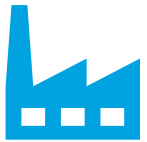# Evaluation and Assessment of Smart Cities and Communities

Cristina Bueti
ITU Focal Point on Smart Sustainable Cities & Communities
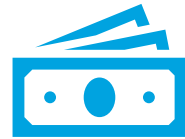
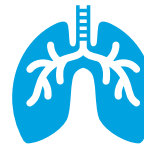# Challenges Facing Cities Today

GHG Emissions | Traffic Congestion | Financial Constraints | Air Pollution | Pandemic | Energy and Water Usage

Digital Transformation Opportunities for Cities

1 Reduce Traffic Congestion

2 New Business Models

3 Decrease in Utility Usage

4 Increase Citizen Engagement

5 More Efficient City Services

6 Improve Measuring and Monitoring

ITU

How ITU Supports IoT and Smart Cities and Communities

SUSTAINABLE DEVELOPMENT GOALS

GROWTH | INCLUSIVENESS | SUSTAINABILITY | INNOVATION | PARTNERSHIP

U4SSC:
United for Smart Sustainable Cities initiative

Joint IEC-ISO-ITU Smart Cities Task Force

JCA-IoT and SC&C:
Joint Coordination Activity on IoT and Smart Cities and Communities

ITU-T Study Group 20:
ITU Study Group on IoT and Smart Cities and Communities

ITU:
International Telecommunication Union – the UN specialized agency for ICTs

ITU-T's Focus on IoT and Smart Cities and Communities

ITU-T Study Group 20 (SG20) is responsible for:

1 Internet of things (IoT) and its applications, and smart cities and communities (SC&C)

2 Big data aspects of IoT and SC&C, e-services and smart services for SC&C

ITU-T Study Group 20 (SG20)

Lead Study Group on

Internet of Things and its applications

Smart cities and communities

IoT Identification

Q1/20 Interoperability and interworking of IoT and SC&C applications and services

Q2/20 Requirements, capabilities and architectural frameworks across verticals enhanced by emerging digital technologies

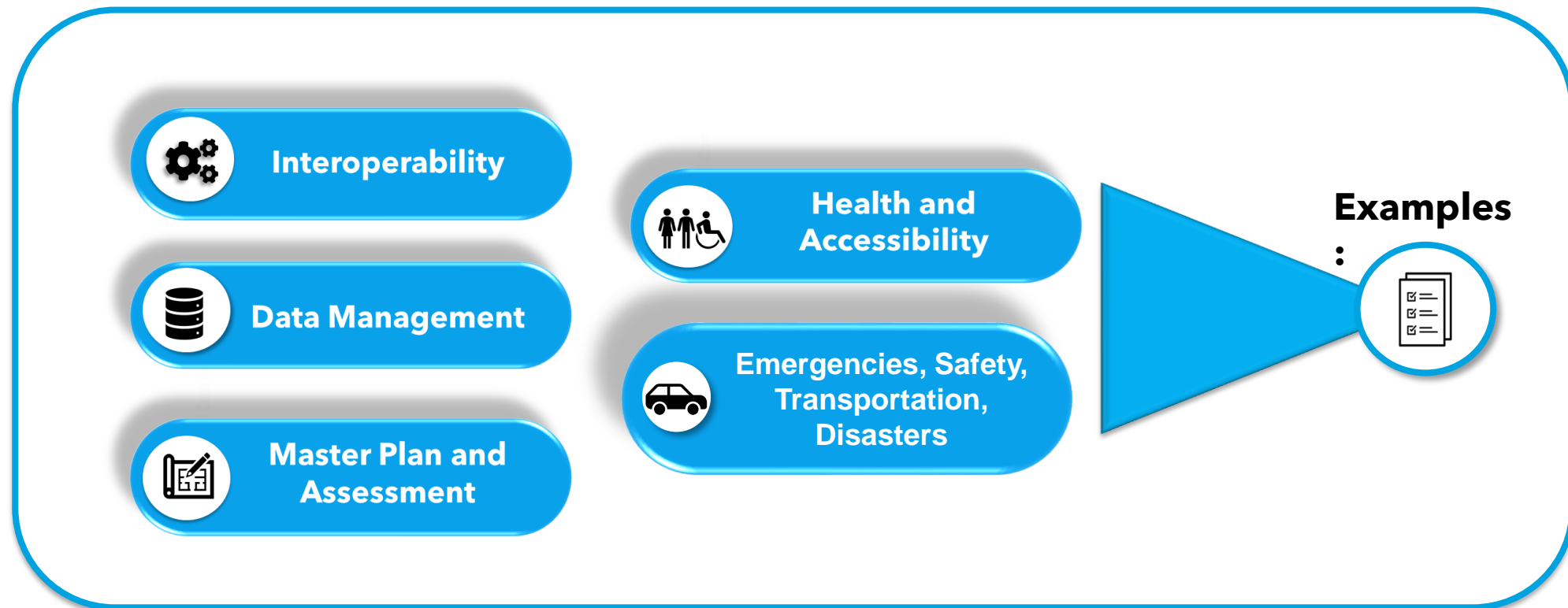**Q3/20** IoT and SC&C architectures, protocols and QoS/QoE

Q4/20 Data analytics, sharing, processing and management, including big data aspects, of IoT and SC&C

Q5/20 Study of emerging digital technologies, terminology and definitions
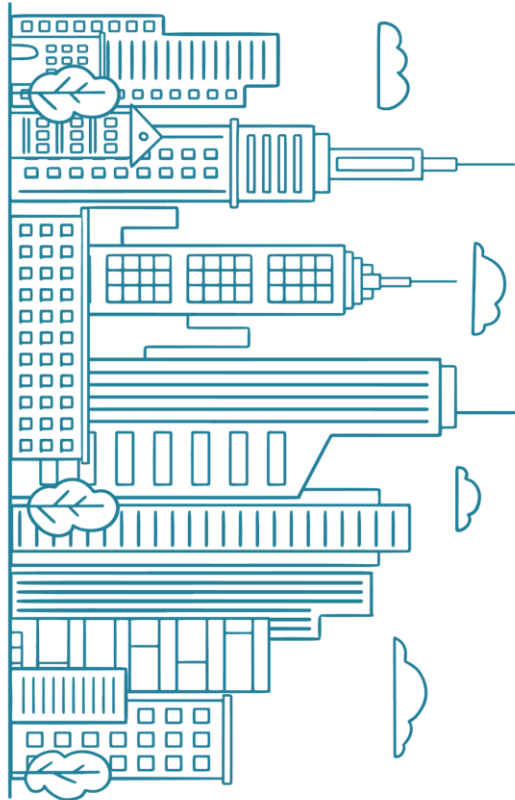
Q6/20 Security, privacy, trust and identification for IoT and SC&C

Q7/20 **Evaluation and assessment of Smart Cities and Communities**

ICT and Digital Technology Standards for Cities and Communities

ITU Standard on Key Performance Indicators

Dimensions

Economy	Environment	Society and Culture
• ICT Infrastructure • Water & Sanitation • Drainage • Electricity Supply • Transport • Public Sector • Innovation • Employment • Waste • Buildings • Urban Planning	• Air Quality • Water and Sanitation • Waste • Environmental Quality • Public Space and Nature • Energy	• Education • Health • Culture • Housing • Social Inclusion • Safety • Food Security

Categories

55 Core Indicators + 36 Advanced Indicators

• 20 Smart + 32 Structural + 39 Sustainable

• 132 Data Collection Points

Recommendation ITU-T Y.4903: 'Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals'

ITU Standard on Smart Sustainable City Maturity Model
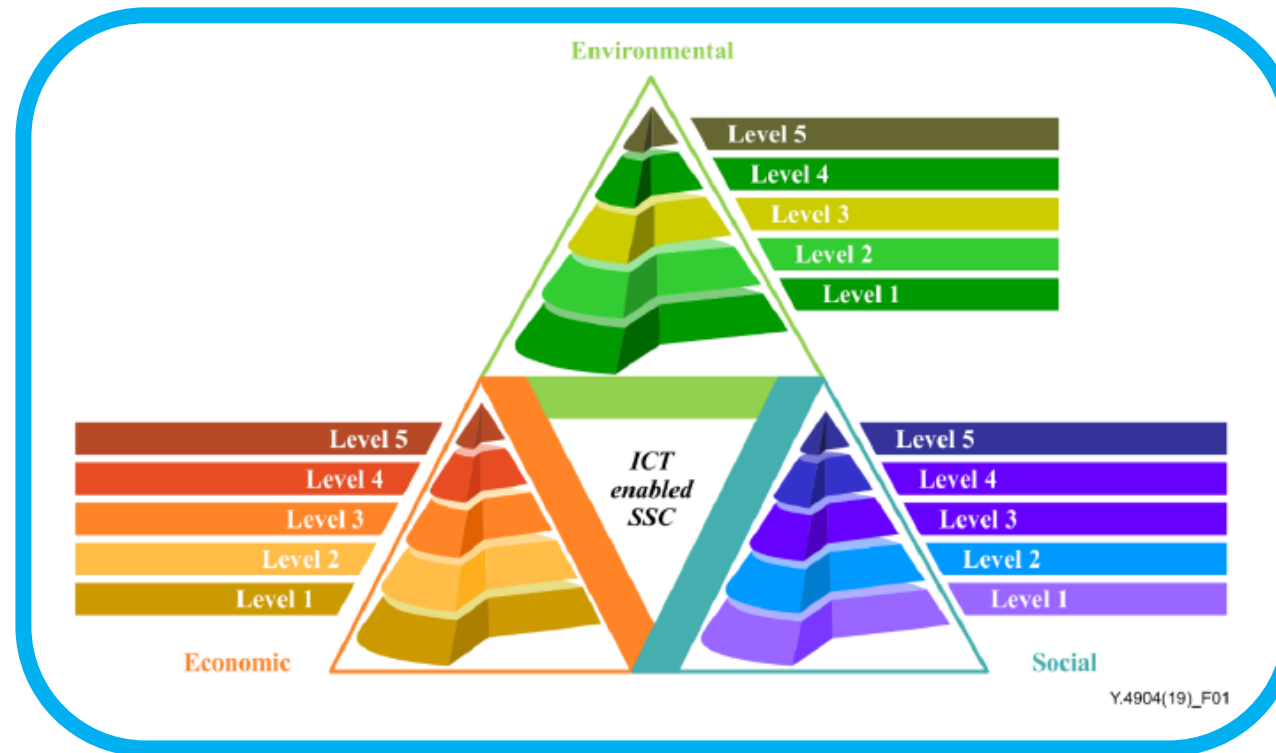
Recommendation ITU-T Y.4904: 'Smart sustainable cities maturity model'

ITU Standard on Impact Assessment

Smart sustainable city impact assessment types

Potential impact areas
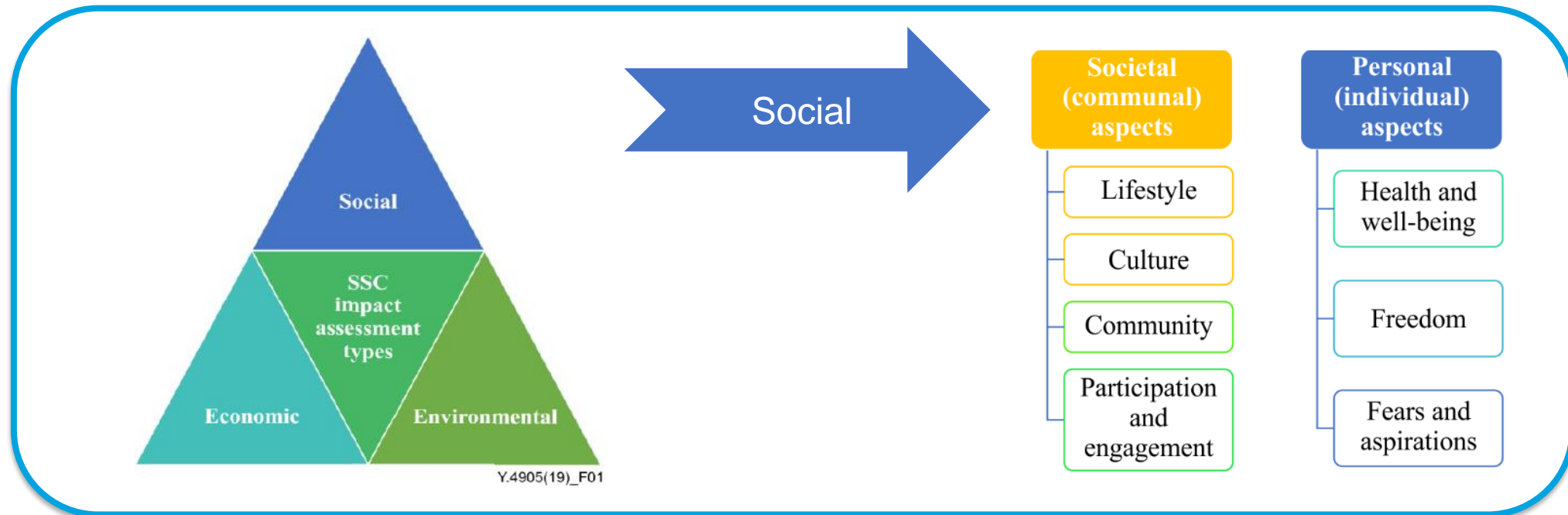
Recommendation ITU-T Y. 4905 'Smart sustainable city impact assessment'

United for Smart Sustainable Cities

U4SSC Brochure

U4SSC Thematic Groups

City Platforms

Economic recovery in cities and urban resilience building in the time of COVID-19

Guiding principles for artificial intelligence in cities

Innovative Financing Instruments for Smart Sustainable Cities

Procurement Guidelines for Smart Sustainable Cities

Latest U4SSC Publications

Identifies smart interventions not requiring excessive material or capacity inputs, but helping cities be sustainable

Gives insight into the potential of blockchain technology in building trust within cities

Sheds light on the impact of frontier technologies in cities and on citizens
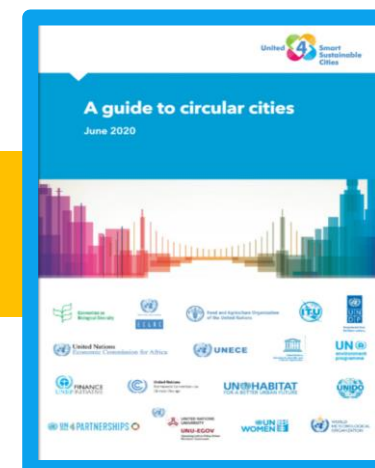
Provides a framework to improve circularity in cities
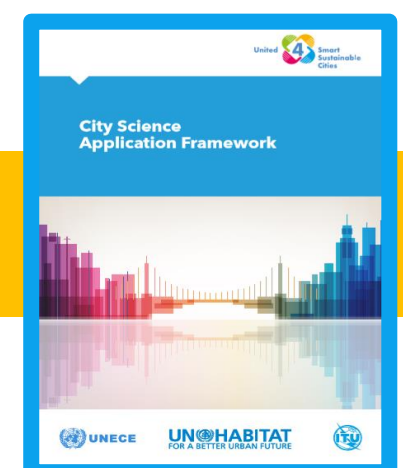
Offers a four-step methodology to assess, prioritize and boost city applications

U4SSC KPIs

Currently implemented in:

- Dubai
- Singapore
- Moscow
- Riyadh
- Valencia
- Wels
- Pully
- Bizerte
- Montevideo
- Krimpen aan den Ijssel

150+ more cities!

Collection Methodology for Key Performance Indicators for Smart Sustainable Cities

Key performance indicators: A key element for cities wishing to achieve the Sustainable Development Goals

U4SSC KPIs Standard

U4SSC KPIs Concept Note

Applications of the U4SSC KPIs

The U4SSC KPIs help cities to:

Track progress

Perform trend analysis

Benchmark performance

Compare results

U4SSC KPIs in Norway - Implementation

- Ålesund
- Kristiansund
- Molde
- Aukra
- Aure
- Averøy
- Fjord
- Gjemnes
- Hareid
- Herøy
- Hustadvika
- Ørsta
- Rauma

- Sande
- Smøla
- Stranda
- Sunndal
- Surnadal
- Sykkylven
- Tingvoll
- Ulsten
- Vanylven
- Vestes
- Volda
- Asker
- Baerum

- Bødo
- Gjovik
- Haugesund
- Karmøy
- Kristiansand
- Larvik
- Lillestrom
- Molde
- Rana
- Sande
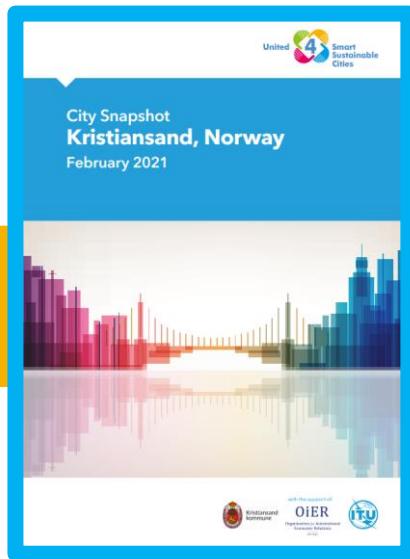- Stavanger
- Trondheim
- Voss …….

ITU – Reporting the U4SSC KPIs

City Snapshots
Provide a visual overview of a city's U4SSC KPIs performance based on global benchmarks

Verification Reports
Summarize the conclusions of a city's U4SSC KPIs project

Factsheets
Elaborate and analyze the results of a city's U4SSC KPIs project

Case Studies
Detail a city's journey towards successfully becoming a smart sustainable city

Upcoming activities

Webinar on Accelerating the path to cities' digital transformation Virtual, 8 September 2021

ITU-T Study Group 20 meeting Virtual, 11-21 October 2021

Webinar series on "Digital transformation for cities and communities" September to December 2021

ITU's Global Portal on Environment & Smart Sustainable Cities

Smart Sustainable Cities

Cities' Actions to Tackle COVID-19

Energy Efficient ICTs

Frontier Technologies

E-waste and Circular Economy

Climate Actions

Thank you!

Questions? Interested in learning more?
Let us know!

Email

u4ssc@itu.int

Website

ITU-T, Smart Sustainable Cities

Additional Information

Examples of ITU-T SG20 standards

Interoperability

- Recommendation ITU-T Y.4200: 'Requirements for the interoperability of smart city platforms'

- Recommendation ITU-T Y.4201: 'High-level requirements and reference framework of SCPs'

- Recommendation ITU-T Y.4459: 'Digital entity architecture framework for Internet of things interoperability'

- Recommendation ITU-T Y.4500.13: 'oneM2M – Interoperability testing'

- ITU-T Y Supplement 61: 'Features of application programming interfaces for IoT data in SC&Cs'

- Technical Specification D3.3: 'Framework to support data interoperability in IoT environments'

Examples of ITU-T SG20 standards

Data Management & Processing

- Recommendation ITU-T Y.4114: 'Specific requirements and capabilities of the Internet of things for big data'

- Recommendation ITU-T Y.4461: 'Framework of open data in smart cities'

- Recommendation ITU-T Y.4560: 'Blockchain-based data exchange and sharing for supporting Internet of Things and Smart Cities and Communities'

- Recommendation ITU-T Y.4561: 'Blockchain-based data management for supporting IoT and SC&Cs'

- TR D2.1: 'Data process and management framework for IoT and SC&Cs'

- TR D2.3: 'Web based data model on IoT and smart city'

- TR D4.3: 'Overview of technical enablers for trusted data'

- TS D4.4: 'Framework to support IoT data quality management'

- TS D.5: 'Data economy: commercialization, ecosystem, and impact assessment'

Examples of ITU-T SG20 standards

Master Plan and Assessment

- ITU-T Series Y Supplement 32: 'A guide for city leaders'

- ITU-T Series Y Supplement 33: 'Master Plan'

- Recommendation ITU-T Y.4903/L.1603: 'Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals'

- Recommendation ITU-T Y.4904: 'Smart sustainable cities maturity model'

- Recommendation ITU-T Y.4905: 'Smart sustainable cities impact assessment'

- Recommendation ITU-T Y.4906: 'Assessment framework for digital transformation of sectors in smart cities'

Examples of ITU-T SG20 standards

Emergency Response & Management

- Recommendation ITU-T Y.4102: 'Requirements for IoT devices and operation of IoT applications during disasters'

- Recommendation ITU-T Y.4116: 'Requirements of transportation safety services including use cases and service scenarios'

- Recommendation ITU-T Y.4119: 'Requirements and capability framework for IoT-based automotive emergency response system'

- Recommendation ITU-T Y.4467: 'Minimum set of data structure for automotive emergency response system'

- Recommendation ITU-T Y.4468: 'Minimum set of data transfer protocol for automotive emergency response system'

- Recommendation ITU-T Y.4558: 'Requirements and functional architecture of smart fire smoke detection service'

Examples of ITU-T SG20 standards

IoT Security, Trust & Identification

- Recommendation ITU-T Y.4805: 'Identifier service requirements for the interoperability of smart city applications'

- Recommendation ITU-T Y.4806: 'Security capabilities supporting safety of the Internet of Things'

- Recommendation ITU-T Y.4807: 'Agility by design for telecommunication/ICT systems security used in the IoT'

- Recommendation ITU-T Y.4808: 'Digital entity architecture framework to combat counterfeiting in Internet of things'

- Technical Report D4.1: 'Framework for security, privacy, risk and governance in data processing and management'

- Technical Report: 'Cybersecurity, data protection and cyber resilience in smart sustainable cities'

Examples of ITU-T SG20 standards

Health and Accessibility

- Recommendation ITU-T Y.4110/Y.2065: 'Service and capability requirements for e-health monitoring services'

- Recommendation ITU-T Y.4117: 'Requirements and capabilities of IoT for support of wearable devices and related services'

- Recommendation ITU-T Y.4204: 'Accessibility requirements for the Internet of things applications and services'

- Recommendation ITU-T Y.4408/Y.2075: 'Capability framework for e-health monitoring services'