zurich allocates more resources to its education infrastructure compared to Kenyan cities leading to robust education infrastructure in the city.

4.1.12 *Education financing*

Adequate and accessible education financing is a crucial catalyst for nurturing the potential of all individuals in the context of smart people. It guarantees equal access to high-quality educational resources, opportunities, and experiences that enable cities to develop a population with talents, necessary skills, and intellectual capabilities. A review of Kenyan policies on education financing reveals that significant efforts have been made to facilitate the financing of education. The Constitution of Kenya, 2010 guarantees the right to education for all individuals through the Bill of Rights. This facilitates the financing of education by the national and county governments. Other national policies and laws that facilitate the financing of education include the Kenya Gazette Supplement (the Supplementary Appropriation, the Finance Bill, the HELB Act, the Universities Bill), TVET Act, 2013, Early Childhood Education Act, the Basic Education Act,

the Universities Act, 2010, Kenya Vision 2030, Digital Economy Blueprint, the National Digital Masterplan, Competency Based Curriculum, the Basic Education Policy Framework, the Pre-Primary Education Policy, 2017, and the Free Primary Education (FPE) and Free Secondary Education (FSE). In Nairobi City, the county government of Nairobi has implemented the Nairobi Early Childhood Development and Education Bill, 2021, and the Nairobi City County Integrated Development Plan to facilitate financing of education. In Mombasa City, the county government has implemented, the Mombasa County Education Development Act, and the Mombasa City County Integrated Development Plan. In Kisumu City, the county government has implemented the Kisumu CIDP. In Zurich City, the policies and laws that facilitate the financing of education include the Federal Act on Vocational and Professional Education and Training, the Swiss Higher Education Sector Higher Education Act, the Federal Act on the Elimination of Discrimination Against People with Disabilities, the Federal Act on Funding and Coordination of the Swiss Higher Education Sector, and Digital Education Action Plan (European Union). In Kenya, the Higher Education Act and the Universities Act facilitate the same. It is noted that only early childhood education in Kenyan cities is funded by the county governments while Zurich funds the education system. Further, it is noted that Zurich spends considerably more financial resources on funding education compared to Kenya thus making Zurich an attractive education city.

4.1.13 *Digital inclusion and equal opportunities*

Digital inclusion ensures equal opportunities are made available for all individuals. This facilitates innovation, creativity, and cross-cultural exchange, allowing people to contribute their various viewpoints and expertise to addressing global issues and jointly forming a more promising future for humanity. A review of Kenyan policies on digital inclusions reveals some progress in facilitating equal digital opportunities. For instance, the Constitution of Kenya, 2010, guarantees equal opportunities for every individual including members of marginalized groups, people with disabilities, and members of vulnerable groups. Other key policies include the Digital Economy Blueprint and the National Digital Masterplan. In Zurich, the policies that facilitate digital inclusion and equal opportunities include the Swiss Higher Education Sector Higher Education Act, the Federal Act on the Elimination of Discrimination Against People with Disabilities, and the Strategies Zurich 2035. The Federal Act on People with Disabilities permits all individuals with disabilities to pursue digital learning and advocates for digital inclusion. Actualizing digital inclusion in Kenyan cities remains a key policy issue.

4.2   *Smart Living*

Smart living is a key component of smart and sustainable cities considered in this study. The smart living concept can only be designed and implemented with active roles for smart people and smart city government, together with electronic democracy, electronic governance, and digital systems. Smart living contributes to enhanced coordination, effective and efficient management, development, and conservation of the city's resources as well as improved ecological, social,

biophysical, psychological, and economic wellbeing of urban population. In the context of this study, eighteen elements on smart living were identified and critically studied.

Table 4.2: Summary of policy initiatives on smart living pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Safety, security/crime prevention	✓	✓	✓	✓		✓	✓				✓	
Housing quality	✓		✓				✓					✓
Educational quality	✓					✓	✓					✓
Health conditions/ health facilities	✓		✓			✓	✓					✓
Cultural facilities and budget allocation	✓					✓	✓					✓
Tourist/recreational attractiveness and entertainment						✓	✓					✓
Application of smart water meters and power meters and other smart home applications						✓						✓
Livability (initiatives to enhance quality of life/ life expectancy initiatives)						✓						✓
Provision of basic urban utilities	✓					✓	✓					✓
Provision of affordable housing	✓						✓					✓
Social housing and vulnerable populations	✓						✓					✓
Financing and funding mechanisms for affordable housing	✓					✓	✓					✓
Slum upgrading and informal settlements	✓						✓					✓
Community engagement in crime management	✓						✓					✓
Rehabilitation and reintegration	✓											✓
Health promotion and disease prevention	✓						✓					✓
Health equity	✓											✓
Health workforce	✓											✓

√=present/available

4.2.1   *Safety, security and crime prevention*

Safety, security, and crime prevention significantly influence the urban quality of life and are, therefore, critical for sound urban development. The notions of safety, security, and crime prevention are closely related. In general, safety reflects a situation of being protected or secured against unintended threats, harm, or catastrophes. Security is a state in which people feel protected against liberate threats or adverse actions. A review of the Kenyan cities reveals significant efforts to create a safe and secure environment. For instance, at the national level, Kenya has recognized the importance of security in the Constitution of Kenya, 2010, to enable economic growth and development including in cities. Further, it is noted that the functions of security are performed by the national government as enshrined in the Constitution of Kenya. In addition, various national laws and policies underpin the importance of security and safety including the Occupational Safety and Health Act, 2007, Kenya Vision 2030, National Slum Upgrading and Prevention Policy, National Policy on Community Development and National Development Policy. Further, the Nairobi, Mombasa, and Nakuru cities have recognized the importance of safety and security as noted in their CIDPs. The cities of Nakuru and Kisumu lack a sufficient policy framework on safety and crime prevention. Provision of security in the cities is a challenging task that requires

both the national and county governments and the citizens to collaborate in fighting against security threats. It is noted that Kenya has a draft Nyumba Kumi policy initiative that requires approval before implementation. The study reveals that Zurich has embraced community policing, which has ultimately contributed to the reduction of crime in the city. Zurich guarantees all its inhabitants a high level of safety and solidarity thus making Zurich a 24-hour city.

4.2.2 *Housing quality*

Housing quality is a key transformative dimension of smart living. The use of smart gadgets, automation systems, and data-driven solutions are important aspects that enhance housing quality for the urban population. Some of the desirable housing quality ranges from energy-efficient appliances that lower utility costs and have environmental effects (building strategies) to sophisticated security systems that improve safety through real-time monitoring and remote control. Kenya has recognized the importance of housing quality and has established several laws and policies that lay the ground for the facilitation of housing quality. The laws and policies include the Constitution of Kenya, 2010, through Article 43 1 (b), the National Policy on Gender and Development of 2016, the National Construction Authority Act,2011, and the Kenya Vision 2030. Despite these positive efforts, a high number of urban populations still dwell in houses that lack smart and sustainable features, therefore leading to heavy consumption of energy and water resources. It is noted that Nairobi, Kisumu, and Nakuru cities have not put in place adequate policy frameworks to facilitate the quality of housing. Although there is a new building code that is in draft form, it is noted that Kenyan cities still rely on outdated building codes that fail to embrace smartness and sustainability aspects. Further, due to gaps in implementing housing standards occasioned by inadequate approval and enforcement staff, cases of buildings collapsing have increased. When compared to Zurich's housing quality facilitated by the Swiss Tenancy Law through Article 257a, the law provides strict building codes that ensure quality in buildings.

4.2.3 *Education quality*

Education quality serves as an important metric in smart living. It measures societal progress, intellectual growth, and innovation. A review of the Kenyan cities and the national government reveals that significant progress has been made. The Kenya Constitution, 2010, through article 53 guarantees access to education. Other supporting policies and laws include the National Policy on Gender and Development, 2016, Kenya Vision 2030, the Basic Education Act, the Universities Act, the Early Childhood Education Act, and the National Policy on Community Development. At the county level, the County Integrated Development Plan for each city county has laid the foundation for the improvement of infrastructure to facilitate quality of education. While education quality remains a key ingredient in smart and sustainable cities, several policy gaps constrain Kenya's education system. Kenya has inadequate teachers and learning equipment as compared to leading smart and sustainable cities. For instance, in Zurich (Switzerland), the

Swiss Federal Constitution, the Swiss Vocational and Professional Education and Training (VPET) Act, and the Swiss Universities Act (Higher Education Act) have facilitated the provision of high quality education through availing required resources. While both Kenya and Switzerland prioritize educational quality, they have distinct legal and policy frameworks and face unique challenges. Kenya strives to improve access to quality education, while Switzerland boasts a well-regarded education system with a strong focus on vocational training. Zurich is referred to as the city of knowledge and culture. Zurich's city council offers equal opportunities for all with a very promising school model. The dual training system, which is highly effective and efficient, ensures an enviable work–school balance. The Kenyan cities are yet to adequately offer a supportive environment for young learners at the ECDE level due to limited budget allocation unlike Zurich which offers free education to young learners. Notably, Kenyan cities have insufficient comprehensive policy frameworks to support all young learners with scholarships, bursaries, and other incentives necessary for quality education.

4.2.4 Health condition and health facilities

Health conditions and health facilitate the wellbeing of individuals in the context of smart living. A review of the Kenyan cities and the National government reveals that significant progress has been made. The Constitution of Kenya, 2010, has recognized the importance of healthcare and health facilities. Article 43 (1) (a) guarantees every citizen the right to healthcare and access to healthcare facilities. Other policies at the national level that have facilitated access to health facilities include the Physical Planning Act, the Occupational Safety and Health Act of 2007, the Kenya Vision 2030, and The Kenya Health Policy. At the county level, the Universal Healthcare Coverage, the Nairobi CIDP, Mombasa CIDP, the Nakuru CIDP, and the Kisumu CIDP provide the policy and legal framework to facilitate access to health facilities and improve health conditions. Addressing health concerns in the cities in Kenya has remained a key challenge to both the national and county governments. Most of the urban population relies on informal jobs that do not offer insurance services coupled with poverty leading to cities being unable to offer affordable medical services. In Zurich, the Swiss Federal Constitution, the Federal Act on Health Insurance, and the Federal Act on Occupational Health and Safety have facilitated access to health facilities and improved health conditions. The City Council in Zurich supports health–related research via Zurich University. In addition, it ensures that cutting-edge research findings are usable to provide high quality healthcare. Kenya and Switzerland have legal frameworks and policies addressing health conditions and health facilities, but their effectiveness and implementation differ significantly. Kenya struggles with inadequate resources and limited enforcement, leading to disparities in healthcare access and workplace safety. Switzerland, on the other hand, boasts a robust healthcare system. Further, the cities of Nairobi, Nakuru, and Kisumu lack a comprehensive policy framework on health conditions and facilities.

4.2.5   *Cultural facilities and budget allocation*

Cultural facilities and budget allocation are important aspects of any country's constitution, as they reflect a government's commitment to preserving and promoting its cultural heritage and providing access to cultural resources for its citizens. In Kenya, cultural facilities and budget allocation for cultural activities are typically governed by various provisions in the constitution and other related laws. The Constitution of Kenya, 2010, recognizes and protects cultural rights and heritage as fundamental aspects of the country's identity and national heritage. It recognizes culture as the foundation of the nation and as an integral part of the nation's heritage. Further, it promotes the use of indigenous languages, the development of traditional knowledge, and the promotion of Kenyan arts and culture. Similarly, in Kenya Vision 2030, cultural facilities and budget allocation play a crucial role in the development and promotion of the country's cultural heritage, artistic expression, and creative industries. Cultural facilities and their appropriate budget allocation are important aspects of this Vision because they contribute to social cohesion, economic growth, and national identity. When compared to Switzerland, Zurich has a well-supported policy and legal framework that has established a strong culture. For instance, Switzerland's Constitution serves as the fundamental legal document that outlines the structure of the government, the rights and responsibilities of citizens, and various aspects of governance. It is noted that Zurich's cultural programmes foster diversity due to well-funded culturally based initiatives while Kenyan cities have inadequate policy frameworks on cultural facilities.

4.2.6   *Tourist/recreational attractiveness and entertainment*

Tourist/recreational attractiveness and entertainment are important aspects of smart living, as they contribute to the overall wellbeing of both residents and tourists, while also boosting the local economy. The Kenya Constitution primarily focuses on the governance structure, fundamental rights, and responsibilities of the citizens. It does not cover specific aspects such as tourist/recreational attractiveness and entertainment in detail.

The Swiss Constitution, also known as the Federal Constitution of the Swiss Confederation, does not explicitly discuss tourist/recreational attractiveness and entertainment as specific aspects within its text, but primarily focuses on fundamental principles of governance, individual rights, federal structure, and the relationship between the different levels of government.

However, while this aspect might not be explicitly mentioned in the constitution, they are undoubtedly important factors in Switzerland's socio-economic landscape and are regulated through various laws, regulations, and policies at the federal, cantonal (state), and municipal levels. Overall, Zurich's tourism promotion focuses on its cultural richness, natural beauty, sustainability, and accessibility, appealing to a broad range of travellers from around the world. As a major travel destination, the Integrated Location and Destination Marketing (ISDM) programme in conjunction with the Canton of Zurich and the Zurich tourism,

the City Council backs up the active promotion of Zurich's outstanding qualities locally and internationally.

4.2.7 *Application of smart water meters and power meters and other smart home applications*

Smart applications such as smart water meters, power meters, and other smart home applications are key in defining smart and sustainable cities. Kenya has identified the importance of smart applications as noted in the National Digital Masterplan and Digital Economy Blueprint. This effort has contributed to increasing the number of smart applications. For example, through the mobile payment platform M-Pesa and its application programming interface, consumers can pay for water and electricity bills. In addition, Nairobi City County has launched the Nairobi Pay online services that help one to know their water bills from the comfort of their homes and fast-track payment. However, the county governments of Mombasa, Nakuru, and Kisumu are yet to establish a policy framework to facilitate the use of smart home applications. In Zurich (Switzerland), the use of smart water and electricity meters and other smart home technology has become essential to contemporary urban living in Zurich. Smart water meters provide real-time data on water consumption and are readily connected to homes. The Zurich Smart City Strategy has been able to guide data and technology integration to enhance urban living. The strategy covers the promotion of smart home applications that improve resource management, waste reduction, and energy efficiency. It is observed that Kenya does not have clear guidelines and protective measures on personal data for consumers in the cities, leaving room for potential misuse of personal data, unlike Zurich which has a strong policy framework for data protection for consumers of smart applications. In Kenya, both the national government and Kenyan city administrations do not have a comprehensive policy framework to facilitate the use of smart home applications.

4.2.8 *Livability (initiatives to enhance the quality of life/ life expectancy initiatives)*

Initiatives to facilitate the quality of life and life expectancy are important to facilitate the long life and wellbeing of individuals. Kenya has recognized the importance of livability initiatives at all levels of government that help in enhancing the quality of life and life expectancies. However, there are policy gaps at both the national level and county level for the successful implementation of programmes for wellbeing of the urban population. In Switzerland, the Federal Constitution does contain provisions related to various aspects of citizens' wellbeing and quality of life, which indirectly impact "Livability" and public health. Some relevant articles in the Swiss Federal Constitution that touch on these matters include Article 74 "Social Security", Article 119 "Health Insurance", and Article 118 "Public Health". Switzerland's strong and stable economy, well-established healthcare system, robust social security infrastructure, and commitment to sustainability contribute to a higher quality of life and better life expectancy compared to Kenya. Kenya

faces various challenges related to healthcare, social security, environmental sustainability, and education, which create gaps in its livability initiatives. Kenyan cities have insufficient policy frameworks on livability to facilitate the provision of initiatives to enhance the quality of life.

4.2.9   Provision of basic urban utilities

Kenya has recognized the importance of providing urban basic utilities to facilitate comfortable stays, delivery of basic services, and enhancing the quality of living. At the national level, the policies and laws that facilitate the provision of the urban basic utilities include Sessional Paper number 6 of 2014, the Urban Areas and Cities Act, the Physical Planning Act, the National Policy on Gender Development of 2016, Kenya Vision 2030, the National Policy on Community Development, and the Kenya National Social Protection Policy. It is noted that at the county level, there are insufficient policies to support basic urban utilities. In Switzerland, various acts have been able to support the provision of basic urban utilities including Article 73 "Spatial Planning and Land Use", Article 74 "Land Use", Article 82 "Economic infrastructure", all under the Constitution. In Kenya, several gaps in policies and legal frameworks hinder the effective provision of urban basic utilities. One major issue is the inadequacies in policies to clearly define the responsibilities and roles of different government agencies and private sector entities involved in service provision. This leads to fragmentation and inefficiency in service delivery, resulting in inadequate access to basic utilities such as water, electricity, and sanitation in many urban areas. Further, it is noted that although there is a National Spatial Plan, only a few cities have further formulated their spatial plans for effective planning of urban basic utilities.

4.2.10 Provision of affordable housing

Affordable housing facilitates social stability and economic empowerment leading to sustainability. Kenya has recognized the importance of affordable housing and has implemented several laws and policies to facilitate the provision of affordable housing. These include the Constitution of Kenya 2010, Sessional Paper No. 3 of 2009 on National Land Policy, the Urban Areas and Cities (Amendment) Act 2019 provisions related to housing and the development of urban areas and cities, The National Housing Corporation (NHC) Act, the Physical Planning Act, Finance Act, 2023, the Kenya National Housing Policy, and the Affordable Housing Programme. A key gap in Kenya is insufficient policies among the counties to support affordable housing. In Zurich, several policies help to facilitate the provision of affordable housing including the Swiss Constitution and the Federal Act on Housing. Kenya and Switzerland have contrasting policies and legal frameworks, with notable gaps in Kenya's system. In Kenya, there are significant gaps in policies and legal frameworks that contribute to the challenges of affordable housing. These gaps result in fragmentation, inefficiency, and inadequate access to affordable housing for the population. While housing is a national government function, Kenyan cities experience policy gaps including financing, land, and provision of basic infrastructure services for affordable housing.

4.2.11 Social housing and vulnerable populations

Social housing is important in the context of smart living to promote social equity and facilitate alleviation from poverty. A review of Kenya's national policies reveals that there have been significant efforts to support social housing and significant support for vulnerable populations. From the matrix, the national policies that help to facilitate this include the Constitution of Kenya 2010 through Articles 43, 53, and 55. Other policies and laws include Sessional Paper No. 3 of 2009, the Urban Areas and Cities (Amendment) Act, 2019, the National Housing Corporation Act, the Physical Planning Act, the Kenya National Housing Policy, and the Kenya Vision 2030. It is noted that in Zurich (Switzerland), the Federal Constitution has provisions that help support vulnerable populations. Kenya and Switzerland differ significantly in their approaches to social housing and addressing the needs of vulnerable populations. While Kenya faces gaps in policies, fragmentation, and weak enforcement mechanisms, Switzerland boasts a comprehensive national policy with clear roles and responsibilities and has strong enforcement mechanisms. In addition, Zurich's Council aims to increase the proportion of social housing units among the rental apartments from 25 per cent to 33 per cent by 2050 to ensure a high quality of life for its residents. Kenyan cities still experience challenges in the provision of social housing for vulnerable populations. Therefore, it is noted that the model provided by Switzerland highlights the importance of a well-developed policy and legal framework, efficient service delivery, and a commitment to transparency and accountability in addressing the housing needs of vulnerable populations.

4.2.12 Financing and funding mechanisms for affordable housing

Policy framework on financing and funding mechanisms for affordable housing is important to facilitate the implementation of affordable living. A review of the national policies and those of Kenyan cities reveals some progressive efforts toward building affordable housing. For instance, the national government has introduced a housing levy to support the affordable housing programme. This is expected to significantly increase house ownership through affordable housing programmes across all counties. However, there are policy gaps including land and financing of affordable housing in Kenya. Policy gaps in financing and funding mechanisms for affordable housing in Kenya are evident due to huge informal settlements in the cities. Further, high land prices, unavailability of land, and high cost of construction materials affect the provision of affordable housing. In contrast, Switzerland's well-developed policies, clear roles and responsibilities, and strong enforcement mechanisms lead to the efficient and effective provision of affordable housing.

4.2.13 Slum upgrading and informal settlements

Slum upgrading involves improving infrastructure and basic services in informal settlements. Smart living integrates technologies and data-driven solutions to enhance infrastructure, such as water supply, sanitation, electricity, and

transportation. Implementing smart infrastructure in slums can significantly improve the quality of life for residents by providing reliable access to essential services. The Kenyan Constitution recognizes the right to accessible and adequate housing for all Kenyan citizens. This includes those living in informal settlements. Efforts to upgrade these settlements fulfill this constitutional right. Sessional Paper No. 3 of 2016 aims to ensure the progressive realization of the right to accessible and adequate housing and reasonable standards of sanitation for every person as per Article 43 of the Constitution. This could provide opportunities for local authorities to address slum upgrading and informal settlements according to the specific needs of their regions. Vision 2030 includes provisions related to social and economic rights, such as access to clean water, healthcare, and education. These rights are highly relevant to addressing the challenges faced by informal settlements. In Zurich, housing is a key priority and thus Switzerland is generally considered to be a highly developed and affluent country with a relatively small proportion of its population living in informal settlements or slums compared to many other parts of the world.

4.2.14 Community engagement in crime management

Empowering citizens to actively participate in crime management enhances the effectiveness of law enforcement efforts. Smart living technologies, such as mobile applications and online platforms, enable residents to report incidents, provide tips, and share relevant data. When citizens feel involved and valued in crime prevention, they become more invested in creating a safe environment.

In the context of the Kenyan Constitution, if provisions for community engagement in crime management are present, they likely reflect the principles of democratic governance, human rights, and citizen participation. The Kenya Vision 2030 emphasizes the concept of community policing, where law enforcement agencies collaborate with local communities to identify and address crime-related issues. This approach involves building trust, improving communication, and involving community members in designing and implementing crime prevention strategies.

Switzerland's approach to community engagement in crime management reflects its commitment to a holistic and inclusive justice system. By involving communities in decision-making, prevention, rehabilitation, and support efforts, Switzerland aims to create a safer society while also focusing on the reintegration and wellbeing of both offenders and victims. Swiss communities have a say in how certain aspects of crime management are carried out. For instance, some cantons allow citizens to participate in determining the conditions of parole or the release of prisoners. This participatory approach ensures that decisions are influenced by those directly affected by crime and the justice system.

4.2.15 Rehabilitation and reintegration

Rehabilitation and reintegration are important aspects of criminal justice systems that focus on helping individuals who have been involved in criminal activities to transition back into society in a productive and law-abiding manner. The Kenyan

Constitution contains a comprehensive Bill of Rights that outlines various human rights and fundamental freedoms. These rights include the right to dignity, fair treatment, and protection from torture and cruel, inhuman, or degrading treatment. These provisions imply that individuals in the criminal justice system should be treated with respect and provided with opportunities for rehabilitation. Vision 2030 emphasizes the rights of arrested persons, including the right to be treated humanely and with respect for their dignity. It also enshrines the right to remain silent and the right to have legal counsel present during interrogations. These rights contribute to the fair treatment of individuals in the criminal justice system and can be linked to rehabilitation efforts. In Zurich, the Swiss Constitution emphasizes the principle of human dignity (Article 7), which forms the basis for treating individuals with respect and ensuring their rehabilitation and reintegration after an offense or a period of incarceration.

4.2.16 Health promotion and disease prevention

Integrating health promotion and disease prevention into the concept of smart living harnesses the power of technology to empower individuals to take control of their wellbeing. By providing accessible information, personalized guidance, and tools for monitoring health, smart living facilitates a proactive approach to staying healthy and preventing diseases. However, it is important to strike a balance between technology and human connection, ensuring that individuals still receive appropriate medical guidance and care from healthcare professionals.

The Kenyan Constitution recognizes the right to health as a fundamental human right. Article 43 of the Constitution guarantees every Kenyan the right to the highest attainable standard of health, including access to healthcare services, reproductive healthcare, and emergency medical treatment. The Kenya Vision 2030 emphasizes social and economic rights that are essential for health promotion and disease prevention. These rights include the right to accessible and adequate housing, clean and safe water, and social security. These factors contribute to a healthier environment and prevent the spread of diseases. Sessional Paper No. 2 of 2017 gives the direction to improve the overall health status in Kenya in line with the Constitution of Kenya 2010, The Kenya Vision 2030, and global commitments. The Universal Health Coverage Policy facilitates health promotion strategies.

The Swiss government has launched various national health promotion programmes that focus on various aspects of health, such as physical activity, nutrition, mental health, and tobacco control. These programmes aim to raise awareness, provide education, and encourage behaviour changes that contribute to better health. Zurich's growing health market is opening options for hospitals, companies from the health-care sector and the fields of MedTech and biotech. Zurich's City Council guarantees that these potentials are exploited by municipal institutions and other players in the healthcare sector, ensuring a high quality of medical care for Zurich's population and further amplifying the attractiveness of the city.

4.2.17 Health equity

Health equity refers to the concept of ensuring that all individuals have the same opportunity to attain their highest level of health, regardless of their social or economic status. It involves addressing disparities in health outcomes and access to healthcare services among different population groups. The Kenyan government has recognized the importance of health equity and has taken steps to address disparities in healthcare access and outcomes among different population groups. Kenya has been working towards achieving Universal Health Coverage (UHC), which aims to ensure that all individuals and communities can access quality health services without facing financial hardship. UHC is a critical step towards health equity, as it seeks to provide essential health services to everyone, irrespective of their socioeconomic status. In Switzerland, several measures have been taken to promote health equity through government policies. The Swiss Constitution aims to ensure that everyone has access to necessary healthcare services, regardless of their socioeconomic background. This is achieved through a combination of public and private healthcare providers, which allows citizens to choose their preferred healthcare services while maintaining a certain standard of care. Switzerland has a system of mandatory health insurance, where all residents are required to have health insurance coverage. This universal healthcare system ensures that all individuals have access to essential healthcare services, regardless of their financial status.

4.2.18 Health workforce

The health workforce is a crucial aspect of smart living, encompassing the skilled professionals who provide healthcare services and play a pivotal role in promoting and maintaining the wellbeing of individuals and communities. As technology continues to shape various aspects of our lives, it also significantly influences the way healthcare services are delivered, making the concept of a "smart" health workforce particularly relevant. The Kenyan government has formulated policies and strategies to ensure proper planning, distribution, and management of the health workforce across different regions of the country. This involves determining the optimal number and mix of healthcare professionals (such as doctors, nurses, and allied health workers) needed to meet the healthcare demands of the population. The Health Sector Human Resource Strategy 2014-2018 is a major step by both county and national governments in collaboration with partners to strengthen the human resources for health to deliver quality health services more efficiently. The Kenya Vision 2030 has also emphasized the importance of gender equity within the health workforce. Efforts have been made to encourage more women to pursue careers in healthcare and to address gender-based disparities in workforce opportunities.

Switzerland is known for its high quality education and training programmes for healthcare professionals. Medical and nursing education is rigorous, and the country offers a diverse range of training options. The government, through various institutions and regulatory bodies, ensures that healthcare professionals meet strict educational and competency standards.

4.3   Smart Economy

A smart economy refers to a modern and efficient system where various sectors and processes are seamlessly interconnected to enhance productivity, resource utilization, and overall wellbeing. It involves leveraging intelligent strategies, data-driven insights, and innovative approaches to optimize the allocation of resources, streamline operations, and improve decision-making. This type of economy prioritizes adaptability, sustainability, and effective utilization of available resources to achieve long-term growth and improved quality of life for individuals and communities. Smart economies often foster a culture of innovation and entrepreneurship. Startups and small businesses play a significant role in driving technological advancements and disrupting traditional industries. The key components and characteristics of a smart economy are presented in Table 4.3.

Table 4.3: Summary of policy initiatives on smart economy

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Tax incentives	✓	✓	✓	✓	✓	✓	✓	✓				✓
Digital economy initiatives for enterprises and startups	✓					✓						✓
Poverty reduction initiatives	✓	✓	✓	✓	✓	✓						
Smart services delivery												✓
Own source revenue initiatives	✓	✓	✓	✓	✓	✓						✓
Smart processing and manufacturing	✓			✓		✓						
Digital jobs (employment)	✓					✓	✓					✓
Digital entrepreneurship culture				✓		✓					✓	✓
Licensing and authorization on mobile money operators	✓	✓					✓					
Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF)	✓			✓			✓					✓
Business efficiency	✓	✓	✓	✓	✓	✓	✓					✓
Economic growth	✓	✓	✓		✓						✓	✓

✓=present/available

4.3.1 *Tax incentives*

Tax incentives are strategic financial advantages governments provide to encourage specific favourable behaviours and practices within an advanced economy. These incentives are designed to promote growth, innovation, and societal wellbeing by rewarding activities that contribute to long-term prosperity. In a smart economy, tax incentives play a crucial role in steering economic activity toward desired outcomes. They catalyze sustainable development by stimulating investments, fostering research and development, nurturing entrepreneurship, and supporting industries that contribute to ecological balance and social progress. These incentives are aimed at enhancing competitiveness, driving efficiency, and cultivating a culture of forward-thinking decision-making among businesses and individuals. By leveraging the power of tax incentives, a smart economy can channel resources into areas that align with its strategic goals, ensuring that the economy remains adaptive, resilient, and positioned to capitalize on emerging opportunities. In this way, tax incentives form an integral part of the broader framework that guides the nation toward a future characterized by prosperity, innovation, and a high quality of life for its citizens.

The Kenyan Constitution provides the legal framework for the imposition and collection of taxes in the country. It outlines the principles and guidelines that govern how taxes are levied, collected, and utilized by the government to fund public services and development initiatives. Among the nine (9) national development plans set by the strategic plan is the 8th corporate plan that lays the foundation for the digitalization of the Kenya Revenue Authority Tax incentives to be structured to encourage businesses to invest in research and development (R&D) activities. This can include deductions or credits for R&D expenditures, allowing companies to reduce their tax liability in proportion to their innovation efforts. Financial Services Authority Bill (FSA, 2016) states the income of the FSA Fund, the Ombudsman Fund, and the Compensation Fund are exempted from income tax. The Kenya Vision 2030 under the economic pillar gives the provision for the turnover tax to be revamped to make it more efficient and easier for the taxpayers to comply with. A sector-specific taxpayer education programme and an expanded scope of electronic payment will be implemented to increase recruitment and registration of taxpayers and revenue collection.

The Draft County Government Revenue Raising Process Bill (2017) states that a county government may not exercise its power in terms of Articles 209 or 210 of the Constitution to impose tax, levy, fee, or any other charge in a way that is materially and unreasonably prejudice. In addition, to support the enhancement of County Government Own Source Revenue, the National Policy states that new taxes, fees, and charges by county governments shall be introduced after review and ratification through a process to be prescribed in law. The Kenya Revenue Authority (KRA) under Gazette Notice No. 1609 of February 25, 2020, was designated as the principal agent for the overall collection of revenue in Nairobi County. It was given full access to county revenue processes, information, data, and systems. This was meant to enhance increased own-source revenue. Nakuru City County Integrated Development Plan states that the key revenue streams in

regard to local revenue contribution include property tax, trade licenses, parking fees, advertising and royalties.

The Swiss Federal Constitution states that any Swiss man who does not do military or alternative service is liable to pay a tax. This tax is levied by the Confederation and assessed and collected by the Cantons. In addition to the European Free Trade Association (EFTA) Convention and the Free Trade Agreement with the European Union (EU) of 1972, Switzerland currently has a network of 33 free trade agreements (FTAs) with 43 partners. Swiss Monetary Policy emphasized the need for a medium-term fiscal plan to address rising spending pressures, related to aging, climate transition, energy security, and defence. The plan would also help manage potential revenue losses from tax reforms. Swiss Export Control and Sanction Policy has concluded more than 100 income double tax treaties (DTTs) and it is seeking to further extend its treaty network.

In comparison with the benchmark city, it is noted that Zurich generally has a lower corporate tax rate compared to Kenya. Zurich's corporate tax rate is one of the lowest in the world, attracting many multinational companies to establish their headquarters or regional offices there. In contrast, Kenya's corporate tax rate is higher. For personal income tax, Zurich offers lower rates compared to Kenya, especially for higher-income earners. Zurich has a well-established system of tax incentives to attract foreign investment and encourage research and development. Various cantons (states) in Zurich offer different tax benefits to businesses. Nairobi also has some tax incentives to promote specific sectors, but there are generally not as many as those in Zurich. Zurich has an extensive network of double taxation treaties with many countries, which has helped to avoid double taxation for businesses and individuals engaged in cross-border activities while Kenyan cities have double taxation treaties with cross border. Zurich applies a reduced VAT rate of 2.5 per cent for necessities, and the standard VAT rate is 7.7 per cent for most goods and services while Kenyan cities have a standard VAT rate of 16 per cent on goods and services, which is considerably high.

4.3.2   *Digital economy initiatives for enterprises and startups*

Digital economy initiatives for enterprises and startups encompass strategic actions that leverage the modern landscape to enhance business operations, stimulate innovation, and drive economic growth. These initiatives involve the integration of advanced methods to optimize processes, harness data, and connect stakeholders. By embracing the opportunities presented by the contemporary environment, businesses can streamline operations, expand market reach, and foster collaboration. This approach fosters an environment of agility, efficiency, and creativity, ultimately contributing to the growth of a dynamic and forward-looking economy.

The economic pillar in line with the goals set out in the Kenya Vision 2030 and under this digital economy is expected to connect Kenyans to the world, goods, services, and expertise that will be accessible across borders. The digital economy is expected to open markets and catapult Kenya to join the first-world markets

where citizens benefit from direct access to global markets. Further, it is expected that the local startups that aim to digitize informal retailers in Africa will be connected to local and multinational suppliers such as Unilever and Proctor and Gamble to offer digitized orders, delivery, and payments to reduce costs and increase profit margins. The Kenya National Digital Master Plan 2022-2032 is a framework that was adopted to leapfrog Kenya's sustainable and successful digital economy.

Smart City Zurich provides a common framework for digital economy activities. The Zurich smart city's framework offers opportunities for digitization to the benefit of the population, companies, and the city administration. Other key policy initiatives supporting the digital economy include the Swiss Monetary Policy that establishes the Financial Markets Authority (FINMA). The federal government has promoted the establishment of foreign companies in Switzerland since 1996 within the framework of the Switzerland Trade and Investment Promotion.

Further, the Kenyan government has shown increasing interest in promoting entrepreneurship and supporting startups. It has launched initiatives such as the Startup Fund, Research Fund, Hustler Fund, Youth Enterprise Development Fund, and the Uwezo Fund to provide financial assistance and training to young entrepreneurs and startups. Zurich has a well-established ecosystem for startups and innovation. It is home to many venture capital firms, incubators, and accelerators that support new businesses. The government also provides various grants and financial aid programmes to foster innovation and entrepreneurship. Zurich has robust Intellectual property Rights (IPR) protection, and its legal system upholds intellectual property rights. Nairobi has made efforts to strengthen its intellectual property rights protection system, but enforcement is still a concern.

4.3.3   *Poverty reduction initiatives*

Poverty reduction initiatives within the framework of a smart economy involve strategic efforts aimed at enhancing economic opportunities, social inclusion, and overall wellbeing. These initiatives focus on employing innovative and efficient methods to uplift disadvantaged communities and individuals. By optimizing resources, streamlining processes, and fostering collaboration across various sectors, these initiatives seek to create an environment where people have improved access to education, skills training, employment, and basic services. In a smart economy context, poverty reduction strategies leverage data-driven insights and forward-thinking approaches to maximize the impact of available resources and uplift the socioeconomic status of marginalized populations, fostering sustainable growth and shared prosperity.

In Kenya, poverty reduction initiatives are programmes and policies aimed at addressing the high levels of poverty and inequality within the country. The National Treasury and Planning Strategic Plan 2023-2027 was prepared to achieve higher and sustainable growth with equity. In this regard, the government is committed, to attaining the target of reducing the number of Kenyans currently living below the poverty line, from 46 per cent to 28 per cent. The economic pillar

of the Kenya Vision 2030 enhances equity and wealth creation opportunities for the poor. No society can gain the social cohesion predicted by Vision 2030 if significant sections of it live in abject poverty. To that extent, the Kenya Vision 2030 includes equity as a recurrent principle in all its economic, social, and political programmes. Digital Economy Blueprint supports the growth of digital financial services that lead to financial inclusion and the resulting increase in prosperity through poverty alleviation (by helping people and enterprises to manage day-to-day, deal with risks, and invest in the future) and job creation.

The Nairobi County Annual Development Plan (CADP) states that the county government recognizes fundamental and universal human right as a prerequisite for economic growth, human development, and poverty reduction. Kisumu County Economic and Social Council Act, 2019, improves the targeting of strategic objectives with a focus on the most critical social and economic needs, especially in areas that have a direct impact on strengthening the potential of the private sector to create employment opportunities and those that address poverty reduction. Nakuru City County Integrated Development Plan envisages eradicating extreme poverty in the county.

In comparison, Switzerland's Foreign Economic Policy states that Cross-border economic relations not only result in increased prosperity in Switzerland but also abroad. Increased integration in global trade in recent decades has contributed to a significant decline in global poverty, with the share of people living in extreme poverty decreasing by 74 per cent since 1990.

Zurich has a lower income inequality compared to Kenya. Income inequality can exacerbate poverty, and Zurich's policies often address wealth redistribution and income equality. Nairobi faces higher income inequality, and its policies may focus on inclusive growth and targeted programmes to address poverty. Zurich, being a high-income country, focuses more on providing technical assistance, expertise, and investment in poverty reduction projects in developing countries such as Kenya. Kenyan cities to some extent depend more on international aid and partnerships with donor countries and organizations to fund poverty reduction programmes.

4.3.4   *Smart services delivery*

Smart service delivery refers to the efficient and advanced methods through which various services are provided to individuals, businesses, and communities. It involves the strategic use of innovative approaches to enhance the quality, accessibility, and responsiveness of services, resulting in improved overall experiences and outcomes. In a smart economy context, smart services delivery encompasses the intelligent optimization of service processes and operations, aiming to streamline workflows, reduce inefficiencies, and make services more convenient and tailored to specific needs. This approach focuses on maximizing the value delivered to users by leveraging data-driven insights, effective resource management, and adaptable strategies. By enhancing smart services delivery, a smart economy can offer smoother interactions between service providers

and users, foster sustainable growth, and boost overall satisfaction. This can contribute to the growth and competitiveness of businesses, improved standards of living for individuals, and the development of a dynamic and resilient economic environment.

The economic pillar of the Kenya Vision 2030 states that the government will implement a Public Service Transformation Strategy aimed at creating an efficient and effective public service with moral and ethical values and ethical standards, and a highly motivated human resource capacity for efficient public service delivery. The strategy will seek to address the global governance environment by enhancing responsible citizenship and value-based socialization. Government customer-centricity is the new standard expected by businesses, citizens, and other government entities. High quality, timely, and accurate data and services are required and should be provided safely, securely, transparently, and accountably. The Public-Private Partnership Act, 2021, determines the duration of a public-private partnership agreement.

Nairobi County Annual Development Plan (CADP) and Mombasa City County Integrated Development Plan state that the overall objective of the public service management and transformation in the county is to ensure that functions are properly structured and staffed to facilitate the transformation of the entire workforce in the county for efficient and effective service delivery. Kisumu County Economic and Social Council Act, 2019, establishes a Technical Services Secretariat to the Council under the Office of the Governor to enhance service delivery.

In Switzerland, Pillar Two rules of the Organization for Economic Co-operation and Development (2022) states that those jurisdictions that offer international financial services may continue to find a market for their services, but on the basis that they add real economic value for their customers and support for commercial transactions that are not tax driven.

Kenya is considered a developing country with a focus on improving access to basic services for its population. Its policies might prioritize sectors such as healthcare, education, and infrastructure to ensure equitable service delivery across the country. So far, the government has digitized over 13,000 public services in the country. Switzerland, on the other hand, is a highly developed and prosperous nation with a well-established infrastructure and public services. Its policies might aim at maintaining high-quality services and continuously improving the efficiency of delivery.

4.3.5   *Own source revenue initiatives*

Own source revenue initiatives refer to strategies and approaches aimed at generating income and resources within an economy through innovative and self-sustaining means. These initiatives involve creating new avenues for generating revenue without solely relying on traditional sources or external factors. By fostering a self-driven approach to financial growth, own source revenue

initiatives contribute to building a resilient and self-sufficient economy that can adapt to changing circumstances and thrive independently. This concept aligns with the idea of a smart economy, where the emphasis is on leveraging internal capabilities and creative thinking to ensure sustainable prosperity. In the context of government policies, own source revenue initiatives could refer to strategies implemented by the government to increase its revenue generation through various means. These initiatives are typically designed to decrease reliance on traditional revenue sources such as taxes and explore alternative ways to fund government activities, services, and development projects. These initiatives could be aligned with the principles of a smart economy by incorporating digital tools and innovative methods.

The Kenyan government has established measures to ensure demand or revenue guarantees where the government retains demand or market risk in public infrastructure project development structured to rely on user fees as the revenue base. For instance, under the Public-Private Partnership Act of 2021, the Act states that the privately initiated proposal under subsection (1) shall contain the following information: a detailed description of the financial viability of the project, including costs and revenues, preliminary funding, and financing plan, supported by relevant financial model in open format.

In terms of county laws, for instance, the Draft County Government Revenue Raising Process Bill (2023) gives particulars of and describes the estimation methods and assumptions used to determine the amount of revenue to be collected on an annual basis over the three financial years following the introduction of the tax, fee, levy, or any other charge. National Policy to Support Enhancement of County Government Own Source Clarifies assignment of revenue-raising powers between the two levels of government and among counties – county governments are entrusted with fiscal powers to raise revenue to finance their functions, but there are overlaps and duplications between the two levels of government. Disputes have arisen between the two levels of government, and among the counties regarding who should collect certain types of revenue (for example, for outdoor advertising and cess) and how revenue should be shared, where a revenue base sits between two or more counties. The Kenya Revenue Authority (KRA) under Gazette Notice No. 1609, of February 25, 2020, was designated as the principal agent for the overall collection of revenue in Nairobi County. It gave full access to county revenue processes, information, data, and systems. This was meant to increase own-source revenue.

The Swiss Federal Constitution states that the Cantons are entitled to a share of the net revenue. In the assessment of the shares allocated, the consequences that levying the charge has for mountainous and remote regions shall be considered. The Swiss Monetary Policy states have improved fiscal management under the debt-brake rule (limiting underspending, improving revenue forecasts. Since 1st January 2008, Switzerland Global Enterprise (formerly known as Osec), a private association, has assumed operational responsibility for the federal government's location promotion programmed. A corresponding service agreement was concluded between SECO and Switzerland Global Enterprise (S-GE) for 2020-2023.

Further, Switzerland tends to have a more substantial social welfare system, with extensive public services and social safety nets, partly funded through taxes. Kenyan cities have fewer social services due to budget constraints and a less developed welfare system. Switzerland is known for its low corporate tax rates, which have attracted many multinational companies to establish their headquarters or operations there. On the other hand, Kenya's corporate tax rates are generally higher, and it relies on a more traditional tax system to generate revenue. Kenya's economy relies heavily on agriculture, while Zurich has limited natural resources and instead has a diverse economy with a strong focus on financial services, pharmaceuticals, and manufacturing.

4.3.6   *Smart processing and manufacturing*

Smart processing and manufacturing initiatives refer to strategic efforts aimed at enhancing the efficiency, precision, and optimization of various industrial processes. These initiatives involve the integration of advanced methods and innovative approaches to improve overall production, quality control, and resource management within the manufacturing sector. By implementing smart processing and manufacturing initiatives, industries can achieve higher levels of productivity and cost-effectiveness. These initiatives often involve the use of data-driven insights to make informed decisions, streamline operations, and minimize waste. Additionally, they focus on the integration of interconnected systems and streamlined workflows to ensure seamless coordination and responsiveness throughout the production cycle.

Key policies and laws include the National Treasury and Planning Strategic Plan, 2023-2027, that state that the increasing competitiveness of the industry requires that technical education and training cover both production and manufacturing technologies. Financial Services Authority Bill (2016) calls for the fair treatment of processing and manufacturing customers, including the promotion, marketing, and distribution of, and advice concerning, those products and services. In the Kenya Vision 2030, the masterplan envisions future manufacturing as a key driver for growth and sustainability, by exploiting current trends, challenges, and opportunities, influencing the development of all manufacturing sectors. Under the manufacturing pillar of the Big Four agenda, the national government aspired to raise the manufacturing sector's contribution to GDP to 15 per cent. Other policies include the Nakuru City County Integrated Development Plan, which state that the major industries in the County are agro-based, supporting the huge potential in the agriculture value chain.

The Swiss Federal Constitution states that the Confederation shall organize measures in such a manner that the agricultural sector fulfils its multi-functional duties. It has legislation on declarations of origin, quality, production methods, and processing procedures for foodstuffs. The Swiss economy is diverse and competitive but faces challenges. Strong manufacturing and services industries, well-capitalized banks, high household wealth, abundant liquidity, and ample fiscal space have contributed to resilience, along with robust policy frameworks

and timely policy responses. The top manufacturing exporting industries in Switzerland are chemicals and chemical products (CHM), computers and electronics (CEQ), and machinery and equipment (MEQ). The import content of exports is relatively high across industries, illustrating the role that importing plays in supporting exports and indicating the degree of global value chain (GVC) integration in these industries.

Further, Switzerland is not a member of the European Union but has numerous bilateral agreements with the EU, ensuring access to the EU single market and facilitating trade in manufacturing goods. Kenya is a member of the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA), which provides access to Kenyan cities to regional markets and enhances trade opportunities for the manufacturing sector. Switzerland is known for its focus on high-tech and precision manufacturing industries, such as pharmaceuticals, machinery, watches, and luxury goods. The government supports research and development in these sectors to maintain a competitive edge. Kenyan cities, for instance, the Nairobi metropolitan region houses Export Processing Zones, where companies enjoy tax benefits, duty-free imports of raw materials, and simplified export procedures. These zones aim to boost export-oriented manufacturing and attract foreign investment.

4.3.7   *Digital jobs (employment)*

Digital jobs in the context of a smart economy involve roles that revolve around the utilization of interconnected systems and processes to enhance productivity, creativity, and efficiency in the modern workforce. These roles encompass a wide range of activities that leverage electronic means for communication, data analysis, and problem-solving. Digital jobs include positions related to data management and analysis, where professionals gather, interpret, and draw insights from vast amounts of information. This enables businesses and organizations to make informed decisions and adapt to dynamic market conditions.

Key polices include the National Treasury and Planning Strategic Plan 2023-2027 emphasis on employment creation, which shall remain important for developing the Industrial Master Plan. The Industrial Master Plan tackles the issue of attaining high growth while maximizing employment opportunities generated through industrial development. The Sector Plan for Labour and Employment was formulated alongside the Second Medium Term Plans of the Kenya Vision 2030. The National Policy supporting the enhancement of county government own source revenue states that the single business permit has objectives that simplify the local regulatory environment to encourage greater economic growth and employment. While Nakuru City County Integrated Development Plan states that to empower and promote entrepreneurship among SME's, the youth, and women, and the creation of new job opportunities and business innovations must be considered.

Swiss Federal Constitution states that the Confederation may temporarily levy surcharges or grant rebates on federal taxes and duties. The accumulated funds must be held in reserve; following their release, direct taxes shall be individually refunded, and indirect taxes used to grant rebates or to create jobs. To safeguard prosperity and employment, Switzerland aims for extensive, legally protected, and non-discriminatory access to well-functioning international markets for its businesses – particularly SMEs. Foreign economic policy interests are defined with the early involvement of stakeholders and considering empirical analyses.

Key observations noted include the absence of a national minimum wage in Zurich. Instead, minimum wages are usually determined through collective bargaining agreements between employers and labour unions, which vary by industry and region. Kenya has set a minimum wage aimed at ensuring workers receive fair compensation. Nairobi City has put in place an unemployment benefit system, but it is not as extensive as in Zurich. The benefits provided are typically limited in duration and scope.

Zurich has a well-developed and comprehensive social security system, including unemployment benefits. Unemployed individuals in Zurich are entitled to receive financial support for a specified period, provided they meet certain criteria. Zurich requires work permits for non-EU/EFTA citizens, but the country has a points-based system to evaluate the eligibility of foreign workers. Zurich tends to prioritize the hiring of Swiss or EU/EFTA citizens over non-EU/EFTA workers. Foreign nationals seeking employment in Kenya are required to obtain a work permit and the process is not always efficient in terms of time. Zurich has stricter policies on the employment of foreign nationals, aiming to prioritize the hiring of Swiss and EU/EFTA citizens. Employers must demonstrate that there is a genuine need to hire non-EU/EFTA workers. Kenya's policies on hiring foreign workers are generally more open and less restrictive than in some other countries.

4.3.8   Digital entrepreneurship culture

Digital entrepreneurship culture refers to the pervasive mindset and set of values that promote innovation, adaptability, and forward thinking in the context of a modern economy. It emphasizes leveraging the capabilities of the digital age to create new business opportunities and enhance existing ones, fostering an environment conducive to growth, creativity, and sustainable success. In this culture, individuals and businesses cultivate an openness to change, an eagerness to explore unconventional avenues, and a willingness to embrace uncertainty. Collaboration and cross-disciplinary thinking are encouraged, allowing for the fusion of diverse ideas and expertise to generate novel solutions to complex problems.

Key policies include the Nakuru City County Integrated Development Plan schemes that aim to empower and promote entrepreneurship among SME's, youth, and women. Further, the plan lays the foundation for the creation of new job opportunities and business innovations. It is noted that the Free Market Policy of Switzerland states that well-secured property rights, including intellectual

property, promote entrepreneurship and productivity. Minimum tolerance for corruption is institutionalized in an efficient legal framework. However, the Kenyan policy framework has gaps in terms of creating awareness among innovators on intellectual property protection. Zurich has robust intellectual property laws, providing entrepreneurs with a secure environment to protect their innovations and ideas. , In Kenya, the government has supported the establishment of key institutions that are instrumental in supporting incubation hubs and innovation centres. However, the country does not have a comprehensive policy framework to nurture and support startups and small businesses in the cities.

4.3.9 *Licensing and authorization on mobile money operators*

Licensing and authorization for mobile money operators play a pivotal role in shaping the smart economy. It involves granting official permission and approval to entities that offer financial services through mobile devices. This process ensures that these operators meet stringent standards and adhere to established regulations, fostering a secure and efficient digital financial ecosystem. By having a structured licensing and authorization framework, governments and regulatory bodies can oversee and control the operations of mobile money services. This helps maintain consumer protection, prevent fraudulent activities, and promote fair competition among operators. Additionally, licensing and authorization enable governments to collect valuable data for economic analysis and policymaking.

Kenya has made great strides in mobile payments supported by the Kenya Vision 2030, National Digital Masterplan, Digital Economy Blueprint, and National Payments Strategy. The Central Bank of Kenya (CBK) is responsible for licensing and regulating mobile money operators in the country. To operate a mobile money service, companies need to obtain the necessary licenses from the CBK. It is observed that the Central Bank of Kenya adopted a 'test and learn approach' allowing a mobile network operator-driven solution for digital payments. However, there is now a concerted effort to move from mobile payments towards a focus on value creation, which encompasses access to credit, access to markets, and access to business skills. Secondly, the country is focusing on the need to increase interoperability among e-payment platforms. It is key to note that Zurich has a developed financial sector but does not have a specific domestic mobile money service such as M-Pesa in Kenya. Nairobi has been a pioneer in mobile money, with the introduction of M-Pesa by Safaricom, which has become one of the most successful mobile money platforms globally.

4.3.10 *Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF)*

Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF) are crucial components of a modern, advanced economy designed to operate efficiently and securely. They pertain to the necessary safeguards in place to ensure that financial transactions within the economy are transparent, and legitimate, and do not

contribute to unlawful activities. AML involves a series of protocols and measures that are put in place to identify and prevent the illegal process of transforming illicitly obtained funds into seemingly legal assets. By doing so, it maintains the integrity of the economy by ensuring that money gained through criminal activities, such as fraud or corruption, cannot be used to infiltrate or manipulate the legitimate financial system. On the other hand, CTF is a set of measures designed to prevent funds from being channeled toward activities that support or promote terrorism. This safeguards the stability and security of the economy by ensuring that money is not being used to fuel harmful acts that threaten the wellbeing of society.

The function of Anti-Money Laundering and Counter-Terrorist Financing is under the national government and is supported by the enactment of key legislation including the Anti-Corruption and Economic Crimes Act, 2003, or the Proceeds of Crime and Anti-Money Laundering Act, 2009. Although Kenya has comprehensive legislations, incidences of money laundering are highly triggered by technology-enabled fraud activities. Switzerland emphasizes a risk-based approach, requiring financial institutions to identify, assess, and mitigate the risks of money laundering and terrorist financing based on their specific clientele and business activities.

4.3.11 *Business efficiency*

Business efficiency in the context of a smart economy refers to the optimized use of resources, processes, and strategies to achieve higher productivity, reduced waste, and improved overall performance. It involves streamlining operations, enhancing the utilization of available resources, and refining workflows to achieve desired outcomes with minimal input. By focusing on business efficiency, organizations can maximize output while minimizing costs, time, and energy consumption, ultimately contributing to the growth and sustainability of the economy. This concept emphasizes the importance of making intelligent decisions and leveraging effective methods to achieve higher levels of success in the business realm.

In the Kenya Constitution, Chapter 4 of the Bill of Rights points to the economic and social rights of the citizens and non-citizens of Kenya. The Anti Counterfeit Authority is meant to eradicate duplication and production of counterfeit products as outlined in its strategic plan. Other efforts include the Draft County Government Revenue Raising Process Bill (2023) that gives particulars of and describes the estimation methods and assumptions used to determine the economic impact on individuals and business residing in the county. Counties have created multiple regulations, which they use as "tax handles", compelling citizens and businesses to pay for numerous licenses and permits.

Switzerland has a free market economic policy that has opened economy to foreign investment and has facilitated the investment to be transparent and efficiently administered. Switzerland performs well in labour and business-environment areas by emphasizing on intentions to sustain competitiveness and dynamism.

Further, Switzerland has a competitive and attractive tax regime, especially for multinational corporations. Zurich has numerous advantages to offer as a business location. Its international flair and economic muscle coupled with high level security; a highly motivated and qualified workforce plus excellent infrastructural facilities make it attractive for businesses. The city put its best foot forward to promote competitiveness and uphold the value of its businesses in liberalized markets. On the other hand, the implementation of Kenya's tax system is perceived as relatively burdensome for businesses, especially in terms of compliance.

4.3.12 *Economic growth*

Economic growth within the context of a smart economy revolves around enhancing productivity, efficiency, and the overall standard of living through strategic and innovative approaches. It involves optimizing resources and processes to increase the output of goods and services while minimizing waste and negative impacts on the environment. This is achieved by embracing advanced methods that promote continuous improvement in various sectors, leading to an expansion of wealth and wellbeing for individuals, businesses, and society.

The National Treasury and Economic Planning Ministry supported by other actors is instrumental in achieving the government's economic agenda as outlined in the Kenya Vision 2030 and its Sector Plans, the "BETA" Plan, the Sustainable Development Goals (SDGs) and other global and regional initiatives. The Economic pillar of the Kenya Vision 2030 seeks to improve the prosperity of all Kenyans through an economic development programme, covering all the regions of Kenya. It aims to achieve an average Gross Domestic Product (GDP) growth rate of 10 per cent per annum by 2030. The economic rationale for digital infrastructure is strong with clear historical evidence of the impact of broadband on economic growth. For example, a one per cent increase in a country's score on the Global Connectivity Index correlates with a 2.1 per cent increase in competitiveness, 2.3 per cent increase in productivity, and 2.2 per cent increase in innovation. Other key policies include the Public Finance Management Act and counties CIDPs. Kisumu County has the Kisumu County Economic and Social Council Act, 2019, to coordinate policies that promote social equity, economic growth, create employment and reduce poverty and inequality.

Switzerland is an open and internationally engaged economy, reflected in high volumes of both gross and value-added trade and investment. It has a highly developed and diversified economy, with a focus on high-value industries such as finance, pharmaceuticals, machinery, and precision instruments. Its economy relies heavily on exports and has a reputation for being a global financial hub. Although Kenya's economy is classified as a developing economy with a greater reliance on agriculture, manufacturing, and services sectors, diversifying the economic activities would be important.

4.4 Smart Environment

A smart environment is a space that has been enhanced with intelligent features to make it more efficient, responsive, and adaptable to the needs of its occupants. This environment is designed to interact with its surroundings and inhabitants in a sophisticated manner, allowing it to optimize various aspects of daily life. It can monitor, analyse, and react to different factors within its surroundings, aiming to improve comfort, convenience, and overall quality of living.

Table 4.4: Summary of policy initiatives on smart environment

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Combustion of fossil fuels			✓			✓				✓		
Protection of water catchment areas			✓			✓		✓	✓			
Climate financing			✓			✓	✓	✓	✓	✓		✓
Water harvesting and storage	✓					✓						
Afforestation and reforestation	✓					✓	✓	✓	✓	✓		
Emission limit and target	✓		✓			✓	✓	✓		✓		
Collaboration and partnerships	✓					✓	✓			✓		
Energy conservation	✓					✓	✓	✓				
Natural disaster	✓					✓	✓	✓	✓	✓		
Clean environment	✓					✓		✓		✓		✓
Climate financing			✓			✓	✓	✓	✓	✓		✓
Biodiversity conservation	✓		✓			✓	✓	✓	✓	✓		✓
Water harvesting and storage	✓					✓	✓					
Infrastructure resilience	✓		✓				✓	✓				

✓=present/available

4.4.1 Climate financing

Climate financing refers to the allocation of financial resources towards initiatives that address environmental challenges, particularly those related to climate change. It involves funding various projects, strategies, and activities aimed at mitigating and adapting to the impacts of climate change. This type of financing supports the implementation of environmentally friendly solutions and sustainable practices that promote a healthier planet and safeguard natural resources for future generations. By providing financial support to such endeavours, society can work towards creating a more balanced and resilient environment.

Article 42 of the Kenya Constitution of 2010 guarantees the right to a clean and healthy environment and requires the environment to be protected for current and future generations. According to the Climate Change Act (2016), agencies at the national and county government levels collaborate to optimize the country's opportunities to mobilize climate finance. Climate finance can help advance the Kenya Vision 2030 agenda by increasing the country's adaptive capacity and resilience to climate change while promoting low-carbon sustainable development. This Vision will oversee all activities related to REDD, REDD+, land use, and land use change to facilitate fundraising for financial support, technology transfer, and provisions for capacity building.

Other relevant laws on climate financing include the Nakuru County Climate Change Act, 2021, which establishes frameworks and mechanisms for mobilization and transparent and accountable management of financial and other resources for climate change response.

In Switzerland, the Federal Act on Reduction of CO_2 Emissions informs the public about precautionary measures relating to climate protection and advises communes, companies and consumers on measures to reduce CO_2 emissions. In addition to mitigation measures, Switzerland is working on several regulations to align its financial industry with the goal of the Paris Agreement. Switzerland, as a developed nation and a member of the Organization for Economic Co-operation and Development (OECD), may have committed to contributing to international climate funds aimed at assisting developing countries in mitigating and adapting to climate change. Another policy contributing to climate financing is the Zurich Strategy 2035.

4.4.2 Infrastructure resilience

Infrastructure resilience in a smart environment refers to the capability of the underlying systems and structures to withstand and adapt to various challenges, disruptions, and changes. It involves designing and planning the fundamental components of a city or community so that it can endure and recover from unforeseen events, stresses, and pressures. This aspect ensures that the essential services, functions, and facilities of the environment remain stable and functional, even in the face of adverse circumstances. By prioritizing infrastructure resilience, we ensure that the environment can continue to provide a safe and supportive space for its inhabitants while minimizing the impact of disturbances.

Key policies include the National Climate Change Action Plan that prescribes measures and mechanisms to identify strategic areas of national infrastructure requiring climate proofing. Kenya's forest resources are being subjected to overwhelming pressure from competing land uses such as agriculture, industry, human settlement, and development of infrastructure. This division shall work in collaboration with other scientific agencies including the Kenya Metrological Department – which is responsible for all matters concerning climate change science and research as well as the development of the infrastructure for scientific information.

The Swiss Federal Constitution proposes concrete measures to enhance energy sector climate resilience, and it identifies rising energy demand. Federal Act on the reduction of CO_2 emission aims to help limit the world temperature rise to less than two degrees Celsius by reducing greenhouse gas emissions, especially those that are related to the use of fossil fuels (motor and thermal fuels) as energy sources. Additionally, it penalizes each new vehicle registered for the first time in the applicable calendar year, and an importer or manufacturer whose average CO_2 emissions exceed the individual targets.

4.4.3 Combustion of fossil fuel

Utilizing the energy contained within fossil fuels through controlled reactions is an integral part of enhancing our surroundings intelligently. This process, involving the controlled release of energy from fossil fuels, plays a crucial role in optimizing our environment's functionality and efficiency. By harnessing the power stored within these natural resources, we can create a more sustainable and balanced ecosystem that supports various human activities and needs. This thoughtful utilization of fossil fuel combustion contributes to a smarter and more harmonious environment by leveraging the energy contained within these resources.

Some of the key policies include the Kenya Vision 2030, that aims to reduce emissions of carbon dioxide from the combustion of fossil fuels that may contribute to long-term environmental degradation are projected through 2030 using various models. In line with the Energy Act (2019), Kenya is expected to create an enabling framework for the efficient and sustainable production, distribution, and marketing of biomass, solar, wind, small hydro, municipal waste, geothermal and charcoal. Additionally, there is a need to formulate a national strategy for coordinating research in renewable energy.

The Switzerland Federal Constitution (Article 9) articulates a popular initiative "Glacier Initiative" to codify a net zero target in the Federal Constitution by 2050 and completely prohibit the use of fossil fuels starting in 2050. For fossil fuels that have been released for consumption or free circulation before the commencement of this Act, the CO_2 levy is collected or refunded in accordance with the previous law.

Switzerland has implemented a carbon tax, which puts a price on carbon emissions. This tax incentivizes individuals and businesses to reduce their fossil

fuel consumption and transition to cleaner alternatives. Zurich promotes energy-efficient technologies and practices to minimize energy consumption and decrease dependence on fossil fuels. The country has committed to reducing its greenhouse gas emissions as part of international agreements such as the Paris Agreement. Kenya does not impose an explicit carbon tax.

4.4.4 *Emission limits and target*

Emission limits and targets in the context of a smart environment refer to the predefined boundaries and objectives set to control the number of pollutants and harmful substances released into the surroundings. This aims to ensure that the overall quality of the environment remains healthy and sustainable. Imagine a carefully designed framework that establishes specific boundaries for the permissible levels of pollutants that can be emitted by various sources such as industries, vehicles, and energy production. These boundaries are like rules that industries and other sources of emissions must follow, ensuring that their activities do not exceed the safe limits that could otherwise harm the air, water, and soil. In addition, there are emission reduction targets that provide a clear direction for pollution that needs to be reduced over time. These targets act as goals that society collectively strives to achieve, working towards a cleaner and safer environment. Just as a destination is marked on a map for a journey, these targets guide our efforts toward a cleaner and more sustainable future.

Among the key policies include the Constitution of Kenya 2010 that require every person to have the right to a clean and healthy environment. These include the right to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69. Further, the Standards and Enforcement Review Committee together with relevant lead agencies advise the Authority on emissions concentration and nature of pollutants emitted. The National Environmental Management Monitoring Authority regulates, enforce, and monitors compliance on levels of greenhouse gas emissions as set by the Council under this Act. It is noted that SMEs are the fastest-growing part of the Kenyan economy. However, the manufacturing SMEs consume substantial resources and produce a significant share of industrial waste. They are prevalent in industrial sectors with relatively high resource and emission intensity thus causing pollution and resource depletion. In addition, the Mombasa Climate Change Action Plan 2020-2024 plans to reduce carbon emissions in the county. National Biotechnology Development Policy advocates for the application of agricultural technologies to increase food production while simultaneously limiting or reducing GHG emissions.

Other policies include the Nairobi Air Quality Action Plan 2019-2023, which was developed to aid in coming up with better air quality management strategies in the city. The Kisumu County Sustainable Mobility Plan, 2020, is a ten-year plan used as a roadmap for improving the mobility needs of the residents and businesses in Kisumu and its environs and subsequently improving air quality. The Mombasa County Climate Change Policy, 2021, is a long-term, strategic plan

that uses climate-smart solutions to move Mombasa County toward a low-carbon, climate-resilient future. Nakuru CIDP identifies environmental threats that are major contributors to unfavourable climate change. Emission limits in Nairobi might be less strict due to the need for economic growth and access to energy for its population. Policies might prioritize balancing environmental concerns with developmental needs.

Given its developed status and advanced environmental regulations, Switzerland has more comprehensive and stringent emission limits and regulations across various sectors such as transportation, industry, and energy production. Supported by the Switzerland Federal constitution and the amendment to the CO_2 Act, Zurich has several measures to further reduce CO2 output and thus reducing greenhouse gas emissions by at least 50 per cent by 2030 and to net zero by 2050 in line with the "nationally determined contribution" (NDC) under the Paris Climate Agreement. Regarding transportation infrastructure, authorities are required to impose measures that are both technically and operationally feasible and economically acceptable to regulate emissions related to traffic.

4.4.5 *Water harvesting and storage*

Water harvesting and storage within a smart environment involves systematically collecting and preserving rainfall and other water sources strategically. This focuses on maximizing the efficient use of water resources to sustain the surrounding ecosystem. It encompasses the thoughtful collection of rainwater, its controlled retention, and careful management for diverse purposes such as irrigation, replenishing groundwater, and supporting natural habitats. This approach ensures that water is captured, conserved, and allocated wisely, contributing to the overall ecological balance and long-term sustainability of the environment.

Key policies and laws include Water Act, 2016 (No. 43 of 2016), which establish the Water Resources Authority, the National Water Harvesting and Storage Authority, the Water Services Regulatory Board, the Water Sector Trust Fund, and the Water Tribunal. Article 209 of the Kenyan Constitution 2010 introduces Tax rebates to industries or other establishments that invest in plants, equipment, and machinery for pollution control, recycling of wastes, water harvesting, and conservation, prevention of floods, and the use of other energy resources as substitutes for hydrocarbons. The National Water Harvesting and Storage Strategy, 2020–2025, outlines Kenya's strategic approaches to attaining water security to fulfill the goals of the country's water policy and realize Vision 2030.

Other policies include the Mombasa Climate Change Action Plan 2020-2024, which puts further pressure on the scarce water resources and food production systems with associated impacts on coastal ecosystems. By improving access to water and sanitation, for example, through the demonstration of eco-sanitation technologies, the protection of wells and springs, encouraging rainwater harvesting, and promoting proper storage of domestic water. Energy Strategy 2050 proposes a ten-year programme to upgrade heating and hot water installations that may

partially close this gap. Switzerland's water policies may focus on efficient water management, ensuring the quality and availability of water resources, flood prevention, and sustainable use of water for various sectors including agriculture, industry, and domestic consumption. Kenya's water policies emphasize strategies for water conservation, addressing water scarcity, enhancing water storage, and promoting equitable access to clean water for its population.

4.4.6 Protection of water catchment areas

Safeguarding the water catchment areas involves adopting intelligent practices to ensure the ecological balance and purity of water sources. By employing strategies that enhance the health of the catchment areas, we contribute to a sustainable environment. This approach involves employing measures that prevent pollution, maintain vegetation cover, and support natural processes. Ultimately, the goal is to nurture the catchment area so that it can continue to supply clean water for present and future generations.

Key policies and laws include the Kenya Constitution of 2010, which acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to the 47 counties and the protection of territorial waters provided for under Section 3 of the Maritime Zones Act. Additional efforts include a review of six catchment management strategies; preparation of 200 sub-catchment development plans; construction of 50 sand dams and/sub-surface dams along seasonal rivers especially in ASALs; upgrading of 100 gauging stations to telemetric stations complete with data-loggers; rehabilitation or establishment of 100 water quality monitoring stations; and development of a national water allocation plan. The water policy will be made more accountable and the current eight regional water service boards will be combined into a single national water services authority with devolved units at the county level. The Water Act of 2002 provides a legal framework for the management conservation, use, and control of water resources and for the acquisition and rights to use water. In addition, it provides for the management and regulation of water supply and sewerage services.

The Swiss Federal Constitution states that the Confederation shall within the scope of its powers ensure the economic use and the protection of water resources and provide protection against the harmful effects of water. Process water or excess ballast water must be degassed before it is discharged into an open system. In addition, Switzerland offers incentives, subsidies, or grants to encourage landowners and communities to adopt sustainable land management practices in water catchment areas. This supports reforestation, erosion control, and sustainable agriculture.

4.4.7   *Afforestation and reforestation*

Afforestation and reforestation are practices that involve enhancing and restoring the natural green cover of an area. Afforestation refers to the deliberate planting of trees and other vegetation in areas that were previously devoid of significant forest cover. Reforestation, on the other hand, involves replanting trees in areas where forests have been depleted or damaged. Both practices play a vital role in creating a smarter and healthier environment.

The National Climate Change Response Strategy (NCCRS) scheme intensified and sustained afforestation and reforestation programmes by the government, individuals, schools, the private sector, multilateral organizations, and development partners. The varied ecosystems provide important goods and services such as tourism, water resources, the provision of food, the provision of wood and non-wood forest resources, and as habitats for fish, coral reefs, and other aquatic and terrestrial organisms. Some of the ecosystems are important for the protection of the coastline from erosion.

According to the Swiss Federal Constitution, the Confederation shall ensure that the forests can fulfil their protective, commercial, and public amenity functions. Measures that reduce greenhouse gas emissions in accordance with other legislation should also contribute to achieving the reduction target. These measures include those in the fields of environment and energy, agriculture, forestry and timber industry, road traffic, the taxation of mineral oil, and voluntary measures. The authorities may in individual cases approve the incineration of forest, field, and garden waste, which is not sufficiently dry if there is an overriding interest, and it does not lead to excessive ambient air pollution levels.

Further, the Swiss Government supports afforestation and reforestation through a mix of public and private initiatives. Private landowners are encouraged to participate in tree planting, often with financial incentives or technical assistance.

4.4.8 *Biodiversity conservation*

Biodiversity conservation within the context of a smart environment revolves around the thoughtful and strategic management of natural ecosystems, resources, and interactions to ensure the flourishing of diverse plant and animal species. It encompasses a comprehensive approach that emphasizes sustainable practices, awareness, and careful planning to protect the richness of life on Earth. In a smart environment, biodiversity conservation relies on the intelligent utilization of data, information, and innovation to make informed decisions. This involves the judicious allocation of resources, adopting practices that minimize harm to ecosystems, promoting responsible land use, and fostering a deeper understanding of the intricate web of life.

Key policies and laws include Article 69(2) of the Constitution of Kenya, which places a duty on every person to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable

development and use of natural resources. The National Climate Change Action Plan (NCCAP), 2018-2022, is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. NCCAP 2018-2022 builds on the first action plan (2013-2017). It sets out actions to implement the Climate Change Act, 2016, and provides a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) to the Paris Agreement. NCCAP 2018-2022 aims to further Kenya's development goals by providing mechanisms and measures that achieve low carbon climate resilient development. A low carbon climate resilient development pathway emphasizes sustainable development. It prioritizes adaptation, recognizing the importance of increasing the climate resilience of vulnerable groups, including women, youth, persons with disabilities, and marginalized and minority communities. The Climate Change Act, 2016 requires the Government to develop action plans to guide the mainstreaming of climate change into sector functions. The Act is the first climate change-dedicated legislation in Africa and is the legal foundation of this Action Plan.

Swiss policies emphasize not only the expansion of forest cover but also the restoration of diverse native ecosystems. Biodiversity conservation is a key aspect of Switzerland's approach.

4.4.9 *Natural disasters*

Natural disasters, within the context of a smart environment, encompass the understanding and response to unexpected environmental events. These events can include various forms of calamities such as hurricanes, earthquakes, floods, wildfires, and more. In a smart environment, the focus is on developing sophisticated, data-driven strategies to anticipate, mitigate, and manage the impacts of these occurrences effectively. This involves the utilization of advanced data analytics, remote sensing, and real-time monitoring systems to enhance people's ability to prepare for, respond to, and recover from natural disasters. The aim is to create an environment that is better equipped to safeguard lives and property in the face of these unpredictable events, fostering resilience and adaptability in the face of nature's challenges.

The unsustainable use of land in urban and rural areas remains a major challenge to all Kenyans due to the serious impact on the environment. Activities contributing to land degradation include unsuitable agricultural land use, poor soil, and water management practices, deforestation, and overgrazing. Natural disasters, including droughts, floods, and landslides, also contribute to land degradation. Climate change is considered one of the most serious threats to sustainable development globally. Kenya has experienced an increasing level of disaster risk because of the increased diversity, frequency, and intensity of impacts across a longer period and space. The National Policy for Disaster Management in Kenya, 2009, intends to diversify the sources of income and coping strategies used by disadvantaged populations to increase and maintain their resilience to hazards. The Natural Disaster Risk Management Bill of 2023 establishes a legislative framework for disaster planning activities related to risk management and for

related objectives. At the county level, the Kisumu County Disaster Management Act, 2015, aims to enable better planning for, mitigation of, response to, and recovery from emergencies and disasters; and to reduce the risk of disaster. Nakuru County Disaster and Emergency Management Bill, 2019, aims to establish efficient planning, risk reduction, response and recovery protocols, coordination amongst responding agencies, and other relevant goals to manage disasters and emergencies in Nakuru County. Nairobi City County Disaster and Emergency Management Act, 2015, provides a legal framework for the management of emergencies and disasters in Nairobi City County and for related purposes. The Mombasa County Disaster Preparedness and Management Bill, 2015, provides a legal framework for the maintenance and operation of an effective system for the anticipation, preparedness for, prevention, coordination, management, mitigation, response to, and recovery from emergencies and disasters in Mombasa and other related objectives.

In Zurich, policies often emphasize proactive measures such as early warning systems, infrastructure investments (such as flood protection systems), and building codes that consider natural hazard risks. In Kenya, policies might focus more on disaster response and recovery due to the country's susceptibility to frequent droughts, floods, and other sudden-onset disasters. Efforts to build resilient infrastructure and improve disaster preparedness are also important.

4.4.10 *Energy conservation*

Energy conservation within a smart environment pertains to the careful management and preservation of available energy resources. It involves optimizing the use of energy to minimize waste and reduce the overall consumption of power. This aspect of a smart environment focuses on efficient practices, sustainable habits, and mindful choices to ensure that energy resources are used judiciously, promoting environmental sustainability and long-term resource availability.

Key policies and laws include the Constitution of Kenya 2010, which provides that natural resources vest in the people of Kenya and gives the government power to regulate and administer natural resources on behalf of the public. The National Climate Change Action Plan prescribes measures and mechanisms to enhance energy conservation, efficiency, and use of renewable energy in industrial, commercial, transport, domestic, and other uses. The Energy Act, 2019, consolidates laws relating to energy and establishes the roles of national and county governments in energy regulation, planning, and operations. It provides for the development of national energy policy, integrated national energy plans, and county energy plans. Energy use, efficiency, and conservation of energy is essential for socioeconomic development. Deliberate efforts have been made by the government to provide power to remote areas in Kenya to spur development and improve livelihoods. The main sources of the country's power production are hydropower, petroleum, and geothermal.

Other policies include the National Energy Efficiency and Conservation Strategy of Kenya, which serves as a guide for attaining energy efficiency objectives

that contribute to the country's economy in general. Reducing the demand for fossil fuels and associated greenhouse gas emissions can be achieved through increasing energy efficiency. The Energy Policy of 2018 overarching goal is to provide a competitive, sustainable, and dependable energy supply at the lowest possible cost to meet counties and national development goals while preserving the environment for future generations.

In Zurich, within the scope of their powers, the Confederation and Cantons endeavour to ensure sufficient, diverse, safe, economic, and environmentally sustainable energy supply as well as the economic and efficient use of energy. Zurich has a well-developed energy infrastructure, and a significant share of its energy comes from hydropower, nuclear power, and some renewable sources. Energy conservation policies might involve improving energy efficiency in industries and buildings. Kenya's energy mix includes hydroelectric, geothermal, wind, and solar power. Policies might focus on harnessing these renewable sources to reduce reliance on fossil fuels and extend energy access to rural areas.

4.4.11 Collaboration and partnerships

Collaboration and partnerships within the context of smart environments revolve around the principle of individuals, organizations, and communities coming together to collectively address challenges and pursue shared goals. In this context, collaboration implies working together synergistically, while partnerships signify mutually beneficial relationships. These collaborative efforts and partnerships play a pivotal role in shaping and enhancing the overall effectiveness of smart environments. They allow for the pooling of resources, expertise, and knowledge to promote innovation, sustainability, and improved quality of life within these environments. Additionally, collaboration and partnerships foster a sense of inclusivity and shared responsibility, enabling diverse stakeholders to contribute to the development and maintenance of smart environments in a cohesive and coordinated manner.

Key policies and laws include Article 42 of the Kenya Constitution 2010, which guarantees the right to a clean and healthy environment and requires the environment to be protected for current and future generations. Subject to the provisions of the Urban Areas and Cities Amendment Act, a city or municipality's board is responsible for creating and overseeing plans, including site development, in coordination with the pertinent government and local entities. Provision 30 requires the council to seek public participation in the implementation of the Climate Management Action Plan and to educate the public about it. The National Climate Change Response Strategy, 2010, makes provision for collaboration with local and external partners, which is important to implement collaborative activities aimed at increasing the use of mechanisms and devices that emit less global greenhouse gas (GHG).

4.4.12 *Clean environment*

A clean and smart environment refers to a sustainable and technologically advanced approach to managing our surroundings with a focus on improving the quality of life, conserving resources, and mitigating environmental challenges. This concept combines two crucial elements, that is, cleanliness, which relates to the removal of pollutants and waste, and smart technologies, which enable efficient resource management and sustainable practices. Kenya was one of the African countries at the forefront of addressing plastic pollution. In 2017, Kenya implemented a ban on single-use plastic bags, which was considered one of the most stringent plastic bags ban globally. This policy aimed at reducing plastic waste and promoting sustainable alternatives, for example, the control of environmental factors that form a link in disease transmission and have an impact on human health. It constitutes a wide range of interventions designed to create and maintain an environment conducive to human health; reduce people's exposure to diseases by providing a clean environment in which to live; and measures to break the cycle of diseases. Switzerland is renowned for its commitment to sustainability and environmental protection, and its policies reflect a strong focus on clean and smart environments. The Swiss government has implemented a range of initiatives and regulations to promote a sustainable and eco-friendly approach to urban planning, transportation, energy production, and waste management.

Kenya faces significant challenges in implementing comprehensive clean and smart environmental policies. Key policies and laws include the Environmental and Coordination Act 2015 – Part (viii) addresses various environmental quality standards such as air quality standards and standards for waste. Additionally, the Sustainable Waste Management Act of 2022 provides a clear legal and institutional framework for waste management in the country. The Constitution of Kenya 2010 also recognizes the right to a clean and healthy environment for every citizen. While there have been initiatives to address environmental concerns, such as the ban on plastic bags, the country still lacks a cohesive and integrated approach to environmental conservation.

There are notable gaps in clean and smart environmental policies between Switzerland and Kenya. Switzerland, known for its strong commitment to environmental sustainability, has a well-established framework of policies and regulations aimed at promoting clean and smart environmental practices. However, even in this environmentally conscious country, there are still areas that could be improved. One such gap is the need for more aggressive measures to reduce carbon emissions from transportation, particularly in urban areas where traffic congestion and emissions remain a challenge. Further, Kenya's policy gaps are evident in issues such as waste management, where inadequate infrastructure and limited public awareness contribute to pollution and littering problems. Furthermore, the lack of robust regulations in sectors such as agriculture and industry has led to issues such as soil degradation and industrial pollution, which require urgent attention.

4.5   Smart Mobility

In the context of this study, rapid urbanization is facilitated by efforts of smart mobility, which includes innovation and policy implementation with a growing focus of achieving sustainability. Smart mobility includes approaches adopted to ensure connectivity and automation to improve the effectiveness, safety, and accessibility of transportation systems. Smart mobility metric covered in the study include efficient road accessibility, efficient public transportation, non-motorized accessibility, availability of ICT infrastructure (for transport including smart parking), electric vehicles, smart lighting, smart innovation, and intelligent transportation.

Table 4.5: Summary of policy initiatives on smart mobility

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Efficient road accessibility	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓
Efficient public transportation	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Non-motorized accessibility							✓					✓
Availability of ICT infrastructure for transport including smart parking	✓				✓		✓					✓
Electric vehicles	✓						✓					✓
Autonomous vehicles							✓					✓
Smart lighting							✓					✓
Intelligent transportation							✓					✓

✓=present/available

4.5.1   Efficient road accessibility

Efficient road accessibility means that a city has well-maintained streamlined roads. It involves cities having open paths that make it simple for vehicles and people to move about. Kenya has recognized and made significant progress in improving efficiency of road accessibility. For instance, the Constitution of Kenya 2010 through the Bill of Rights guarantees freedom of movement and access to infrastructure. Other laws in Kenya at the national level that help to facilitate efficient road accessibility include the Urban Areas and Cities (Amendment) Act, 2019, the Kenya Roads Act, 2007, The Transport Act (Cap 403, 2015), The National Transport and Safety Act, 2012, Motor Vehicle Inspection Regulations, 2023, The Traffic Rules, 2023, The Kenya Vision 2030, National Integrated Transport

Policy, and the Kenya Transport and Logistics Network Framework. In Nairobi City County, the policies that help to facilitate efficient road accessibility include the Nairobi City CIDP, Nairobi Metropolitan Act, Nairobi City County Transport Act, and the Nairobi Metropolitan Area Transport Authority Act. In Mombasa County, the policies include the Mombasa City CIDP and the Mombasa City County Roads Act, 2016. In Kisumu, the policies include the Kisumu County Transport Act and the Kisumu CIDP. In Nakuru City, the policy includes the Nakuru CIDP. Zurich (Switzerland) has better policies including The Road Transport Act, the Federal Road Traffic Act, the Federal Pedestrian Roads and Hiking Roads Act, the Public-Private Initiative 2025, and the Smart Lighting for Swiss Energy City. In Nakuru City, there are insufficient laws and regulations to facilitate efficient road accessibility. Kenyan Cities have inadequate policy framework for accessibility of pedestrian roads.

4.5.2   *Efficient public transportation*

Efficient public transportation involves improving mobility and intelligent public transportation to ease traffic congestion, lowering pollution levels, and encouraging sustainable urban living. Kenya has recognized and has made significant efforts in terms of policy framework to facilitate efficient public transportation. The Constitution of Kenya 2010 through Chapter 4 of the Bill of Rights guarantees freedom of movement, which is important in laying the policy framework foundation for efficient public transportation. Other laws and policies include the Urban Areas and Cities (Amendment) Act, 2019, the Kenya Roads Act, 2007, The Transport Act (Cap 403, 2015), The Railway Act, 2012, The National Transport and Safety Act, 2012, Motor Vehicle Inspection Regulations, 2023, The Traffic Rules, 2023, the Civil Aviation Act, The Kenya Vision 2030, National Integrated Transport Policy, and the Kenya Transport and Logistics Network Framework. Kenyan cities have also made policy framework effort to facilitate efficient public transportation. The Nairobi City County has adopted various policies including the Nairobi City CIDP, Nairobi Metropolitan Act, Nairobi City County Transport Act, and the Nairobi Metropolitan Area Transport Authority Act. This has enabled Nairobi City to embrace smart mobility through adoption of intelligent transport management systems. In Mombasa City County, various policies have also been implemented including the Mombasa City CIDP and the Mombasa City County Roads Act, 2016. In Kisumu City, the policies implemented include the Kisumu County Transport Act and the Kisumu CIDP. In Nakuru, the policy includes the Nakuru CIDP. Further, it is noted that Kenya has approved the standards for smart cities such as real-time data and informatics exchange, smart transportation, and electric power infrastructure. In Zurich (Switzerland), there are far better policies including the Railways Act that facilitates efficient public transportation using electric trains. Other policies include The Road Transport Act, the Federal Road Traffic Act, the Federal Pedestrian Roads and Hiking Roads Act, The Public-Private Initiative 2025, and the Smart Lighting for Swiss Energy City. The gap on efficient public transportation from Kenyan cities is the use of electric railways. The Railways Act facilitates the use of electric rail infrastructure

for public transportation in Zurich. Kenya is yet to lay policy framework on electric gauge for public transportation.

4.5.3   Autonomous vehicles

Autonomous vehicles are self-driven cars that serve as smart city innovations. These cars are key in improving mobility, intelligent public transportation and make a substantial contribution to easing traffic congestion, lowering pollution levels, and encouraging sustainable urban living. In Kenya, there is little progress in policy framework both nationally and the cities regarding the access and use of autonomous vehicles. However, the Constitution of Kenya 2010 guarantees the freedom of movement that lays the foundation for future use of autonomous vehicles. In Zurich, however, the Federal Roads Traffic Act through Article 6 facilitates the use of autonomous vehicles on public roads. In addition, the Federal Roads Act through the intelligent mobility section facilitates the use of autonomous vehicles on public roads. While Zurich has a policy for autonomous vehicles such as the Federal Road Traffic act, Kenyan cities have no policy or act for autonomous vehicles.

4.5.4   Non-motorized accessibility

Non-motorized road accessibility facilitates the provision of secure and practical routes for non-motorized modes of transportation, such as walking or bicycling. It makes sure that bikes and pedestrians can easily navigate cities, encouraging active and environmentally friendly modes of transportation and reducing traffic jam. In Kenya, there is little progress in policy framework in relation to non-motorized accessibility. However, the Constitution of Kenya 2010 guarantees the freedom of movement from one place to another, which lays the foundation for the development of policy framework that would lead to the development of road infrastructure hence facilitate non-motorized accessibility. Kenyan cities also lack policy frameworks that would help to facilitate non-motorized accessibility. However, in Zurich (Switzerland), the Federal Roads Act, and the Federal Pedestrian Roads and Hiking Roads Act facilitates the development and access of non-motorized roads. The Zurich Federal Roads Act under the cycling and intelligent mobility advocates for non-motorized accessibility. In Kenya, both at the national level and at county/cities levels, there are no acts, policies, strategies or work plans on non-motorized accessibility.

4.5.5   Availability of ICT infrastructure for transport including smart parking

ICT infrastructure for mobility including smart parking, involves the use of technological systems that improve how cities manage and use transportation resources. These systems deliver real-time information on parking spots and traffic conditions using digital communication and data processing, making

it easier for drivers to find parking spots. Kenya has recognized and made significant progress aimed at improving the availability of ICT infrastructure for transport including smart parking. The Traffic Act Cap 2015 provides for the use ICT infrastructure such as the use of speed cameras to help facilitate safety on national highways. Other policies include the Traffic Rules, 2023, The Kenya Information and Communication Act, The Computer Misuse and Cybercrime Act, the Data Protection Act, the Kenya Vision 2030, the Kenya Digital Masterplan, the National ICT Policy, 2019, the National Digital Masterplan, and the Digital Economy Blueprint. On the cities, the Nairobi, Mombasa, Kisumu, and Nakuru CIDP have laid policy framework for parking. In Zurich (Switzerland), several policies lay ground for the use of ICT infrastructure for transportation and smart parking including the Federal Road Traffic Act, the Federal Roads Act, the Federal Pedestrian Roads and Hiking Roads Act, The Public-Private Partnership Initiative that facilitates the provision of smart parking infrastructure such as the use of ground sensor technology and overhead counter technology, and the Smart Lighting Initiative. In Kenya, the Traffic Act cap and the Traffic Rules Act advocate for the use of traffic lights and speed cameras as a form of ICT Infrastructure. Kenyan cities lack smart parking policies on the use of the ground sensor technology, smart counter technology, overhead counter technology unlike in Zurich. Kenyan cities have inadequate policy framework to facilitate the provision of ICT infrastructure to facilitate mobility and smart parking.

4.5.6   *Electric vehicles*

Electric vehicles (EVs) are essential to smart mobility because they provide environmentally friendly transportation that is powered by electricity rather than petroleum. These automobiles contribute to cleaner and calmer urban environments while reducing air pollution and reliance on fossil fuels. Kenya at the national level, has recognized and made significant efforts in strategy development to facilitate the use of electric vehicles. The National Transport Policy has provided a strategy on the development of infrastructure that would facilitate the use of electric vehicles. However, Kenyan cities are yet to develop policy framework that would facilitate easy access to the use of electric vehicles. Although there are no comprehensive policies and laws to initiate electric vehicle transportation in Kenya at both national and counties/ cities levels, Kenya established a taskforce in August 2023 to establish policy, legal and regulations for electric mobility. The framework will be key to support sustainable and affordable transport. Zurich has robust laws and policies on electric mobility that facilitate the use of electric vehicles. The Federal Road Traffic Act facilitates the road access for vehicles that are electrically powered. Other policies include the Federal Roads Traffic Act, and the Public-Private initiative 2025.

4.5.7   *Smart lighting*

Smart lighting involves the use of intelligent and responsive lighting system such as the use of application software and eco sensors that are incorporated into the

infrastructure of transportation to improve safety, energy economy, and provide well-lit pathways for pedestrians and motorists. A review of Kenya national policies on street lighting reveals significant progress that help to achieve street lighting to lay ground for smart lighting. The Constitution of Kenya 2010 has devolved the function of street lighting to the counties allowing the county governments to provide this essential service. Other policies at the national level include the Urban Areas and Cities (Amendment) Act, 2019. On Kenyan cities, Nairobi, Mombasa, Kisumu, and Nakuru CIDPs facilitate the use of street lighting, which is a significant step towards smart lighting. In Zurich (Switzerland), the Smart Lighting for Swiss Energy City has facilitated the use of smart lighting in Switzerland. Zurich aims to become a 2000-Watt society, reduce Carbon dioxide emissions to one tonne per person annually by 2050 and forego any investments in nuclear energy because of safety concerns as the City Council continues to promote energy efficiency and renewable energies. This follows a major voter turnout in 2008 to vote for the goal of the 2000-Watt society to be written in municipal code (Zurich 2035 Strategy). In Kenya, there is no policy for smart lighting except for street lighting. Similarly, Kenyan cities are yet to develop a concrete policy framework that would facilitate the provision of smart lighting services.

4.5.8 *Intelligent transportation*

Intelligent transportation involves the use of modern technologies and data-driven solutions to improve the efficacy, safety, and efficiency of transportation systems. Intelligent transportation is important to help control traffic, optimize traffic flow, and give road users timely information. These systems use real-time data, sensors, and analytics. As a result, a more connected and responsive urban mobility environment is created. A review of Kenya national policies reveals that the Constitution of Kenya does not have a specific clause to facilitate the use of intelligent transportation, but it does provide the freedom of movement laying ground for the use of intelligent transportation. There are no other policies both nationally and at the county level to facilitate the use of the same. However, in Zurich, the Federal Roads Act facilitate the use of intelligent transportation such as the dynamic message signs and the public transit tracking. There are insufficient acts in Kenya at both national and county levels that advocates for intelligent transportation. Kenyan cities similarly have insufficient policies, laws, and regulations to facilitate the implementation of intelligent transportation.

4.6   Smart Infrastructure

Modern urban landscapes are supported by smart infrastructure, which paves the path for developing effective and sustainable smart cities. Smart infrastructure improves people's quality of life while maximizing resource allocation through the integration of innovative technologies such as the Internet of Things (IoT), data analytics, and artificial intelligence. These interconnected networks alter the essence of the meaning of living in a city, from smart energy grids that minimize carbon footprints and optimize consumption to intelligent transportation systems

that ease traffic and encourage green mobility. Furthermore, real-time data collection, and analysis that is made possible by smart infrastructure enables local officials to make better decisions, improve public services, and strengthen emergency response systems. The success of smart cities depends on the smooth integration of new technologies as they develop. The key elements considered in the study under smart infrastructure are presented in Table 4.6.

Table 4.6: Summary of policies for smart infrastructure pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Planning for infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Implementation for infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Maintenance and upgrading of infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Automation of infrastructure systems	✓	✓	✓	✓	✓							✓
Access, usage, and distribution of infrastructure services	✓		✓	✓	✓		✓			✓	✓	✓
Investment in infrastructure	✓		✓	✓	✓	✓	✓					✓
Design for infrastructure		✓					✓					✓
Internet connectivity at households and offices	✓						✓					✓
Tech hubs and innovation Centres		✓					✓					✓

✓ =present/available

4.6.1   *Planning for infrastructure*

Infrastructure planning in the context of the study involves laying down plans to build a technologically sophisticated and liveable urban environment. Strategic infrastructure planning for smart cities requires a careful integration of digital technology, sustainable urban design, and effective resource management. Building a seamless network of interconnected sensors, data hubs, and communication channels is a key component of infrastructure development for smart cities. This network enables real-time data analysis and informed decision-making to improve city services and the quality of life for inhabitants. A review of Kenya's national policies reveals that significant efforts have been made in the planning for infrastructure. The Kenya Constitution 2010 guarantees every citizen the right to access infrastructure. It serves as an important policy in facilitating the government to plan for infrastructure. Other policies at the national level that have facilitated the planning for infrastructure include The Urban Areas and Cities (Amendment) Act, 2019, The Kenya Information and Communication Act, the Computer Misuse and Cybercrime Act, the Data Protection Act of 2019, the Physical Land Use and Planning Act, The Public-Private Act No. 15 of 2013, the National Insurance Act, the Kenya Vision 2030, The Digital Economy Blueprint, and the

Health Sector Unique Identification Framework, 2022, through the provision of a robust health infrastructure. Kenyan cities have also made significant progress in laying the policy framework for the planning of infrastructure. In Nairobi City, the county government has implemented several policies including the Nairobi CIDP, the Nairobi City County Nuisance Act, the Nairobi County Finance Act, 2015, and the Nairobi City County Investment Profile Plan. In Mombasa City, the county government has also formulated various policies to facilitate the planning of infrastructure including the Mombasa CIDP and the Mombasa County Roads Act, 2016. In Kisumu City, the county government has also made progress in policy framework to facilitate the planning of infrastructure with various policies including the Kisumu CIDP and the Kisumu Gazette supplement. In Nakuru City, the county government has implemented the Nakuru CIDP and the Nakuru County Finance Act. In Zurich, several policies have been implemented to facilitate the planning of infrastructure including the Federal Roads Act, the Federal Railways Act, the Energy Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. Zurich has better infrastructure policies including the Spatial Planning Act that aims to identify faulty infrastructure while Kenya does not have such a policy hence making it a deficiency.

4.6.2   Implementation of infrastructure

The implementation of infrastructure in smart cities involves cutting-edge technologies such as IoT devices, data analytics platforms, sensor networks, and other critical infrastructure placement. Implementation of infrastructure requires efficient resource allocation to improve urban services. To ensure that technological advancements effectively address urban challenges and provide concrete benefits to both residents and businesses, effective implementation of smart city infrastructure necessitates close collaboration between the public and private sectors. A review of Kenyan policies reveals that significant progress has been made toward the implementation of infrastructure including the Kenya Constitution 2010, which guarantees every citizen the right to access infrastructure. Other policies at the national level that have facilitated the planning for infrastructure include the Urban Areas and Cities (Amendment) Act, 2019, The Kenya Information and Communication Act, the Data Protection Act of 2019, The Public-Private Act No. 15 of 2013, the National Insurance Act, the Kenya Vision 2030, The Digital Economy Blueprint, and the Health Sector Unique Identification Framework, 2022. Kenyan cities have also made significant progress in laying the policy framework for the implementation of infrastructure. In Nairobi City, the county government has implemented several policies including the Nairobi CIDP, the Nairobi City County Nuisance Act, The Nairobi City County Gazette supplement, the Nairobi County Finance Act, 2015, and the Nairobi City County Investment Profile Plan. In Mombasa City, the county government has also formulated various policies to facilitate the implementation of infrastructure including the Mombasa CIDP and the Mombasa County Roads Act, 2016. In Kisumu City, the county government has also made progress in policy framework to facilitate the implementation of infrastructure with various policies including

the Kisumu CIDP and the Kisumu Gazette supplement. In Nakuru City, the county government has implemented the Nakuru CIDP, the Nakuru County Finance Act, and the Nakuru Energy Infrastructure and ICT Policy. In Zurich (Switzerland), several policies have been implemented to facilitate the laying of infrastructure including the Federal Roads Act, the Federal Railways Act, the Energy Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. The implementation of infrastructure draws gaps in the differences in financial spending. Zurich being a smart city has allocated a lot of financial resources to implementing infrastructure compared to Kenya's national and county governments. However, the approach to the implementation of infrastructure is similar such as the public-private partnerships and the fiscal year budgets.

4.6.3   *Maintenance and upgrade of infrastructure*

Maintenance and upgrade of infrastructure in the context of this study involves proactive monitoring, prompt maintenance, and the incorporation of emerging technology. To maintain and upgrade infrastructure in smart cities, iterative processes are used that not only address technical problems but also embrace innovation to make room for fresh ideas, adapt to shifting urban needs, and build a future-proof urban environment that consistently improves the quality of life for residents. A review of Kenya's national policies reveals that significant efforts have been made in the policy framework to facilitate the maintenance and upgrade of infrastructure. The Constitution of Kenya 2010 guarantees every citizen the right to access infrastructure. Other policies that have provisions for the maintenance and upgrade of infrastructure include The Urban Areas and Cities (Amendment) Act, 2019, The Kenya Information and Communication Act, the Data Protection Act of 2019, The Public-Private Act No. 15 of 2013, the National Insurance Act, and the Kenya Vision 2030. Kenyan cities have also made progress in policy framework to facilitate the maintenance and upgrade of infrastructure. In Nairobi City, the county government has implemented several policies including the Nairobi CIDP, The Nairobi City County Gazette supplement, the Nairobi County Finance Act, 2015, and the Nairobi City County Investment Profile Plan that help to facilitate the upgrade of infrastructure. In Mombasa City, the county government has also formulated various policies to facilitate the maintenance and upgrade of infrastructure including the Mombasa CIDP and the Mombasa County Roads Act, 2016. In Kisumu City, the county government has also made progress in policy framework to facilitate the same with various policies including the Kisumu CIDP and the Kisumu Gazette supplement. In Nakuru City, the county government has implemented the Nakuru CIDP and the Nakuru County Finance Act. In Zurich (Switzerland), several policies have been implemented to facilitate the maintenance and upgrading of infrastructure including the Federal Roads Act, the Federal Railways Act, the Energy Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. The gap is the number of resources allocated to facilitate the same as Zurich spends more resources in upgrading and maintaining its infrastructure compared to Kenya at both levels of government.

4.6.4 *Automation of infrastructure*

Automation of infrastructure is important in the context of smart infrastructure as it entails putting up automated systems to facilitate access to infrastructure. Automated systems enable cities to respond dynamically, optimize operations, and improve the quality of services through the fusion of cutting-edge technology with conventional infrastructure, ultimately catapulting communities into a future characterized by innovation and resilience. In Kenya, there have been significant efforts that have been made through policy frameworks to help in the automation of infrastructure. The Kenya Constitution 2010 does not have a specific clause regarding the automation of infrastructure. However, it guarantees every citizen the right to access public infrastructure, which forms a foundation of the policy framework that facilitates the automation of infrastructure. Other national policies that have facilitated the automation of infrastructure include the National Insurance Act, the Kenya Vision 2030, the Digital Economic Blueprint, and the National Digital Masterplan. In Nairobi City County, Nairobi CIDP has provided a policy framework on the automation of infrastructure such as the Nairobi E-service that guarantees the automation of services. The Nairobi Express Way, which offers toll payment services demonstrates the success of automation in Kenya. The cities of Mombasa, Kisumu, and Nakuru have no policy framework on the same. In Zurich, the Federal Roads Act, the toll system, the Federal Railways Act, the Telecommunications Act, and the Spatial Planning Act facilitate the provision of automated systems for infrastructure. The Swiss Federal Railways Act and the Roads Act advocate for the automation of payments and luggage collection systems. The gap in Kenya is the inadequate policy framework and implementation of automation of our infrastructure both at the national and county levels. Zurich infrastructure policies have advocated for automation systems such as toll services on roads and railways. Zurich spends more funds in infrastructure development and planning including design as compared to Kenyan cities.

4.6.5 *Access, usage, and distribution of infrastructure services*

The access, usage, and distribution of infrastructure services ensure that resources are easily harnessed, allocated based on equity and equality principles, and enjoyed in ways that amplify sustainability, accessibility, and the overall quality of life. The Kenya Constitution of 2010 guarantees every citizen the right to access public infrastructure. Further, the Constitution has allocated specific infrastructure development roles to both the national and county governments. Other policies that have facilitated the access, usage, and distribution of infrastructure services include The Urban Areas and Cities (Amendment) Act, 2019, the Kenya Information and Communication Act, the Computer Misuse and Cybercrime Act, the Kenya Gazette Supplement, the Data Protection Act of 2019, the Public-Private Act No. 15 of 2013, the National Insurance Act, the Kenya Vision 2030, the National Action Plan on Safety, the Digital Economy Blueprint, and the Health Sector Unique Identification Framework, 2022. In Zurich, several policies facilitate the access, usage, and distribution of infrastructure services including

the Federal Roads Act, the Federal Railways Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. Kenya does not have a policy framework to facilitate the use of electric railways. The Railways Act facilitates the use of electric rail infrastructure for public transportation in Zurich. Also, Kenya has yet to lay a policy framework on the electric gauge for public transportation.

4.6.6   Investment in infrastructure

Investment in infrastructure within the context of smart cities is a crucial and transformative endeavour that has the potential to change urban environments for both present and future generations, improve quality of life, spur economic growth, and reshape urban landscapes. In Kenya, significant progress has been made in the policy framework to facilitate investment in infrastructure. The Constitution of Kenya 2010 guarantees the right to access infrastructure, particularly for marginalized groups laying the policy framework for investment in infrastructure. Other policies include The Urban Areas and Cities (Amendment) Act, 2019, The Kenya Information and Communication Act, the Data Protection Act of 2019, The Public-Private Act No. 15 of 2013, the Kenya Gazette Supplement of Finance Act of fiscal years, the National Insurance Act, the Kenya Vision 2030, The Digital Economy Blueprint, and the Health Sector Unique Identification Framework, 2022. In Kenyan cities, there has also been significant progress in the investment of infrastructure. In Nairobi City, the policies include the Nairobi CIDP, the Nairobi City County Finance Act under the Kenya Gazette Supplement, and the Nairobi City County Investment Profile. In Mombasa City, the policies include the Mombasa CIDP, and the Mombasa County Roads Act, 2016. In Kisumu City, the policies include the Kisumu CIDP and the Gazette Supplement. In Nakuru City, the policies that facilitate investment in infrastructure include the Nakuru CIDP, the Nakuru County Finance Act, and the Nakuru Energy Infrastructure and ICT Policy. In Zurich, the policies that facilitate investment in infrastructure include the Federal Roads Act, the Federal Railways Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. The Kenya Gazette Supplement provides for Fiscal year financing of infrastructure development for both national and county governments. Similarly, the Swiss federal budget also finances infrastructure. The gap is in the amount spent on investing in infrastructure. Switzerland spends more resources on infrastructure investment compared to Kenya hence more developed smart infrastructure than Kenyan cities.

4.6.7   Design for infrastructure

In the context of smart cities, infrastructure design embodies a creative, multidisciplinary approach that aims to integrate technical advancement, urban planning, environmental principles, and human-centric concerns. It includes the thoughtful and coordinated use of social, digital, and physical components in urban settings to design intelligent, adaptable, and liveable cityscapes that

meet the demands of various populations while maximizing resource efficiency. In Kenya, a review of the national and county policies reveals significant efforts have been made in policy framework to facilitate the design of infrastructure including the Constitution of Kenya 2010 as the policy framework foundation, the Urban Areas, and Cities (Amendment) Act, 2019, the Kenya Gazette Supplement, the public-private Act No.15 of 2013, the Kenya vision 2030, and the Health Unique Identification Framework of 2022. A review of the policy framework in Kenyan cities also reveals that significant progress has been made. In Nairobi, the county government's policy includes the Nairobi Finance Act of 2015 under the Kenya Nairobi County Gazette Supplement. In Mombasa, the policies include the Mombasa CIDP and the Mombasa Roads Act of 2016. In Kisumu, the policies include the Kisumu County CIDP, and in Nakuru, the policies include the Nakuru CIDP. In Zurich, several policies have been implemented to facilitate the design of infrastructure including the Federal Roads Act, the Federal Railways Act, the Energy Act, the Telecommunications Act, the Federal Water Protection Act, and the Spatial Planning Act. The gap in Kenya is the limited effort in the policy framework that would facilitate the proper allocation of resources toward the design of infrastructure as Zurich spends a lot of resources on the same.

4.6.8   Internet connectivity in households

In the context of smart cities, residential internet access is a crucial pillar that supports the creation of a technologically advanced, data-driven, and inclusive urban environment. It serves as a key facilitator for the seamless integration of digital technologies, real-time communication, and information exchange, creating a dynamic ecosystem where citizens, businesses, and public services may collaborate, develop, and grow. A review of Kenyan national and county policies reveals significant efforts have been made to facilitate internet connectivity in households including optic fibre coverage. The national policies that facilitate internet connectivity in households include the Constitution of Kenya 2010 through the right to access information, the Kenya Gazette Supplement, the Public-Private Act No. 15 of 2013, the Kenya Vision 2030, the Digital Economy Blueprint, the National Digital Masterplan, and the Bottom-Up Economic Transformation Agenda. There are various initiatives such as Universal Service Fund projects to boost internet connectivity to households in the country. In Zurich, the Telecommunications Act facilitates the provision of high-speed internet to households and offices. However, a large proportion of the population can afford internet services, especially from the informal settlements. The Zurich Telecommunications Act facilitates access to affordable internet for every individual while being protected from traffic interference.

4.6.9   Tech hubs and innovation centres

Tech hubs and innovation hubs are essential to the creation and development of smart cities because they act as dynamic catalysts for entrepreneurship development, technical advancement, and collaborative innovation. These hubs

serve as thriving ecosystems where resources, knowledge, and creativity come together to build, implement, and improve cutting-edge solutions that support the concept of the smart city. In Kenya, the national policies that facilitate the development of tech hubs and innovation centres include the Constitution of Kenya 2010 through the Bill of Rights, the Kenya Vision 2030, and the National Digital Masterplan. There are a few policy initiatives in Kenyan cities to facilitate the building of tech hubs and innovation centres. In Zurich, the Swiss Data Protection and Privacy Law and the Telecommunication Act facilitate the establishment of tech hubs and innovation centres. Kenya has yet to spend sufficient resources to facilitate the building of tech hubs and innovation centres as compared to Switzerland – being one of the most developed countries in the world, it spends largely on tech hubs and innovation centres.

4.7   Smart Governance

Smart governance refers to the modern approach of utilizing innovative methods to efficiently manage and make decisions for a community or organization. It involves the application of intelligent and forward-thinking strategies that enhance transparency, responsiveness, and effectiveness in decision-making processes. This often includes data-driven analysis, streamlined communication, and the integration of best practices to ensure that resources are used optimally, goals are achieved, and the needs of stakeholders are met.

Table 4.7: Summary of policies for smart governance pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws					
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)
Public engagement/ digital democracy		✓	✓				✓	✓	✓	✓	✓	✓
E-government models, platforms, and services	✓											
Provision of efficient public and social services	✓		✓				✓		✓			
Public-private partnership initiatives	✓	✓					✓					
Digital civil and registration systems	✓						✓			✓		
Transparent governance	✓	✓	✓				✓					
Urban innovations	✓	✓			✓							✓
Open data initiatives	✓									✓		
Multi-sector collaboration	✓	✓	✓				✓					

✓=present/available

4.7.1 Public engagement/ digital democracy

Public engagement in governance involves actively involving citizens in the decision-making processes of a government. It aims to ensure that policies, initiatives, and decisions reflect the diverse needs, preferences, and concerns of the population. This approach acknowledges the importance of citizen input and participation to create more inclusive and effective governance. Digital democracy refers to the use of online platforms and tools to enable citizens to contribute to the decision-making process. It allows people to express their opinions, provide feedback, and collaborate with government entities without the need for physical presence. This enhances accessibility, convenience, and participation, promoting more informed and involved citizens.

Key policies and laws include the Kenyan Constitution 2010. Article 118(1)(b) of the constitution mandates that parliament encourage public involvement in legislative and other proceedings of the parliament and its committees. Additionally, it stipulates that the parliament should operate openly and hold both its general sessions and committee meetings in public. The Kenya Urban Areas and Cities (Amendment) Act, 2019 supports digital democracy and public participation in urban government. Article 196(1) of the Act mandates that national legislation include provisions for citizen involvement in the governance of metropolitan regions and cities. The Act assures that structures are in place to promote public participation in decision-making processes and acknowledges the value of doing so. This includes utilizing digital tools and platforms to boost participation from the general population and give them a voice in urban governance. The Act seeks to advance accountability, inclusion, and transparency in the administration of Kenya's cities and urban areas. The primary goal of Kenya's Computer Misuse and Cybercrimes Act of 2018 is to combat these offenses. Although the act does not specifically specify backing for digital democracy or public participation, it is extremely important in defending the freedom of speech and privacy rights. These rights are crucial for encouraging citizen participation and digital democracy in urban governance. The legislation indirectly promotes a situation that is favourable to public involvement and the use of digital technologies and platforms for decision-making processes by protecting people's online actions and maintaining their privacy. It is crucial to remember that the Act has also drawn criticism for allegedly impinging on online liberties. The Public-Private Act No. 14 of 2021 (PPA) includes provisions for digital democracy and public participation in public-private partnerships (PPPs). The PPA emphasizes the importance of involving the public throughout the PPP process, from the initial planning stages to project monitoring and evaluation. To facilitate public involvement, the PPA encourages the use of information and communication technologies (ICTs) to inform the public about PPPs, facilitate discussions, and monitor PPP implementation. The act also establishes the Public-Private Partnerships Commission (PPPC) to oversee the execution of the PPA, develop policies for public participation in PPPs, and ensure that public engagement remains integral to the PPP process.

The Nairobi City County Integrated Development Plan (CIDP) 2023–2027 places a strong emphasis on fostering digital democracy and boosting public participation. The Kenyan government mandates that all counties design and implement the CIDP as their framework for development because the country value public involvement. Kenya Youth Development Policy, 2019, aims to enhance Kenyan youth's quality of life by empowering them, involving them in democratic and economic processes, and creating an enabling environment to enable the youth to actively participate in national development. The Mombasa County Public Participation Act, 2017, provides the legal framework for facilitating public participation in the County Government processes and for connected purposes. The Kisumu County Public Participation Act, 2015, establishes modalities and platforms for public participation in the governance of the county and connected purposes. Nairobi City County has the Nairobi City County Public Participation Act, 2016, and Nakuru County has the Nakuru County Public Participation Act, 2016, to encourage public participation in governance.

In Zurich (Switzerland), Article 34 of the Swiss Federal Constitution, provides for public engagement and digital democracy. This article emphasizes the importance of public participation in decision-making processes and the use of modern technology to facilitate citizen engagement. It states that the federal government must ensure transparency, openness, and accessibility in public affairs. Additionally, it highlights the need to provide citizens with information and opportunities to express their opinions and concerns. The aim is to foster a democratic society where citizens can actively contribute to the political process through digital means.

The Swiss legal system primarily deals with private law matters, and there is no specific section in the Swiss Code of Obligations that addresses public engagement or digital democracy. However, the Swiss political system promotes citizen participation through referendums and initiatives like e-voting. Kenyan cities face challenges in the enforcement and regulation of public engagement policies. While there are frameworks in place, implementation and enforcement are often weak, resulting in limited impact and effectiveness. Additionally, there is a need for capacity building and training for government officials and stakeholders involved in public engagement processes.

4.7.2 E-government models, platforms, and services

E-government models refer to the strategic frameworks and approaches that governments adopt to enhance their service delivery and decision-making processes through digital means. These models streamline interactions between citizens, businesses, and government agencies, fostering more efficient and transparent governance. E-government platforms are online environments where various government services and information are made accessible to the public. These platforms serve as virtual hubs where individuals and organizations can access essential resources, submit applications, and obtain relevant information without the need to physically visit government offices.

E-government services encompass the array of offerings that governments provide to their constituents through digital channels. These services cover a wide spectrum, including issuing licenses, processing permits, providing information about regulations and policies, accepting tax payments, and enabling online citizen engagement. E-government services are designed to simplify administrative processes, reduce bureaucracy, and enhance public convenience. Kenya had over 13,000 digitized public services as of November 2023 indicating a strong commitment by the government to enhance public service delivery.

There are no specific Acts that address e-government models, platforms, and services, but there are various strategies that lay a strong emphasis on e-government models. The Kenya Communication and Information Act offers a legal basis to establish key institutions including the Communications Authority of Kenya and the National Communications Secretariat that are key to supporting e-government services. To protect personal data, which is a valuable asset for the digital economy, the Data Protection Act of 2019 primarily focuses on regulating the use of data subjects' personal information. This is crucial in supporting the government agenda of embracing digital superhighway. The Kenya Vision 2030 focuses on transforming Kenya into a newly industrializing, globally competitive nation by 2030. While it emphasizes the use of technology and innovation to enhance service delivery and improve decision-making, it does not explicitly outline e-government models or platforms. Notably the National Digital Master Plan and the Digital Economy Blueprint focus on creating an enabling environment for digital transformation, promoting innovation and entrepreneurship, and enhancing digital skills and inclusion.

At the city levels, the County Integrated Development Plans (CIDPs) for the four cities have focused on socio-economic development and infrastructure. In terms of providing policy platforms for public participation, the Kisumu County Public Participation Act of 2015 does not explicitly cover e-government models, platforms, and services. The Act primarily focuses on establishing a legislative framework for public participation in county government activities and defines terms related to public participation.

There is no specific section in the Swiss Civil Code that covers e-government models, platforms, and services. The Swiss Civil Code primarily focuses on private law matters, such as contracts, property rights, and family law. E-government models, platforms, and services are typically governed by separate legislation and regulations in Switzerland. Kenya and Switzerland have legal frameworks and policies in place for e-government, notably, Kenya has more specific legislation that directly addresses e-government practices. Switzerland, on the other hand, relies on a combination of separate legislation and initiatives to govern e-government.

4.7.3   Provision of efficient public and social services

Efficiently delivering essential public and social services is a key facet of smart governance. This involves the adept management and allocation of resources to ensure that citizens receive necessary support and facilities promptly. By

streamlining administrative processes, optimizing resource utilization, and employing modern approaches, smart governance can enhance the quality and accessibility of services, thereby fostering the wellbeing and progress of the community.

Kenya's Constitution 2010 emphasizes the provision of efficient, accessible, and affordable public services to all inhabitants. Kenya's government has enacted several policies and reforms to improve public service delivery, including devolution, which aims to bring services closer to the people. For instance, the Kenyan Constitution 2010 Article 43 outlines each person's economic and social rights, such as the right to the best possible health, social security, affordable, accessible housing, reasonable sanitation standards, freedom from hunger, access to sufficient wholesome food, access to clean, safe water in sufficient quantities, and the right to an education. Article 13 of the Urban Areas and Cities (Amendment) Act, 2019 spells out how social services are classified, governed, and managed. It also allows residents to participate in the governance of metropolitan areas and cities. The Act includes provisions for service delivery by a board, partnership, and joint venture. The Act also calls for the formation of organizations to encourage people's active engagement in the management of their urban region or city, proper service delivery, and clear work distribution.

However, obstacles remain in the form of insufficient finance, corruption, and inefficiency in the public sector, all of which impede the provision of efficient services. Switzerland is regarded for providing high-quality public services such as healthcare, education, and social welfare. The Swiss government has a decentralized approach to service provision, with responsibilities divided among the federal, cantonal, and local levels. The country has a well-developed social welfare system that covers its residents comprehensively, including unemployment compensation, healthcare, and pensions. Switzerland also prioritizes education and research, which helps to improve the overall efficiency of its public services.

4.7.4   Public-private partnership initiatives

Public-private partnership (PPP) initiatives represent a facet of effective governance that involves collaboration between government entities and private sector organizations. This cooperative approach aims to enhance the quality and efficiency of public services, infrastructure development, and various projects that benefit society. In a PPP, the government and private sector entities join forces to leverage their respective strengths. The government provides its regulatory expertise, public resources, and policymaking capabilities, while private sector partners bring their specialized skills, innovation, and investment capacity. The key goal of such collaborations is to achieve optimal resource allocation, mitigate risks, and ensure the sustainable development of critical projects. By combining public sector oversight and private sector efficiency, PPPs enable more streamlined decision-making processes, enhanced project delivery, and improved service delivery to the public.

The Constitution of Kenya does not have a specific section that provides for PPP initiatives. However, the Constitution does provide a framework for public participation, accountability, and transparency, which are important elements in the implementation of PPP projects. The PPP legal and regulatory framework in Kenya is primarily governed by the Public-Private Partnership Act of 2013, which establishes the legal basis for PPPs and sets out the procedures for their implementation. There is no specific section in the Urban Areas and Cities (Amendment) Act, 2019 that talks about PPP initiatives. However, the Act provides a legal framework for partnerships in urban development and addresses various aspects related to urban areas and cities in Kenya. The act emphasizes the need to customize PPP regulations to the financing needs of urban development. Additionally, the Act is aimed at enhancing the institutional frameworks and addressing the challenges faced in implementing PPP projects. There is no specific section that talks about PPP initiatives in The Public-Private Act No. 14 of 2021. However, the Act provides for the participation of the private sector in the financing, construction, development, operation, or maintenance of public infrastructure and services. Additionally, the new statute allows PPP parties to conduct direct procurement in certain instances to reduce costs and accelerate the implementation of projects.

A review of the Kisumu County Public Participation Act indicated that the law provides a legislative framework for public participation in county government activities and establishes the Office of Public Participation to facilitate and coordinate public participation in the county government. In addition, the Kisumu County Economic and Social Council Act, 2019, focuses on the establishment, powers, and functions of the Council, including providing advice on social, economic, and political affairs, creating a forum for policy discussions, and targeting strategic objectives.

There is no specific section in the Zurich Cantonal Constitution that addresses public-private partnership initiatives in Switzerland. The legal and regulatory framework for such initiatives is determined by various laws, regulations, and guidelines at different levels of government, both federal and cantonal. These laws and regulations govern the establishment, operation, and management of public-private partnership projects in Switzerland.

Regarding PPP initiatives between Kenya and Switzerland, it is important to note that the legal and regulatory frameworks for PPPs differ in each country. While Switzerland does not have specific sections in its federal or cantonal constitutions addressing PPP initiatives, it relies on various laws, regulations, and guidelines at different levels of government to govern PPPs. In Kenya, on the other hand, the lack of clear guidelines and procedures hampers the effective engagement of the private sector in public projects. Additionally, there is a need for capacity building and training for government officials and stakeholders to understand the intricacies of PPPs and ensure their successful implementation.

4.7.5   Digital civil and registration systems

Digital civil and registration systems refer to modernized methods of managing and maintaining important records and information about citizens within a governmental framework. This aspect of smart governance involves utilizing advanced tools and methods to efficiently capture, store, update, and retrieve data related to citizens' identities, vital events (such as births, deaths, marriages), and other legal documents. By implementing these systems, governments can enhance their ability to manage resources, plan services, and make informed policy decisions. It promotes transparency, accuracy, and accessibility in administrative processes, enabling authorities to better allocate resources and provide timely services to citizens. Additionally, it minimizes the likelihood of errors and fraud, ensuring that the information available to public officials is trustworthy and up to date.

In the Data Protection Act, 2019 Article 31(c), the Act creates the Office of the Data Protection Commissioner, which oversees the monitoring, implementation, and enforcement of data protection regulations. The Act also requires data controllers and processors to register with the Commissioner, including those participating in civil and registration processes. This provides transparency and accountability in how personal information is handled within these platforms. The development of digital civic and registration systems is a vital component of Kenya's Vision 2030 strategy, which extends across all pillars. The Vision emphasizes the need for effective public and social services, such as civil and registration services, in improving government and promoting economic development. The integration of digital civil and registration systems is consistent with Kenya's Vision 2030 goal of improving public services and supporting good governance. Kenya wants to improve transparency, efficiency, and citizen-centric service delivery by embracing technology and exploiting digital platforms, ultimately contributing to the country's socio-economic progress.

In the Nairobi e-Service Plan, the County Government plans to "develop a digital civil and registration system." The plan indicates that the county government will "strengthen the county government's capacity to deliver e-services." This includes creating computerized civil and registration systems. Section 5 of the plan indicates that the county government will "monitor and evaluate the implementation of the plan." Monitoring and evaluating the development and deployment of digital civic and registration systems is part of this.

Switzerland has a well-defined legal framework that ensures the protection of data and privacy. The country has put in place legislation to secure the protection of data, which contributes to the transparency, accountability, and public trust in digital civil registration systems. Switzerland's experience in public engagement and collaboration further strengthens the effectiveness of these systems. Kenya, on the other hand, does not have clear policies and regulations, creating gaps in the protection of personal data and leaving room for misuse and potential breaches.

4.7.6   Transparent governance

Transparent governance refers to a facet of smart governance that emphasizes openness, clarity, and accountability in the way a governing body operates. It involves the practice of ensuring that decision-making processes, policies, and actions are readily understandable and accessible to the public and stakeholders. In a transparent governance system, information related to government activities, budgets, policies, and performance is made available to citizens in a clear and comprehensible manner. This fosters a sense of trust and enables citizens to be informed participants in the governance process. It also allows for greater scrutiny of government actions and facilitates the identification of potential issues or discrepancies.

Key policies and laws that facilitate transparent governance include the Constitution of Kenya 2010, which provides the national values and guiding principles of governance outlined in Article 10(2). The Data Protection Act, 2019 (No. 24) establishes the Office of the Data Protection Commissioner, which serves as a key component in ensuring transparent governance of personal data. The Commission is responsible for facilitating data sharing and ensuring the innovative use of data across all public and private bodies. Through this transparent governance structure, the Act aims to enhance accountability and ensure the proper handling of personal data. Transparent governance is an important component of the Kenya Vision 2030, and it applies to the three pillars: economic, social, and political. The Vision emphasizes the need for good governance and accountability in attaining sustainable development and enhancing Kenyans' lives. The goal of fostering openness in governance is to increase citizen participation, ensure effective decision-making processes, and prevent corruption and resource mismanagement. Fostering multi-sector collaboration, adopting e-government models and services, offering efficient public and social services, and supporting public-private partnership ventures. Furthermore, the Vision emphasizes the need for digital civil and registration systems to improve openness and efficiency in government.

The Nairobi e-services plan states that the county government will "strengthen the capacity of the county government to deliver e-services." This includes the promotion of transparent and accountable governance. There is no specific information regarding the Kisumu County Economic and Social Council Act, 2019, parts or clauses that address transparent governance. However, it may be deduced that the Act's primary goal is transparent governance. The legislation aims to create a venue for dialogues and planning, to engage and include many players, and to provide for development monitoring and auditing in Kisumu County. Transparent governance may be addressed throughout the Act, particularly in sections dealing with consultations, engagement, monitoring, and auditing.

Kenya has introduced policies and legal frameworks to enhance transparency. The Public Procurement and Disposal Act of 2015, for example, encourages transparency in public procurement processes. The Access to Information Act of 2016 protects citizens' right to access information held by government agencies, increasing transparency and accountability. Switzerland is well-known for its

transparent government practices. It consistently rates high in global transparency indexes, showing a strong accountability and transparency system. To promote transparency, Switzerland has built strong policies and legal frameworks. Transparency in public procurement processes is ensured under the Swiss Federal Act on Public Procurement. Notably, corruption and bribery are criminalized in Switzerland, underscoring the country's commitment to transparency.

4.7.7 Urban innovations

Urban innovations in the context of smart governance refer to creative and forward-thinking approaches implemented by cities to enhance the quality of life for their residents while efficiently managing resources and services. These innovations encompass a range of strategies and practices that aim to address urban challenges and improve urban living conditions. By adopting these approaches, cities can achieve better outcomes in areas such as sustainability, inclusivity, infrastructure, and public services.

Urban innovations often involve novel ways of designing and utilizing urban spaces, optimizing transportation networks, promoting environmentally friendly practices, and enhancing citizen engagement. They prioritize data-driven decision-making, allowing city officials to make well-informed choices based on insights derived from various sources. Moreover, urban innovations emphasize collaboration among different stakeholders, fostering partnerships between local governments, businesses, communities, and academia to collectively contribute to the city's growth and development.

Key policies and laws that support urban innovations in Kenya include the Kenya Constitution 2010. Article 184 of the Constitution provides for resident participation in the governance of urban areas and cities, creating criteria for defining areas as urban areas and cities and establishing the fundamentals of urban governance and management. The Kenya Vision 2030 focuses on adopting strategies and activities that apply across all pillars of the national planning strategy in the context of urban innovations. These solutions seek to address critical urban issues, promote inclusive development, and use technology to improve service delivery. The Nairobi e-services plan describes the Nairobi County e-services plan's broad vision, which includes "achieving a more efficient, transparent, and accountable government". This might be taken as a purpose of encouraging urban innovations, which could aid in improving the efficiency and transparency of government services. Section 2.2.1 outlines the primary interventions that will be utilized to achieve the plan's vision and goals. Among these interventions is "the development of a digital platform for service delivery". Allowing individuals to interact with government services online, might be utilized to foster urban innovation.

While both Kenya and Switzerland face challenges in their urban innovation policies and legal frameworks, Switzerland's focus on sustainability, strong legal framework, and well-established knowledge base sets it apart from Kenya. Kenya,

on the other hand, needs to address gaps in enforcement, regulation, and skills to enhance its urban innovation efforts.

4.7.8   Open data initiatives

Open data initiatives involve making certain types of information collected and generated by government agencies available to the public in a transparent and accessible manner. This information can include statistics, reports, datasets, and other relevant content. This aspect of smart governance focuses on promoting accountability, increasing citizen engagement, and fostering informed decision-making within the community. By implementing open data initiatives, governments enable citizens, researchers, businesses, and civil society organizations to access accurate and up-to-date information.

The Kenya Constitution 2010 covers access to information in Article 35(1) and states that every citizen has the right to access information that is held by the State and by a third party, which is necessary for the exercise or protection of any right or basic freedom. Chapter 411A of The Kenya Information and Communications Act establishes the Kenya Communications Authority to promote the development of the information and communications sector (including broadcasting, multimedia, telecommunications, and postal services) and electronic commerce. Article 31 (c) and (d) contribute to the creation of trustworthy and user-friendly e-government models, platforms, and services. The legislation supports the establishment of data initiatives. Open data projects can make economic data available, such as market trends, trade statistics, and investment prospects. This data can help entrepreneurs, investors, and politicians make informed decisions, hence driving economic growth and attracting international investment. It is noted that Kenya launched its Open Data Initiative in 2011. Over 800 datasets have so far been made available on government sectors such as health, education, and infrastructure. Although the portal enables data consumers to access data, the platform lacks up-to-date datasets from all sectors in the country.

4.7.9   Multi-sector collaboration

Multi-sector collaboration in the context of smart governance refers to the practice of various sectors, such as government agencies, private businesses, community organizations, and non-profit entities, working together to collectively address complex societal challenges, improve public services, and enhance overall wellbeing. This collaboration involves the sharing of resources, expertise, and knowledge from different sectors to achieve common goals and outcomes. It recognizes that no single entity can adequately address the multifaceted challenges faced by modern societies. Instead, it promotes the pooling of diverse perspectives, strengths, and resources to create more effective and holistic solutions. Multi-sector collaboration in smart governance aims to improve the quality of life for citizens by fostering better coordination, leveraging complementary strengths, and optimizing resource allocation. By breaking down traditional silos and

fostering open communication among sectors, it enables the development of comprehensive strategies that can address issues ranging from urban planning and environmental sustainability to social services and economic development.

Key policies and laws that promote multi-sector collaboration in Kenya include Article 189 of the Constitution of Kenya, which states that the government at either level must carry out its duties and use its authority in a way that respects the institutional and functional integrity of government at the other level. It also mandates that both levels of government must work together to exchange information, coordinate policies and operations, and build capacity. Collaboration across sectors is a fundamental component of Kenya Vision 2030, and it is intended to apply across the three pillars of the Vision: economic, social, and political. The Vision emphasizes the need for public-private collaboration in accelerating development and improving efficiency. Kenya strives to stimulate innovation, assure sustainability, and improve the lives of all Kenyans by encouraging collaborations among different sectors. This collaborative method entails utilizing technology and data to propel progress and fulfil the Vision's objectives. Kenya Vision 2030 initiatives are being implemented and monitored by the government, civil society, the private sector, and international organizations.

The United Nations Development Assistance Framework (UNDAF) 2014-2018 serves as the framework for UN partnership with the Kenyan government. The framework is divided into several sections, including governance and human rights, economic development, and cultural linkages.

5.   Conclusion and Recommendations

5.1   Introduction

The section provides the conclusion of the study and recommendations based on smart and sustainable pillars.

5.2   Conclusion

5.2.1   Smart people

Smart people ensure that individuals are innovative and creative. The pillar also ensures that there is adoption and utilization of technological resources. On digital literacy initiatives, Nairobi, Nakuru, and Kisumu cities are yet to develop laws and regulations on digital literacy initiatives. On information and awareness initiatives, Kenyan cities have insufficient policy frameworks to facilitate the provision of the necessary initiatives. On caring and community facilities, Nairobi and Kisumu cities have inadequate policy frameworks. In addition, the cities of Kisumu, Nakuru, and Mombasa have insufficient laws and regulations to facilitate the development of caring community facilities. On skilled and talented human capital initiatives, the cities have their respective CIDPs to support policy frameworks. There are still insufficient laws and regulations to facilitate the development of skilled and talented human capital initiatives. On access and equity of education and inclusive education, the cities have inadequate policy framework to facilitate the provision of equity and inclusive education. On early childhood education, while there is substantial progress from the cities, there is still an inadequate comprehensive policy framework on the same. On educational infrastructure, Mombasa, Kisumu, and Nakuru have inadequate laws and regulations to facilitate the provision of educational infrastructure despite CIDPs providing a policy framework. On digital inclusion and equal opportunities, there are insufficient national policies, laws, and regulations to facilitate digital inclusion and equal opportunities. The cities have insufficient laws, regulations, and policies to facilitate digital inclusion and equal opportunities.

5.2.2   Smart living

The smart living pillar is important in optimizing resource use and raising quality of life. The pillar ensures environmentally friendly behaviours, effective mobility, and technologically advanced solutions that enhance urban wellbeing. On crime prevention, safety, and security, the national government plays a key role since this is a national function. On housing quality, the cities of Nairobi, Kisumu, and Nakuru still face poor housing challenges. Regarding health conditions and facilities, the cities of Nairobi, Nakuru, and Kisumu still face challenges

of poor health conditions and facilities. On cultural facilities, the cities have insufficient supportive policy frameworks as compared to Zurich's Federal Act on the Protection of Nature and Cultural Heritage. Kenyan cities have a deficiency of comprehensive policy frameworks on tourists and recreational attractiveness and entertainment. On the application of smart water meters, both the national government and Kenyan cities administrations have insufficient policy framework to facilitate the use of smart home applications. The cities have insufficient policy frameworks on the provision of basic urban utilities. On rehabilitation and integration, the cities have inadequate policy frameworks to facilitate initiatives on rehabilitation and reintegration. In addition, the cities have insufficient policy frameworks to facilitate initiatives on health promotion and disease prevention. Lastly, on health equity, the cities have inadequate policy frameworks to facilitate initiatives on health equity.

5.2.3   Smart economy

The implementation of smart economy policies holds immense potential for driving sustainable economic growth and development in cities. These policies represent a strategic approach that leverages technological advancements, data-driven insights, and innovative practices to enhance productivity, attract investments, and improve the overall quality of life for citizens. Nairobi, as the capital city and a hub of innovation, stands to benefit greatly from smart economy policies. By investing in digital infrastructure, fostering a conducive environment for startups, and promoting digital literacy, the city can further solidify its position as a regional tech powerhouse. Embracing smart transportation systems and efficient urban planning can alleviate traffic congestion, reduce carbon emissions, and enhance mobility for its residents. Moreover, initiatives that encourage the integration of technology in various sectors, such as healthcare and education, can lead to improved services and increased access for the population. Mombasa, being a key coastal city and a vital trade gateway, can significantly enhance its economic activities through smart economy policies. The adoption of smart logistics and port management systems can streamline trade operations, reduce processing times, and boost overall efficiency in the movement of goods. The development of smart tourism initiatives, including digital marketing and enhanced visitor experiences, can also drive growth in the hospitality sector, a critical contributor to the city's economy. Additionally, investing in renewable energy sources and efficient waste management can lead to environmental sustainability while fostering economic resilience. Nakuru, as a rapidly growing urban centre, could leapfrog into a smarter and more connected economy. By focusing on smart urban planning, the city can sustainably manage its expansion, preventing issues such as urban sprawl and inadequate infrastructure. The promotion of e-commerce and digital marketplaces can empower local businesses and entrepreneurs, expanding their market reach beyond traditional boundaries. With a strong emphasis on education and skill development in emerging technologies, Nakuru can also build a skilled workforce capable of driving innovation and entrepreneurship.

5.2.4   Smart environment

Developing smart environmental policies for Kenya, specifically targeting the cities of Nairobi, Mombasa, Nakuru, and Kisumu, holds significant promise for fostering sustainable development, enhancing quality of life, and mitigating pressing environmental challenges. As these cities experience rapid urbanization and population growth, a well-structured policy framework is crucial to address issues such as air and water pollution, waste management, traffic congestion, and energy consumption. In Nairobi, the heart of Kenya's economy, a comprehensive approach to smart environmental policies is imperative. Implementing robust public transportation systems, promoting the use of electric vehicles, and investing in renewable energy sources could collectively reduce traffic congestion, air pollution, and greenhouse gas emissions. Additionally, green infrastructure initiatives such as urban parks and green rooftops can contribute to improved air quality, mental wellbeing, and temperature regulation in the city. Moving to Mombasa, a major coastal city, policies need to prioritize marine conservation and sustainable tourism. Stricter regulations on waste disposal and a focus on plastic reduction can safeguard the marine ecosystem and preserve the region's natural beauty.

5.2.5   Smart mobility

Smart mobility serves a crucial role in smart and sustainable cities by ensuring efficient public transportation, and traffic management and facilitates safety enhancement while cutting down the cost of transportation. While Kenya has made significant efforts to facilitate efficient public transportation, the cities of Nakuru and Kisumu have inadequate policy frameworks to facilitate efficient transportation. Kenya and its cities also have insufficient policy frameworks on non-motorized accessibility, which is present in Zurich. In addition, the cities are yet to lay a policy framework for the use of smart parking infrastructure such as the ground sensor technologies that are present in Zurich. Moreover, while there is significant progress in strategies to facilitate the use of electric vehicles through the National Digital Masterplan, there is no comprehensive policy framework to facilitate the use of the same. Zurich has a comprehensive policy framework for autonomous vehicles, while Kenya has yet to lay a policy framework on the use of such vehicles. Similarly, Kenya does not have an adequate policy framework to facilitate the implementation of intelligent transportation. Furthermore, the cities do not have policy frameworks to facilitate the use of smart lighting.

5.2.6   Smart infrastructure

Smart infrastructure ensures the efficient integration of technology into public infrastructure. This in turn facilitates environmental safety, efficient utilization of public infrastructure by individuals, and optimization of infrastructure to enhance the quality of life. In the planning of infrastructure, Kenya has inadequate spatial planning policy framework as compared to Zurich, to facilitate safety and urban

organization. On implementation, access, usage, and distribution of infrastructure, there is insufficient resource allocation leading to poor access and distribution of infrastructure services. Regarding the automation of infrastructure, there is a deficiency of policy framework from both the national and county governments to facilitate the automation of public infrastructure. In investment and design of infrastructure, there are still insufficient investments made in Kenyan cities compared to Zurich. Further, Kenya has insufficient national laws and policies to facilitate the provision of adequate internet services. While the National Digital Masterplan has led to the implementation of innovation hubs, there are still insufficient policies and legal gaps to enable the establishment and support of tech hubs and innovation centers.

5.2.7   Smart governance

The implementation of smart governance policies holds immense potential for Kenya, particularly in its cities. These policies, driven by technology and data-driven decision-making, can revolutionize various aspects of governance and service delivery, ultimately leading to more efficient, transparent, and responsive administrations. In Nairobi City, the heart of Kenya's economic and administrative activities, the adoption of smart governance policies could lead to improved traffic management, waste disposal systems, and public service delivery. By leveraging real-time data from sensors and digital platforms, the city can better address its traffic congestion issues and enhance urban mobility. Furthermore, smart waste management systems can lead to cleaner streets and reduced environmental impact. The integration of digital services can also streamline administrative processes, reducing bureaucratic bottlenecks and enhancing citizen engagement. Similarly, in the coastal city of Mombasa, smart governance policies can significantly impact the tourism industry and urban infrastructure. Utilizing technology to manage tourist flows, enhance security, and promote cultural heritage can boost the local economy and provide visitors with a more seamless experience. Smart infrastructure projects can improve utilities, transportation, and public safety, ensuring a higher quality of life for residents and visitors alike. Nakuru, as a rapidly growing city, can benefit from smart governance in terms of urban planning, resource management, and public participation. By harnessing data analytics and Geographic Information Systems (GIS), city planners can make informed decisions about land use, infrastructure development, and environmental conservation. Empowering citizens with digital platforms for feedback and participation can lead to more inclusive and representative decision-making processes.

5.3   Policy Recommendations

5.3.1   Smart people

i.   The county governments need to fast-track the implementation of the 2023-2027 CIDPs (third generation) to provide more resources to fund digital literacy initiatives. Amend CIDPs to include the provision of digital literacy initiatives to the members of the public.

ii.   There is a need for the national government to fast-track the implementation of the National Digital Masterplan to provide digital literacy initiatives to improve Intermediate skills.

iii.   Mombasa City County is yet to formulate a policy framework on information and awareness initiatives. Similarly, Nakuru and Kisumu cities do not have adequate policies, laws, and regulations for information/awareness initiatives. The cities' administrations need to develop and implement comprehensive policy frameworks that would roll out initiatives that would lead to information awareness.

iv.   The cities and their administrations need to develop comprehensive policy frameworks that would lead to the development of research institutions for knowledge acquisition.

v.   The Ministry of Information, Communications, and Digital Economy needs to fast-track the implementation of the National Digital Masterplan 2022-2032 to develop digital innovation centres across all wards for skills development.

vi.   The cities' administrations to develop comprehensive policy frameworks that would promote digital culture.

vii.   County governments in collaboration with the Ministry of Education to develop a policy framework on caring community facilities to cater for the needs of vulnerable individuals in their respective communities.

viii.   ECDE departments in conjunction with the Ministry of Education to develop and implement policy initiatives that would lead to access and equity in the acquisition of education and inclusive education.

ix.   On access to early childhood education, county governments of Mombasa, Kisumu, and Nakuru to facilitate the provision of early childhood education as recommended by the Constitution of Kenya 2010.

x.   The county governments of Mombasa, Kisumu, and Nakuru facilitate the provision of educational infrastructure despite CIDPs providing a policy framework. There is a need to develop public-private initiatives like Zurich that would facilitate the development of educational infrastructure.

xi.   There is a need for the national government to develop and implement policies, laws, and regulations to facilitate digital inclusion and equal opportunities. Kenyan cities similarly need to develop and implement laws, regulations, and policies to facilitate digital inclusion and equal opportunities.

5.3.2   Smart living

i.   The Boards of cities establish a legal framework to smoothly coordinate the implementation of national and county security initiatives. In addition, the full operationalization of the Urban Areas and Cities (Amendment) Act, 2019 is key to ensuring the proper running of cities.

ii.   The national government needs to promote community policing and support security personnel with facilities and vehicles and adopt smart surveillance systems, which could significantly reduce the crime rate in cities.

iii.   Implement smart water meters and power meters, along with other smart home applications to have transformative effects. These technologies offer real-time monitoring and control of water and energy consumption, promoting efficient resource usage and reducing wastage. In Nairobi, for instance, where water scarcity is an issue, smart water meters can enable precise measurement and equitable distribution, while power meters can aid in demand management and curb energy inefficiencies. In Mombasa, technology can enhance water and energy resilience. Kisumu and Nakuru can benefit from reduced utility costs and a smaller environmental footprint. Moreover, these policies can foster awareness, behaviour change, and sustainable urban development, paving the way for a more resource-efficient and environmentally conscious future.

iv.   The county governments, in liaison with the national government to implement policies that prioritize urban green spaces, efficient public transportation, and sustainable infrastructure to promote physical activity and reduce pollution.

v.   City Boards invest in healthcare accessibility, education, and clean water initiatives to address health disparities and contribute to increased life expectancy.

vi.   Fostering community engagement through cultural and recreational events to enhance social cohesion, mental wellbeing, and overall quality of life. Collaborative efforts between government, NGOs, and local communities will be crucial to ensure the success of these initiatives in Nairobi, Mombasa, Kisumu, and Nakuru.

vii. Fostering public-private partnerships can leverage private sector expertise and resources for affordable housing projects.

viii. Implement comprehensive slum upgrading policies, which are essential for sustainable urban development. By investing in infrastructure, housing, sanitation, and social services within informal settlements, the government can improve living conditions, enhance residents' access to basic amenities, and promote inclusive economic growth.

ix. To enhance the provision of urban basic utilities in key Kenyan cities like Nairobi, Mombasa, Kisumu, and Nakuru, a multifaceted approach is recommended. The county governments prioritize investments in infrastructure development, focusing on efficient water supply, reliable electricity, sewage systems, waste management, and accessible transportation networks. Implementing transparent and accountable governance structures will aid in resource allocation and service delivery.

x. The county departments of health in collaboration with the Ministry of Health to prioritize community-based health education campaigns that raise awareness about preventive measures for prevalent diseases such as malaria, HIV/AIDS, and non-communicable diseases. Collaboration with local health organizations, schools, and community leaders is key in disseminating accurate information and encouraging healthy behaviours.

xi. The counties planning and housing departments in collaboration with the National Construction Authority to fully implement the National Building Codes, 2022 to ensure quality buildings are put up and avoid cases of buildings collapsing including financing elements.

5.3.3 Smart economy

i. A balanced approach should be taken by the Boards of Cities to ensure that tax incentives do not lead to revenue losses that could affect essential public services. It is recommended to conduct thorough economic assessments and engage with relevant stakeholders to ensure that the incentives align with the cities' economic goals and priorities.

ii. The county governments in collaboration with the Ministry of Education to offer training programmes and workshops to enhance digital literacy and skills among the city's young workforce. This includes coding, data analysis, digital marketing, and cybersecurity training. Collaboration with local universities, tech hubs, and training centres is key to providing accessible and affordable learning opportunities.

iii. The Ministry of Information, Communications, and Digital Economy to establish tech-focused incubators and accelerators in all cities to pro-

vide startups with mentorship, resources, and networking opportunities. These hubs can help startups refine their business models, access funding, and connect with potential partners and customers.

iv. Implementing smart services delivery by County ICT departments in collaboration with the Ministry of Information, Communications, and Digital Economy in all cities requires a comprehensive approach that leverages technology and data to improve the efficiency, accessibility, and quality of services provided to residents. Other key considerations include developing mobile applications and web platforms that allow citizens to access and request services such as public transportation, waste management, utilities, and government services that have features for real-time tracking, status updates, and user feedback to enhance transparency and accountability.

v. Mombasa City County government to introduce a tourism promotion levy on hotels, resorts, and other tourism-related establishments to fund marketing and infrastructure improvements that enhance the tourist experience.

vi. The national government to develop and implement policies that encourage innovation in manufacturing, such as tax incentives for research and development (R&D) expenditures, technology transfer programmes, and grants for technology adoption. Establishing technology parks or innovation hubs in Nairobi, Mombasa, and Nakuru is key to facilitating collaboration between academia, industry, and startups.

vii. The Ministry of Interior and Coordination and relevant government ministries to formulate and enforce policies that combat Money Laundering and Terrorist Financing, conduct comprehensive risk assessments for each region (Nairobi, Mombasa, Nakuru) to identify local money laundering and terrorist financing risks, consider factors such as economic activities, geographic location, types of businesses, and historical data on financial crimes in each area, and consider updating risk assessments regularly to reflect evolving threats across all cities.

viii. The Ministry of Information, Communications and Digital Economy together with the Communications Authority of Kenya to fast-track the implementation of an efficient national addressing system to leapfrog Kenya's digital economy through the added efficiency of locating businesses and people.

5.3.4   Smart environment

i.   The national and county governments implement stricter emission standards for industries, vehicles, and power plants to reduce air pollution. Both governments encourage the adoption of clean energy sources such as solar, wind, and hydroelectric power through formal legislation processes. In addition, both levels of government coordinate a policy framework to facilitate investment in public transportation and promote electric vehicles to reduce traffic-related emissions. Establishing air quality monitoring systems to track pollution levels and take timely corrective actions is paramount.

ii.   The administration of city counties to implement a comprehensive waste management system that includes recycling, composting, and waste-to-energy initiatives. Both levels of government encourage citizens to separate waste at source and promote community clean-up initiatives. Imposing penalties for littering and illegal dumping and enforcing waste disposal regulations is a key consideration.

iii. The county governments, through their respective departments of water and sanitation enforce regulations to prevent industrial discharge and sewage pollution into water bodies. Other considerations include investing in modern sewage treatment facilities and proper sewage infrastructure in urban areas and promoting water conservation practices among citizens, industries, and agricultural sectors.

iv.   The national government through the Ministry of Agriculture, Livestock, Fisheries, and Cooperatives to partner with the county government of Nakuru to encourage organic farming practices, implement efficient irrigation systems, and protect Lake Nakuru from pollution. are vital steps. By integrating smart technologies like sensor-based irrigation and precision agriculture, the region can optimize resource use and minimize negative environmental impacts.

v.   Nakuru City to invest in desalination technology and efficient water management strategies to ensure a stable freshwater supply, supporting both the local population and the tourism industry.

vi.   Establish and maintain urban parks, green belts, and protected areas to preserve biodiversity and provide recreational spaces across the cities and implement tree-planting campaigns and urban forestry programmes to increase green cover and combat urban heat island effects.

vii. County governments ban or restrict single-use plastics and encourage the use of eco-friendly alternatives.

viii. Implement extended producer responsibility (EPR) programmes, making manufacturers responsible for the entire lifecycle of their products, including proper disposal.

ix. Conduct public awareness campaigns on environmental issues, emphasizing the importance of individual actions in maintaining a clean environment. Integrate environmental education into school curricula to promote long-term behavioural change.

x. Involve local communities, NGOs, and grassroots organizations in the planning and implementation of environmental policies and fostering partnerships with businesses to support sustainable practices and community initiatives.

xi. County governments enforce energy-efficient and environmentally friendly building standards to reduce the carbon footprint of new constructions and provide incentives for retrofitting existing buildings with energy-saving technologies.

xii. County governments develop and implement strategies to mitigate the impact of climate change, including flooding and extreme weather events. Integrate climate resilience into urban planning and infrastructure development.

xiii. County governments establish a robust regulatory framework and empower regulatory agencies to enforce environmental laws effectively. Implementing transparent reporting mechanisms to track progress and hold stakeholders accountable is a key consideration.

xiv. The Ministry of Environment and Natural Resources in conjunction with the National Environment Management Authority and county governments of Nairobi, Mombasa, Nakuru, and Kisumu to facilitate the complete implementation of the Sustainable Waste Management Act, 2022, and Environmental Management and Coordination Act, 2015, to facilitate smart environment, particularly regarding air quality and waste management.

5.3.5 Smart mobility

i. The national government to develop and implement a comprehensive policy framework that facilitates efficient public transportation including a comprehensive policy framework coverage on non-motorized accessibility along highways. The county governments construct non-motorized roads on county roads.

ii. The county governments of Nairobi, Mombasa, Kisumu, and Nakuru to develop and implement a comprehensive policy framework on commuter

means of transportation to facilitate efficient public transportation and to ease traffic in line with the Swiss Federal Road Traffic Act.

iii. The national government to work alongside the county governments in developing and implementing a comprehensive policy framework that would facilitate non-motorized accessibility across the cities. Federal Roads Act, Federal Pedestrian Roads, and Hiking Roads Act section, and Smart Lighting for Swiss Energy City facilitate the provision of non-motorized accessibility in Zurich.

iv. The national government and the county administrations of Nairobi, Mombasa, Kisumu, and Nakuru cities to formulate and implement a policy framework that would facilitate the use of modern smart parking infrastructure such as ground sensor technology.

v. The national government to make use of the Public-Private Partnership Act to facilitate the building of infrastructure that would promote the use of electric vehicles in Kenya. In addition, the national digital master plan to be fully implemented to facilitate the use of electric vehicles. Similarly, the cities need to develop comprehensive policies to facilitate the provision of infrastructure to support the use of electric vehicles.

vi. The national government fast-tracks the implementation of the National Digital Masterplan backed by laws and regulations that would encourage the public to use autonomous vehicles. The cities similarly develop strategies that would facilitate the use of autonomous vehicles to facilitate efficient transportation.

vii. The cities to develop and implement policy frameworks that would lead to the use of smart lighting.

viii. Develop and implement comprehensive laws and regulations and policy frameworks alongside policies to facilitate the use of intelligent transportation means.

5.3.6 Smart infrastructure

i. Kenya and its respective cities to develop and implement a policy framework on comprehensive spatial planning like Zurich's Spatial Planning Act to facilitate spatial planning arrangement and development and measure the quality of buildings to facilitate safety. The national government to fully implement the National Spatial Planning Policy and support county governments in implementing the same.

ii. Kenya and its cities need to allocate more resources to facilitate the implementation of key infrastructure like electric trains through a comprehensive policy framework like Zurich's Railway Act. The national gov-

ernment to allocate more resources to the county governments in the development of key infrastructure to facilitate mobility.

iii. The cities need to develop and implement a comprehensive policy framework to facilitate the automation of infrastructure like Zurich's Federal Road Act that facilitates the use of autonomous vehicles reducing human interaction with IT systems. The national government through the Public-Private Partnership Act to promote investment leading to the development of critical infrastructure to facilitate the use of autonomous vehicles in Kenyan cities.

iv. Both cities and the national government need to develop and implement a comprehensive policy framework to facilitate proper maintenance and upgrade of infrastructure made available to the public.

v. The national government and cities to develop and implement a comprehensive policy framework that will facilitate access, usage, and distribution of electric railways, and commuter infrastructure.

vi. The National government needs to develop and implement a comprehensive policy framework to facilitate the provision of more resources to invest in infrastructure. The national government and cities also need to fully implement the Public-Private Partnership Act to attract more investors to invest in infrastructure.

vii. On design for infrastructure, Nairobi and Nakuru county administrations need to develop and implement a comprehensive policy framework regarding infrastructure design and invest more resources.

viii. The national government needs to fast-track the implementation of the Kenya Vision 2030, which outlines the optic fiber plan to facilitate the development of internet infrastructure. Kenyan cities also need to develop and implement a comprehensive policy framework that would facilitate the provision of adequate and reliable internet.

ix. The National Digital Masterplan has led to the implementation of Ajira digital hubs, there is still a need to develop and implement a comprehensive policy framework to facilitate the establishment of tech hubs and innovation centres at both the national and county levels.

x. The national and county governments need to leverage the newly established smartphone companies to manufacture low-cost devices for low-income households.

5.3.7   Smart governance

i.   The Boards of Cities take a holistic approach to implementing effective policies on public engagement and digital democracy. The implementation of digital literacy programmes to educate citizens about using digital tools for civic engagement will ensure inclusivity for all age groups.

ii.   The Ministry of Information, Communications, and Digital Economy to develop a comprehensive national E-government strategy that outlines the goals, objectives, and roadmap for the implementation of E-government services. This strategy should align with the country's overall development goals and focus on improving citizen services, reducing bureaucratic processes, and enhancing government-citizen interaction.

iii.   The county governments ensure transparent bidding processes, clear risk-sharing mechanisms, and fair regulatory frameworks for PPPs. Proper feasibility studies, financial structuring, and stakeholder engagement are also critical for the success of these initiatives. The success of PPPs depends on various factors, including the alignment of interests between public and private stakeholders, effective risk management, and a commitment to delivering value for both parties and the community.

iv.   The national government to develop an integrated digital platform that connects various government departments responsible for civil registration, such as birth, death, marriage, and identity documents for Nairobi, Mombasa, and Nakuru counties. This system should allow for efficient data sharing and reduce duplication of efforts.

v.   Fully implement the Urban and Cities Act, 2019, to enhance the management of cities.

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Appendix

Appendices 1: Existing policy framework for smart people pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Digital literacy initiatives	Kenya Vision 2030 section 3.6	Nairobi City County Integrated Development Plan section 2.2	Mombasa City County Integrated Development Plan section 1.25	Nakuru County Integrated Development Plan section 1.21	Kisumu City County Integrated Development Plan section 4.4.12	Digital Education Action Plan (European Union) Action plan 3 and action plan 8	The constitution of Kenya 2010-chapter 4 bill of rights		The Mombasa County Education Development Act Part 3			Switzerland Federal Act on Data Protection section 1 article 3	The Kenyan cities of Nairobi, Nakuru, and Kisumu are yet to develop laws and regulations on digital literacy initiatives
	Digital Economy Blueprint Chapter 7				Kisumu County ICT Policy the whole policy	E-government plan	The Kenya Information and Communication Act Part 4 (section 46 A-N)					Federal Act on Data Protection Article 6 section 1	
	The National Digital Masterplan part 4 on digital infrastructure					The Digital Switzerland Strategy Chapter 3	The Computer Misuse and Cyber Crime Act (The whole Act)					Federal Act on Vocational and Professional Education and Training	
	National ICT Policy section 4.5.6					Swiss Action Plan 2019-2020 Chapter on Basic Principles	The Data Protection Act, 2019 (Part 2, part 3, part 4, part 5, part 6, part 7)					Swiss Higher Education Sector Higher Education Act	
	Competency-Based Curriculum on Information Literacy.					Strategies Zurich 2035 chapter on digital city	TVET Act 2013 (part 2 section 4)					Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16	
							The Basic Education Act Part 5					Federal Act on Funding and Coordination of the Swiss Higher Education Sector	
							The Universities Act 2010						

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Information/awareness initiatives	Kenya Vision 2030 section 3.6

Digital Economy Blueprint Chapter 7

The National Digital Masterplan part 4.4

National ICT Policy Section 6

Competency-Based Curriculum on Information Literacy.

The Pre-Primary Education Policy 2017 Chapter 4

Free Primary Education (FPE)and Free Secondary Education (FSDE) chapter 5 | Nairobi City County Integrated Development Plan Chapter 4 | | Nakuru County Integrated Development Plan section 1.21 | Kisumu City County Integrated Development Plan section 4.4.12

Kisumu County ICT Policy the whole policy | Digital Education Action Plan (European Union) Action Plan 7

E-government plan

The Digital Switzerland Strategy Chapter 3

Swiss Action Plan 2019-2020 Chapter on Research and Innovation

Strategies Zurich 2035 chapter on digital city | parts 3 and 4

The constitution of Kenya 2010-chapter 4 bill of rights

The Kenya Information and Communication Act Part 4 (section 46 A-N)

The Computer Misuse and Cyber Crime Act (The whole Act)

The Data Protection Act, 2019 (Part 2, part 3, part 4, part 5, part 6, part 7)

TVET Act 2013 (part 2 section 4)

Early Childhood Education Act (yes part 3) | The Nairobi Early Childhood Development and Education Bill 2021- part 3 | The Mombasa County Education Development Act part 4 section 17 | | | Switzerland Federal Act on Data Protection section 1 article 3

Federal Law Against Unfair Competition (LCD; RS 241) article 19

Federal Act on Data Protection Article 8

Federal Act on Vocational and Professional Education and Training

Swiss Higher Education Sector Higher Education Act

Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 | Mombasa City is yet to formulate policy framework on information and awareness initiatives.

Nakuru and Kisumu cities lack comprehensive policies, laws, and regulations information/awareness initiatives |

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
							The Basic Education Act Part 6 The Universities Act 2010 parts 3 and 4						
Academia and research institutions	Kenya Vision 2030 section 5.1 Digital Economy Blueprint Chapter 5 (on infrastructure to facilitate research The National Digital Masterplan part 4.4 National ICT Policy section 6.3 Competency-Based Curriculum on Information Literacy. The Basic Education Policy Framework (Academic institutions) The Pre-Primary Education Policy	Nairobi City County Integrated Development Plan Chapter 4	Mombasa City County Integrated Development Plan section 1.7.4	Nakuru County Integrated Development Plan section 1.21	Kisumu City County Integrated Development Plan section 1.22 Kisumu County ICT Policy the whole policy	Digital Education Action Plan (European Union) Action Plan 6 E-government plan The Digital Switzerland Strategy Chapter 4 Swiss Action Plan 2019-2020 Action Area 2	The constitution of Kenya 2010-chapter 4 bill of rights TVET Act 2013 (part 2 section 4) The Basic Education Act Part 5 The Universities Act 2010 parts 3 and 4	The Nairobi Early Childhood Development and Education Bill 2021-part 4				Federal Act on Vocational and Professional Education and Training Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 Federal Act on Funding and Coordination of the Swiss Higher Education Sector Article 3d	Mombasa, Nakuru, and Kisumu cities lack policies, laws, and regulations on academia and research institutions

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations							Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	2017 Chapter 4 Free Primary Education (FPE)and Free Secondary Education (FSDE) chapter 5												
Digital culture	Kenya Vision 2030 section 3.6 Digital Economy Blueprint chapter 3 and chapter 6 The National Digital Masterplan Part 4 on digital government services National ICT Policy section 5.4.3 Competency-Based Curriculum on Information Literacy	Nairobi City County Integrated Development Plan Chapter 4	Mombasa City County Integrated Development Plan section 1.25	Nakuru County Integrated Development Plan section 4.4.2.3	Kisumu City County Integrated Development Plan section 4.4.12 Kisumu County ICT Policy the whole policy	Digital Education Action Plan (European Union) Action Plan 2 E-government plan The Digital Switzerland Strategy Chapter 3 Swiss Action Plan 2019-2020 Action Area 7 Strategies Zurich 2035 chapter on digital city	The Kenya Information and Communication Act Part 4 (section 46 A-N) The Computer Misuse and Cyber Crime Act (The whole Act) The Data Protection Act, 2019 (Part 2, part 3, part 4, part 5, part 6, part 7) TVET Act 2013 (part 2 section 4) The Universities Act 2010 parts 3 and 4					Switzerland Federal Act on Data Protection section 1 article 3 Swiss Higher Education Sector Higher Education Act	Nairobi, Mombasa, Kisumu, and Nakuru cities lack laws and regulations to facilitate digital culture

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Caring community facility	Kenya Vision 2030 section 5.6 Competency-Based Curriculum on Information Literacy. The Basic Education Policy Framework (Academic institutions) The Pre-Primary Education Policy 2017-chapter 2		Mombasa City County Integrated Development Plan section 1.21	Nakuru County Integrated Development Plan section (special schools)		E-government plan The Digital Switzerland Strategy Chapter 3 Strategies Zurich 2035 chapter on digital city	The constitution of Kenya 2010-chapter 4 bill of rights Early Childhood Education Act Part 3 The Basic Education Act Part 6	The Nairobi Early Childhood Development and Education Bill 2021 part 4 and part 12				Federal Act on Vocational and Professional Education and Training Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16	Nairobi and Kisumu cities lack a policy framework on caring community facilities. The cities of Kisumu, Nakuru, and Mombasa lack comprehensive policies, laws, and regulations to facilitate the development of caring community facilities.
Skilled and talented human capital initiatives	Kenya Vision 2030-chapter 4 Digital Economy Blueprint Chapter 6 The National Digital Masterplan Part 6 on digital implementation National ICT Policy Section 6 Competency-Based Curriculum on Information Literacy.	Nairobi City County Integrated Development Plan Chapter 4	Mombasa City County Integrated Development Plan section 1.16	Nakuru County Integrated Development Plan section 3.3.5	Kisumu City County Integrated Development Plan section 1.9 Kisumu County ICT Policy the whole policy	Digital Education Action Plan (European Union) Action Plan 9 E-government plan The Digital Switzerland Strategy Chapter 3 Strategies Zurich 2035 chapter on digital city	TVET Act 2013-part 2 The Universities Act 2010 parts 3 and 4	The Nairobi Early Childhood Development and Education Bill 2021-part 7				Swiss Higher Education Sector Higher Education Act Federal Act on Funding and Coordination of the Swiss Higher education Sector (Facilitating Higher education)	While Kenyan cities have their CIDPs as supporting policy frameworks, there are insufficient laws and regulations to facilitate the development of skilled and talented human capital initiatives

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	The Basic Education Policy Framework												
Values and ethics	Kenya Vision 2030-chapter 6 National ICT Policy section 6.4.3 Competency-Based Curriculum on Information Literacy. The Basic Education Policy Framework The Pre-Primary Education Policy 2017-chapter 3				Kisumu City County Integrated Development Plan	Digital Education Action Plan (European Union) Action Plan 6	The Constitution of Kenya 2010-chapter 6 The Kenya Information and Communication Act Part 4 (section 46 A-N) The Computer Misuse and Cyber Crime Act (Part 3 section 14-46) various digital offenses highlighted. The Data Protection Act, 2019 (Part 2, part 3, part 4, part 5, part 6, part 7) TVET Act 2013-part 2 The Basic Education					Federal Act on Data Protection Data protection provisions Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16	Kenyan cities lack laws and regulations, and insufficient policy frameworks to facilitate values and ethics.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Access and Equity of Education	Kenya Vision 2030 social pillar Digital Economy Blueprint section 7.0 The National Digital Masterplan Part A 4.3 Competency-Based Curriculum on Information Literacy The Basic Education Policy Framework The Pre-Primary Education Policy 2017 chapter 2.1.3 Free Primary Education (FPE)and Free Secondary Education (FSDE)	Nairobi City County Integrated Development Plan section 2.4.3	Mombasa City County Integrated Development Plan section 1.19	Nakuru County Integrated Development Plan section 1.21	Kisumu City County Integrated Development Plan section 4.4.12	Digital Education Action Plan (European Union) action plan 2 The Digital Switzerland Strategy chapter 3	Act part 9 and part 10 The constitution of Kenya 2010-chapter 4 bill of rights The Kenya Gazette Supplement (Basic Education Bill of 2021) TVET Act 2013-chapter 1 Early Childhood Education Act (part 2 and part 3) The Basic Education Act parts 4, 5, and 6 The Universities Act 2010-part 2 Provision 6 Strategies Zurich 2035 chapter on digital city	The Nairobi Early Childhood Development and Education Bill 2021 provisions 30 to 33	The Mombasa County Education Development Act provision 18			Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 Federal Act on Funding and Coordination of the Swiss Higher Education Sector	Nakuru and Kisumu cities lack laws and regulations to facilitate access and equity of education

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Inclusive Education	Kenya Vision 2030 social pillar

The National Digital Masterplan Part A 4.3

Competency-Based Curriculum on Information Literacy.

The Basic Education Policy Framework

The Pre-Primary Education Policy 2017 chapter 2.2.3

Free Primary Education (FPE)and Free Secondary Education (FSDE) | Nairobi City County Integrated Development Plan section 2.2 | Mombasa City County Integrated Development Plan section 1.19.1 | Nakuru County Integrated Development Plan section 1.21 | Kisumu City County Integrated Development Plan section 4.4.12 | Digital Education Action Plan (European Union) Action Plan 2

Strategies Zurich 2035 chapter on digital city | The constitution of Kenya 2010-chapter 4 bill of rights

The Kenya Gazette Supplement (Learners with Disabilities)

TVET Act 2013-chapter 1

Early Childhood Education Act (part 2 and part 3)

The Basic Education Act Part 6 | The Nairobi Early Childhood Development and Education Bill 2021 provisions 30 to 33 | | | | Swiss Higher Education Sector Higher Education Act

Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 | The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate the provision of inclusive education. |
| Early Childhood Education | Kenya Vision 2030 social pillar

Competency-Based Curriculum on Information Literacy.

The Basic Education | Nairobi City County Integrated Development Plan section 2.2 | Mombasa City County Integrated Development Plan section 1.19.1 | Nakuru County Integrated Development Plan section 4.4.4 | Kisumu City County Integrated Development Plan section 4.4.12 | | The constitution of Kenya 2010-chapter 4 bill of rights

The Kenya Gazette Supplement (Early Childhood | The Nairobi Early Childhood Development and Education Bill 2021 the whole act | The Mombasa County Education Development Act provision 18 | | | | The Kenyan cities of Nakuru, Mombasa, and Kisumu lack comprehensive policies, laws, and regulations to facilitate the provision of early childhood education. |

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Policy Framework The Pre-Primary Education Policy 2017 chapter Free Primary Education (FPE)and Free Secondary Education (FSDE)						Education Act) Early Childhood Education Act (The whole act) The Basic Education Act parts 4, 5, and 6						
Educational infrastructure	Kenya Vision 2030 social pillar Digital Economy Blueprint section 7.0 The National Digital Masterplan Part A 3.1 Competency-Based Curriculum on Information Literacy. The Basic Education Policy Framework	Nairobi City County Integrated Development Plan section 2.4.3	Mombasa City County Integrated Development Plan Section 1.19	Nakuru County Integrated Development Plan section 1.21	Kisumu City County Integrated Development Plan section 1.22	Digital Education Action Plan (European Union) Action Plan 4 Strategies Zurich 2035 chapter on digital city	The constitution of Kenya 2010-chapter 4 bill of rights The Kenya Gazette Supplement (the supplementary appropriation The Computer Misuse and Cyber Crime Act (Part 2 on the National Committee and Cyber-crimes Co-ordination Committee Section q(h) on public policy	The Nairobi Early Childhood Development and Education Bill 2021 provisions 51 to 56				Federal Act on Vocational and Professional Education and Training Article 1 Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 Federal Act on Funding and Coordination of the Swiss Higher Education Sector Article 3	The Kenyan cities of Mombasa, Kisumu, and Nakuru lack comprehensive policies, laws, and regulations to facilitate the provision of educational infrastructure despite CIDPs providing a policy framework.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
							education infrastructure) TVET Act 2013-chapter 1 Early Childhood Education Act part 6 provision 51 to 55 The Basic Education Act Provision 26 The Universities Act 2010-part 2 Provision 6						
Education Financing	Kenya Vision 2030 social pillar; Digital Economy Blueprint section 7.7; The National Digital Masterplan Part A 3.1; Competency-Based Curriculum on information literacy. The Basic Education Policy Framework	Nairobi City County Integrated Development Plan section 2.4.3	Mombasa City County Integrated Development Plan Chapter 3	Nakuru County Integrated Development Plan section 3.3.4	Kisumu City County Integrated Development Plan section 4.4.12; Kisumu County ICT Policy the	Digital Education Action Plan (European Union) Action Plan 5	The constitution of Kenya 2010-chapter 4 bill of rights; The Kenya Gazette Supplement (the supplementary appropriation, the finance bill, the HELB Act, the universities Bill); TVET Act 2013 (on financing)	The Nairobi Early Childhood Development and Education Bill 2021 provisions 50 to 56		The Mombasa County Education Development Act Provisions 11 to 14		Federal Act on Vocational and Professional Education and Training Article 1; Swiss Higher Education Sector Higher Education Act; Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16; Federal Act on Funding and Coordination of the Swiss Higher Education Sector article 3 provision g	Kisumu and Nakuru cities lack comprehensive policies, laws, and regulations to facilitate sufficient education financing initiatives.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	The Pre-Primary Education Policy 2017 chapter 1.2.1 Free Primary Education (FPE) and Free Secondary Education (FSDE)						and partnerships) Early Childhood Education Act (Roles of the County Governments) The Basic Education Act Provision 26 The Universities Act 2010-Part 2 Provision 6						
Digital Inclusion and equal opportunities						Strategies Zurich 2035 chapter on digital city	The constitution of Kenya 2010-chapter 4 bill of rights					Swiss Higher Education Sector Higher Education Act Federal Act on the Elimination of Discrimination Against People with Disabilities (All initiatives of Education) Article 16 Federal Act on Funding and Coordination of the Swiss Higher Education Sector	On the national level in Kenya, there are insufficient policies, laws, and regulations to facilitate digital inclusion and equal opportunities. Kenyan cities similarly lack comprehensive policies, laws, regulations, and policies to facilitate digital inclusion and equal opportunities.

Appendices 2: Analysis for smart living pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Safety, security/crime prevention	National Slum Upgrading and Prevention Policy Chapter 3 Section 3.2 Chapter 2 of the National Policy on Community Development chapter 2 National Development Policy Chapter 2 Kenya Vision 2030 social pillar	Nairobi City County Integrated Development Plan Chapter 3 section3.14	Mombasa CIDP 2023-2027 plan Chapter 3 section 3.14	Nakuru County CIDP			The Constitution of Kenya 2010 (Chapter 14, National Security) The Occupational Safety and Health Act 2007			Public Particip ation Act Chapter 1 section 1.24		Federal Constitution Article 5, 98, 107, 118 Swiss Criminal Code Section 14	The city of Kisumu lacks comprehensive policy frameworks on safety and crime prevention.
Housing quality	National Policy on Gender and Development of 2016 chapter 6 Kenya Vision 2030 social pillar		Mombasa CIDP 2023-2027 plan Chapter 3 section 3:14				The constitution of Kenya 2010 Article 43(1) (b) Sessional Paper (number 5 of 2016) The National Housing Corporation Act section 9					Swiss Tenancy Law article 257 and 259	In Kenya, the cities of Nairobi, Kisumu, and Nakuru lack a comprehensive policy framework to facilitate the quality of housing
Educational quality	National Policy on Gender and Development of 2016 chapter 3 National Policy on Community Development chapter 1						The constitution of Kenya Article 53 (1) (b) Sessional Paper (number 14 of 2012) Basic Education Act					Federal Constitution Swiss Vocational and Professional Education and Training (VPET) Act	Kenyan cities have insufficient policies to improve on provision on ECE

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Kenya Vision 2030 social pillar Kenya National Social Protection Policy Chapter 2 Chapters of National Curriculum Policy - 1,2,5 Nairobi Education and Youth Affairs Plan section 3						Universities Act Early Childhood Education (ECE) Act Chapter 3 section 3.24					Swiss Universities Act (Higher Education Act)	
Health conditions/ health facilities	National Policy on Gender and Development of 2016 chapter 5 Kenya Health Policy 2014 the whole policy Kenya Vision 2030 social pillar		Mombasa CIDP 2023-2027 plan Chapter 4 section 4.14				The constitution of Kenya Article 43 (1) (a) Sessional Paper (number 7 of 2012) The Physical Planning Act The Occupational Safety and Health Act 2007 section 8, section 25					Federal Constitution section 118 Federal Act on Health Insurance Article 7 Federal Act on Occupational Health and Safety "Ordinance 3 on Labor Protection", "Ordinance on Hazardous Substances"	The cities of Nairobi, Nakuru, and Kisumu lack comprehensive policy frameworks on health conditions and facilities.
Cultural facilities and budget allocation	National Development Policy, Chapter 7						The Constitution of Kenya 2010 Article 37 (1) (a)					Federal Constitution Article 27, 68, 72, 74	Kenyan cities lack comprehensive policy frameworks on cultural facilities.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Kenya Vision 2030 social pillar												Federal Act on the Protection of Nature and Cultural Heritage	
Tourist/recreational attractiveness and entertainment							The Land Act						Federal Act on the Protection of Nature and Cultural Heritage	Kenyan cities lack comprehensive policy frameworks on tourists and recreational attractiveness and entertainment.
Application of smart water meters, power meters, and other smart home applications													In Kenya, both the national government and Kenyan cities administrations lack a comprehensive policy framework to facilitate the use of smart home applications
Livability (initiatives to enhance quality of life/ life expectancy initiatives)													Federal Constitution	Kenyan cities lack a comprehensive policy framework on livability to facilitate the provision of initiatives to enhance quality of life.
Provision of basic urban utilities	National Policy on Gender and Development of 2016 chapter 1 National Policy on Community Development chapter 5 National Development						Sessional Paper (number 6 of 2014) Urban areas and Cities (Amendment) Act, 2019 section 29 and section 32 The Physical Planning Act						Federal Constitution article 73, 74, and 82	Kenyan cities lack comprehensive policy frameworks on provision of urban basic utilities.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Policy Chapter 4 Kenya Vision 2030 social pillar Kenya National Social Protection Policy Chapter 3 National Curriculum Policy Chapter 1,2,5												
Provision of affordable housing	Kenya National Housing Policy Chapter 4 Affordable Housing Program (AHP) Kenya Vision 2030 social pillar Kenya National Social Protection Policy						The constitution of Kenya Article 43(1)(b) Sessional Paper No. 3 of 2009 on National Land Policy. Urban areas and Cities (Amendment) Act, 2019 chapter 7 The National Housing Corporation Act section 3 and section 4 The Physical Planning Act Finance Act 2023 Section 31b The Housing Act Section 15					Federal Constitution Article 41 Federal Housing Act on subsidies and rent control	While housing is a national government function, Kenyan cities lack a comprehensive policy framework for the provision of affordable housing.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Social housing and vulnerable populations	Kenya National Housing Policy; Kenya Vision 2030 social pillar						The constitution of Kenya Article 43(1)(b); Sessional Paper No. 3 of 2009 on National Land Policy. Urban areas and Cities (Amendment) Act, 2019 part 5; The National Housing Corporation Act; The Physical Planning Act					Federal Constitution Article 41, 112	Kenya and its cities have insufficient policy framework on the provision of housing to vulnerable populations
Financing and funding mechanisms for affordable housing	Kenya Vision 2030 social pillar						Sessional Paper No. 3 of 2009 on National Land Policy.						Kenya and its cities have insufficient legal framework to facilitate the provision of affordable housing
Slum upgrading and informal settlements	Kenya Vision 2030 social pillar						The constitution of Kenya Article 43(1)(b); Sessional Paper No. 3 of 2009 on National Land Policy.						Kenya and its cities lack a comprehensive legal framework for slum upgrading
Community engagement in crime management	Kenya Vision 2030 social pillar						The constitution of Kenya chapter 9						Kenyan cities lack a comprehensive policy framework to facilitate Community engagement initiatives on crime management

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Rehabilitation and reintegration	Kenya Vision 2030 social pillar												Kenyan cities lack a comprehensive policy framework to facilitate initiatives on rehabilitation and reintegration
Health promotion and disease prevention	Kenya Health Policy 2014 section 4.2 Kenya Vision 2030 social pillar						Sessional Paper No. 7 of 2012						Kenyan cities lack a comprehensive policy framework to facilitate initiatives on health promotion and disease prevention
Health equity	Kenya Vision 2030 social pillar Universal Healthcare Policy												Kenyan cities lack a comprehensive policy framework to facilitate initiatives on health equity
Health workforce	Kenya Vision 2030 social pillar											Federal Constitution Article 1 Section 8	Kenya and its cities lack a comprehensive legal framework for facilitating the provision of a sufficient health workforce

Appendices 3: Existing policy framework for smart economy pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Tax incentives	National Treasury and Planning Strategic Plan (2018) (Chapter 4.2) VISION 2030 Economic pillar Government Support Measures Policy (1.2.4) Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 1609) Nairobi City County Integrated Development Plan (Article 32)	Mombasa City County Integrated Development Plan (chapter2)	Nakuru City County Integrated Development Plan chapter3	Kisumu City County Integrated Development Plan (Chapter 2)	Free market Economic Policy Swiss Monetary Policy Swiss Export Control and Sanction Policy Switzerland Foreign Economic Policy, Pillar Two Rules of the Organization for Economic Cooperation and Development (2022)	The Constitution of Kenya 2010 (article 210) Financial Services Authority Bill (2016) Article 177 Public Finance Management Act (Chapter 6) Public Private Partnership Act 2021 (14.5) Draft County Government Revenue Raising Process Bill (2017) Article 45 National Policy to Support Enhancement of County Government Own source Revenue (Article 23)					Federal Constitution	Kenyan cities do not have comprehensive policies laws and regulations on Tax Incentives
Digital Economy Initiatives for Enterprises and startups	VISION 2030 Economic pillar					Swiss Monetary Policy Swiss Export Control and Sanction Policy						Federal Constitution	The Kenyan cities of Nairobi Mombasa, Nakuru, and Kisumu lack sufficient

Initiative	National / Vision Policy	Nairobi	Mombasa	Nakuru	Kisumu	International / Swiss Policy	PPP / Revenue	Federal Constitution	Notes
	Digital Economy Blueprint								laws and regulations to facilitate Digital Economy Initiatives for Enterprises and startups.
Poverty Reduction Initiatives	National Treasury and Planning Strategic Plan (2018) (chapter 6.5) VISION 2030 Economic pillar Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 21) Nairobi City County Integrated Development Plan (Article 45)	Mombasa City County Integrated Development Plan (chapter2)	Nakuru City County Integrated Development Plan chapter3	Kisumu City County Integrated Development Plan (Chapter 2)	Switzerland Foreign Economic Policy, Pillar Two Rules of the Organization for Economic Cooperation and Development (2022)			The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations for Poverty Reduction Initiatives.
Smart Services Delivery	Vision 2030 Economic pillar Government Support Measures Policy (1.3) Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 1608) Nairobi City County Integrated Development Plan (Article 23)	Mombasa City County Integrated Development Plan (chapter3)	Nakuru City County Integrated Development Plan chapter5	Kisumu City County Integrated Development Plan (Chapter 2)	Two Rules of the Organization for Economic Cooperation and Development (2022)	Public Private Partnership Act 2021 (14) Draft County Government Revenue Raising Process Bill (2017) Article 45	Federal Constitution	The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Smart Services Delivery.
Own Source Revenue Initiatives	Government Support Measures Policy (chapter 4)	Nairobi County Annual Development Plan (CADP) (Notice No. 1609)	Mombasa City County Integrated Development Plan (chapter2)	Nakuru City County Integrated Development Plan	Kisumu City County Integrated Development Plan (Chapter 2)	Swiss Monetary Policy Swiss Export Control and Sanction Policy	Public Private Partnership Act 2021 (14.5) Draft County Government Revenue	Federal Constitution	The Kenyan cities of Mombasa and Kisumu lack sufficient laws and regulations to

Smart Processing and Manufacturing	Digital Economy Blueprint	Nairobi City County Integrated Development Plan (Article 32)	Chapter3	Switzerland Foreign Economic Policy, Pillar / Two Rules of the Organization for Economic Co-operation and Development (2022)	Raising Process Bill (2017) Article 34 / Government Own source Revenue (Article 20)	facilitate Own Source Revenue Initiatives.
	National Treasury and Planning Strategic Plan (2018) (chapter 4.2) / VISION 2030 Economic pillar / Digital Economy Blueprint		Nakuru City County Integrated Development Plan chapter3	Swiss Monetary Policy / Switzerland Foreign Economic Policy, Pillar / Two Rules of the Organization for Economic Co-operation and Development (2022)		The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Smart Processing and Manufacturing.
Digital Jobs (Employment)	National Treasury and Planning Strategic Plan (2018) (chapter 5) / VISION 2030			Switzerland Foreign Economic Policy, Pillar / Two Rules of the Organization for Economic Co-	Public Finance Management Act (Chapter 6) / Public Private Partnership Act 2021 (14.5)	Federal Constitution — The Kenyan cities of Nairobi, Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations for the creation of jobs.

Digital Entrepreneurship Culture	Economic pillar		Nakuru City County Integrated Development Plan chapter3	Free market Economic Policy / Switzerland Foreign Economic Policy, Pillar	Draft County Government Revenue Raising Process Bill (2017) Article 45 / National Policy to Support Enhancement of County operation and Development (2022)	The Kenyan cities of Nairobi, Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Digital Entrepreneurship Culture.
Licensing and authorization on mobile money operators	Vision 2030 Economic pillar / Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 16) / Nairobi City County Integrated Development Plan (Article 30) / Nairobi International Financial Centre (NIFCA) Bill (2016)			National Policy to Support Enhancement of County / Government Own source Revenue (Article 23)	The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws for Licensing and Authorization of mobile money operators.

Theme	National policies	Nairobi	Mombasa	Nakuru	Kisumu	Other	Federal Constitution	Findings
Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF)						Public Private Partnership Act 2021 (14.5)	Federal Constitution	The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient policies, laws, and regulations to prevent Anti-Money Laundering (AML) and Counter-Terrorist Financing (CTF)
Business Efficiency	National Treasury and Planning Strategic Plan (2018) (chapter 6); VISION 2030 Economic pillar; Government Support Measures Policy (1.2.4); Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 1609); Nairobi City County Integrated Development Plan (Article 32)	Mombasa City County Integrated Development Plan (chapter2)	Nakuru City County Integrated Development Plan Chapter3	Kisumu City County Integrated Development Plan (Chapter 2)	The constitution of Kenya 2010 (chapter 4); Financial Services Authority Bill (2016) Article 177; Draft County Government Revenue Raising Process Bill (2017) Article 45; National Policy to Support Enhancement of County; Free market Economic Policy; Swiss Export Control and Sanction Policy; Switzerland Foreign Economic Policy, Pillar; Two Rules of the Organization for Economic Co-operation and Development (2022)	Federal Constitution	The Kenyan cities of, Nairobi Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Business Efficiency.

Economic Growth	National Treasury and Planning Strategic Plan (2018) (chapter 4.2) VISION 2030 Economic pillar Government Support Measures Policy (1.2.4) Digital Economy Blueprint	Nairobi County Annual Development Plan (CADP) (Notice No. 1609) Nairobi City County Integrated Development Plan (Article 32)	Mombasa City County Integrated Development Plan (chapter2)	Nakuru City County Integrated Development Plan chapter3	Kisumu City County Integrated Development Plan (Chapter 2)	Free market Economic Policy Swiss Monetary Policy Swiss Export Control and Sanction Policy Switzerland Foreign Economic Policy, Pillar Two Rules of the Organization for Economic Co-operation and Development (2022)	The Constitution of Kenya 2010 (article 210) Financial Services Authority Bill (2016) Article 177 Public Finance Management Act (Chapter 6) Public Private Partnership Act 2021 (14.5) Draft County Government Revenue Raising Process Bill (2017) Article 45 National Policy to Support Enhancement of County Government Own source Revenue (Article 23)	Federal Constitution	The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Economic Growth.

Appendices 4: Existing policy framework for smart environment pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Clean environment	The National Environment Policy (2013) Kenya Vision 2030 National Climate Change Response Strategy (NCCRS)					Energy Strategy 2050	The Constitution of Kenya 2010	Nairobi Solid Waste Management Act no 5 of 2015 The Nairobi City County Public Nuisance Act 2021	Mombasa County Solid Waste Mgt Policy	Nakuru County Climate Change Act 2021 Nakuru County Waste Mgt Bill 2021	Kisumu County Solid Waste Management Act,2020	Ordinance Air Pollution Control Act (OAPC	Kenyan cities have insufficient policies, to facilitate a clean environment.
Combustion of Fossil fuels	The National Environment Policy (2013) Kenya Vision 2030					Energy Strategy 2050	The Constitution of Kenya 2010	Nairobi Solid Waste Management Act no 5 of 2015 The Nairobi City County Public Nuisance Act 2021		Kisumu County Solid Waste Management Act,2020			Kenyan cities have insufficient policies, to facilitate the combustion of fossil fuels.
Protection of water catchment Areas	The National Environment Policy (2013) Kenya Vision 2030					Energy Strategy 2050	The Constitution of Kenya 2010	Nairobi Solid Waste Management Act no 5 of 2015			The Switzerland Federal constitution		Kenyan cities have insufficient policies for the protection of water catchment areas.
Water harvesting and storage	The National Environment Policy (2013) Kenya Vision 2030					Energy Strategy 2050							Kenyan cities have insufficient policies, laws, and regulations on water harvesting and storage.
Infrastructure resilience	The National Environment Policy (2013) Kenya Vision 2030					Energy Strategy 2050	The Constitution of Kenya 2010						Kenyan cities similarly have insufficient policies, laws, and

	National policies	Acts	Energy	Nairobi	Mombasa	Kisumu	Gaps
	National Climate Change Response Strategy (NCCRS)						regulations on infrastructure resilience.
Afforestation and reforestation	The National Environment Policy (2013) Kenya Vision 2030; National Climate Change Response Strategy (NCCRS)	The Constitution of Kenya 2010; The Urban Areas and Cities (Amendment) Act, 2019; The Environment Management and Coordination Acts (1999); Climate Change Act (2016)	Energy Strategy 2050	Nairobi Solid Waste Management Act no 5 of 2015; The Nairobi City County Public Nuisance Act 2021	Mombasa County Solid Waste Mgt Policy; Mombasa Climate Change Action Plan 2020-2024	Kisumu County Solid Waste Management Act,2020	Kenyan cities have insufficient policies, laws, and regulations on Afforestation and Reforestation.
Emission limit and target	The National Environment Policy (2013; National Climate Change Response Strategy (NCCRS)	The Urban Areas and Cities (Amendment) Act, 2019; Climate Change Act (2016)	Energy Strategy 2050	The Nairobi City County Public Nuisance Act 2021	Mombasa County Solid Waste Mgt Policy	Kisumu County Solid Waste Management Act,2020	Nakuru City lacks policies, laws, and regulations on emission limits and targets.
Collaboration and partnerships	The National Environment Policy (2013) Kenya Vision 2030; National Climate Change Response Strategy (NCCRS)	The Constitution of Kenya 2010; The Urban Areas and Cities (Amendment) Act, 2019	Energy Strategy 2050			Kisumu County Solid Waste Management Act,2020	Nairobi, Mombasa, and Nakuru cities have insufficient policies, laws, and regulations on Collaboration and partnerships.

						Status
Energy Conservation	Kenya Vision 2030	Energy Strategy 2050	The Constitution of Kenya 2010			Kenyan cities have insufficient policies, laws, and regulations on **energy conservation**.
Natural disaster	National Climate Change Response Strategy (NCCRS)	Energy Strategy 2050	The Constitution of Kenya 2010	Nairobi Solid Waste Management Act no 5 of 2015 1	Mombasa Climate Change Action Plan 2020-2024	Kisumu and Nakuru cities have insufficient policies, laws, and regulations on **Natural Disaster**.
Climate financing	The National Environment Policy (2013) Kenya Vision 2030	Energy Strategy 2050				Kenyan cities have insufficient policies, laws, and regulations on **Climate Financing**.
Biodiversity conservation	The National Environment Policy (2013) Kenya Vision 2030 National Climate Change Response Strategy (NCCRS)	Energy Strategy 2050		Nairobi Solid Waste Management Act no 5 of 2015 The Nairobi City County Public Nuisance Act 2021	Nakuru County Climate Change Act 2021 Nakuru County Waste Mgt Bill 2021 — Kisumu County Solid Waste Management Act, 2020	Mombasa City has insufficient policies, laws, and regulations on biodiversity conservation.

Appendices 5: Existing policy framework for smart mobility pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Efficient road accessibility	Kenya Vision 2030 Section 3.4; National Integrated Transport Policy; The Kenya Transport and Logistics Network Framework The whole document	Nairobi City County Integrated Development Plan Section 1.6	Mombasa City County Integrated Development Plan section 1.7	Nakuru County Integrated Development Plan section 1.7 and 1.8	Kisumu City County Integrated Development Plan section 4.4.11, section 1.7		The Constitution of Kenya 2010 (Chapter 4 Bill of Rights); The Urban areas and Cities (Amendment) Act, 2019 (Part 4, clause 60); The Kenya Roads Act 2007, Part Sections A, B, C; The Transport Act (CAP 403) Traffic Act Cap 2015 Part 5; The National Transport and Safety Act (2012) Part 4 Motor Vehicle Inspection Regulations 2023 (Through Approving); The Traffic Rules 2023 Citation 1 to 5; Urban Areas and Cities (Amendment) Act, 2019 Section 36	Nairobi Metropolitan Act Part 5; Nairobi City County Transport Act 2020-part 3; Nairobi Metropolitan Area Transport Authority Act part 2 and part 3	Mombasa County Roads Act 2016 the whole act		Kisumu County Transport Act, 2019 the whole act	The Road Transport Act Chapter 1 general provisions; Federal Road Traffic Act (SVG) Articles 5 and 6; Federal Roads Act; Federal Pedestrian Roads and Hiking Roads Act; The Public-private Initiative 2025; Smart Lighting for Swiss Energy City	In Nakuru city, there are insufficient laws and regulations to facilitate efficient road accessibility.
Efficient public transportation	Kenya Vision 2030 Section 3.4; National Integrated Transport Policy; The Kenya Transport and Logistics	Nairobi City County Integrated Development Plan Section 1.6	Mombasa City County Integrated Development Plan section 1.7	Nakuru County Integrated Development Plan section 1.7	Kisumu City County Integrated Development Plan section 4.4.11, section 1.7		The Constitution of Kenya 2010 (Chapter 4 Bill of Rights); The Urban Areas and Cities (Amendment) Act, 2019; The Kenya Roads Act 2007 Part Section A, B, C	Nairobi Metropolitan Act part 5; Nairobi City County Transport Act	Mombasa County Roads Act 2016 the whole act		Kisumu County Transport Act, 2019 the whole act	Federal Railways Act the whole act; The Roads and Transport Act; Federal Road Traffic Act (SVG) articles 5 and 6; Federal Roads Act	Kenyan cities have insufficient policies regarding commuter public transportation.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Network Framework The whole document						The Transport Act (CAP 403) Traffic Act Cap 2015 Part 5 The Railway Act 2012, Part 4 The National Transport and Safety Act (2012) Part 4 Motor Vehicle Inspection Regulations 2023 (Through Approving) The Traffic Rules 2023 Citation 1 to 5 Urban Areas and Cities (Amendment) Act, 2019 Section 36, 42 Civil Aviation Act 2013 Yes Part 3, Part 4	2020- part 3 Nairobi Metropolitan Area Transport Authority Act part 2 and part 3				Federal Pedestrian Roads and Hiking Roads Act sections 1 and 2 The Public-private Initiative 2025 Smart Lighting for Swiss Energy City	
Non-motorized accessibility							The Constitution of Kenya 2010 (Chapter 4 Bill of Rights) The Urban Areas and Cities (Amendment) Act, 2019					Federal Roads Act Federal Pedestrian Roads and Hiking Roads Act section 2 Smart Lighting for Swiss Energy City	In Kenya, there are insufficient policies, laws, and regulations to facilitate non-motorized accessibility. Kenyan cities similarly lack sufficient laws and policies to facilitate the provision of non-motorized roads.
Availability of ICT infrastructure for transport Including smart parking)	Kenya Vision 2030 Section 3.4, Kenya Digital Master Plan Pillar 11				Kisumu City County Integrated Development Plan section 4.4.12		The Traffic Rules 2023 Citation 4 The Kenya Information and Communication Act (section 83A-D) The Computer Misuse and					Federal Railways Act the whole act The Roads and Transport Act Chapters 1 and 2 Federal Road Traffic Act (SVG),	Kenyan cities lack comprehensive laws, regulations, and policies to facilitate the provision of ICT infrastructure to facilitate smart mobility and smart parking.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	National ICT Policy (2019) Section 6.4 The National Digital Masterplan (section 4.1.1.3) Digital Economy Blueprint Chapter 5						Cyber Crime Act part 3 sections 14-46 The Data Protection Act, 2019						Federal Roads Act Federal Pedestrian Roads and Hiking Roads Act section 2 The Public-private Initiative 2025 Smart Lighting for Swiss Energy City	
Electric vehicles	The National Digital Masterplan (section 4.1.1.3.2)						The Constitution of Kenya 2010 (Chapter 4 Bill of Rights)						Federal Road Traffic Act (SVG), Federal Roads Act The Public-private Initiative 2025	In Kenya, while the National digital plan has provided a policy framework on the use of electric vehicles, there is still insufficient policy framework to facilitate the use of the same. Kenyan cities similarly have insufficient policies, laws, and regulations to facilitate the use of electric vehicles.
Autonomous vehicles							The Constitution of Kenya 2010 (Chapter 4 Bill of Rights)						Federal Road Traffic Act (SVG) article 6 paragraph 5 Federal Roads Act	In Kenya, while the National digital plan has provided a policy framework on the use of autonomous vehicles, there is still insufficient policy framework to facilitate the use of the same. Kenyan cities similarly have insufficient policies, laws, and regulations to facilitate the use of autonomous vehicles.
Smart lighting							The Constitution of Kenya 2010 (Chapter 4 Bill of Rights)						Federal Roads Act	In Kenya, there is insufficient policy framework to facilitate the implementation of smart lighting.

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
												The public-private Initiative 2025	Kenyan cities similarly have insufficient policies, laws, and regulations to facilitate the implementation of smart lighting.
Intelligent Transportation							The Constitution of Kenya 2010 (Chapter 4 Bill of Rights) The Urban Areas and Cities (Amendment) Act, 2019					Federal Roads Act	In Kenya, there is insufficient policy framework to facilitate the implementation of intelligent transportation. Kenyan cities similarly have insufficient policies, laws, and regulations to facilitate the implementation of intelligent transportation.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Planning for infrastructure	Kenya Vision 2030 Chapter 3 The National Action Plan on Safety 2022 health infrastructure Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole Act	Nairobi CIDP 2018-2022 chapter 2	Mombasa CIDP Chapters 1 and 2	Nakuru CIDP section 1.7 Nakuru Energy, Infrastructure, ICT Policy Chapter 3	Kisumu CIDP Section 1.7		The Constitution of Kenya 2010- chapter 4 The Urban Areas and Cities (Amendment) Act, 2019 Part 2 The Kenya Information and Communication Act Part 3 The Computer Misuse and Cyber Crime Act Part 5 The Data Protection Act, 2019 Part 5 The Physical Land Use Planning Act Part 3 The Kenya Gazette Supplement finance act 2015, finance Act 2015, and finance Act 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11	Nairobi City County Gazette Supplement Finance Act 2019 The Nairobi City County Nuisance Act Part 3	The Mombasa County Roads Act 2016-part 2	Nakuru County Finance Act 2020-part 5	Kisumu County Gazette Supplement (Finance Act part 2 and part 3)	Federal Roads act Federal Railways Act Sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act Spatial planning Act	Kenya and its cities need to develop a comprehensive policy framework to facilitate the allocation of more resources toward planning for infrastructure.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
							The National Insurance Act Part 2						
Implementation for infrastructure	Kenya Vision 2030 Chapter 3 The National Action Plan on Safety 2022 health infrastructure Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole act	Nairobi CIDP 2018-2022 chapter 2	Mombasa CIDP chapter 1 and 2	Nakuru CIDP section 1.7 Nakuru Energy, Infrastructure, ICT Policy Chapter 3	Kisumu CIDP Section 1.7		The Constitution of Kenya 2010- chapter 4 The Urban Areas and Cities (Amendment) Act, 2019 parts 2 and 3 The Kenya Information and Communication Act Part 3 The Data Protection Act, 2019-part 5 The Physical Land Use Planning Act Part 3 The Kenya Gazette Supplement finance act 2015, finance ACT 2015, and finance Act 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11 The National Insurance Act Part 2	Nairobi City County Gazette Supplement Finance Act 2019 The Nairobi City County Nuisance Act Part 3	The Mombasa County Roads Act 2016-part 2	Nakuru County Finance Act 2020-part 5	Kisumu County Gazette Supplement (Finance Act part 3)	Federal Roads act Federal Railways Act sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act Spatial Planning Act (Building zones)	Kenya and its cities need to allocate more resources to facilitate the implementation of infrastructure.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Maintenance and Upgrading of Infrastructure	Kenya Vision 2030 Chapter 3 The National Action Plan on Safety 2022 health infrastructure Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole act	Nairobi CIDP 2018–2022 chapter 2	Mombasa CIDP chapter 1 and 2	Nakuru CIDP section 1.7	Kisumu CIDP Section 1.7, and Section 2.4		The Constitution of Kenya 2010- Chapter 4 The Urban Areas and Cities (Amendment) Act, 2019 parts 2 and 3 The Kenya Gazette Supplement finance act 2015, finance Act 2015, and finance ACT 2016 The Public Private Act No. 15 of 2013, parts 3 to 11 The National Insurance Act Part 2	Nairobi City County Gazette Supplement Finance Act 2019	The Mombasa County Roads Act 2016-part 3	Nakuru County Finance Act 2020-part 5	Kisumu County Gazette Supplement (Finance Act part 3)	Federal Roads act Federal Railways Act sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act Spatial Planning Act	Kenya and its cities have insufficient policy frameworks to facilitate proper maintenance and upgrading of infrastructure.
Automation of Infrastructure Systems	Kenya Vision 2030 Chapter 3 Digital Economy Blueprint Chapter 5	Nairobi CIDP 2018-2022 Chapter 2 (E-digital services)										Federal Roads act Federal Railways Act sections 1 and 2 Telecommunications Act Spatial Planning Act	Kenyan cities lack comprehensive policies, laws, regulations, and policies to facilitate the automation of infrastructure.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Access, Usage, and Distribution of Infrastructure Services	Kenya Vision 2030 Chapter 3 The National Action Plan on Safety 2022 health infrastructure Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole act		Mombasa CIDP chapter 1 and 2	Nakuru CIDP section 1.7 Nakuru Energy, Infrastructure, ICT Policy Chapter 3	Kisumu CIDP Section 1.7		The Constitution of Kenya 2010-chapter 4 The Urban Areas and Cities (Amendment) Act, 2019 parts 2 and 3 The Kenya Information and Communication Act Part 4 The Computer Misuse and Cyber Crime Act part 5 and part 6 The Data Protection Act, 2019 part 5 and part 6 The Kenya Gazette Supplement finance act 2015, finance Act 2015, and finance Act 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11 The National Insurance Act Part 2		The Mombasa County Roads Act 2016-part 3	Nakuru County Finance Act 2020- part 5	Kisumu County Gazette Supplement (Finance Act part 3)	Federal Roads act Federal Railways Act sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act:	The city of Nairobi lacks sufficient laws and regulations on access, usage, and distribution of infrastructure services.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Investment in infrastructure	Kenya Vision 2030 Chapter 3

The National Action Plan on Safety 2022 health infrastructure

Digital Economy Blueprint Chapter 5

The National Digital Masterplan the whole act | | Mombasa CIDP chapter 1 and 2 | Nakuru CIDP section 1.7

Nakuru Energy, Infrastructure, ICT Policy Chapter 3 | Kisumu CIDP Section 1.7 | | The Constitution of Kenya 2010- chapter 4

The Urban areas and Cities (Amendment) Act, 2019 part 2

The Computer Misuse and Cyber Crime Act Part 5

The Data Protection Act, 2019 part 5

The Kenya Gazette Supplement finance act 2015, finance Act 2015, and finance Act 2016

The Public Private Act No. 15 of 2013, parts 3 to 11

The National Insurance Act Part 2 | | The Mombasa County Roads Act 2016-part 2 | Nakuru County Finance Act 2020-part 5 | Kisumu County Gazette Supplement (Finance Act part 3) | Federal Roads act

Federal Railways Act sections 1 and 2

Energy Act

Telecommunications Act:

Federal Water Protection Act

Spatial Planning Act (federal financing) | Kenyan cities have insufficient policy frameworks to facilitate public-private partnerships in the investment of infrastructure. |
| Design for Infrastructure | Kenya Vision 2030 Chapter 3 | | Mombasa CIDP chapter 1 and 2 | | | | The Constitution of Kenya 2010- Chapter 4 | | The Mombasa County | | Kisumu County Gazette Supplement | Federal Roads act | The Kenyan cities of Nairobi and Nakuru lack sufficient laws and |

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
	Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole act						The Urban areas and Cities (Amendment) Act, 2019 part 2 The Kenya Gazette Supplement finance act 2015, finance ACT 2015, and finance Act 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11 The National Insurance Act Part 2		Roads Act 2016-part 2		ent (Finance Act part 3)	Federal Railways Act sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act Spatial Planning Act (Building restrictions)	regulations regarding infrastructure design.
Internet Connectivity at Household and Offices	Kenya Vision 2030 chapter 3 on optic fiber connection Digital Economy Blueprint Chapter 5						The Constitution of Kenya 2010-chapter 4 The Kenya Gazette Supplement finance act 2015, finance Act 2015, and finance ACT 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11 The National Insurance Act Part 2					Telecommunications Act:	In Kenya, there are insufficient national laws and policies to facilitate the provision of adequate internet services.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Tech Hubs and Innovation Centres	Kenya Vision 2030 Chapter 3 The National Digital Masterplan the whole act (Ajira digital hubs)						The Constitution of Kenya 2010-chapter 4					Telecommunications Act	While the National Digital Masterplan has led to the implementation of Ajira digital hubs, there are still insufficient policies and laws to facilitate the establishment of tech hubs and innovation centers.

Appendices 7: Existing policy framework for smart governance pillar

Policy elements	Policy documents (policies, strategies, plans)						Laws						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Public engagement/ digital democracy		Nairobi City County Integrated Development Plan (chapter 1 and 2) Nairobi Education and Youth Affairs Plan (Chapter 3)	Mombasa CIDP 2023-2027 plan (Chapter 4)				The Constitution of Kenya 2010 (Article 118) The Urban Areas and Cities (Amendment) Act, 2019 Article 196(1) Private Act No. 14 of 2021			Nakuru County CIDP Public Participation Act		Federal Constitution (Article 4)	Nairobi City Mombasa City and Kisumu City lack policies on public engagement.
E-government models, platforms, and services	Kenya Vision 2030 The National Digital Masterplan Digital Economy Blueprint						The Constitution of Kenya 2010 The Urban Areas and Cities (Amendment) Act, 2019 The Kenya Information and Communication Act						The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate E-government models, platforms, and services.
Provision of efficient public and social services	Kenya Vision 2030						The constitution of Kenya 2010(article 43)		Nakuru County CIDP Public Participation Act				The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to provide efficient public and social services.

Policy elements	Policy documents (policies, strategies, plans)						Laws and regulations						Gaps
	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	National	Nairobi	Mombasa	Nakuru	Kisumu	Zurich (benchmark)	
Implementation for infrastructure	Kenya Vision 2030 Chapter 3 The National Action Plan on Safety 2022 health infrastructure Digital Economy Blueprint Chapter 5 The National Digital Masterplan the whole act	Nairobi CIDP 2018-2022 chapter 2	Mombasa CIDP chapter 1 and 2	Nakuru CIDP section 1.7 Nakuru Energy, Infrastructure, ICT Policy Chapter 3	Kisumu CIDP Section 1.7		The National Insurance Act Part 2 The Constitution of Kenya 2010- chapter 4 The Urban Areas and Cities (Amendment) Act, 2019 parts 2 and 3 The Kenya Information and Communication Act Part 3 The Data Protection Act, 2019-part 5 The Physical Land Use Planning Act Part 3 The Kenya Gazette Supplement finance act 2015, finance ACT 2015, and finance Act 2016 The Public Private Act No. 15 of 2013 yes parts 3 to 11 The National Insurance Act Part 2	Nairobi City County Gazette Supplement Finance Act 2019 The Nairobi City County Nuisance Act Part 3	The Mombasa County Roads Act 2016-part 2	Nakuru County Finance Act 2020-part 5	Kisumu County Gazette Supplement (Finance Act part 3)	Federal Roads act Federal Railways Act sections 1 and 2 Energy Act Telecommunications Act: Federal Water Protection Act Spatial Planning Act (Building zones)	Kenya and its cities need to allocate more resources to facilitate the implementation of infrastructure.

Open data Initiatives	Kenya Vision 2030		The Constitution of Kenya 2010 (Article 35) The Kenya Information and Communication Act (chapter 4(11A)) The Computer Misuse and Cyber Crime Act The Data Protection Act, 2019(chapter 31) The Public-Private Act No. 14 of 2021	Federal Constitution	The Public-Private Act No. 14 of 2021	The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Open Data Initiatives.
Multi-sector collaboration	Kenya Vision 2030 The National Digital Master-plan	Nairobi e-services plan	Mombasa CIDP 2023-2027 plan (Section 3.2.1)	The Constitution of Kenya 2010 (Article 189)		The Kenyan cities of Mombasa, Nakuru, and Kisumu lack sufficient laws and regulations to facilitate Multi-sector Collaboration.