Toolkit on Digital Transformation for People-Oriented Cities and Communities

Module 1:
Digital Transformation for People-Oriented 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

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

UN DESA 2019 Revision of World Population Prospects
Challenges Cities Face Today

- 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 unequal
- Conflicts over resources
- COVID19 exacerbating existing inequalities and problems with governments which had a digital governance structure were better off and recovering faster
The COVID-19 pandemic has shed light on the challenges and gaps of digital solutions, increasing inequalities across and within countries in the region. Network congestions, decline in average internet speed, deterioration of 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 generations 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.

**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.
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 & responsibilities
   - 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

1. **Enabling environment**
   - Digital Transformation & Smart cities Strategy
   - Sectoral policies
   - Adapt governance structure

2. **Building Blocks**
   - Data processing and mgmt.
   - Connectivity, digital divide and inclusion
   - Digital rights
   - Smart city governance
   - Financing instruments
   - City adaptation

3. **Sectors of implementation**
   - Smart Education
   - Digital Health
   - Digital Agriculture
   - Smart transport
   - Smart Government
   - 4IR and Smart Manufacturing
   - Environment & Smart Energy
   - Smart Water
   - Smart Tourism
   - Digital Security
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)

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)

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.
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 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 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
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
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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](#)