Toolkit on Digital Transformation for People-Oriented Cities and Communities

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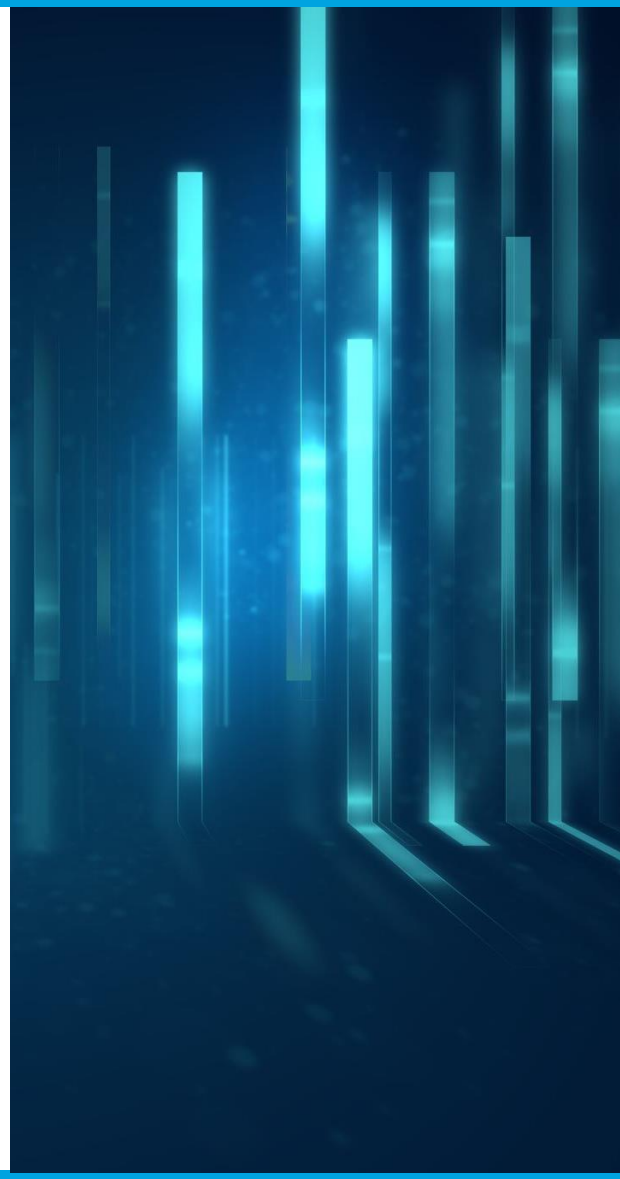
Module 1:
Digital Transformation for People-Oriented Cities and Communities

11 SUSTAINABLE CITIES AND COMMUNITIES

Jointly developed by: ITU, UNDP, UN-Habitat

Module 1 –
Digital Transformation for People-Oriented Cities and Communities

- This Module of the ITU Toolkit for Digital Transformation for People-Oriented Cities and Communities focuses on providing the foundations of implementing digital technologies in cities and communities.
- Cities and communities that are starting on their digital transformation journey will find the resources highlighted within this Module useful towards putting the foundations in place.
- This Module is also useful for cities and communities that are beginning their journey towards digital transformation and need to understand the various opportunities available to them.



Module 1 –
Digital Transformation for People-Oriented Cities and Communities

This Module will cover the following topics:

1. Challenges facing cities and communities
2. Opportunities of digital transformation for people-oriented cities and communities
3. Digital Transformation for People-Oriented Cities and Communities Roadmap
4. Key Digital Transformation Technologies for People-Oriented Cities and Communities
    1. Technology #1:Artificial Intelligence
    2. Technology #2: Internet of Things
    3. Technology #3: 5G
    4. Technology #4: Digital Twin
    5. Technology #5: Big Data
    6. Technology #6: Blockchain

1. Challenges Facing Cities and Communities

The Future of Cities

68% of the world's population will live in cities by 2050

UN DESA 2019 Revision of World Population Prospects

Sustainable urbanization has become a key challenge to cities around the world.

Challenges Cities Face Today

Population growth

Economy

Food Security

Education

Citizen Health

Housing

Transportation

Safety and Security

Infrastructure

Service Delivery

Environment

Waste

- Urbanization pace: by 2050, with 68% of the population projected to live in urban areas, with close 90% of this increase taking place in Asia and Africa
- climate change: up to 70% of global carbon emissions come from urban areas + economic crisis slowing down de-carbonization efforts
- digital transformation and inclusion: 3.7 billion people were offline in 2019, freedom of expression trough digital means still inequal
- conflicts over resources
- COVID19 exacerbating existing inequalities and problems with governments which had a digital governance structure were better off and recovering faster

COVID19 Challenges

COVID19 & Digital Challenges

- ↑ Unemployment
- 40% Gender Gap
- ⊘ Education disruption
- Slow down decarbonization

- The COVID-19 pandemic has shade light on the challenges and gaps of digital solutions, has increased inequalities across and within countries in the region. Network congestions, decline in average internet speed, deterioration of the service quality, unequal access to broadband connectivity.
- The economic impact of the pandemic on the informal sector and on sectors requiring physical presence, have made digitalization even more critical to differentiate countries' economy and find new sources of growth. Pre-existing gender gaps have exacerbated the asymmetric effect of the pandemic. Unemployment has surged, being more pronounced for women than for men.
- The opportunities for youths and future generation is also challenged. Disruption to in-person education together with the shut-down of public life has revved up the need to move to digital, virtual, and remote learning solutions to build skills and ensure economic opportunities to earn living and social and political participation as part of a society.
- With the current economic pressure and high public debt reaching net zero is a real challenge questioning a sustainable recovery especially for developing and commodities' dependent countries.

Cities Must Act Now to Meet the Linked Goals of the 2030 Agenda and the New Urban Agenda

The New Urban Agenda

Paragraph 66:
"We commit ourselves to **adopting a smart-city approach** that makes use of opportunities from digitalization, clean energy and technologies, as well as innovative transport technologies..."

Paragraph 156:
"We will promote the development of national information and communications technology policies and e-government strategies, as well as **citizen-centric digital governance tools**, in order to **make information and communications technologies accessible** to the public to enable them to develop and **exercise civic responsibility, broadening participation and fostering responsible governance, as well as increasing efficiency**..."

2. Opportunities of Digital Transformation for People-Oriented Cities and Communities

Digital Transformation Framework

Digital governance

Digital governance framework defines accountability, roles and responsibilities, coordination and decision making to streamline digital development.

Policy and Regulation

Presence of an enabling environment which includes national digital strategies and sectoral policies and standards in line with the SDGs ad agenda 2030

Skills and training

Development of the adequate set of skills and to fill digital skills-gaps and ensure none is left behind/equal right to digital literacy

Data management

Digital databases, data exchange (interoperability) and collaboration, reuse of data to make service people-centered and data management skills.

ECOSYSTEM BUILDING

Infrastructures

Ability to procure, maintain and
Update ICT infrastructures

Digital Services

Processes optimization and efficiency gains, services' streamline opportunities for PA, businesses, academia and citizen.

Example of technologies

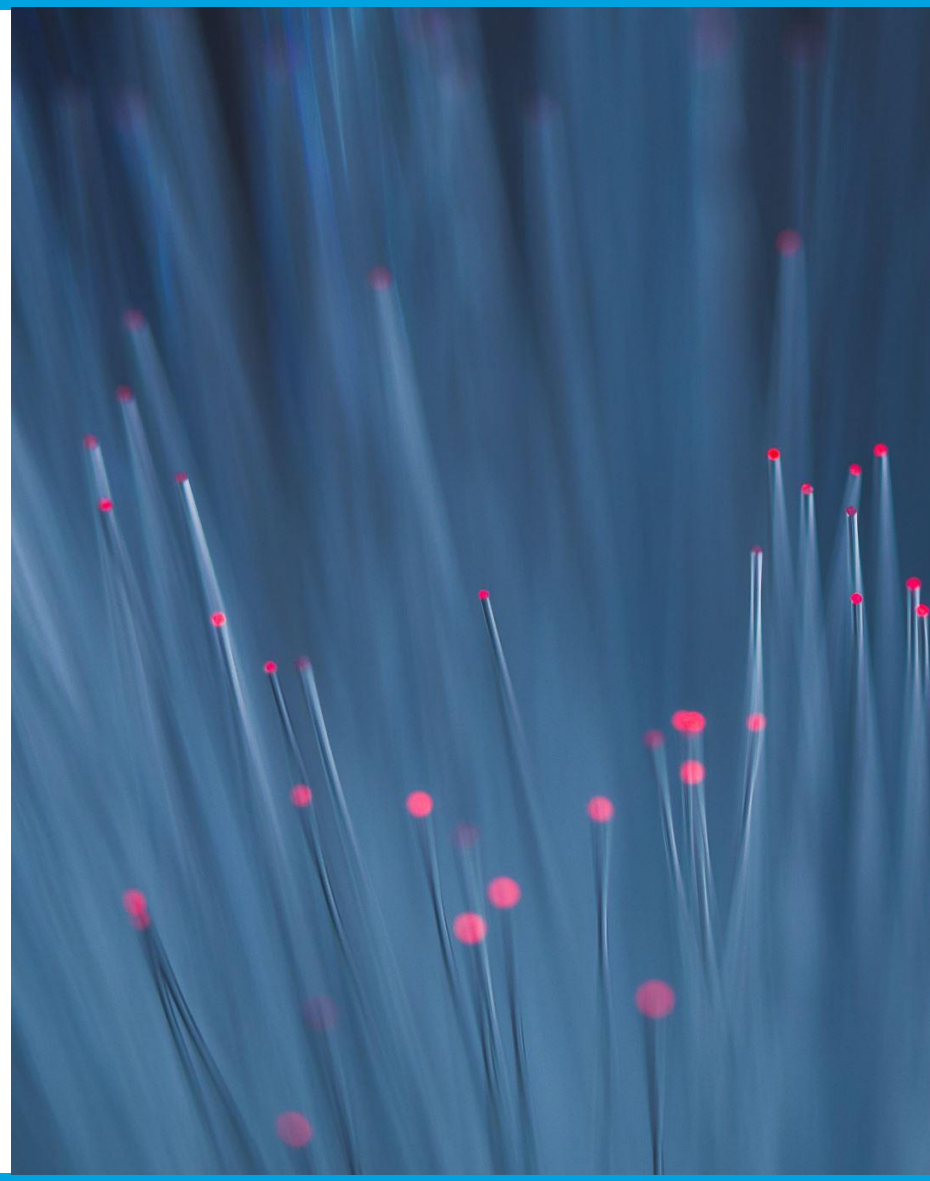
Principles for Digital Development

- Design with the User
- Understand the Existing Ecosystem
- Design for Scale
- Build for Sustainability
- Be Data Driven
- Use Open Standards, Open Data, Open Source, and Open Innovation
- Once-only principle
- Data/solution Reuse and Improve
- Address Privacy & Security
- Be Collaborative & Inclusive

Source: www.digitalprinciples.org.

Digital Transformation Opportunities for Cities

1. Reduce Environmental Impact
2. New Business Models
3. Decrease in Utility Usage
4. Increase Citizen Engagement
5. More Efficient & Transparent Services
6. Improve Measuring and Monitoring/Performance



Benefits of Digital Transformation

Decision Making

Citizen Engagement

City Services

Safety

Representation and Equality

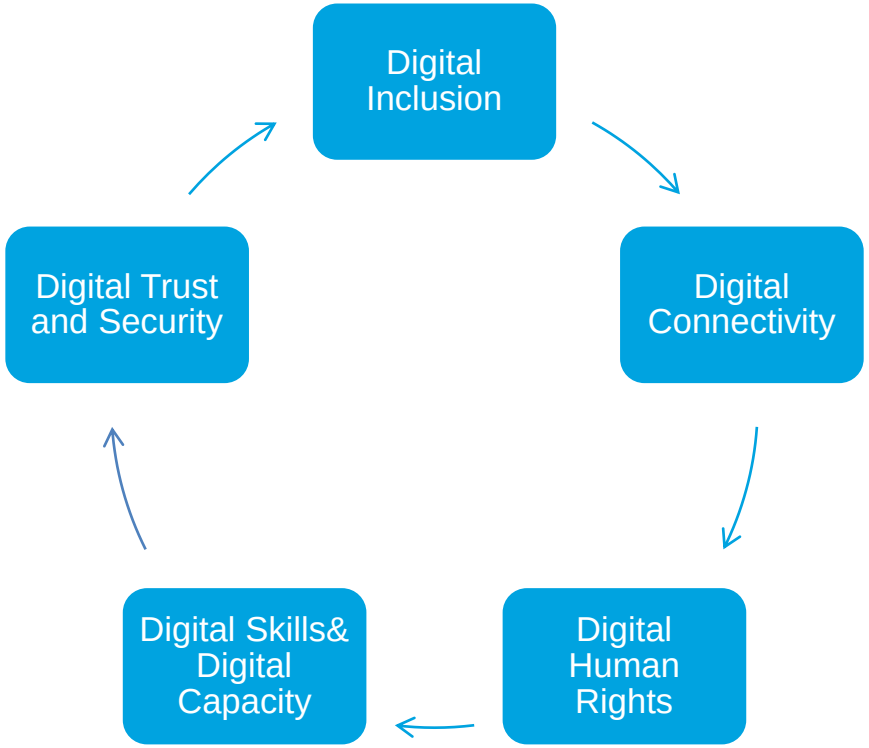
Economic Development

Workforce Engagement

Quality of life

Environmental Friendliness

Risks of Digital Transformation



A Shift Towards People-Oriented Smart Sustainable Cities

"*A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects*".

Digital Transformation to Meet the SDGs

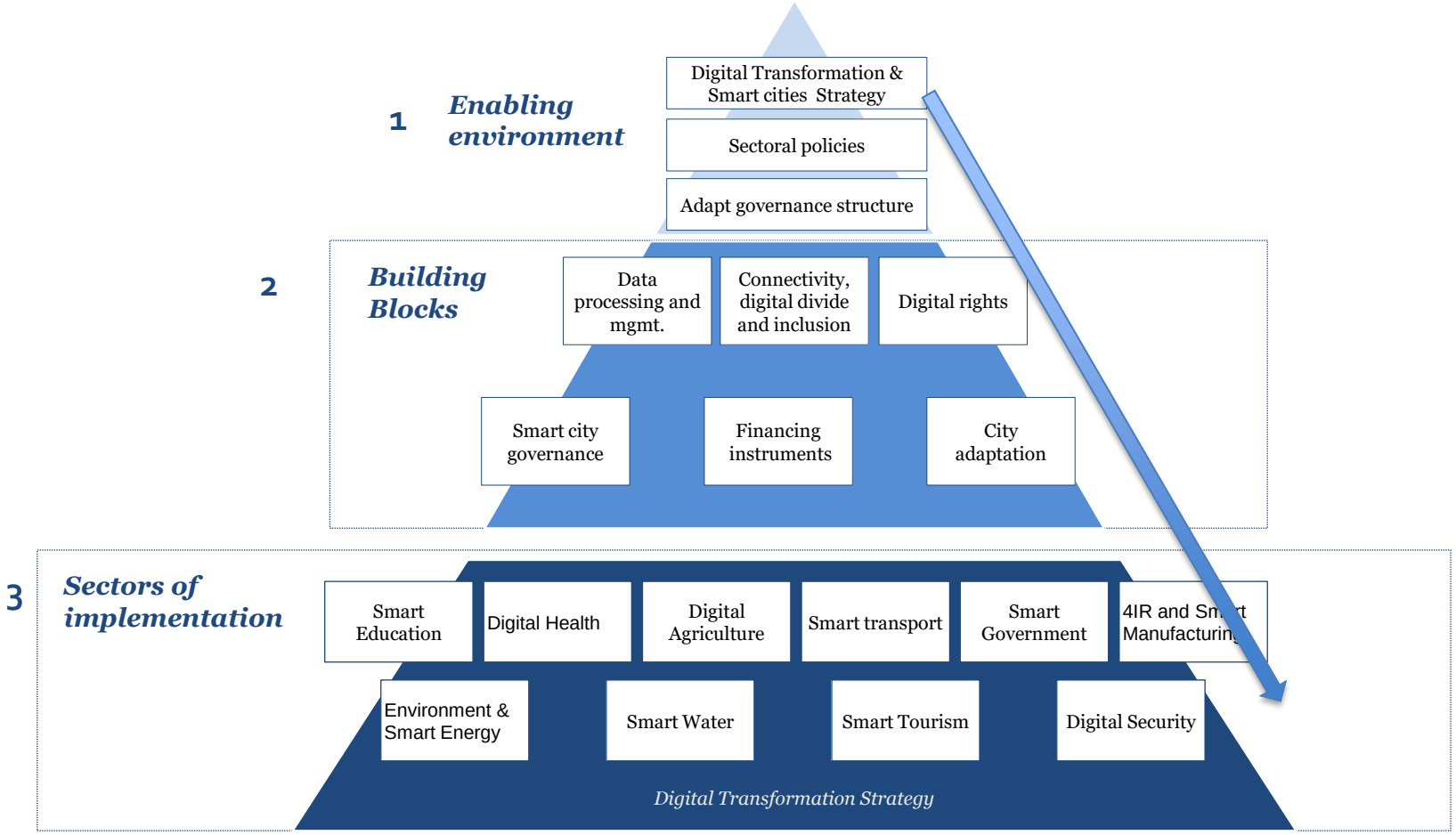
Digital transformation can achieve results at a scale, speed, quality, accuracy and cost not imaginable just a decade ago. They are means to deliver quality goods and services in the areas of health care, education, finance, commerce, governance and agriculture, among others. They can help to reduce poverty and hunger, boost health, create new jobs, mitigate climate change, improve energy efficiency and make cities and communities sustainable.

3. Digital Transformation for People-Oriented Cities and Communities Roadmap

Digital Transformation for People-Oriented Cities and Communities Roadmap

1 *Enabling environment*	Strategy Sectoral policies (building blocks) Sectors	Institutional framework	Governance Structure & Coordination mechanisms	Collaboration ecosystem/ Stakeholder engagement	Funding mechanisms/budgeting	Services Planning/Technology	Monitoring and evaluation framework
2 *Implementation*	Implementation plans	• Organizational mgmt • Change mgmt. • upskilling	• Roles & responsivities • Coordination plans	Partnerships development	• PPP • Procurement • Innovative financing	• E-Services delivery • Technology uptake	Monitoring/assessing progress
3 *Monitoring/ evaluation*	Plans evaluation/replication & scale up	• Improvements and new adaptations as needed	• Monitoring and evaluation/new coordination mechanisms	Partnerships evaluation	• Auditing evaluation	• Service/technology performance	Monitoring and evaluation (End of cycle)
4 *Replication/ scale up*	Strategy/ Sectoral Plans replication & scale up	• If applicable, replicate to national authorities or other dep.	• Revise and replicate as needed	Scale up/expand to other sectors/replicate	• New opportunities/scale up	• Replicate solutions	Revise/replicate as needed

Digital Transformation for People-Oriented Cities and Communities Structure



Digital Transformation for People-Oriented Cities and Communities Roadmap (1/3)

Digital Transformation Strategy

Digital Transformation Strategy helps set cities and communities on the path to forging the utilization of digital technologies for the benefit of all, while mitigating the associated harms and risks. It supports the development of a digital transformation strategy; planning resources; and establishing a partnership model to bring key stakeholders and groups into the city's digital transformation planning and decision-making framework.

Digital Transformation for People-Oriented Cities and Communities Roadmap (2/3)

- Data Processing and Management
- Connectivity, Digital Divide and Digital Inclusion
- Digital Rights
- Smart City Governance
- Financing Instruments
- City Adaptation

Digital Transformation Building Blocks: help cities and communities optimize the data being collected, ensures equitable digital services, and prevent and address the various challenges related to privacy and security that comes with digital transformation.

Digital Transformation for People-Oriented Cities and Communities Roadmap (3/3)

- Smart Education
- Digital Health
- Digital Agriculture
- Smart Emergency Management
- Smart Procurement
- 4IR and Smart Manufacturing
- Environmental Impacts
- Smart Energy
- Smart Water

Digital Transformation Sectors: allow cities and communities implement various technologies to better support various areas of a city such as education, agriculture, health, and water.

4. Key Digital Transformation Technologies for People-Oriented Cities and Communities

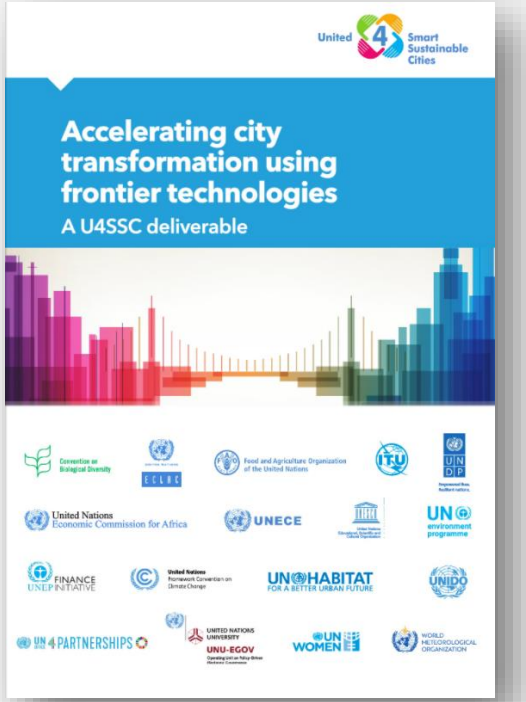
Introduction to Technologies for Digital Transformation for People-Oriented Cities and Communities

Technology #1: Artificial Intelligence	Technology #2: Internet of Things	Technology #3: 5G
Technology #4: Digital Twin	Technology #5: Big Data	Technology #6: Blockchain

***Note** that this is not an inclusive list of digital technologies.*

Accelerating City Transformation Using Frontier Technologies

Frontier technologies are new, cutting-edge and innovative technologies. Frontier technologies could fundamentally change the way we operate. They constantly collect data and information to create a shorter feedback loop that could, in theory, enable better decision-making overtime.



Types of Frontier Technologies

Artificial Intelligence

Internet of Things (IoT)

5G

Digital Twin

Digitalization and Big Data

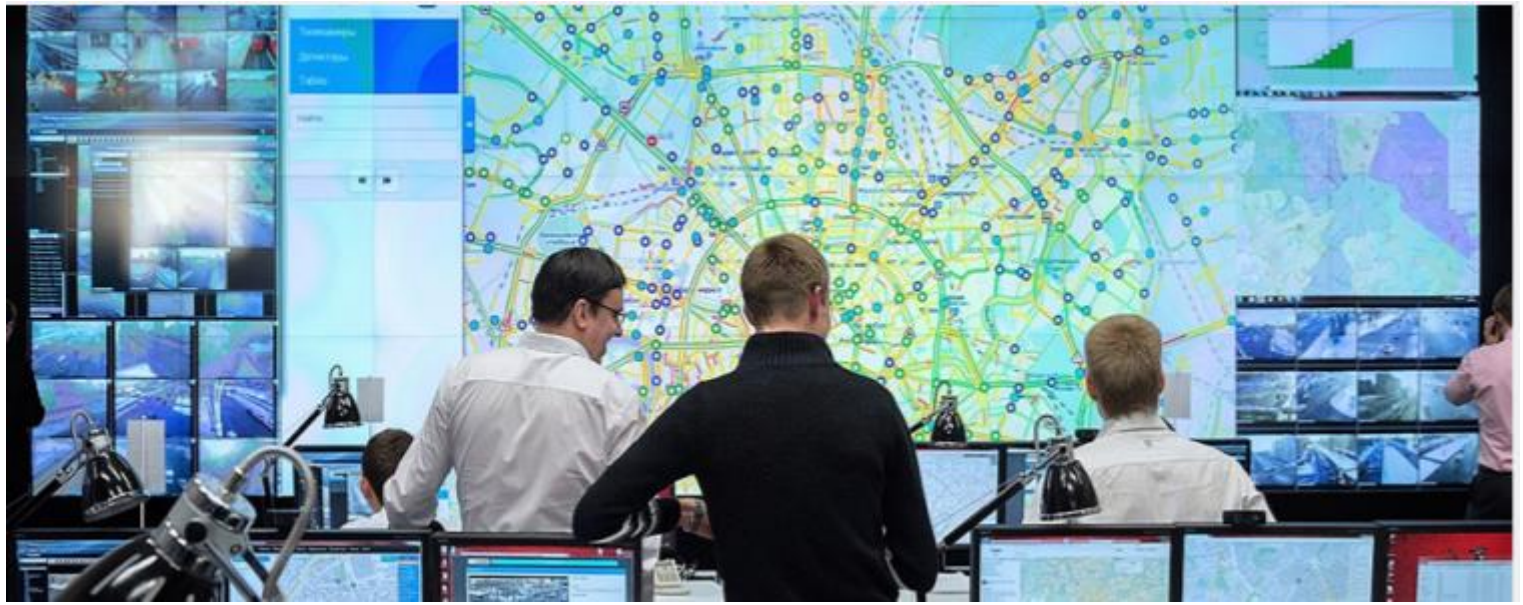
Blockchain

***Note** that this is not an inclusive list of frontier technologies.*

Artificial Intelligence

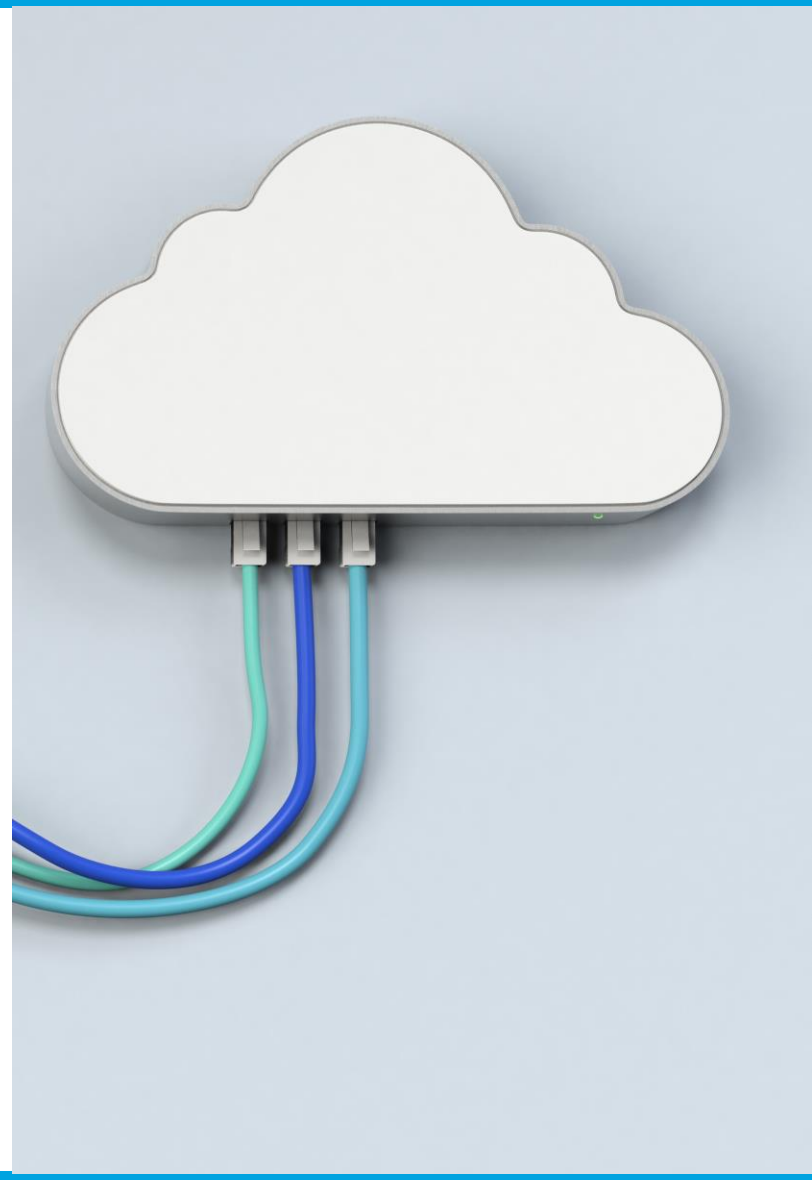
Artificial intelligence makes it possible for machines to learn from experience. Intelligent systems use a combination of Big Data analytics, cloud computing, machine-to-machine communication and the Internet of Things to learn to perform cognitive tasks: sensing, processing of oral language, reasoning, decision-making, displacement and manipulation of objects, etc. It is important to use AI in an ethical and trustworthy way to avoid discrimination and to always assess risk and add human control to avoid bias.

Case Example
Moscow Traffic Management Centre



Internet of Things

The Internet of Things is a concept that enables advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies. IoT is essentially about measuring and remotely controlling previously unconnected “things”. It reaches people and objects that older technology could not.

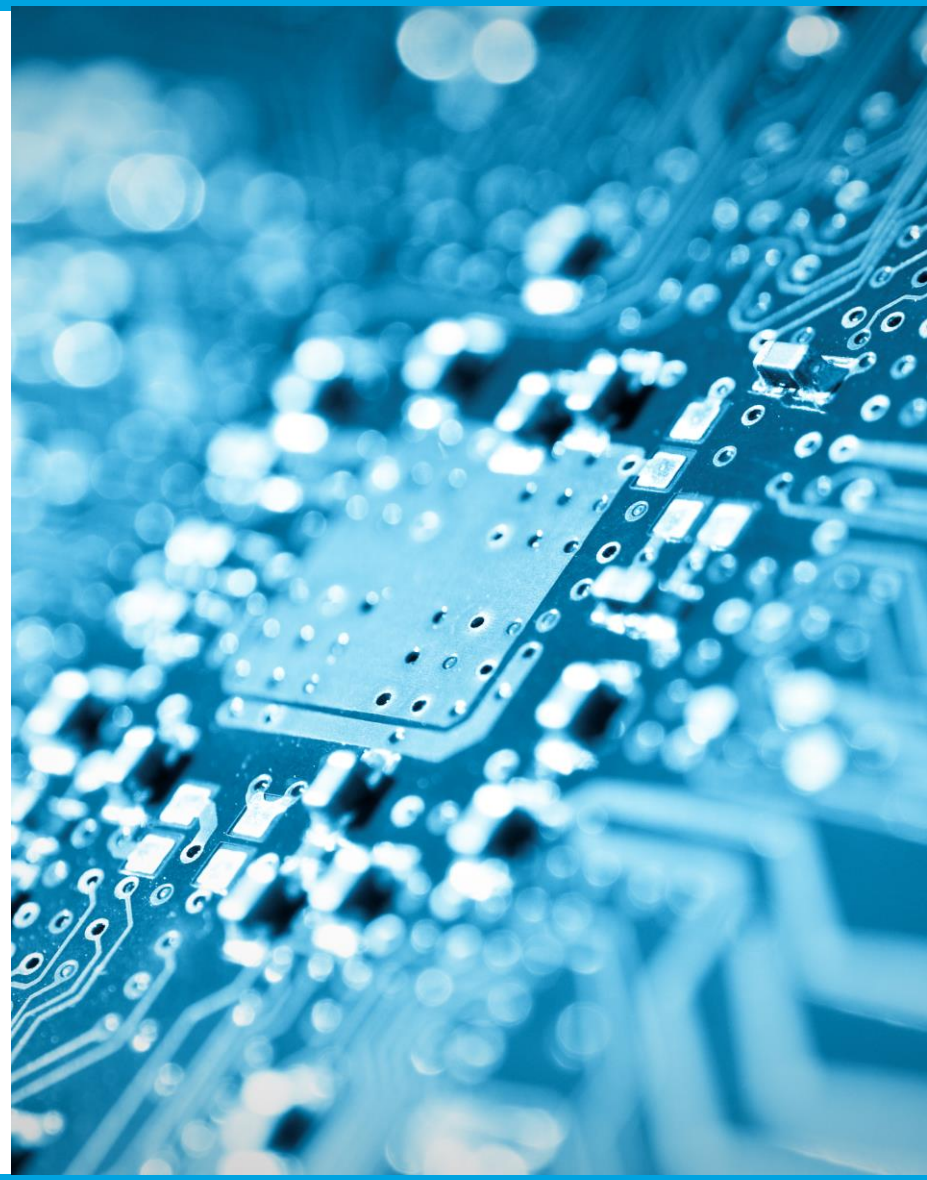


Case Example
Dubai and Silver Spring Network

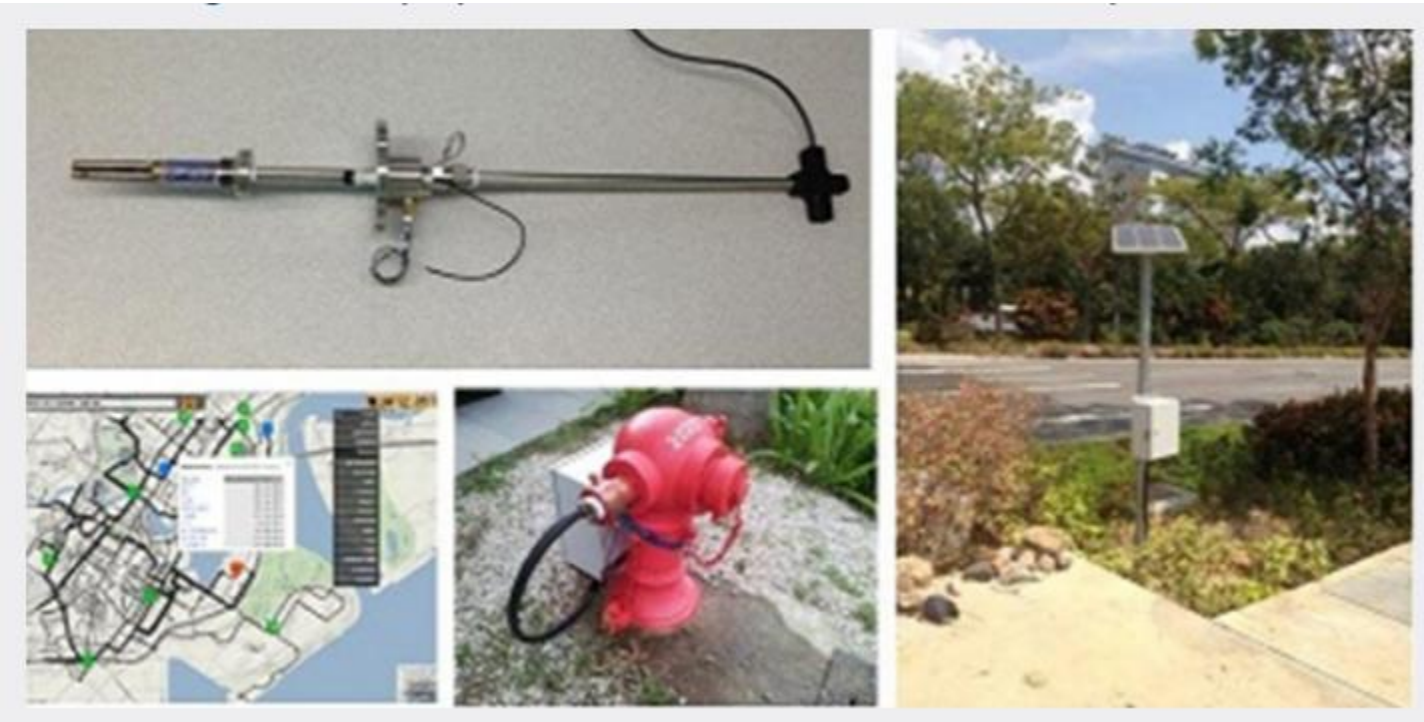
Case Example
Connected Market Vendors — Kampala, Uganda

5G

5G mobile and internet technology is the next generation of mobile internet connectivity promising much faster data download and upload speeds, wider coverage and more stable connections.

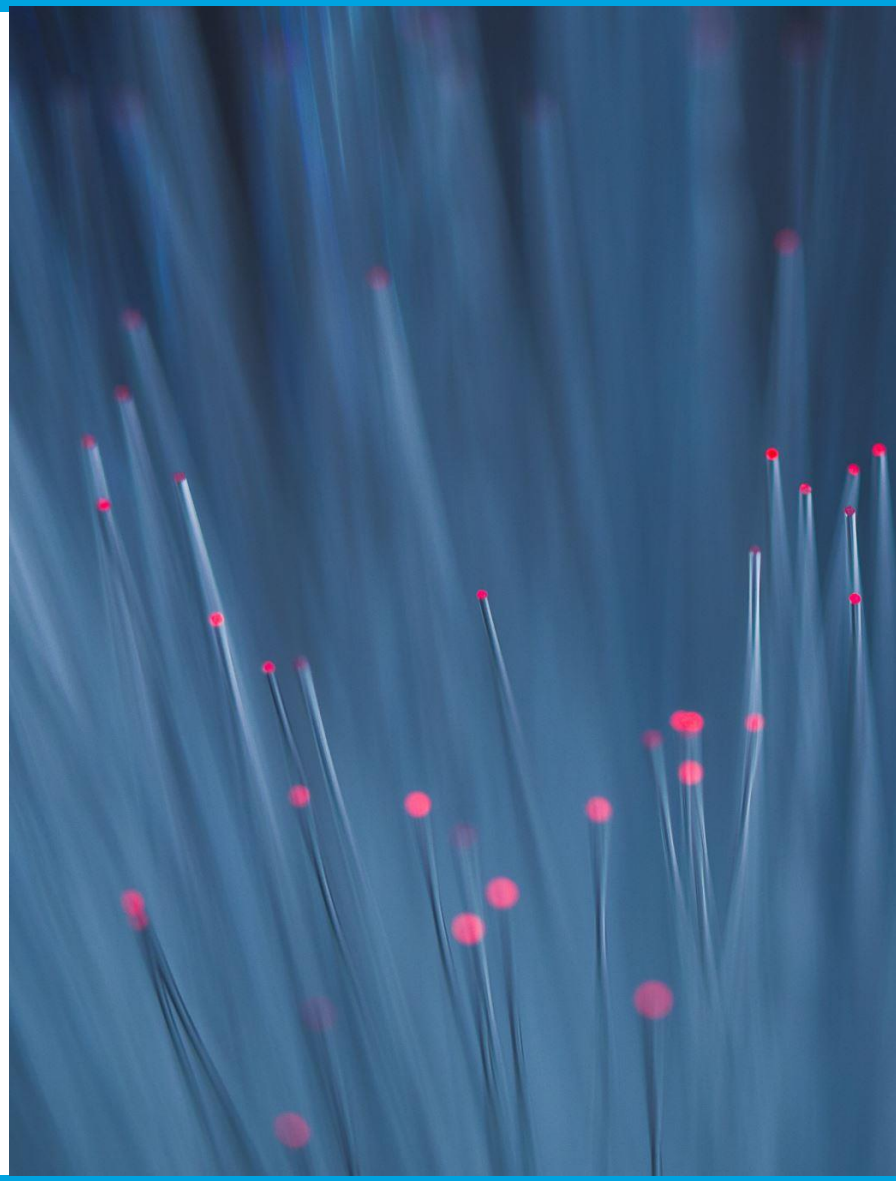


Case Example
Singapore WaterWiSe



Digital Twin

A digital twin is the virtual representation of a physical object or system across its life cycle. It uses real-time data and other sources to enable learning, reasoning, and dynamically recalibrating for improved decision making.

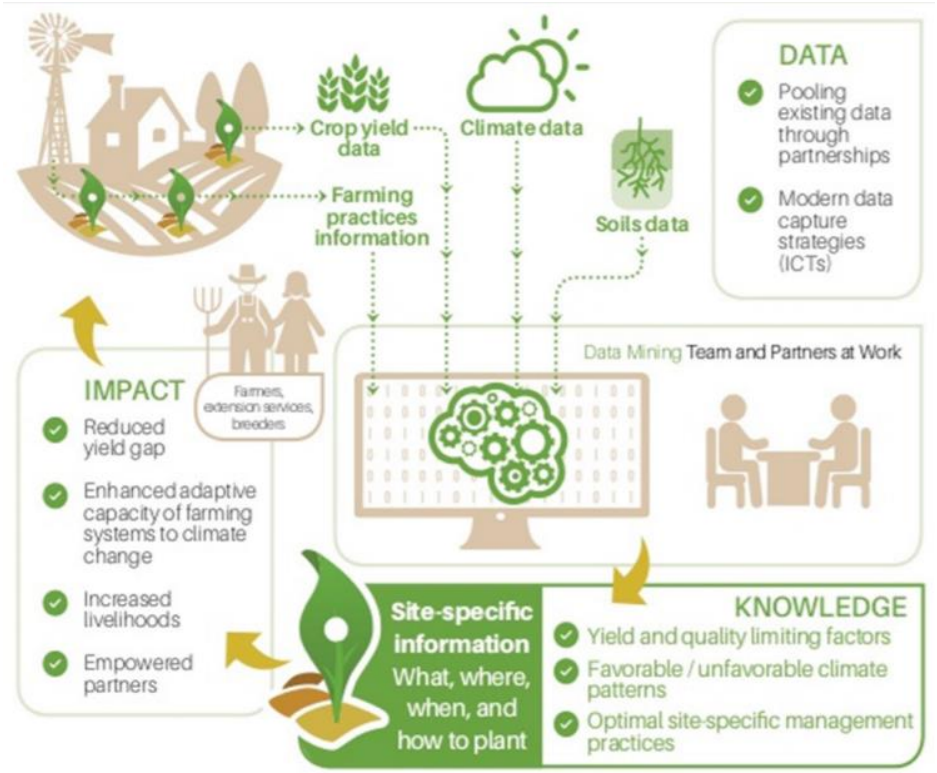


Case Example
Virtual Singapore

Digitization and Big Data

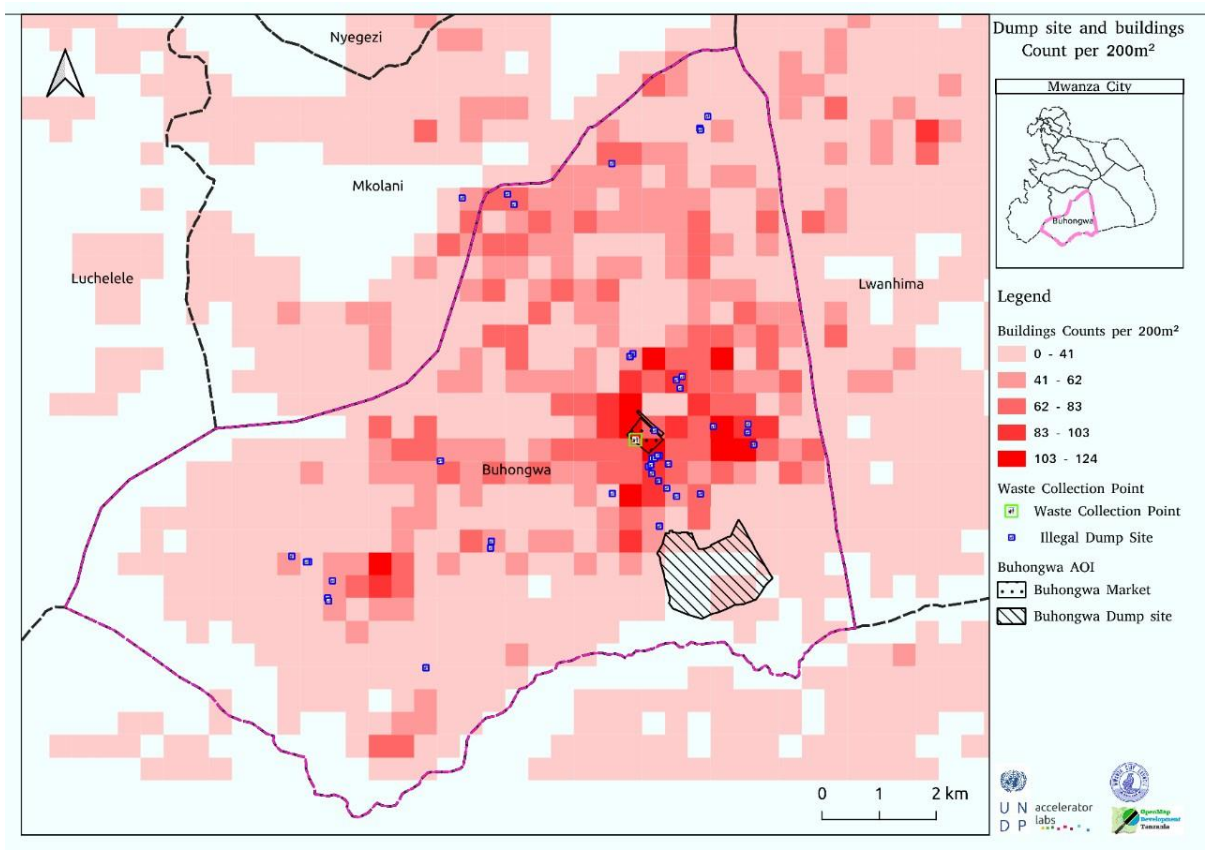
Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities. Big data refers to extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations.

Case Example
Columbia's Agriculture Project



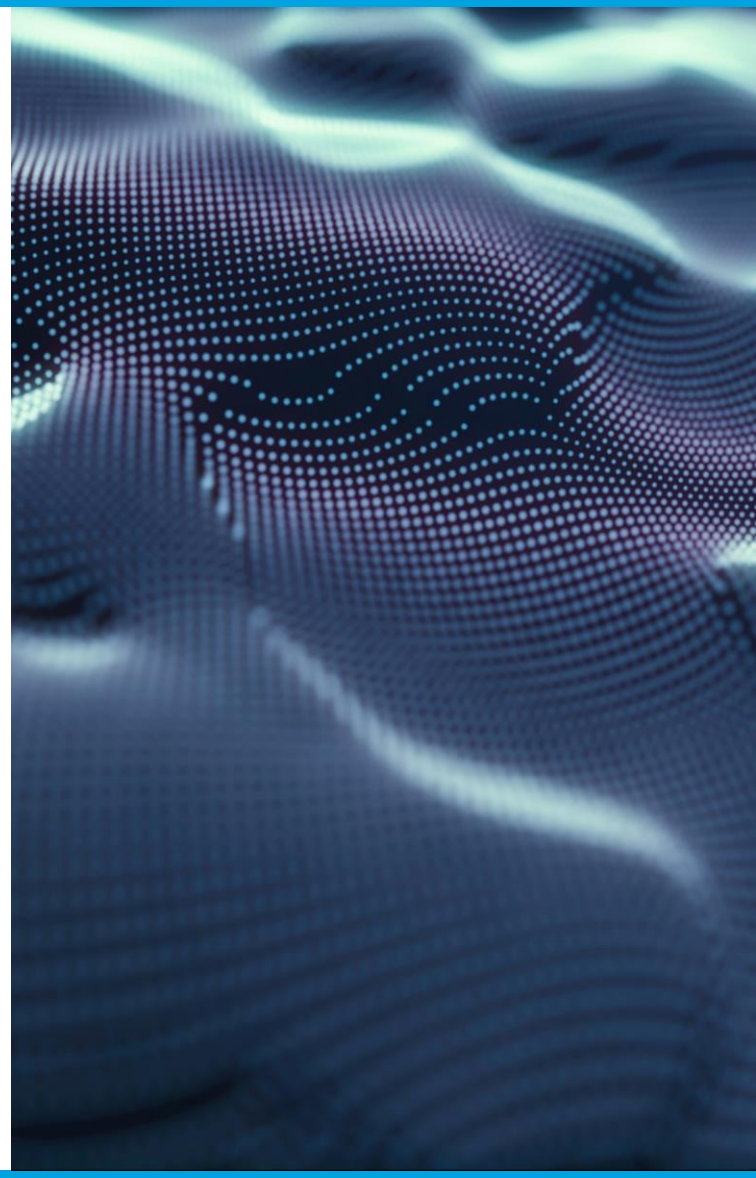
Case Example
Jungle Bus Project

Case Example
Mwanza Waste Management Project



Blockchain

Blockchain is an open and shared distributed ledger technology (DLT), which can record transactions between two parties efficiently, permanently and in a verifiable way.



How Blockchain can Help

Increasing Security

Execute and validate data trails

Ensure authenticity and integrity of data

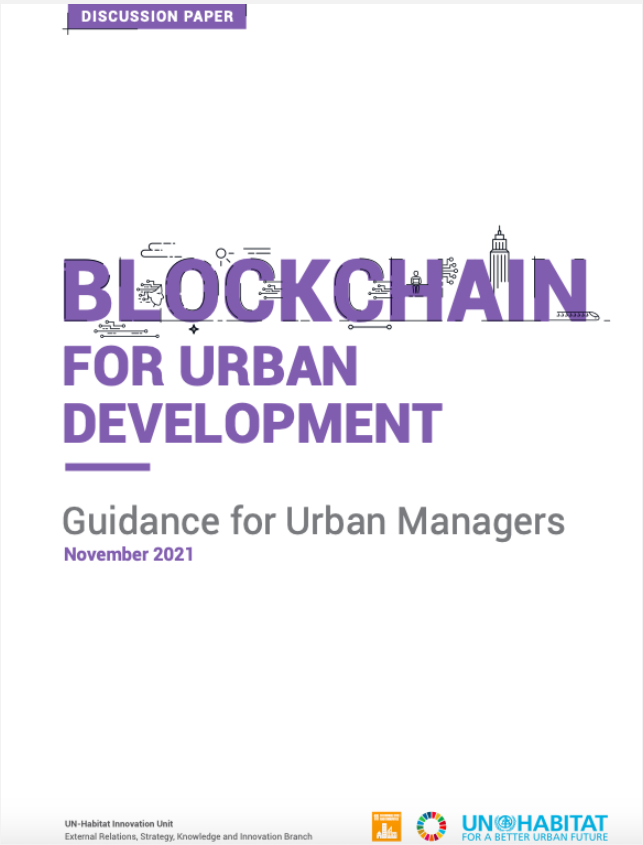
The Potential of Blockchain Technology

Blockchain For Land & Property Management, Documenting Property Rights, and Tenure Security

Blockchain for Urban Governance and Social Inclusion

Blockchain for Urban Basic Services

Blockchain for Urban Energy Systems



Case Example
Active Citizen – Moscow, Russia

Module 1 – Digital Transformation for People-Oriented Cities and Communities

Thank you for completing this Module of the ITU Toolkit for Digital Transformation for People-Oriented Cities and Communities.

We hope that you found the information in this Module useful toward planning and initiating your city or community's digital transformation process.

Please review the resources highlighted within for further details, including valuable real-world use cases, on how to get started on – and optimize from the onset – your city or community's digital transformation journey.

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Additional Resources

- UNH playbooks,
  - centering people in smart cities here,
  - other playbooks here