Africa-Europe BioClimatic buildings for XXI century

Sustainable Smart Cities For SDGs Acceleration

جامعة الأخوين
AL AKHAWAYN UNIVERSITY

November, 3rd to 5th 2022
Ifrane, Morroco

Mohamed Essaaidi
Moroccan School of Engineerins Science (EMSI)
m.essaaidi@emsi.ma

www.abc21.eu

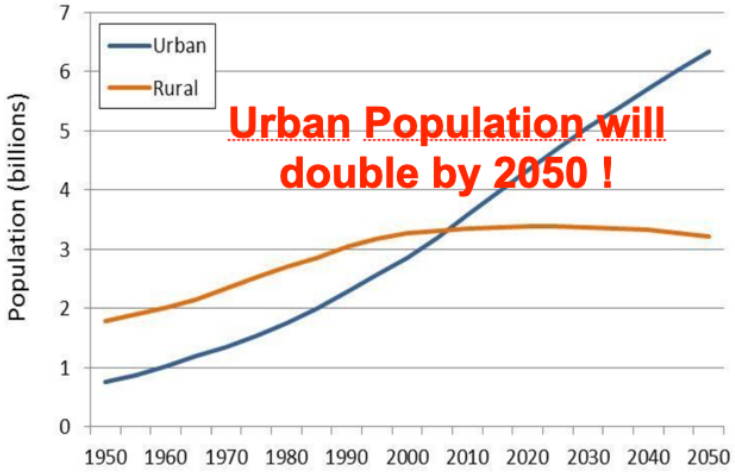
ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No. 894712.

OUTLINE

- Introduction
- SC Framework and Architecture
- SC KPIs & SC Global Index
- SC Standards
- SC Digital Twins
- Key Smart Cities Initiatives in Morocco
- Concluding Remarks

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Key Urban Challenges



ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Introduction

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

12 Trends Shaping Human Living

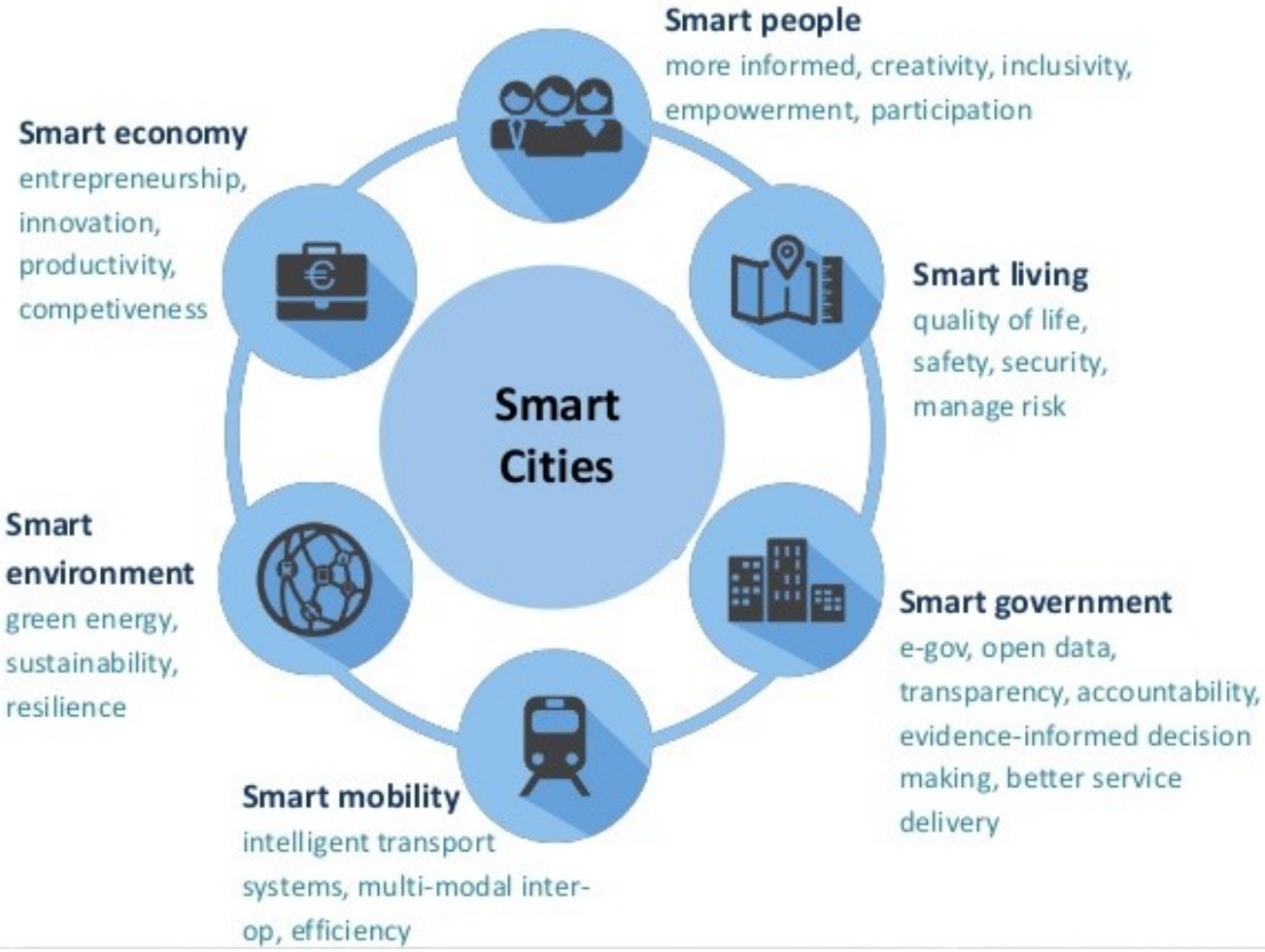
- GREEN PLANNING OF PUBLIC SPACES
- SMART HEALTH COMMUNITIES
- 15-MINUTE CITY
- MOBILITY: INTELLIGENT, SUSTAINABLE AND AS-A-SERVICE
- INCLUSIVE SERVICES AND PLANNING
- DIGITAL INNOVATION ECOSYSTEM
- CIRCULAR ECONOMY AND PRODUCING LOCALLY
- SMART AND SUSTAINABLE BUILDINGS AND INFRASTRUCTURE
- MASS PARTICIPATION
- CITY OPERATIONS THROUGH AI
- CYBERSECURITY AND PRIVACY AWARENESS
- SURVEILLANCE AND PREDICTIVE POLICING THROUGH AI

Deloitte. Insights

Source: Urban future with a purpose, Delloite Insight, September 2021.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities are the Basis for Smart Society



Source: Rob Kitchin, Smart Cities : Realizing the promises while minimising the perils,

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Some definitions

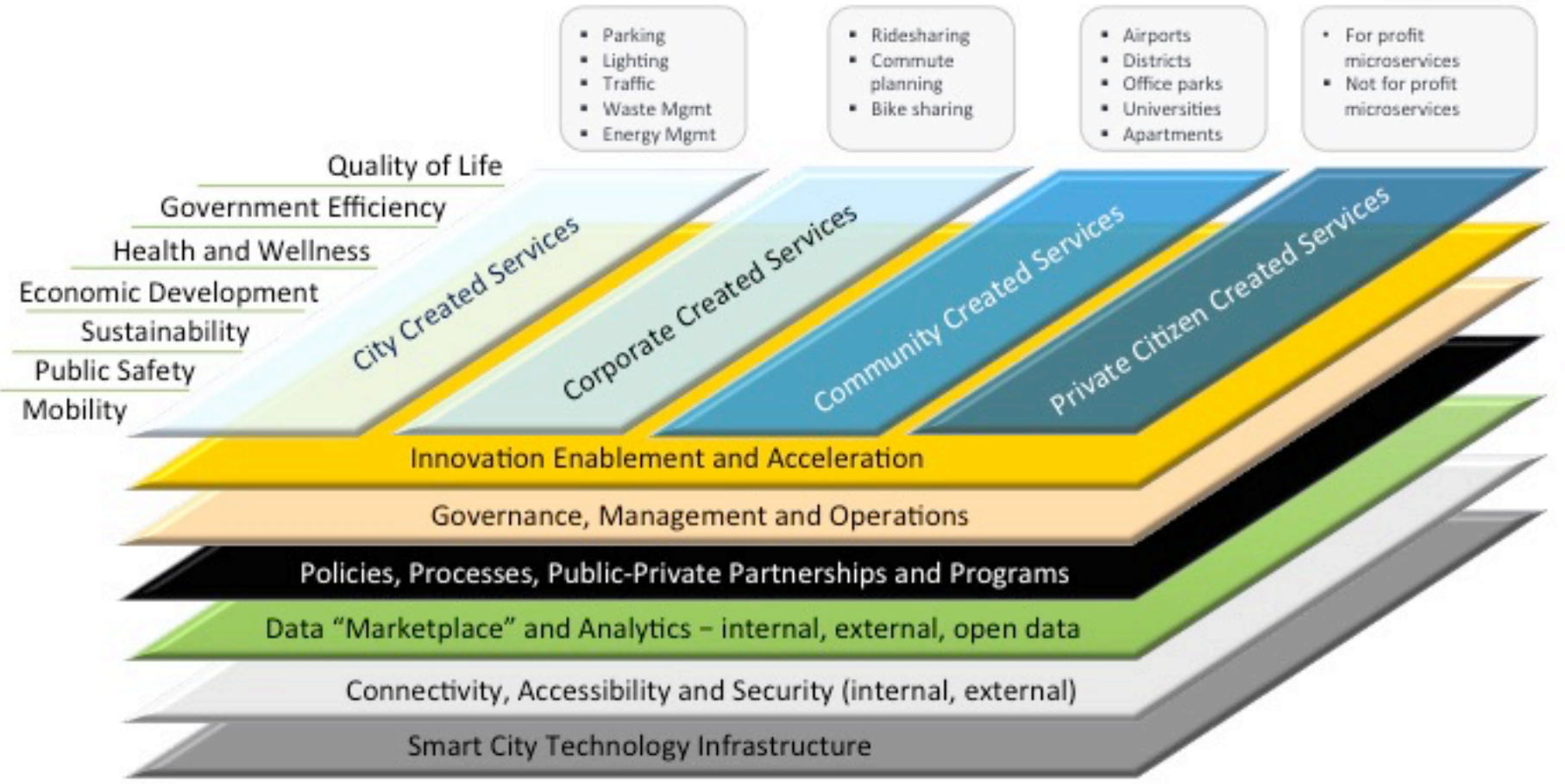
A **smart city approach** makes use of opportunities from **digitalisation**, **clean energy** and **technologies**, as well as **innovative transport technologies**, thus providing options for inhabitants to make more **environmentally friendly choices** and boost sustainable economic growth and enabling cities to improve their service delivery.", **United Nations, 2016.**

Smart cities are **defined** as "initiatives or approaches that effectively leverage digitalisation to **boost citizen well-being** and deliver **more efficient**, **sustainable** and **inclusive** urban services and environments as part of a **collaborative, multi-stakeholder process**", **OECD, 2018.**

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 and environmental** aspects", **Recommendation ITU-T Y.4900/L.1600, 2016.**

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

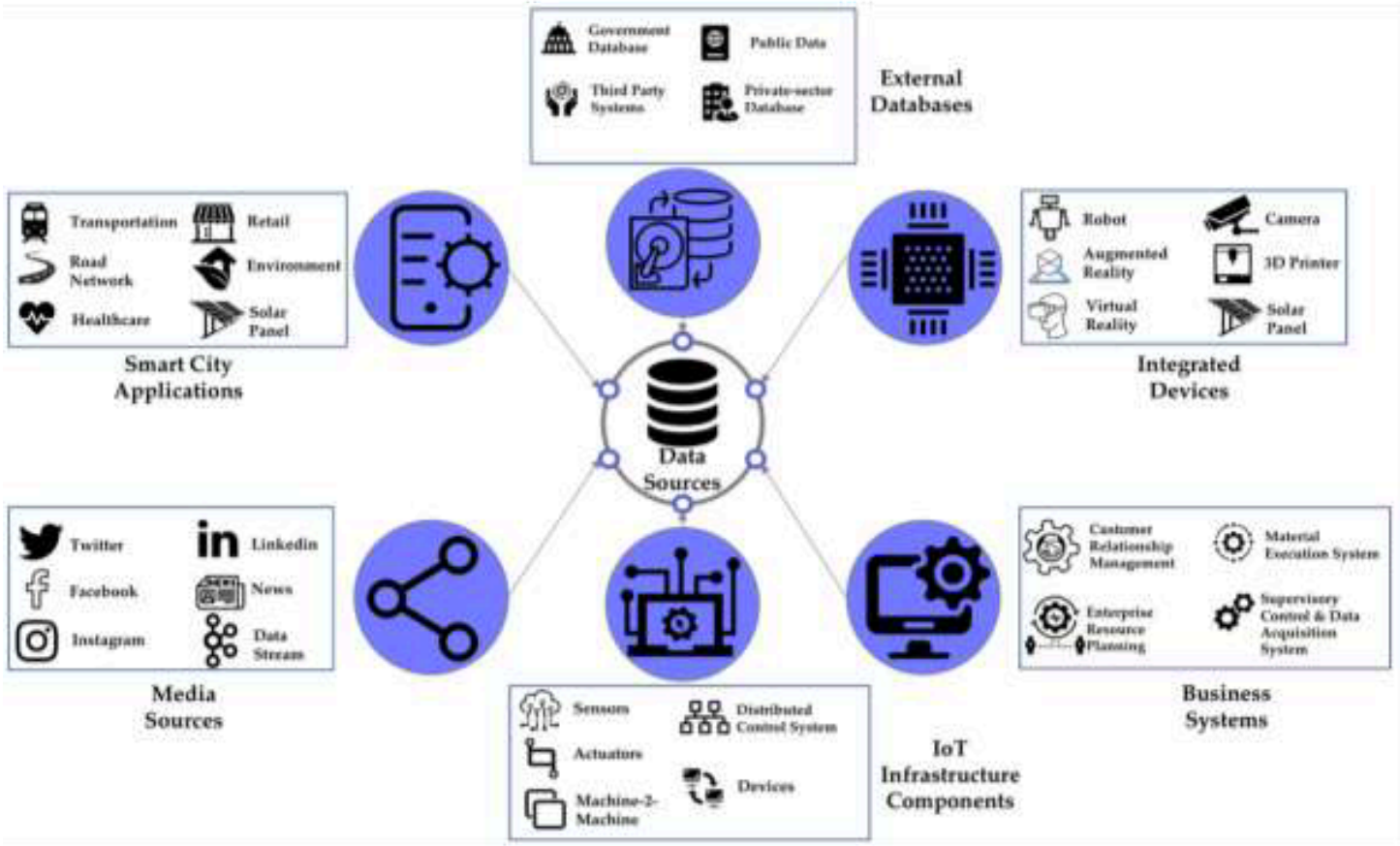
Smart City Ecosystem Framework



Source: strategyofthings.io

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Sources for Data Collection in a Smart City



Source: Naqvi, Rehman & Islam, A Hyperconnected Smar City Framework, 2020, Vol 24.

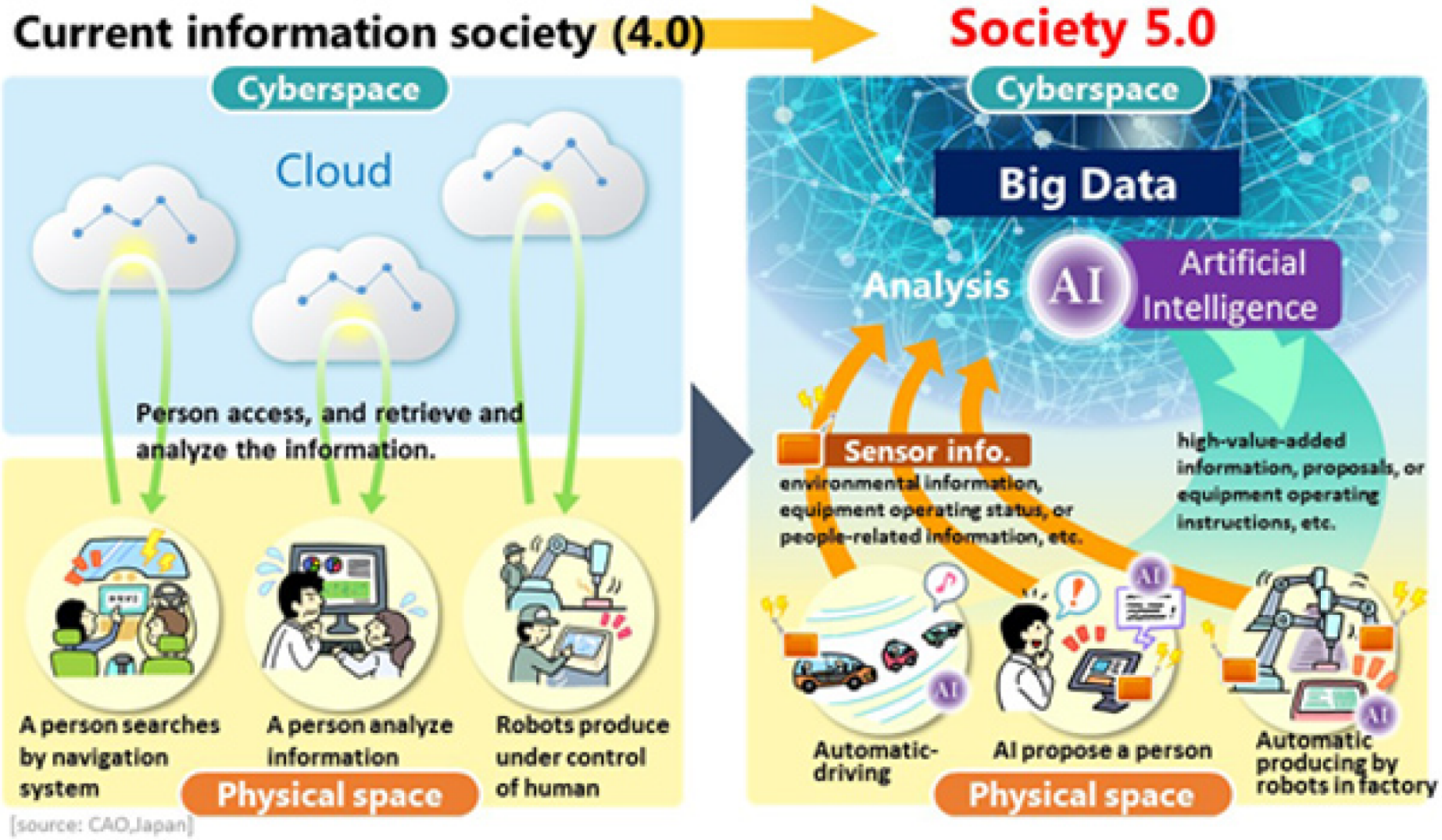
ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Society 5.0

Source: Naqvi, Rehman & Islam, A Hyperconnected Smart City Framework, 2020, Vol 24.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Society 5.0



Source: Naqvi, Rehman & Islam, A Hyperconnected Smar City Framework, 2020, Vol 24.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Society 5.0 & SDGs

Source: Global Business Coalition.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Some definitions:

- Resilient cities are cities that have the ability to absorb, recover and prepare for future shocks (economic, environmental, social & institutional).
- Resilient cities promote sustainable development, well-being and inclusive growth.

OECD

"Those cities that have invested in developing capabilities to deal with all stages of the **threat cycle: sense, defend, respond and recover** have demonstrated their resilience in dealing with the socioeconomic effects of the pandemic. **Cities should adopt an integrated approach, working with all stakeholders to enhance their preparedness for future shocks."**

Source: Cities and Local Government Global, pwc, 2020

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Sendai Framework for Disaster Risk Reduction

(a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005–2015;

(b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;[9]

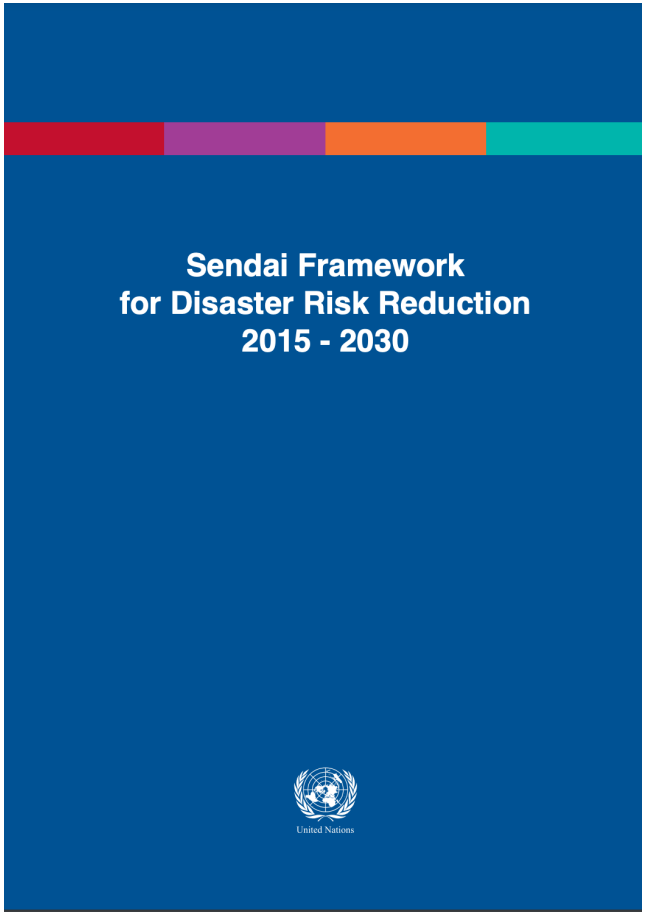
(c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;

(d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

(e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;

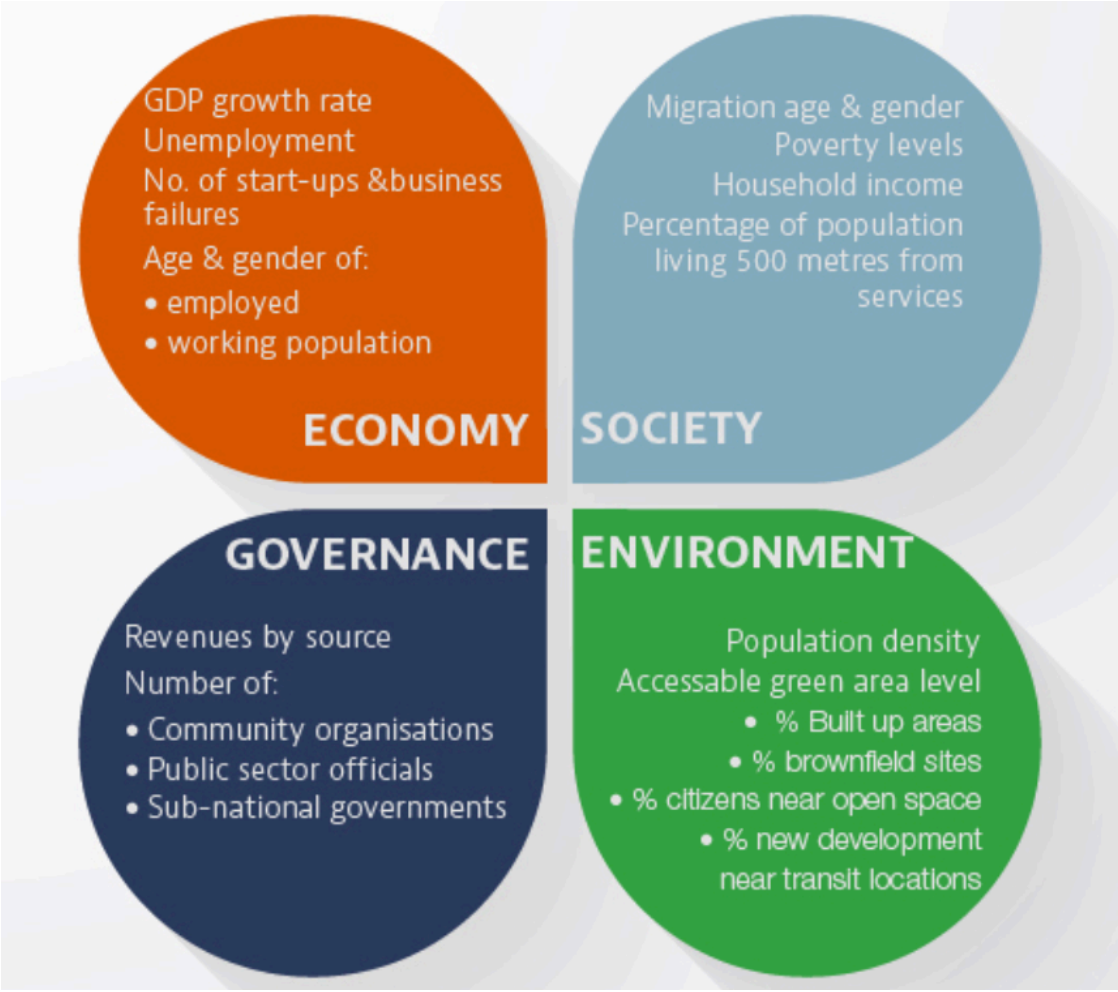
(f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030;

(g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.



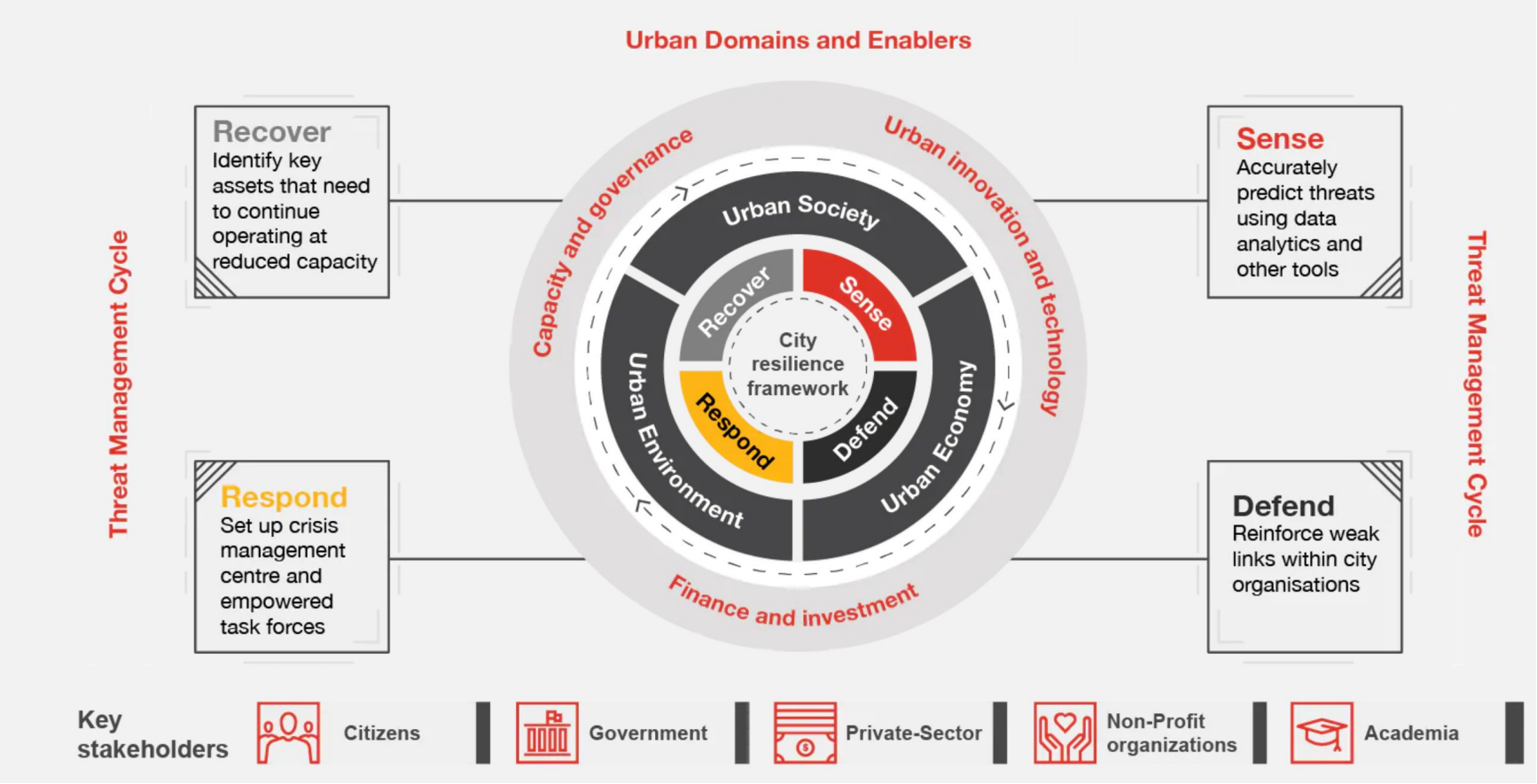
ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Resilience Metrics



ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Resilience Framework



Source: Building more resilient cities to endure COVID-19 and future shocks. pwc, 2020.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities KPIs

UN ITU KPIs Project for Smart Sustainable Cities to Reach SDGs

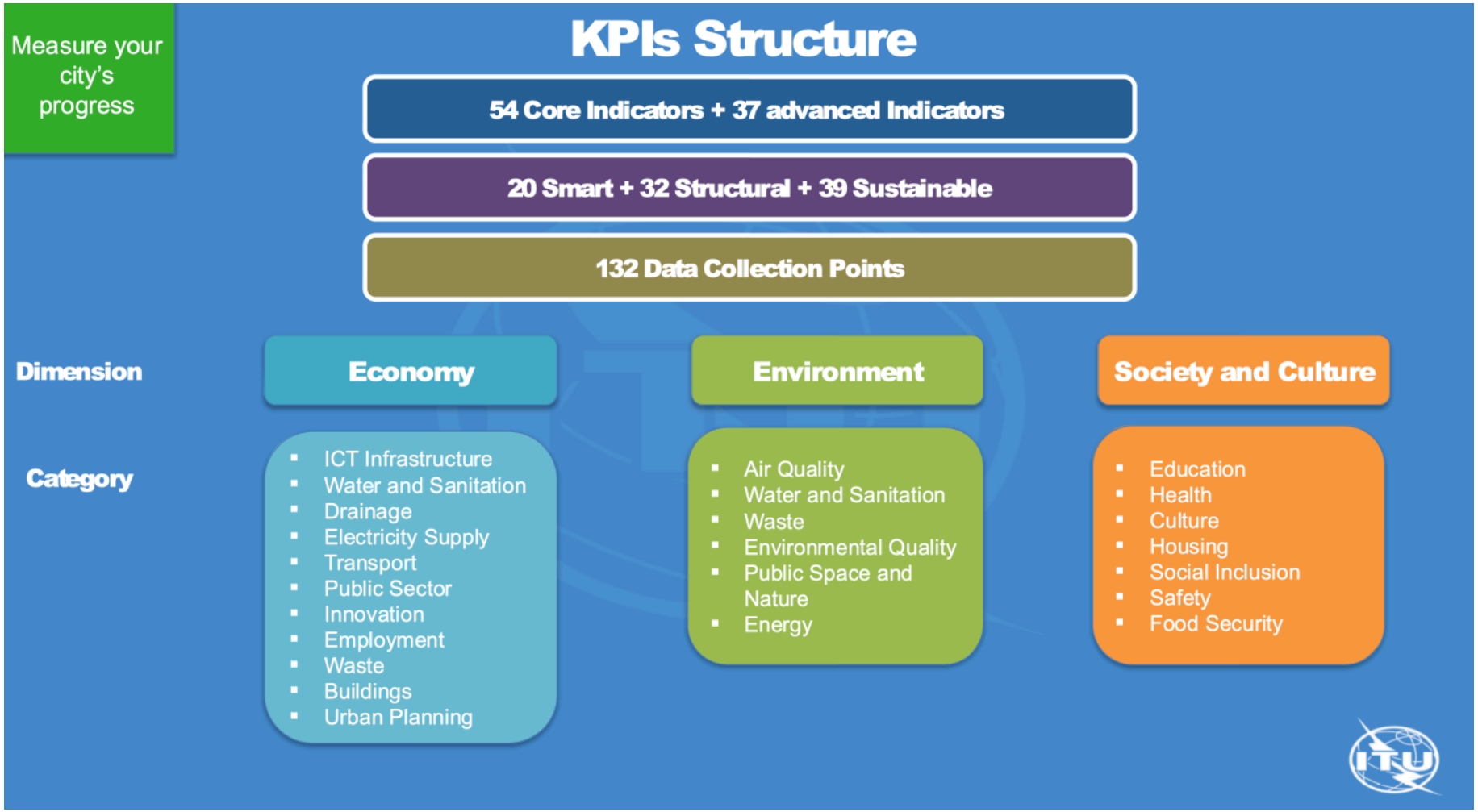
- To support cities in the implementation and use of the SSC KPIs
- To test and verify the applicability of SSC-KPIs in several cities of the world.
- To develop a global **Smart Sustainable Cities (SSC) Index.**

More than **50 cities** are participating in the project

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

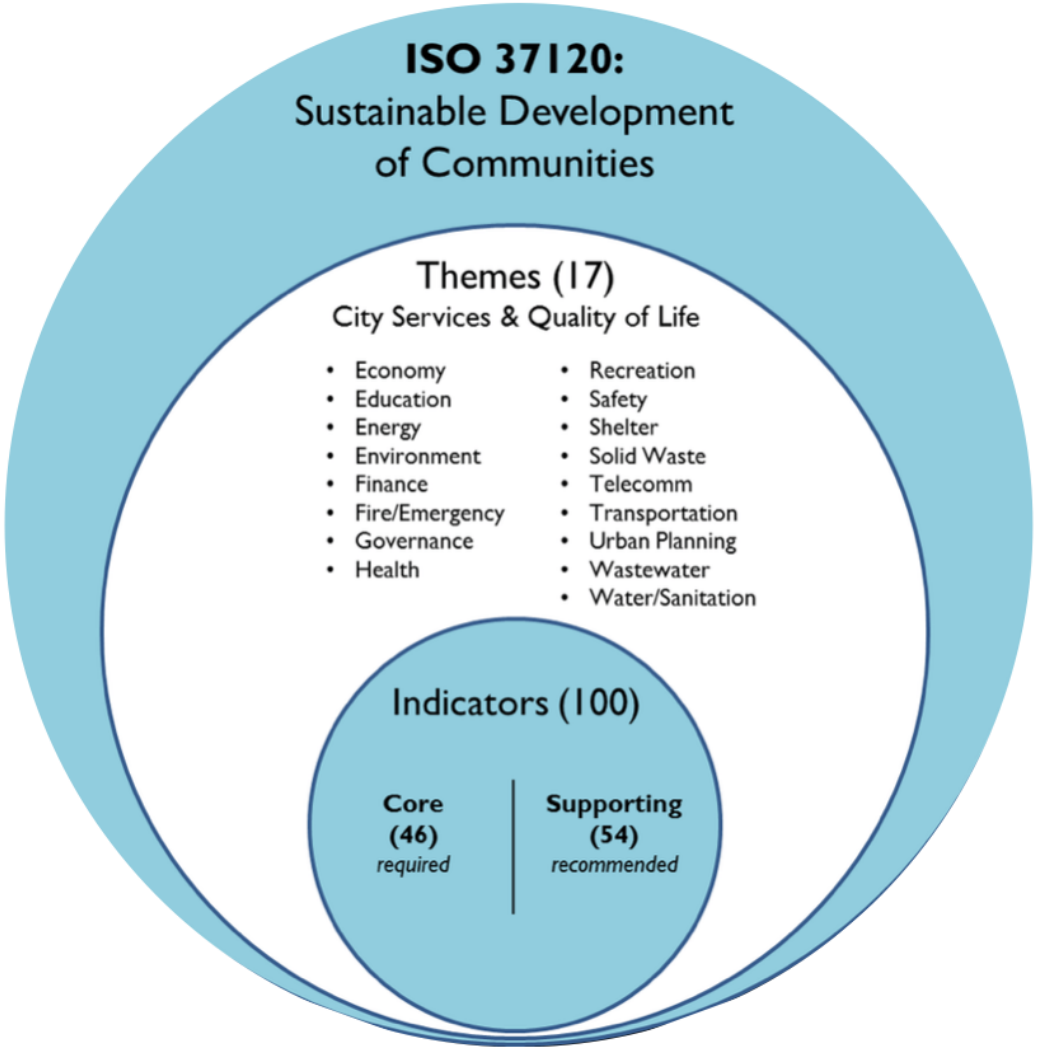
Smart Cities KPIs

ITU KPIs For Smart Sustainable Cities



ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities KPIs



ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

WCCD & ISO 37120 Certified Cities

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Global Smart Cities Index

Smart Cities Index

IMD SMART CITY INDEX

- Assesses the perceptions of residents on issues related to structures and technology applications.
- Perceptions from residents are solicited for 2 pilars: Structures and the Technology.
- Pillars are evaluated based on five key areas: health and safety, mobility, activities, opportunities, and governance.
- 4 groups of cities based on the UN Human Development Index (HDI) score.

Top 10 Smart Cities 2021

Rank	City	Change in rank from 2020
1	**Singapore**	–
2	Zurich, Switzerland	▲1
3	Oslo, Norway	▲2
4	Taipei, Taiwan	▲4
5	Lausanne, Switzerland	New entry
6	Helsinki, Finland	▼4
7	Copenhagen, Denmark	▼1
8	Geneva, Switzerland	▼1
9	Auckland, New Zealand	▼5
10	Bilbao, Spain	▲14

Sources: INSTITUTE FOR MANAGEMENT DEVELOPMENT, SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN
STRAITS TIMES GRAPHICS

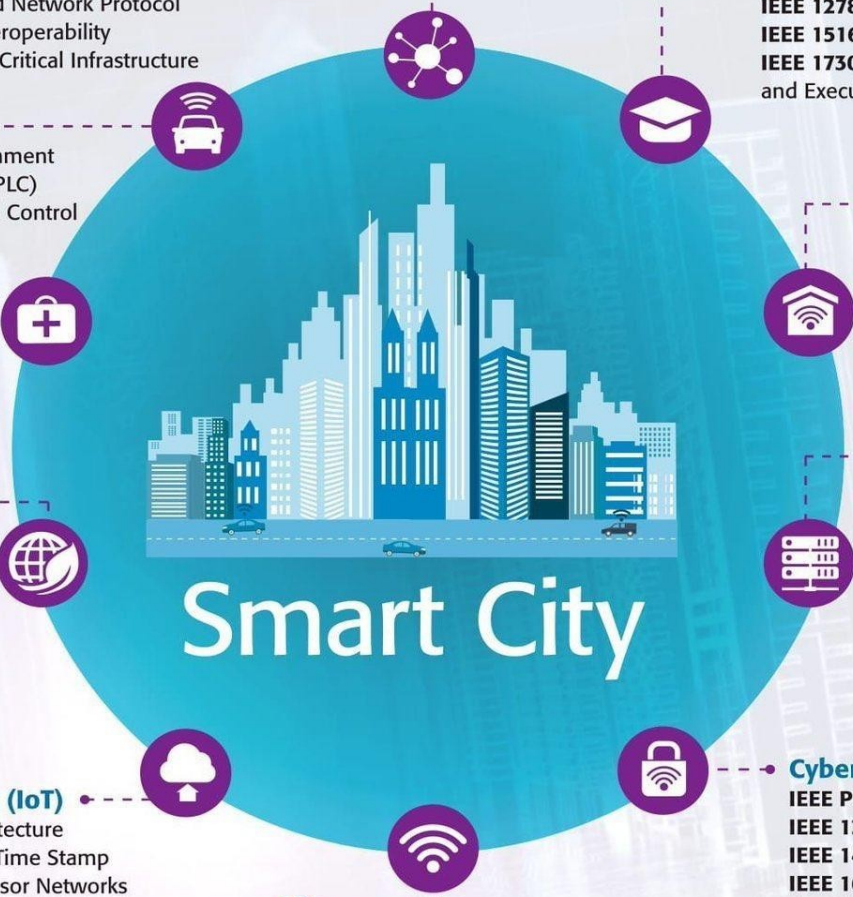
ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Landscape of Smart Cities Standards

- The EU-funded, **StandICT.Eu 2023** Project, ICT Standardisation Observatory and Support Facility in Europe, has just published the second of a series of Landscape Reports on ICT standards, **Landscape Of Smart Cities**
- A palpable, go-to reference, providing an overview of the diverse array of global standardisation work underway in Smart Cities and the various organisations behind it.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Standards For Smart Cities



Smart Grid
IEEE 1547™ Series DER
IEEE 1815™ Distributed Network Protocol
IEEE 2030™ Series Interoperability
IEEE C37™ Series Grid Critical Infrastructure

Learning Technologies
IEEE 1484™ Series eLearning Technologies
IEEE 1278™ Series Distributed Interactive Simulation
IEEE 1516™ Series Modeling and Simulation
IEEE 1730™ Series Distributed Simulation Engineering and Execution Process

Intelligent Transportation
IEEE 1609™ Series Wireless Access Vehicle Environment
IEEE 1901™ Series Power Line Communications (PLC)
IEEE 802.15.4p™ WPAN Rail Communications and Control
IEEE 1512™ Emergency Management System

Smart Home
IEEE 802® LAN/MAN
IEEE 1901™ Series PLC
IEEE 1905.1™ Home Network for Heterogeneous Technologies
IEEE 2030.5™ Smart Energy Profile

eHealth
IEEE 11073™ Series Medical Devices
IEEE 139™ RF Emission from ISM Equipment
IEEE 602™ Healthcare Facilities
IEEE 1363™ Series Encryption

eGovernance
IEEE P7002™ Data Privacy Process
IEEE P7004™ Child and Student Data Governance
IEEE P7005™ Transparent Employer Data Governance
IEEE P7006™ Personal Data Artificial Intelligence (AI) Agent

Energy Efficiency
IEEE 1801™ Low Power, Energy Aware Electronic Systems
IEEE P1889™ Electrical Performance of Energy Saving Devices
IEEE P1823™ Universal Power Adapter for Mobile Devices
IEEE P1922.1™-IEEE P1929.1™ Series for Energy Efficient Systems

Internet of Things (IoT)
IEEE P2413™ IoT Architecture
IEEE 1588™ Precision Time Stamp
IEEE 1451™ Series Sensor Networks
IEEE P1451-99™ Harmonization of IoT Devices and Systems

Cyber Security
IEEE P802E™ ePrivacy
IEEE 1363™ Series Encryption
IEEE 1402™ Physical Security
IEEE 1686™ Intelligent Electronic Devices (IEDs)

5G
IEEE P1914.1™ Fronthaul
IEEE P1918.1™ Tactile Internet
IEEE 802® LAN/MAN
IEEE P1915™-IEEE P1921.1™ Series Software Defined Networks

The Smart Cities Planning and Technology Guide – P2784

Home | Meetings | Subscribe to IEEE Smart Cities Email List | Meeting Agenda & Minutes | IEEE Smart Cities Webinars

Home / IEEE P2784 Guide for the Technology and Process Framework for Planning a Smart City

IEEE P2784 Guide for the Technology and Process Framework for Planning a Smart City

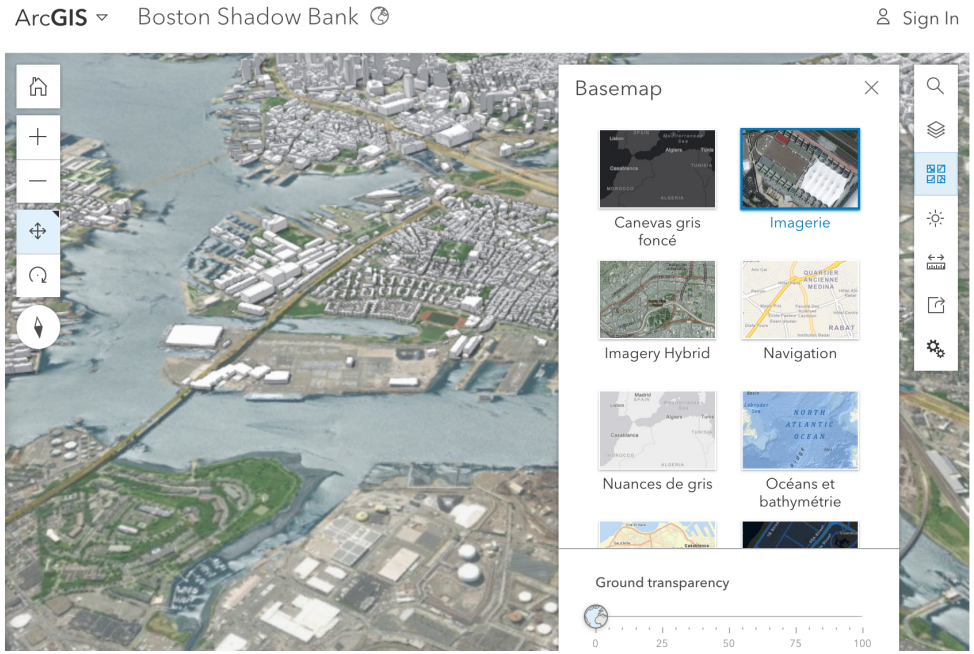
Sponsor: Communications Society/Standards Development Board
Sponsor Chair: Mehmet Ulema, email: m.ulema@ieee.org

Scope: This guide will provide a framework that outlines technologies and the processes for planning the evolution of a smart city. Smart Cities and related solutions require technology standards and a cohesive process planning framework for the use of the internet of things to ensure interoperable, agile, and scalable solutions that are able to be implemented and maintained in a sustainable manner. This framework provides a methodology for municipalities and technology integrators to use as a tool to plan for innovative and technology solutions for smart cities.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Digital Twins

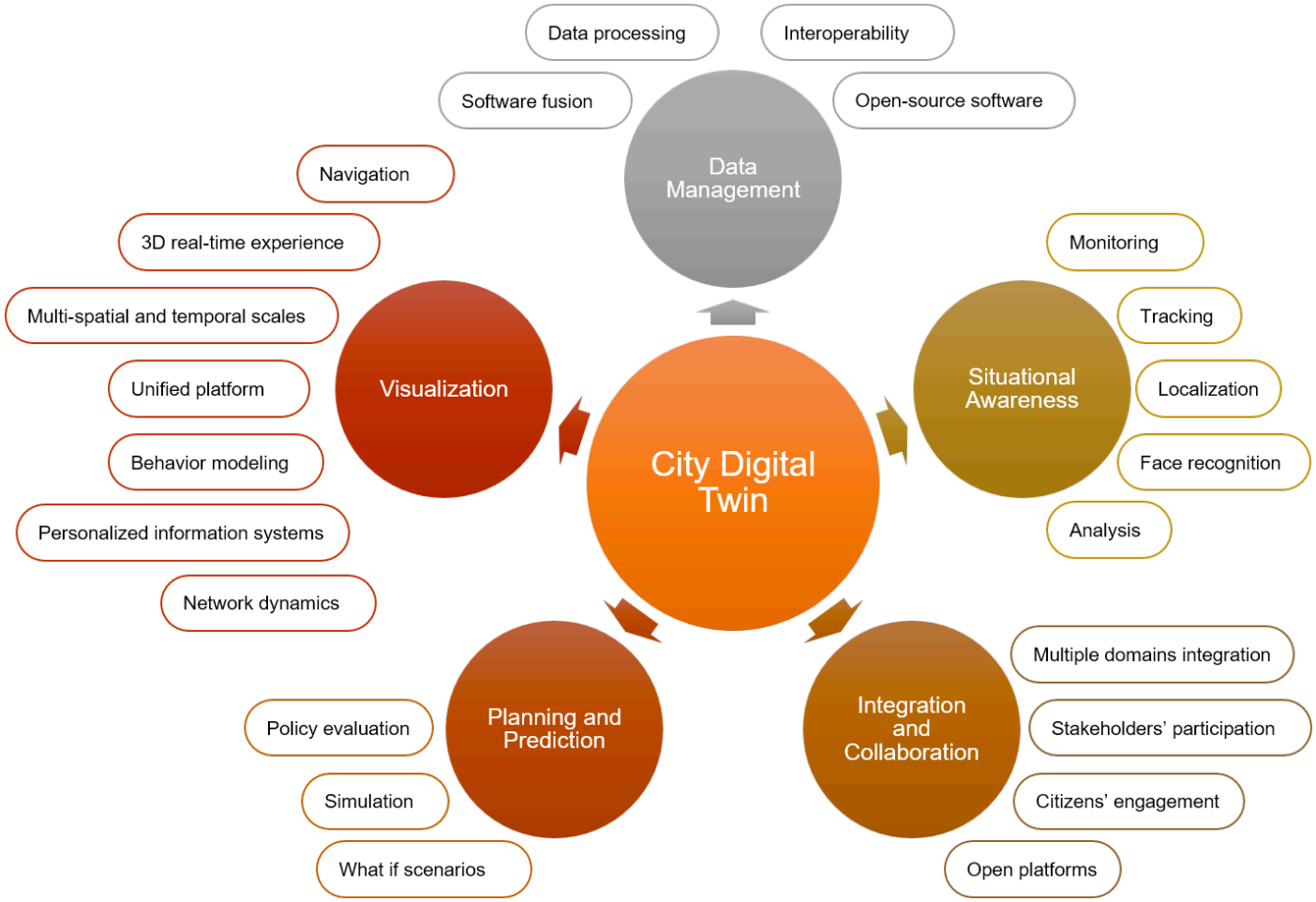
- Digital twins enable the planning, management and optimization of cities across a range of applications, such as mobility and sustainability.
- Over 500 cities are expected to deploy digital twins by 2025, according to ABI research.



Source: JOSH TRIANTAFILOU , The role of digital twins in smart cities, AUGUST 27, 2021

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

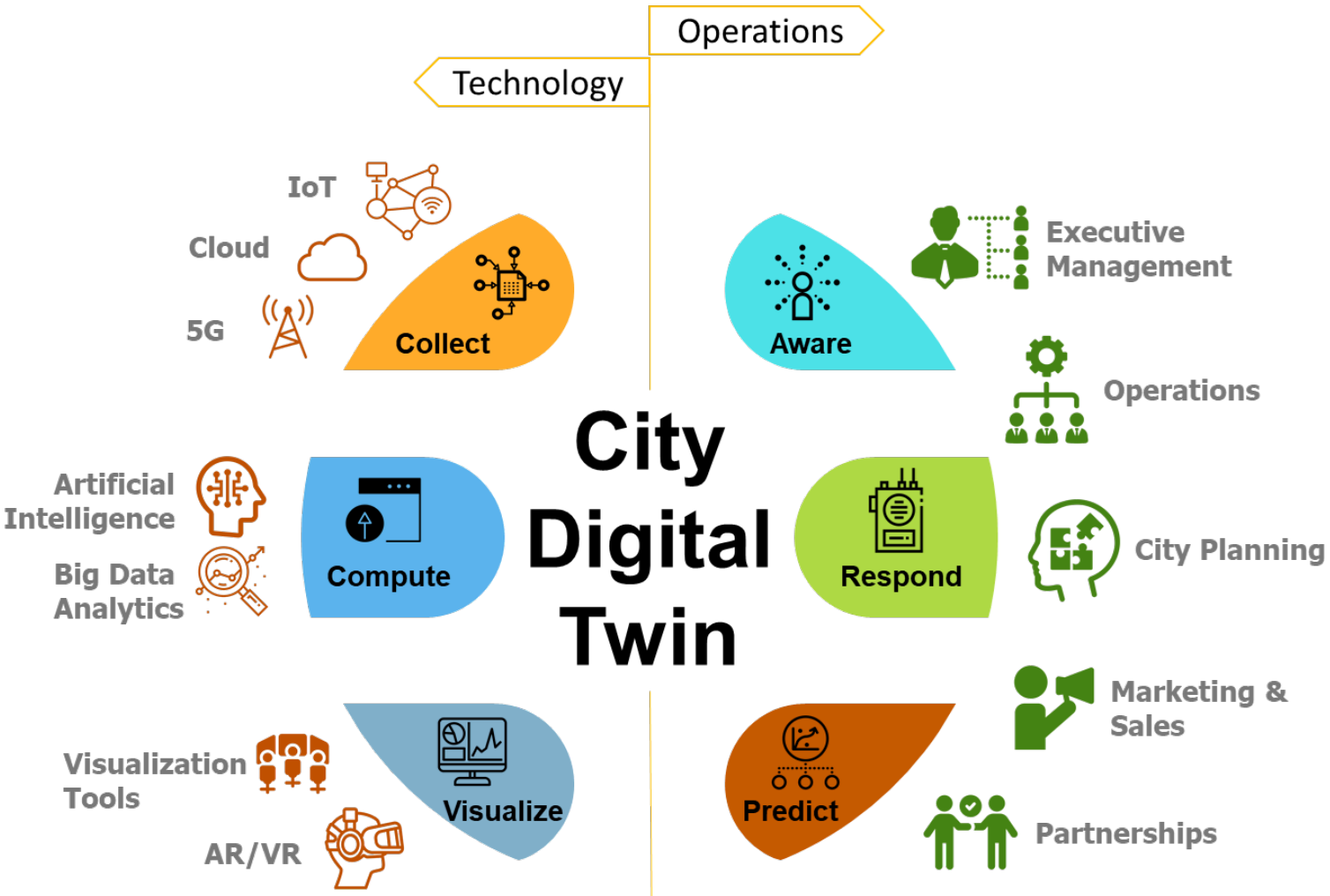
Smart Cities Digital Twins



Source: E. Shahat, et.al, City Digital Twin Potentials: A Review and Research Agenda, Sustainability, 13, 3386, 2021.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

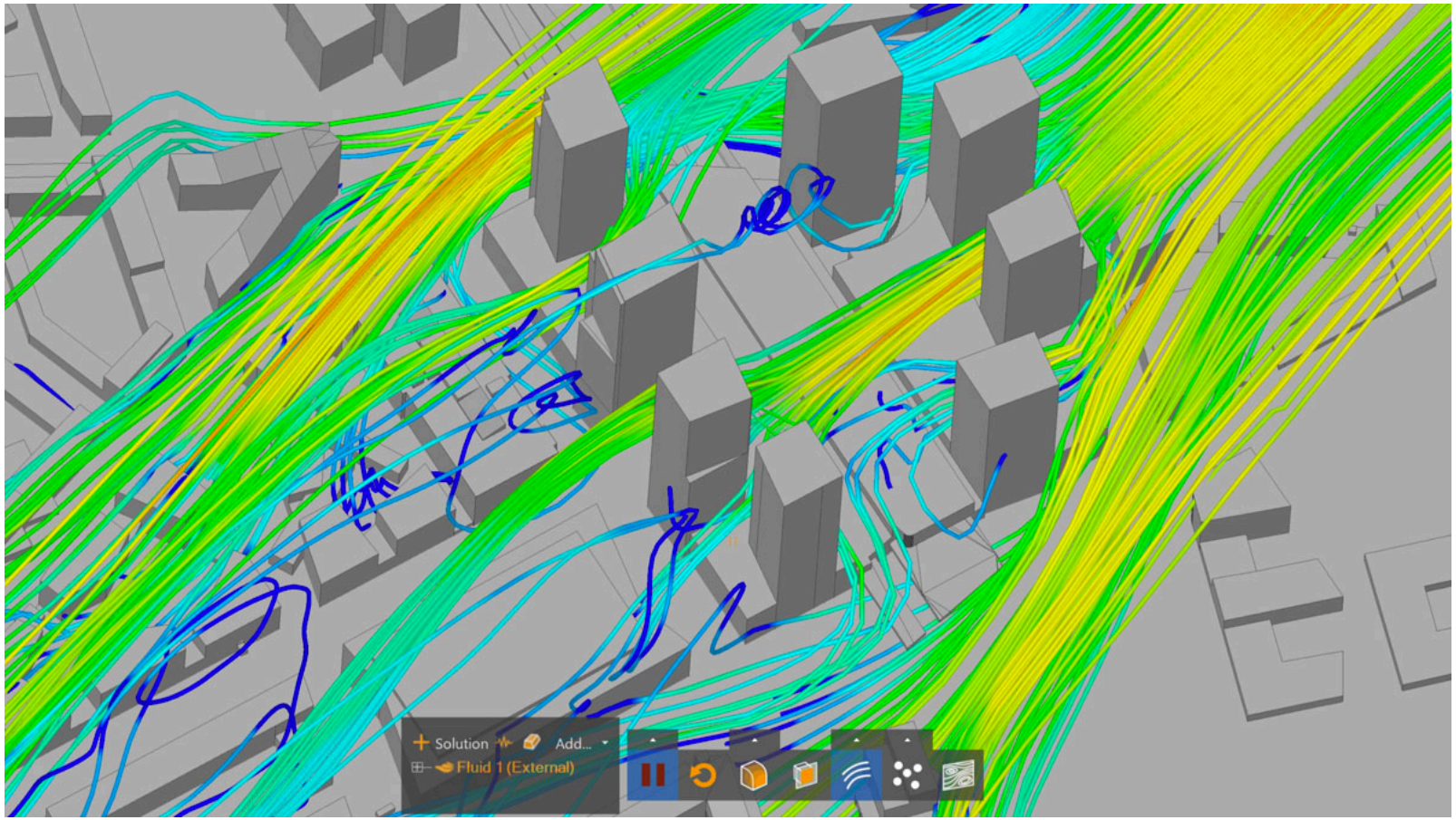
Smart Cities Digital Twins



Source: S. Nazie, How Digital Twins Enable Intelligent Cities, eblog, Huawei, 2020.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Kalasatama (Helsinki) Wind Analysis

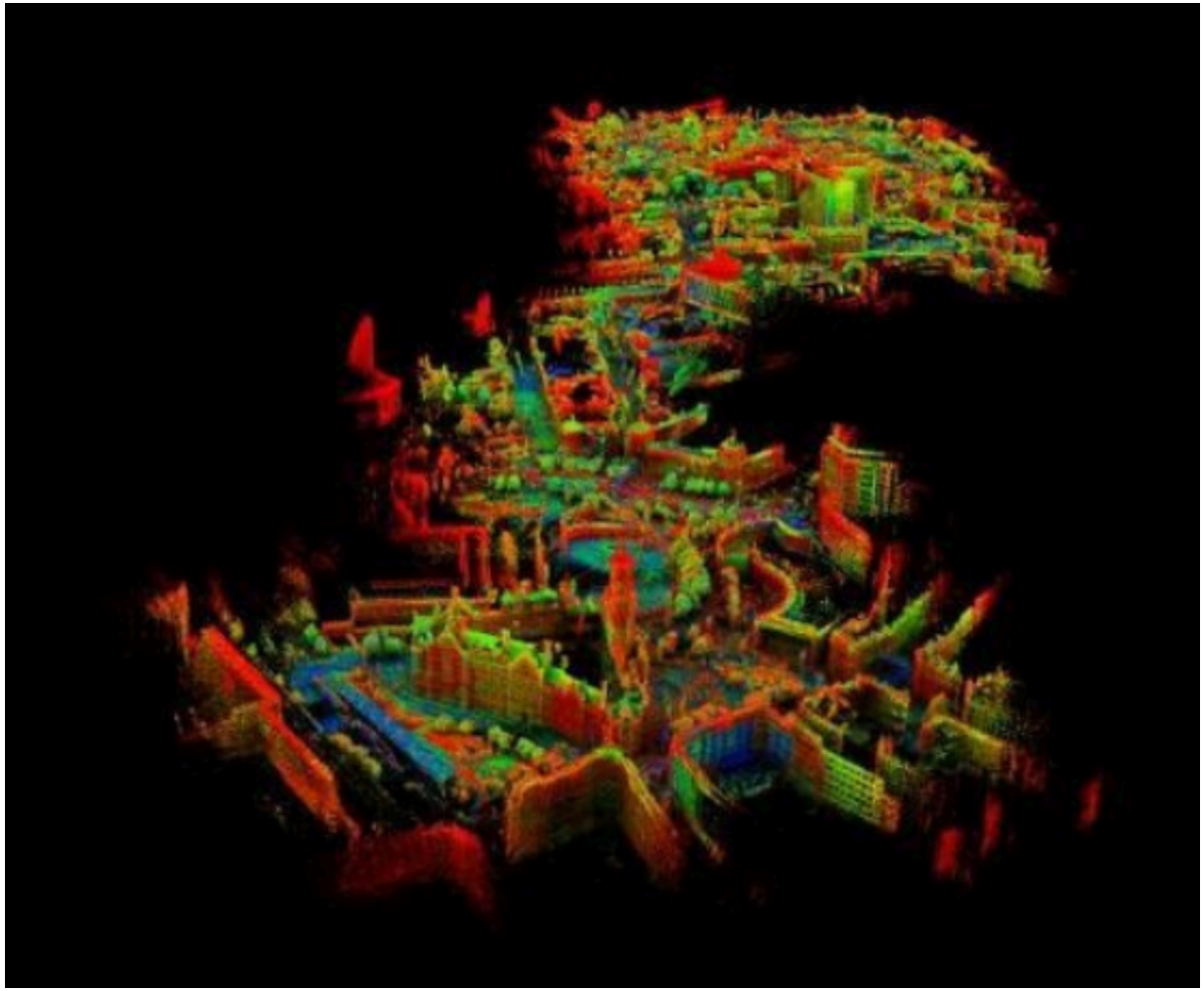


Source: Aarni Heiskanen , Helsinki is Building a Digital Twin of the City, AEC Business, 2019.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Digital Twins

Bradford, UK Digital Twin For Pandemic Recovery



Source: MyITU, 2020.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Digital Twins

NTU EcoCampus, Singapore

Source: Cities Today, June 2019

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Digital Twins

Digital Twins For Water Utilities

Source: Crista Campbel, Digital Twins Bring Value to Water Utilities, Arcgis-blog, 2021.

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Smart Cities Digital Twins

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Key Smart Cities Initiatives in Morocco

Casablanca
2016 IEEE Core Smart City

IEEE Smart Cities

Rabat
IMD Global Smart City Index 2021
Top Africa Smart City

Berkane
IEEE Smart Cities Contest Award **- Septembre 2022 -**

Benguerir

Ifrane Chefchaouen

UNESCO

2020
Global Network of Learning Cities
www.uil.unesco.org/learning-cities

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

Key Smart Cities Initiatives in Morocco

Winners of the 2022 IEEE Smart Cities Contest!

Jury Award

City	Country	Project Name	Category (OECD)
Roorkee	India	Distributed Energy - Storage	Emerging Economy
Jakarta	Indonesia	Flood Control System	Emerging Economy
Coral Gables	USA	Coral Gables Smart District Expansion Project	Developed Economy
Peachtree Corners	USA	City Streets of the Future	Developed Economy
Berkane	Morocco	Smart Waste Management & Control System	Emerging Economy

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No.894712

ABC 21 project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No. 894712.

Thank You!
Q & A

Mohamed Essaaidi
Moroccan School of Engineers Science (EMSI)
Email: m.essaaidi@emsi.ma

www.abc21.eu

Africa-Europe Bioclimatic Collaboration 21

Africa-Europe BioClimatic buildings for XXI century