

2022 Climate Academy: Digitalization, Energy Transition & Climate Action

Emerging technologies as a fundamental component of Smart cities for energy conservation and to mitigate climate change:

Smart City use cases in Africa, Challenges and recommendations

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From Knowledge
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United Nations
Climate Change

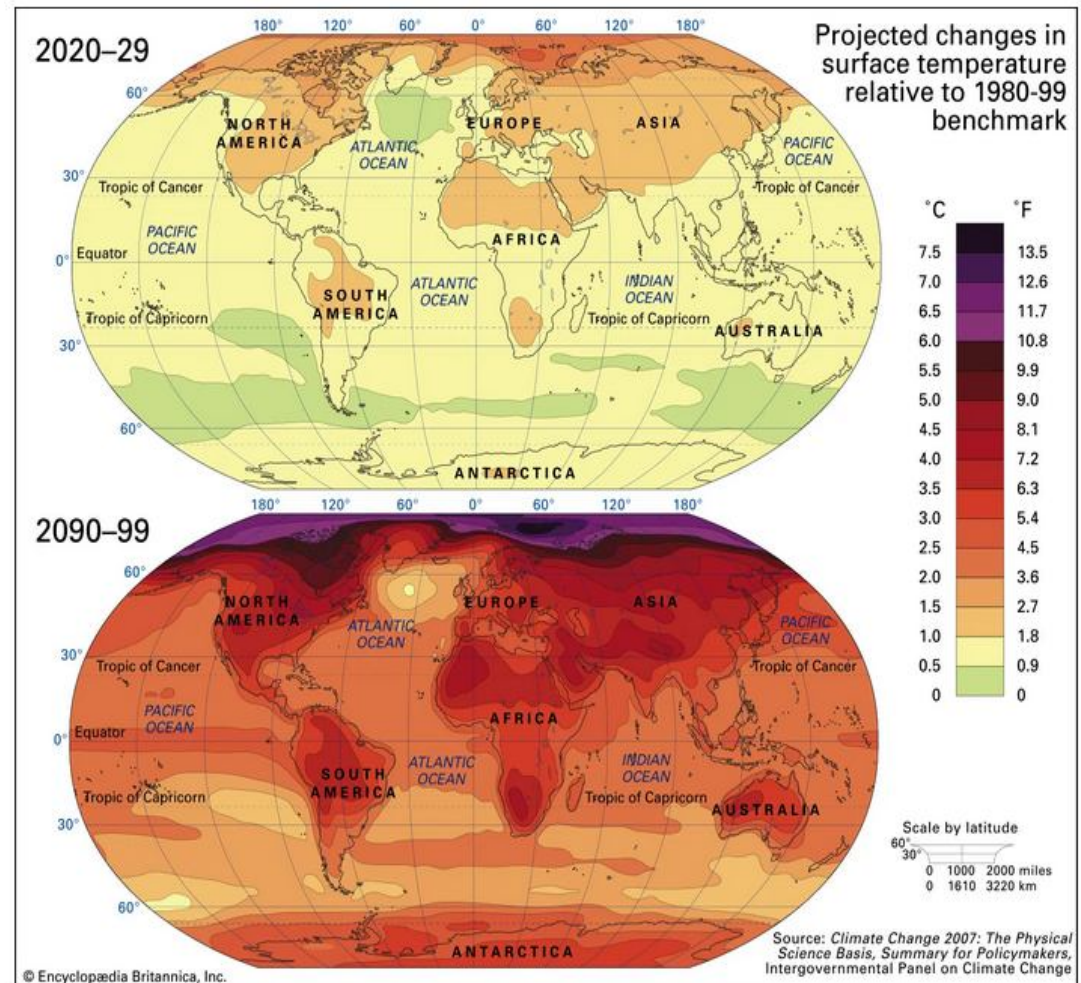


Outline of my presentation

- **Climate change overview**
- **Projected Changes in surface temperature**
- **World Climate change performance index**
- **Climate change mitigation and adaptation mechanisms**
- **Smart cities as one of Climate change mitigation and adaptation mechanisms**
- **A framework for Emerging technologies to the climate challenge**
- **Emerging Technologies as one of the primary components of Smart city**
- **Smart cities initiatives around the world**
- **Smart city initiatives in Africa: five use cases**
- **Challenges of implementing smart city projects in Africa**
- **Recommendations**

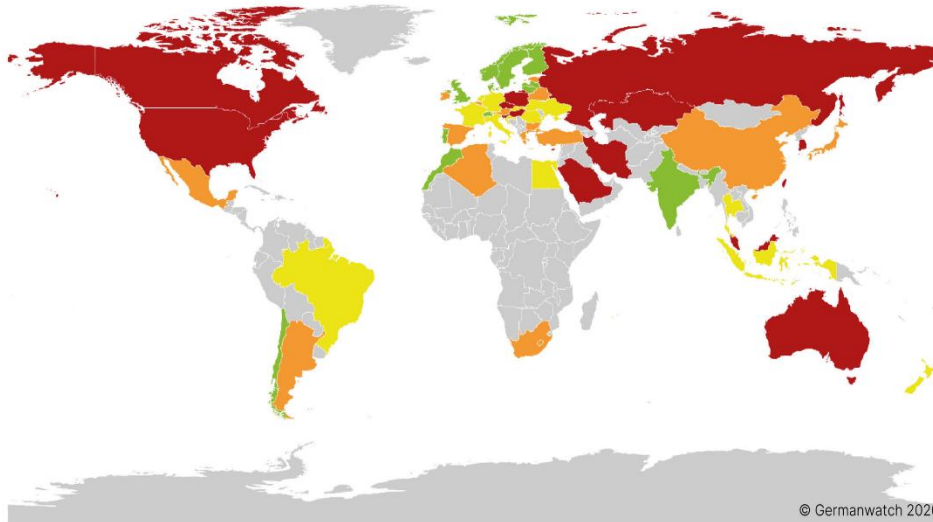
Climate change & Projected changes in surface temperature

- The global climate is changing and that is posing increasingly severe risks for ecosystems, human health and the economy. The world is already facing impacts of a changing climate, including
 - Deserts are expanding,
 - Heat waves and wildfires are becoming more common.
 - Increased warming in the Arctic has contributed to melting permafrost, glacial retreat and sea ice loss.
 - Higher temperatures are also causing
 - more intense storms,
 - droughts, and other weather extremes.



World Climate change performance index

Climate change performance rated: ■ Very High ■ High ■ Medium ■ Low ■ Very Low



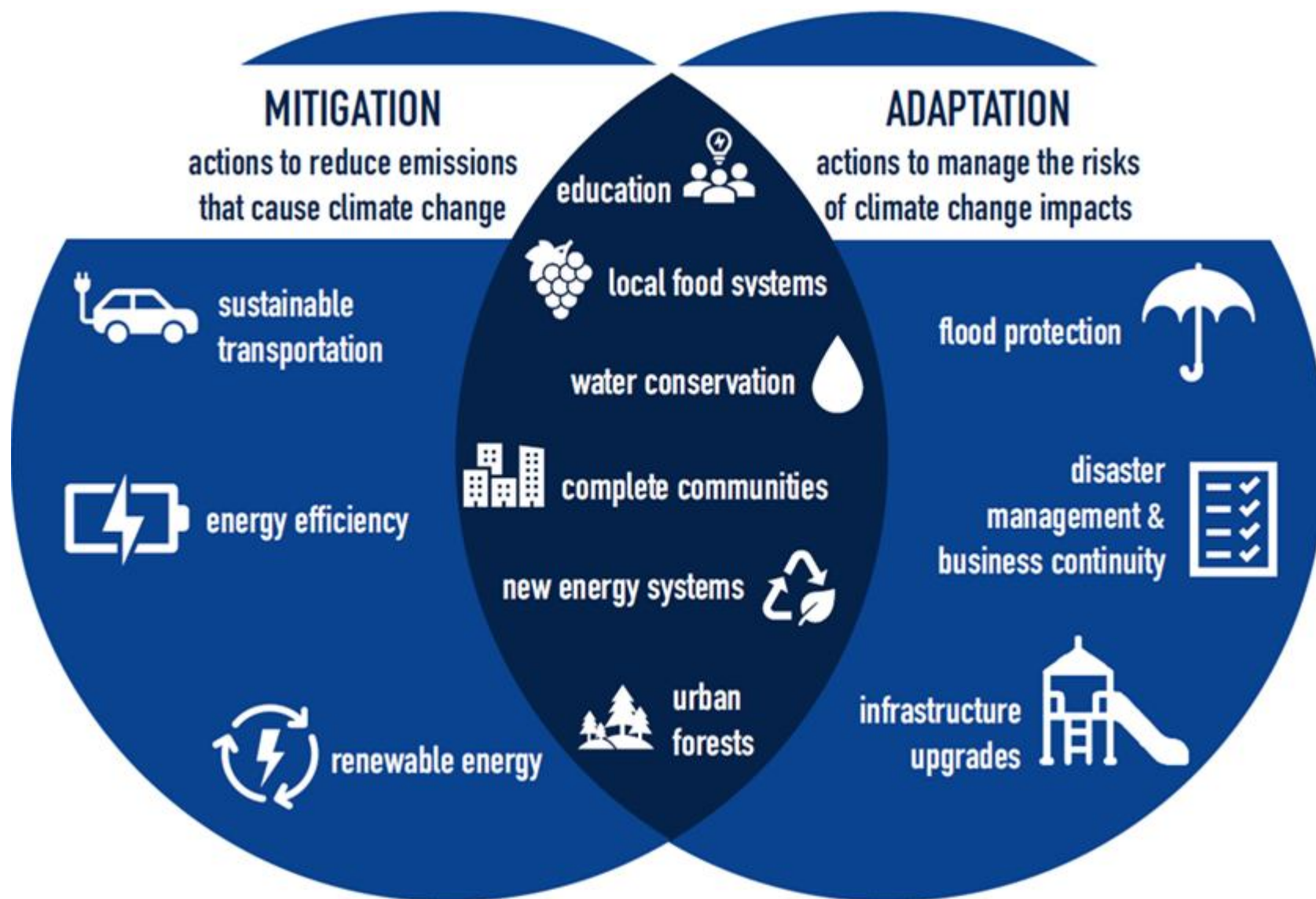
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Rank		Country							
1.*	–	–	20.	▼	Ukraine	41.	▼	Spain	
2.	–	–	21.	▼	Luxembourg	42.	▲	Turkey	
3.	–	–	22.	▼	Egypt	43.	▲	Algeria	
4.	–	Sweden	23.	▼	France	44.	▲	Bulgaria	
5.	▲	United Kingdom	24.	▲	Indonesia	45.	▲	Japan	
6.	▼	Denmark	25.	▼	Brazil	46.	▼	Argentina	
7.	▼	Morocco	26.	▲	Thailand	47.	▼	Czech Republic	
8.	▲	Norway	27.	▼	Italy	48.	▲	Poland	
9.	▲	Chile	28.	▲	New Zealand	49.	▼	Cyprus	
10.	▼	India	29.	–	Netherlands	50.	▼	Hungary	
11.	▼	Finland	30.	▼	Romania	51.	▼	Slovenia	
12.	▲	Malta	31.	▼	Slovak Republic	52.	–	Russian Federation	
13.	▲	Latvia	32.	–	Mexico	53.	▲	Korea	
14.	▲	Switzerland	33.	▼	China	54.	▲	Australia	
15.	▼	Lithuania	34.	▼	Greece	55.	▼	Kazakhstan	
16.	▲	European Union (28)	35.	▲	Austria	56.	▼	Malaysia	
17.	▲	Portugal	36.	▲	Belarus	57.	▲	Chinese Taipei	
18.	▲	Croatia	37.	▼	South Africa	58.	▼	Canada	
19.	▲	Germany	38.	▼	Estonia	59.	▼	Islamic Republic of Iran	
			39.	▲	Ireland	60.	–	Saudi Arabia	
			40.	▼	Belgium	61.	▼	United States	

* None of the countries achieved positions one to three. No country is doing enough to prevent dangerous climate change.

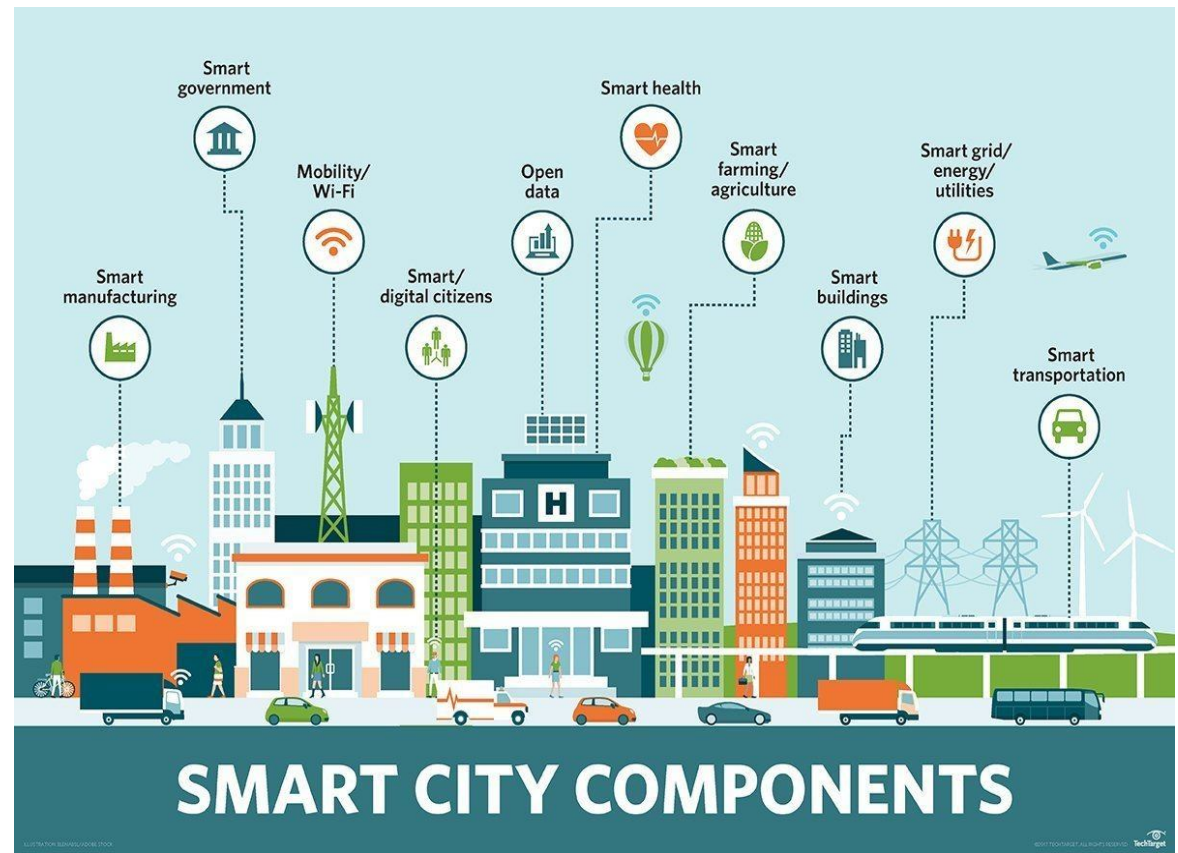
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Climate change mitigation and adaptation mechanisms

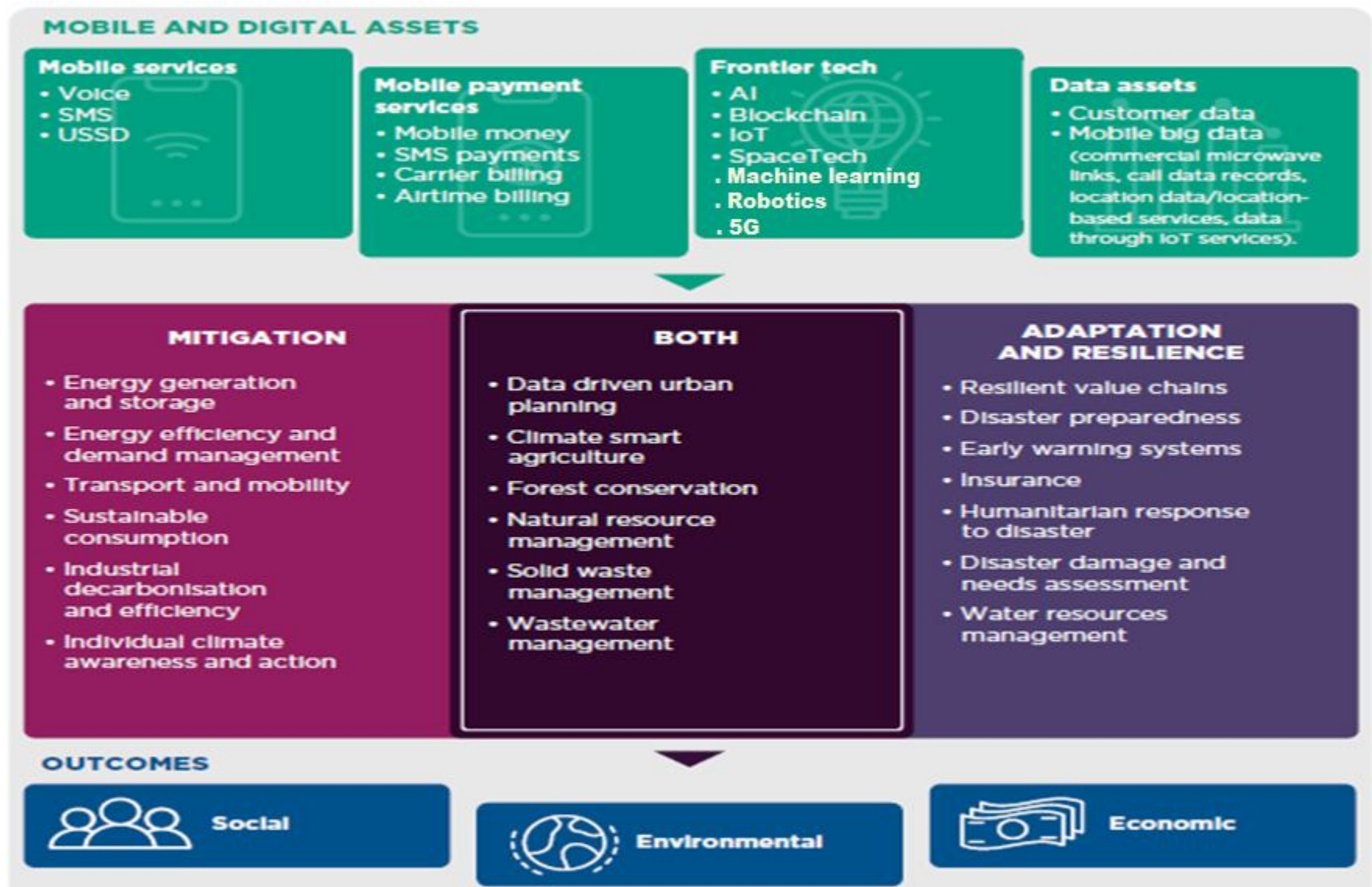


Smart cities

- A smart city is an urban development using Information and Communication Technology (ICT) and Internet of Things (IoT) to provide useful information to effectively manage resources and assets.
- It also includes more energy efficient buildings, integrated renewable energy sources, sustainable heating and cooling systems, smarter urban transport networks, upgraded water supply and better waste disposal facilities to tackle the city's economic, social and environmental challenges.



A framework for Emerging technologies to the climate challenge



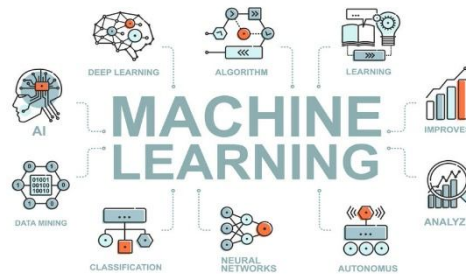
**Emerging
Technologies
as one of the
primary
components of
Smart city**



- Smart waste management solutions
- Smart air quality monitors
- Smart grids
- Advanced Public Transport System
- Formed Traffic System
- Maximum Utilized Energy Sources
- Smart parking system
- Pollution Monitoring



- Smart utility meters
- Smart Recycling sensors
- Smart air quality monitoring
- LED lighting controls.
- Surveillance cameras.
- Environmental sensors.
- Electronic billboards.
- Environmental and Wastewater Management Applications



- Intelligent Traffic Management System
- Smart grid system management
- Public Safety and Security
- Advanced Healthcare System
- Solid Waste Management
- Smart mobility
- Decision making

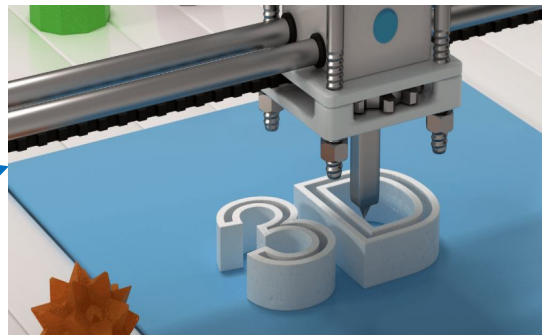


- Latest Communication System
- Backbone for every components of the smart city
- Massive device connectivity
- higher data rates, reduced latency, higher system capacity
- To connect everyone and everything

Emerging Technologies as one of the primary components of Smart city Cont....



- Smart and autonomous driving in cities
- undertaking maintenance and routine work that is difficult or unpleasant for humans
- monitor traffic and even sense weather conditions in cities
- involving drones/ UAVs and aerial taxis in cities



- Can help visualize urban planning and routes to build better vehicles and forms of transportation
- Lets you see anything you envision come to life. This could be helpful in smart cities that put a premium on factors like energy efficiency.
- is perfect for complex architectural projects of smart city



- empowered through 5G for public sector applications such as disaster preparedness and personnel training.
- can improve residents' self-reliance and decision-making
- Navigation
- Urban planning
- Disaster response



- Secure and seamless data exchange between residents
- Efficient urban management
- high degree of reliability and transparency without the need for a centralized administrator
- An interface across multiple sectors such as finance, education and transportation

Smart city initiatives around the world



Source: O.City Survey, 2020

Smart City initiatives in Africa

Use case 1: Konza Techno City, Kenya

- This Kenyan urban initiative is located 60 km South East of Nairobi.
- Konza (Konza Technopolis) is a key flagship project of Kenya's Vision 2030 economic development portfolio.
- Konza will be a world-class city, powered by a thriving information, communications and technology (ICT) sector, superior reliable infrastructure and business friendly governance systems.
- Konza Techno City is a 5 000 acre piece of land that experts estimate will cost \$15,5 billion to construct and will generate around \$1 billion for the country each year.
- Konza will be a world-class smart city, powered by a thriving and progressive ICT sector, superior reliable infrastructure and business friendly governance, policy and regulatory frameworks



Smart City initiatives in Africa

Use case 2: Cape Town, South Africa

The Cape Town Smart city project provides

- E-government, which provides better access to more efficient service delivery
- The provision of ICT skills, promoting social and economic development
- Public Wi-fi and improving the city's broadband infrastructure, reducing the digital divide
- The use of CCTV cameras, making the city safer with 560 cameras situated in and around the city
- Cape Town's open data portal is the first of its kind in Africa
- The use of smart-grid technologies at municipal levels, supporting the digital economy and several smart grid pilots are underway.
- Last year, the City of Cape Town called for formal public submissions to make it the first truly digital smart city in Africa.



Smart City initiatives in Africa

Use case 3: Hope City, Ghana

- The technology hub is to be built at Prampram in the Greater Accra Region and will cost \$10 billion.
- IT hub near the capital, Accra.
- Will employ about 50,000 people and house 25,000 people
- One of the planned towers will become Africa's tallest building and the park is intended to create more than 50 000 jobs in Ghana's ICT sector.
- It would include an IT university, a residential area, a hospital, as well as social and sporting amenities with state of the art smart city technologies.



Smart City initiatives in Africa

Use case 4: Eko Atlantic, Nigeria

- Eko Atlantic in Lagos is built on land reclaimed from the sea and it is estimated that it will house about 250 000 people once it is completed.
- Hope City, which is yet to get off the ground, will feature the continent's tallest skyscraper.
- Located on 2 400 acres of land on Victoria Island near Lagos,
- Eko Atlantic will include advanced fiber optic telecoms, independent reliable electricity and state of the art urban design.



Smart City initiatives in Africa

Use case 5: Kigali Innovation City, Rwanda

- The Rwandan government valued the project around 2 billion US\$ and expects to house world-class universities, technology companies, biotech firms, commercial and retail real estate.
- Kigali Innovation City (KIC) is being developed to be a mixed-use, master-planned, innovation city to be situated on 60 hectares of land in Kigali, Rwanda.
- KIC will seek to facilitate the development of pan-African talent and act as a technology innovation hub.
- Its plan includes four universities, office spaces, and start-up business incubators, alongside supporting facilities for retail, hospitality and accommodation.
- The project will incorporate international and local green and sustainable smart city design guidelines. It will efficiently manage water through the development of a wastewater treatment plant.



Challenges of implementing smart city projects in Africa

Skills, competency and Technological Challenges

- ▶ Lack of human capital with technology skills
- ▶ Lack of smart city specific skills
- ▶ Technology readiness of senior management
- ▶ Lack of integration between systems
- ▶ Lack of access to data
- ▶ Slow uptake of technology
- ▶ Inconsistent data

Infrastructure and socio-economic challenges

- ▶ Lack of infrastructure
- ▶ High costs associated with smart city technologies
- ▶ Lack of appropriate funding
- ▶ High income inequality
- ▶ Lack of access to basic services
- ▶ Poverty

Organizational, governance & political challenges

- ▶ The lack of smart city vision or mission statement
- ▶ Smart city projects are identified as lower priority
- ▶ Lack of continuity due to constant change of administration
- ▶ Lengthy supply chain process for fast moving digital technologies
- ▶ Citizens resistance to change

Recommendations

1

Investing an appropriate fund for infrastructure development for smart city

2

Increasing efforts to improve digital literacy and digital skills

3

Take into consideration network coverage and infrastructure needs for smart city

4

Bring the efforts of all stakeholders together to realize smart city projects

5

Promotion of broadband internet affordability which is the backbone of smart city

6

Incorporation of public data access & privacy policies into universal access and service

7

Develop an appropriate platform that integrate different digital systems

8

Increasing the Digital Technology readiness of senior management

9

Facilitate the lengthy supply chain process for fast moving digital technologies

10

Incorporate smart city vision and mission statement in the ICT policy of the country

11

Creating massive awareness on the importance of emerging technologies for climate change

12

Subsidizing High costs associated with smart city technologies

Thanks