SMART CITIES STANDARDS

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Presentation for the homonymous Webinar of the Crisis project (EU Erasmus + Program)

University of Thessaly (Business Administration Dept.)

30 January 2023

Co-funded by the European Union

Aim and objectives

- ✓ *Our world is changing rapidly and we have to design and implement the new world by valorising all the available resources, knowledge, data, legacy systems with an anthropocentric & holistic approach. In this interconnected, interrelated, interdependent world we need to work smarter and efficiently to take advantage of the available tools such as digitalisation and standardisation among others, against the alarming global backdrop of climate change, energy crisis, cyber & hybrid threats, invasions and other geopolitical crises.*
- ✓ *The 21st century will be urban for some 70% of humanity and digitalisation is the key to deal with the needs resulting of a supply chain related to 9~10 billion people to be feed, clothe, transport, employ, educate and entertain, as expected will be by 2050!*
- ✓ *Both European and International Standardisation ecosystems issued an outstanding set of standards in order to support and enhance all the efforts of the relevant stakeholders.*
- ✓ *In this presentation we will present the setting-standards organisations, the relevant Forums, Technical Committees, Working Groups and Standards. EU Policies will be highlighted too. Moreover, pertinent FP7 and H2020 R&I Projects will be presented briefly in order to bring into the light their valuable contributions to the topic and how important it is to build synergies, capacities and clusters. Last but not least, insights in terms of the way forward will be delivered as well.*

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Introduction

- By 2050 the world population is expected to reach nearly 10 billion people.
- 80 % Amount of people living in cities in 2050
- 2.7 % Surface occupied by today's cities on the earth's surface
- 70 % proportion of energy consumed by cities
- 75 % proportion of waste and greenhouse gas emissions produced by cities
- 33 megacities with more than ten million inhabitants

1) United Nations Sustainable Development Goals, press release, June 2017
2) World Food Research and Innovation Forum
3) Habitat III : The United Nations Conference on Housing and Sustainable Urban Development

Smart city: making cities more life enhancing – by people, for people. – YouTube

WORLD ECONOMIC FORUM - SMART CITIES - YouTube

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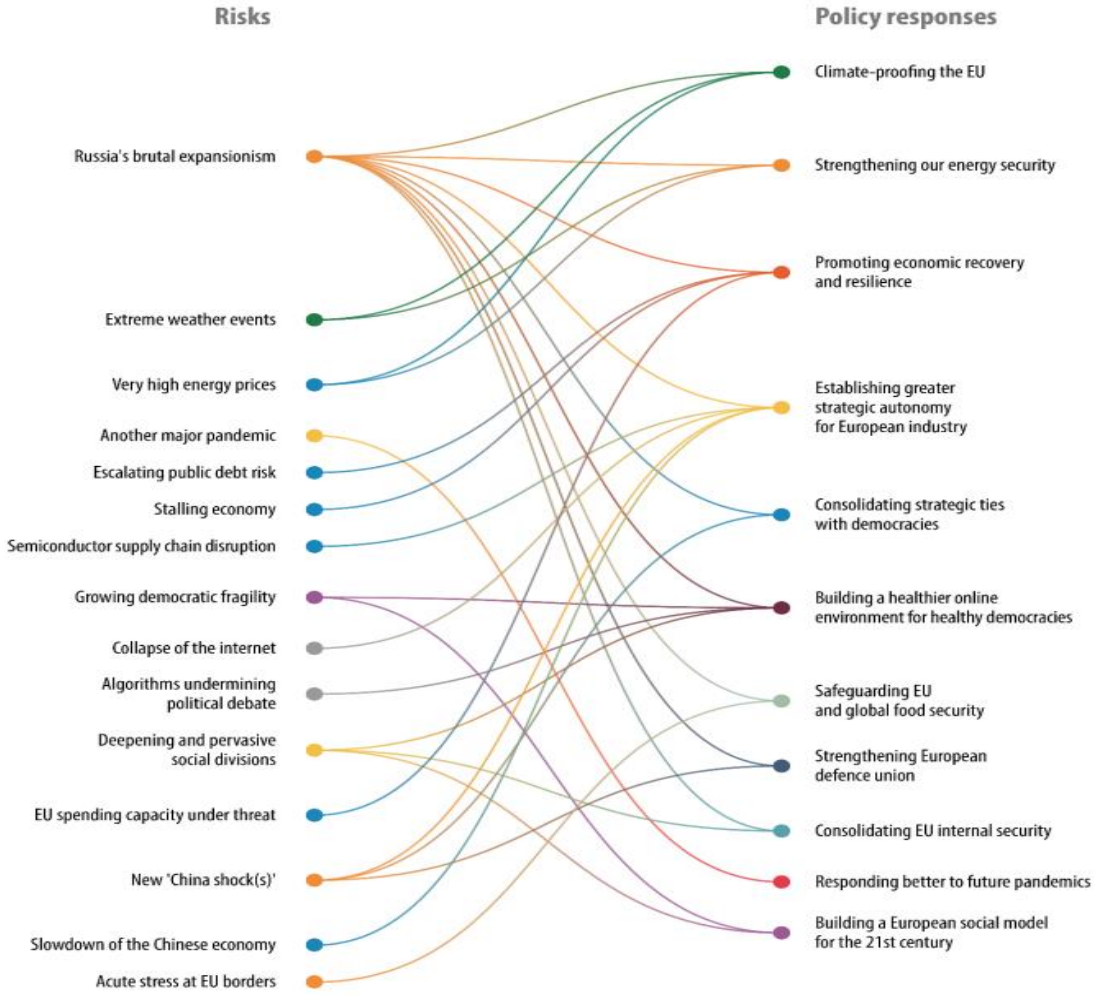
Introduction

Figure 1: Interconnections between the risks (Part 2) and policy responses (Part3) set out in this study



SOURCE: **(Figure 1 από Study Future Shocks 2022, EPRS).**

Speaking the same language

- Standards are about speaking the same language!
- Not being able to understand each other is a punishment, NOT a business model!

WHY Standards and Standardisation?

- ✓ Standards are of great benefit – that applies nationally, in Europe and internationally. Standards are of major significance for consumers and users as well as for commerce, science and the state as they ensure innovative technologies and increased safety for society.
- ✓ Trust, reliability, interchangeability and compatibility to increase efficiency and productivity with a high level of acceptance; improve communication; transparency/comparability; accepted requirements for safety; interoperability; dissemination of best practices.
- ✓ Standardization in a rapidly changing world, provides orientation, safety and clarity through its deliverables: Standards (EN), specifications (TS), TR, Guides, CWAs.
- ✓ The fundamental structures of standards and specifications are beneficial because they significantly simplify the integration and diffusion of new innovations.
- ✓ Standards are accessible to everyone and are therefore the ideal tool to help increase the use of new technologies and products and thus stimulate the economy. Benefits for the economy and society, for market participants.
- ✓ Of the approximately 9,000 experts who currently cooperate with CENELEC, IEC and ETSI, around 1,250 DIN (or DKE) experts are active in the IEC and 550 in CENELEC. (9000 experts at DKE and > 30.000 experts at DIN).

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Standards Development Organisations

The main international bodies are:

- ISO: International Organization for Standards. ISO was founded on 23 February 1947 (in UK?) and its headquartered in Geneva, Switzerland] and works in 167 countries as of 2022. The three official languages of the ISO are English, French, and Russian.
- **ESOs = CEN/CENELEC/ETSI**: In Europe, standards are developed and agreed by the three officially Organisations: the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI).
- ITU: ITU is the United Nations specialized agency for information and communication tech. ITU was founded in Paris in 1865 as the International Telegraph Union. It took its present name in 1932, and in 1947 became a specialized agency of the United Nations. (**International Telecommunication Union**, is located in Place des Nations, 1211 Geneva 20, Switzerland)
- IEC: Founded in 1906, the IEC (**International Electrotechnical Commission**) is the world's publication of International Standards for all electrical, electronic and related technologies "electrotechnology" (IEC Secretariat is located in the 3 rue de Varembé, CH-1211 Geneva 20, Switzerland).
- **Institute of Electrical and Electronic Engineers** (IEEE): IEEE and its members inspire a global community to innovate for a better tomorrow through highly cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted "voice" for engineering, computing, and technology information around the globe. The IEEE traces its founding to 1884 and the American Institute of Electrical Engineers. The IEEE headquarters is in New York City..

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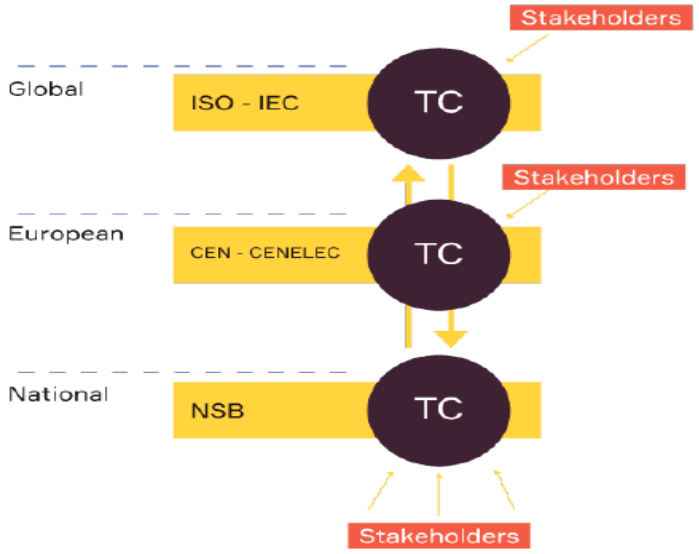
Other Organisations

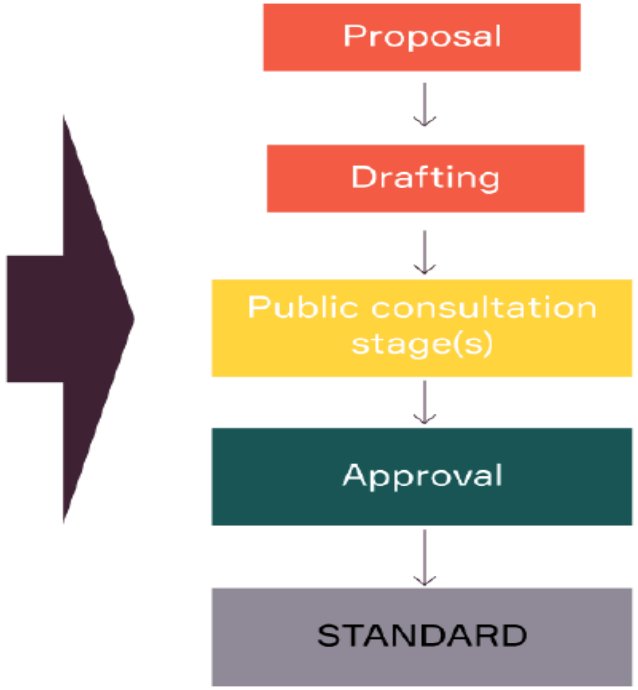
Other international bodies:

- **United Nations Statistics Division (UNSD).** (2008). International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4. https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf
- **Organisation for Economic Coorperation and Development (OECD).** (2002). Annex 1. The OECD definition of the ICT sector. http://www.oecd.org/internet/ieconomy/2771153.pdf
- **United Nations Educational, Scientific and Cultural Organization (UNESCO).** (2017). What is meant by "cultural heritage"? http://www.unesco.org/new/en/culture/themes/illicit-trafficking-of-cultural-property/unesco-database-of-national-cultural-heritage-laws/frequently-asked-questions/definition-of-the-cultural-heritage/
- **United Nations Economic Commission for Europe (UNECE), Sustainable Smart Cities.** The Key Performace Indicators for Smart Sustainable Cities (KPIs for SSC), a United Nations standard on smart sustainable cities, were developed by UNECE and ITU in 2015. The indicators were endorsed by the UNECE Committee on Urban Development, Housing and Land Management at its seventy-sixth session in 2016.. UNECE's work on Smart Sustainable Cities forms a part of the initiative United for Smart Sustainable Cities (U4SSC). U4SSC is a global platform for smart cities stakeholders,, Sustainable Smart Cities | UNECE

Standardisation

How standardization works





- Standardization is a **consensus based** process of agreeing voluntary technical specifications among all interested stakeholders.
- Standards organizations provide the framework and common, transparent rules to the stakeholders to get their agreements.
- **Voluntary** in use
- Possible tools to underpin **legislation**

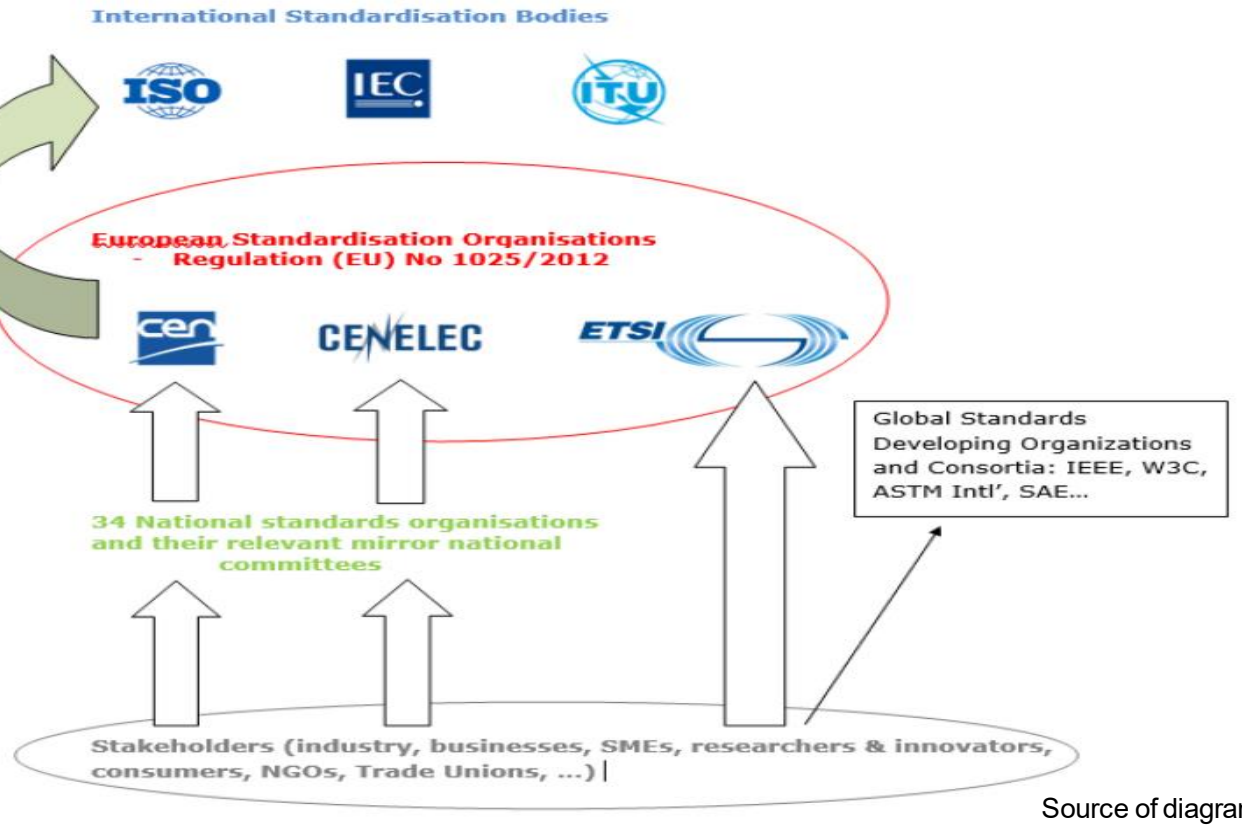
Source of diagram: ©CEN CENELEC

Standardisation

4 What can CEN and CENELEC and their members offer to the innovator?

4.1 The standardization landscape

The standardization landscape is a diverse one as illustrated in Figure 4 but ensures the support of the innovator in a structured, pluralistic, transparent and consensus way.



Source of diagram: ©CEN CENELEC

•**Cooperative agreements** - there are cooperative arrangements between the European and international standardisation organisations. The aim is to avoid European standards competing or even conflicting with international ones. The two main agreements are:

- the Vienna Agreement between the International Organisation for Standardisation (ISO) and the European Committee for Standardisation (CEN)
- the Dresden Agreements between the International Electrotechnical Commission (IEC) and the European Committee for Electrotechnical Standardization (CENELEC).

Standardisation

ISO/IEC Guide 2:2004(en): Standardization and related activities — General vocabulary, 1.1 standardization is an activity of establishing, with regard to actual or potential problems, **provisions** for common and repeated use, aimed at the achievement of the optimum degree of order in a given context.

ISO standardization deliverables:

- ✓ ISO Standards
- ✓ ISO/TS Technical Specifications
- ✓ ISO/TR Technical Reports
- ✓ ISO/PAS (Publicly Available Specification, Δημόσια Διαθέσιμες Προδιαγραφές)
- ✓ IWA International Workshop Agreements/ Διεθνείς Εργαστηριακές/Τεχνικές Συμφωνίες
- ✓ ISO Guides.

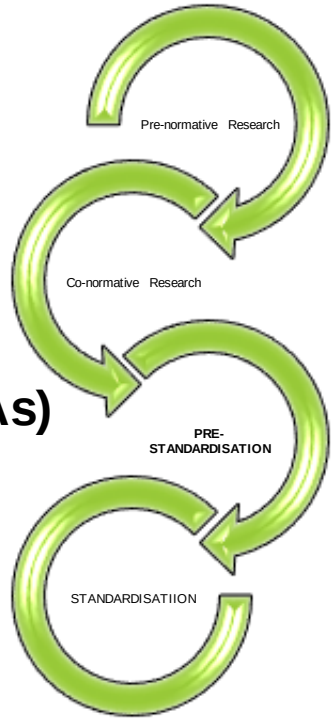
Standardisation Deliverables:

- ✓ European Standards (EN)
- ✓ Technical Specifications (TS)
- ✓ Technical Reports (TR)
- ✓ CEN CENELEC Guides
- ✓ **CEN CENELEC Workshop Agreements (CWAs)**
- ✓ Harmonised Standards (OJEF)/Documents CENELEC only (hEN)

European Standards - CEN-CENELEC (cencenelec.eu)/

European Standardisation System

- ❖ Pre-normative Research
- ❖ Co-normative Research
- ❖ Pre-standardization
- ❖ Standardisation



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Standardisation - CWAs

Fast track to standardization

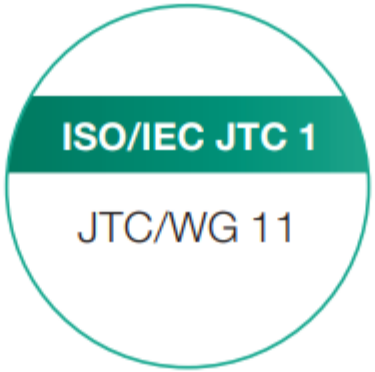
- CEN/CENELEC Workshop Agreement (CWA) is a standardization deliverable developed in a CEN/CENELEC Workshop open to the direct participation of anyone.
- CWA reflects consensus of identified stakeholders - the Workshop participants who drafted and approved CWA are indicated in the Foreword
- Participation in the Workshop is open to anyone willing to join and accepting the project plan

Source : ©CEN CENELEC

CWA 17381:2019 The Description and Assessment of Good Practices for Smart City solutions (SMARTER TOGETHER)

CWA download area - CEN-CENELEC (cencenelec.eu)

Standardisation – Smart Cities



The Global Smart Cities Standards Landscape

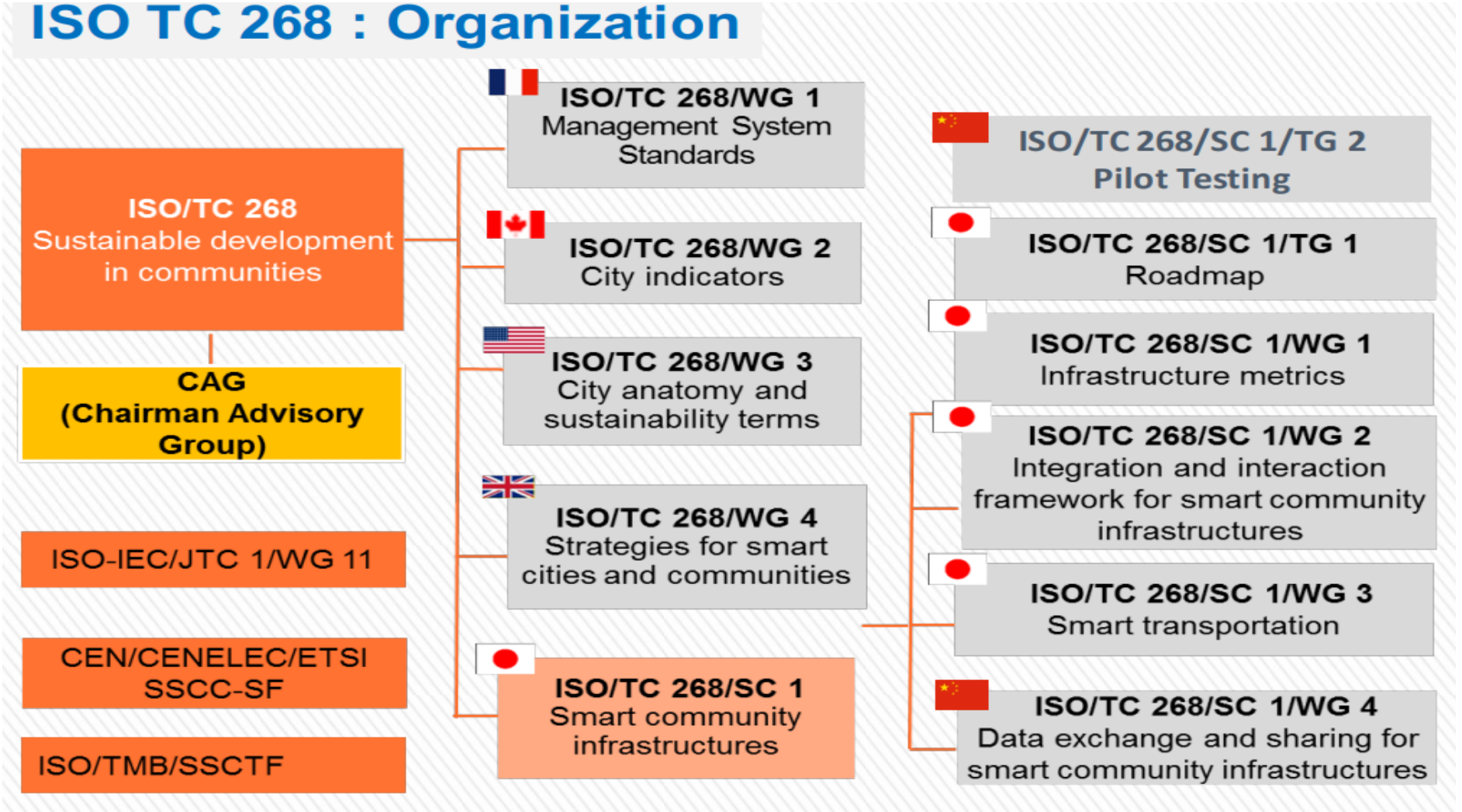
ISO/TC 268
Sustainable cities and communities

IEC Syc Smart Cities

Joint Technical Committee 1 (ISO/IEC JTC 1) Working Group 11 (Smart Cities)

ISO Guide 82 Guide for addressing sustainability in standards
ISO 26001Social responsibility management system

Standardisation – ISO/TC 268



ISO/TC 268 Sustainable cities and communities

[ISO - ISO/TC 268 - Sustainable cities and communities]

Source : ©ISO

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Standardisation – ISO/TC 268

Resilience within ISO/TC 268

Identified into the TC scope :

Standardization in the field of Sustainable Cities and Communities will include the development of requirements, frameworks, guidance and supporting techniques and tools related to the achievement of sustainable development considering smartness and **resilience**, to help all Cities and Communities and their interested parties in both rural and urban areas become more sustainable.

=> TC 268 members are considering that City, Community or Urban Resilience are part of the scope of ISO/TC 268 in respect with principles and approach developed within ISO/TC 292

Identified within ISO 37101 as one of the six Sustainability purposes to be achieve by Cities and Communities :

ISO/TC 268
Sustainable cities and communities

Source : ©ISO

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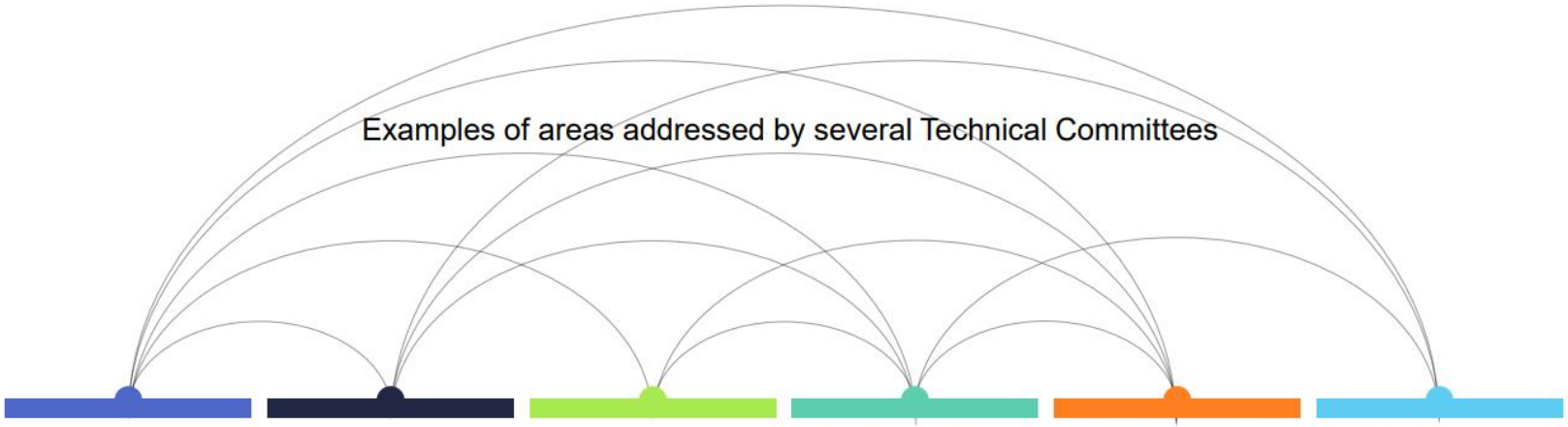
Standardisation

Various scopes and areas of interest

Source of diagram : ©CEN CENELEC SECURITY SECTOR FORUM



Standardisation

International Technical Committees and Working Groups

ISO 292 Security and Resilience

ISO 262 Risk Management

ISO/TC 262/JWG 1	Joint ISO/TC 262 - ISO/TC 292 WG: Managing emerging risk
ISO/TC 262/TCG 1	Terminology Coordination Group
ISO/TC 262/TG 1	Strategic Advisory Group
ISO/TC 262/TG 2	Communications
ISO/TC 262/TG 5	Study for the way forward in TC/262
ISO/TC 262/WG 6	Guidance Handbook
ISO/TC 262/WG 8	Vocabulary
ISO/TC 262/WG 9	Managing risk for youth and school trips

ISO/IEC JTC 1/SC 27 IT Security techniques (πχ ISO/IEC JTC 1/SC **27 Information security, cybersecurity and privacy protection; ISO/IEC JTC 1/SC 42 Artificial intelligence; ISO/TMBG - IWA 39:2022 Gap analysis for standardization on sustainable and human-centred societies enabled with cyber physical systems etc.**)

ISO/TC 224 Drinking water, wastewater and stormwater systems and services (πχ **ISO/TC 224/WG 7 Crisis management of water utilities)**

ISO/TC 251 Asset Management

Fundamental terms & definitions

ISO 37122: 2019, 3.4 smart city

- city that increases the pace at which it provides social, economic and environmental sustainability outcomes and responds to challenges such as climate change, rapid population growth, and political and economic instability by fundamentally improving how it engages society, applies collaborative leadership methods, works across disciplines and city systems, and uses data information and modern technologies to deliver better services and quality of life to those in the city (residents, businesses, visitors), now and for the foreseeable future, without unfair disadvantage of others or degradation of the natural environment
- Note 1 to entry: A smart city also faces the challenge of respecting planetary boundaries and taking into account the limitations these boundaries impose.
- Note 2 to entry: There are numerous definitions of a smart city; however, the definition that is used within TC268 is the official one agreed to by the ISO Technical Management Board.

- A Smart Sustainable City (SSC) 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. *ITU-TFocusGrouponSmartSustainableCities*

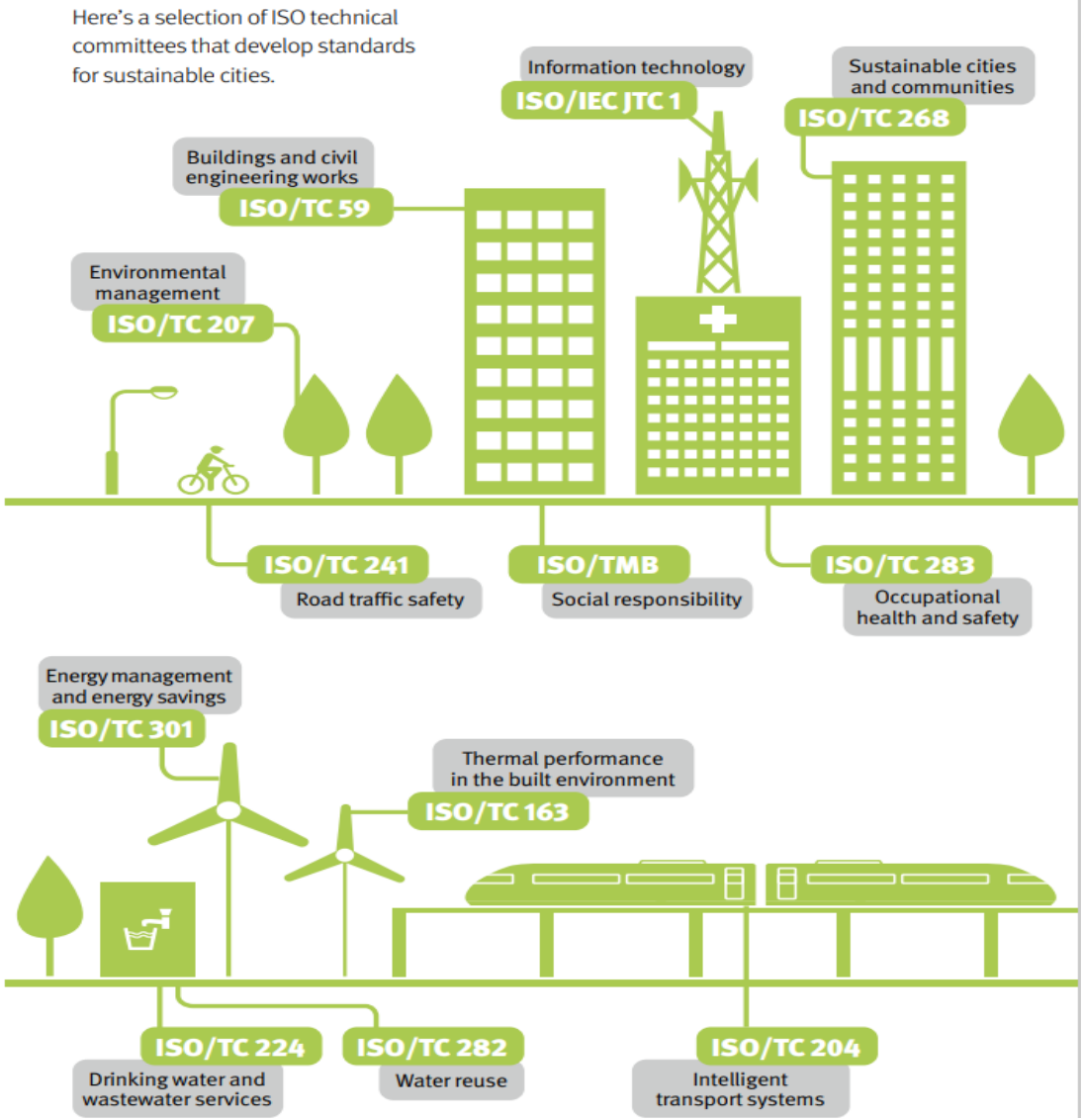
ISO

ISO 37101 is supported by a number of different standards in areas such as terminology and key indicators for measuring the performance of city services, which offer specific guidance for developing strategies and implementing them. These include:

- ISO 37100, Sustainable cities and communities – Vocabulary
- ISO 37105, Sustainable cities and communities – Descriptive framework for cities and communities
- ISO 37120, Sustainable cities and communities – Indicators for city services and quality of life

In addition, ISO 26000, Guidance on social responsibility, helps organizations operate in a socially responsible way, thus contributing to the health and welfare of society.

ISO and Sustainable Cities



- ✓ ***Energy***
- ✓ ***Transport***
- ✓ ***Water***
- ✓ ***Connected cites***
- ✓ ***Infrastructures***
- ✓ ***Security & Resilience***
- ✓ ***Health & Wellbeing***

Source of diagram : ©ISO

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Resilience standards key to sustainability and security in our cities

- In recent decades cities have evolved to become smarter, utilising rapidly evolving technologies across many sectors, from communication to banking, construction to education and service provision. For governments, using information communication technology to improve governance remains a priority.
- A framework for addressing key challenges facing smart cities :
  - Adopt standards early to promote the interoperability and security of smart cities solutions, including by incorporating standards into ICT procurement requirements and regulation.
  - Define data custody, use and sharing principles to better manage data flow, use and security.
  - Identify interdependencies in interconnected systems to identify vulnerabilities and ensure resilience of systems.
- “Security and resilience can no longer be afterthoughts for devices, systems, or even communities.
- We have seen the ever-rising impact of natural and man-made disasters globally (EU, USA, Australia, Indonesia etc). Firesand floods, cyber-attacks and …..”
- Standards help us level the playing field, give us structured ways of addressing complex interconnected systems, and help us strengthen all aspects of our security and resilience.

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Resilience standards key to sustainability and security in our cities

- Cities face greater uncertainty as a result of intensifying impacts from climate change, geo-political forces impacting supply chains, and changes in the flow of talent to design and manage digital transformations.
- Standards provide the most efficient form of collective good and best practices to respond in smart and sustainable ways.
- **We could identify which standards are most applicable to protecting smart cities and enabling their growth under a concept based on the Security and Resilience for Smart Cities. Key standards are:**
  - **ISO 37123:2020, Sustainable cities and communities** — Indicators for resilient cities, establishes definitions and methodologies for a set of indicators on resilience in cities: applicable to any city, municipality or local government that seeks to measure its resilience performance and includes core and secondary indicators across 17 thematic areas.
  - **ISO/IEC 30146:2020, Information technology — Smart city ICT indicators**, defines a comprehensive set of evaluation indicators and supports organisations to measure the performance of ICT in Smart Cities to support security and resilience.

Resilience standards key to sustainability and security in our cities

- **Key Standards:**
  - **ISO/IEC 30141:2018, Internet of Things (IoT) —** Reference Architecture, ensures IoT systems are safe and reliable by outlining functional requirements such as data and device management as well as non-functional requirements like scalability, security, privacy and usability
  - **ISO/IEC 27001, Information security management systems** – Requirements, specifies the requirements for establishing, implementing, maintaining and continually improving information security management systems .

Technological applications in smart cities for security and resilience – Key Standards

- **ISO/IEC 21823-1, Interoperability for IoT systems —** Part 1: Framework, provides an overview of interoperability as it applies to IoT systems and a framework for interoperability for IoT systems. This document enables IoT systems to be built in such a way that the entities of the IoT system can exchange information and mutually use the information in an efficient way. This document enables peer-to-peer interoperability between separate IoT systems.

Resilience standards key to sustainability and security in our cities

Technological applications in smart cities for security and resilience – Key Standards

- **ISO/IEC 38505-1, Information technology — Governance of IT — Governance of data — Part 1:** Application of ISO/IEC 38500 to the governance of data, applies to the governance of the current and future use of data that is created, collected, stored or controlled by IT systems, and impacts management processes and decisions relating to data. This standard is applicable to all organizations, including public and private companies, government entities, and not-for-profit organizations.
- **ISO/IEC TS 5147, Guidelines for Representation and Visualization of Smart Cities,** provides guidance on representation and visualization of smart cities, supporting the virtual simulation of security and resilience issues to understand threat impacts and develop solutions. (In development).

Resilience standards key to sustainability and security in our cities

Cybersecurity

ISO/IEC 27001, Information security management systems – Requirements, specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system within the context of the organization.

ISO/IEC 27035.2, Guidelines to plan and prepare for incident response, provides guidelines to increase the confidence of an organization's readiness to respond to an information security incident.

ISO/IEC 27701 Extension to ISO/IEC 27001 and ISO/IEC 27002 for privacy information management provides guidance for implementing and maintaining a Privacy Information Management System (PIMS). This framework is applicable to organisations of all types and sizes that process or control Personally Identifiable Information (PII) and supports organisations to adapt to, and report on, varied international privacy requirements.

Resilience standards key to sustainability and security in our cities

Climate resilience

IEC SRD 63152-2, City Service Continuity – Implementation Guideline and City Service Cases, provides guidance on how to ensure electrical service continuity in the event of a disaster (preparedness and countermeasures) from a plan, design, operation and collaboration perspective. (*1)

IEC SRD 63301-1, Systems Reference Deliverable (SRD) - Use Case Collection and Analysis: Water Systems in Smart Cities Part 1: High Level Analysis, focuses on the management of water systems, and the guarantee of water security supported by ICT and electro technologies, with effective coordination and clear orientation.

IEC 63347-1, Management of Public Health Emergencies in Smart Cities- Part1: High Level Analysis and

IEC 63347-2, Management of Public Health Emergencies in Smart Cities- Part 2: Use Case Analysis, provides a comprehensive set of high-level scenarios of how smart cities can best respond to public health emergencies, and strengthen their "Urban Immune System", with use cases related to the prevention, control and successful eradication of public health emergencies, and to deal with the longer-term harm that these may cause. (In development)

*1: This standard has been developed by the IEC Systems Committee for Smart cities.; IEC publishes implementation guidelines for city service continuity | IEC

Resilience standards key to sustainability and security in our cities

Future standards development opportunities

We could identify gaps for future standards development work:

- Agreed definitions for ‘secure’ smart cities
- IEC System of Systems security and resilience framework and methodology
- Guidance on reporting best practice for security and resilience
- Security use cases: residential IoT self-healing following a breach
- Resilience use cases: renewable energy and smart grids, share infrastructure, national electricity interconnect principles
- Guidance on the application of ISO 31000, Risk Management and IEC/ ISO 31010, Risk Assessment Techniques to assess and mitigate risks for Smart Cities
- Guidance on obsolescence – for example, smart devices when manufacturers no longer update software or provide parts for repair. There is a role for standards to define protocols to encourage competition and vendor options so equipment can be replaced, updated or receive ongoing support from other vendors.

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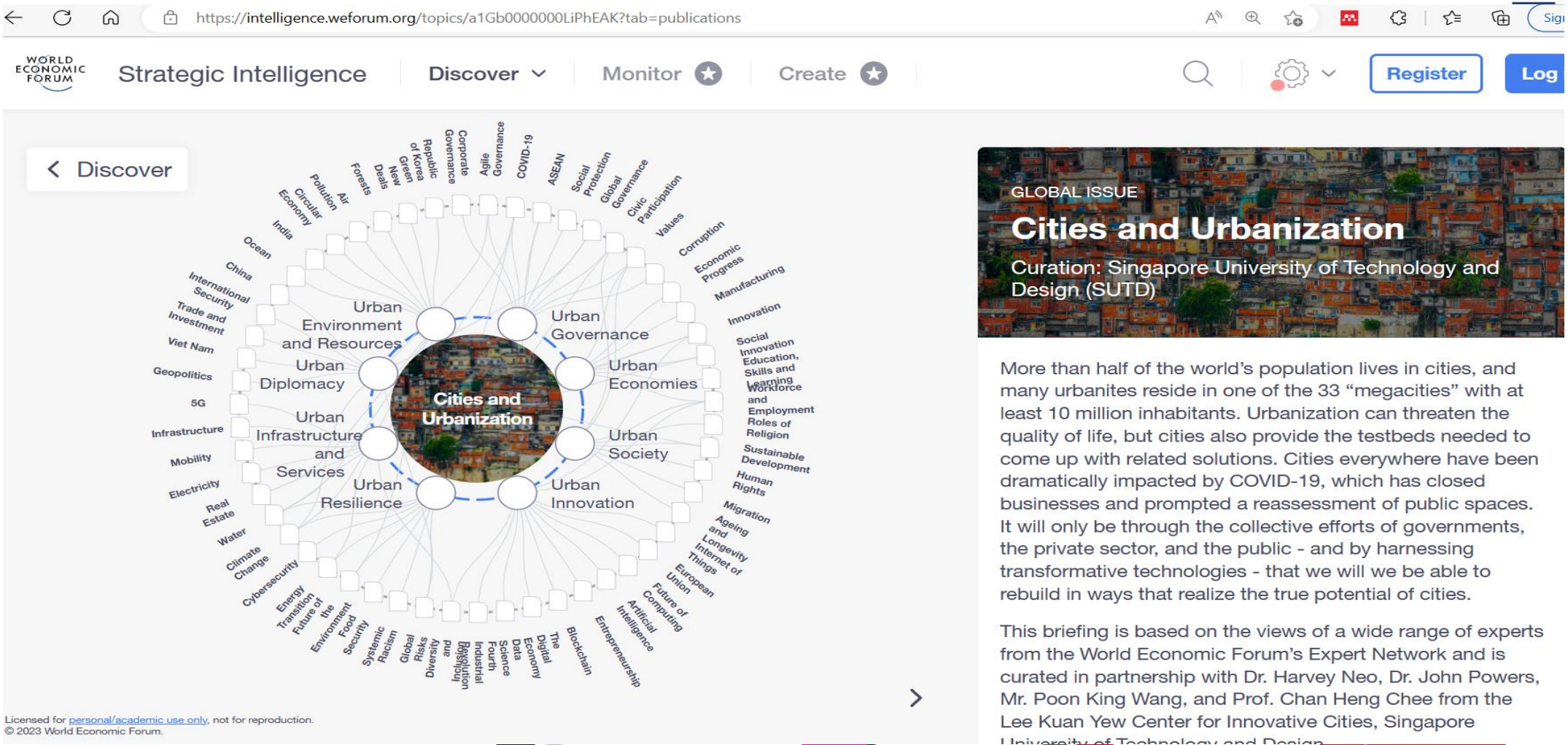
Interconnected and Interdependent World



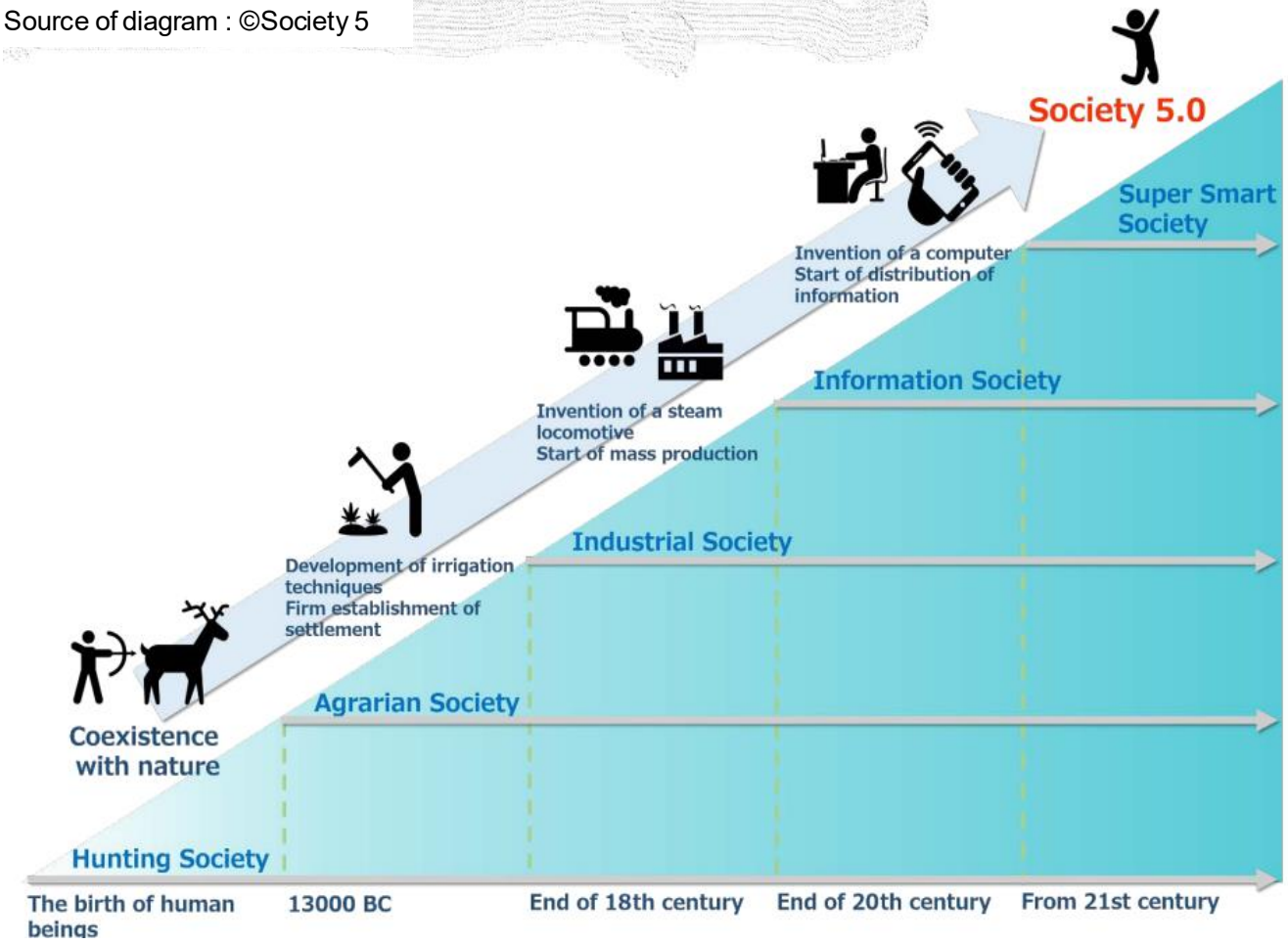
[Strategic Intelligence (weforum.org)]

NEXT:
Society 5
IWA 39

Source : ©World Economic Forum

Society 5 A digital society for an ageing population?

Source of diagram : ©Society 5



A digital society for an ageing population ?

Society 5.0 refers to the new society that follows the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0) and information society (Society 4.0). It is defined as “a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space.” It was first proposed in 2016 by Japan as the future society it should aspire to be. Furthermore, Society 5.0 was redefined in 2021 as “a sustainable and resilient society that protects the safety and security of the people and one that realizes the well-being of individuals.”

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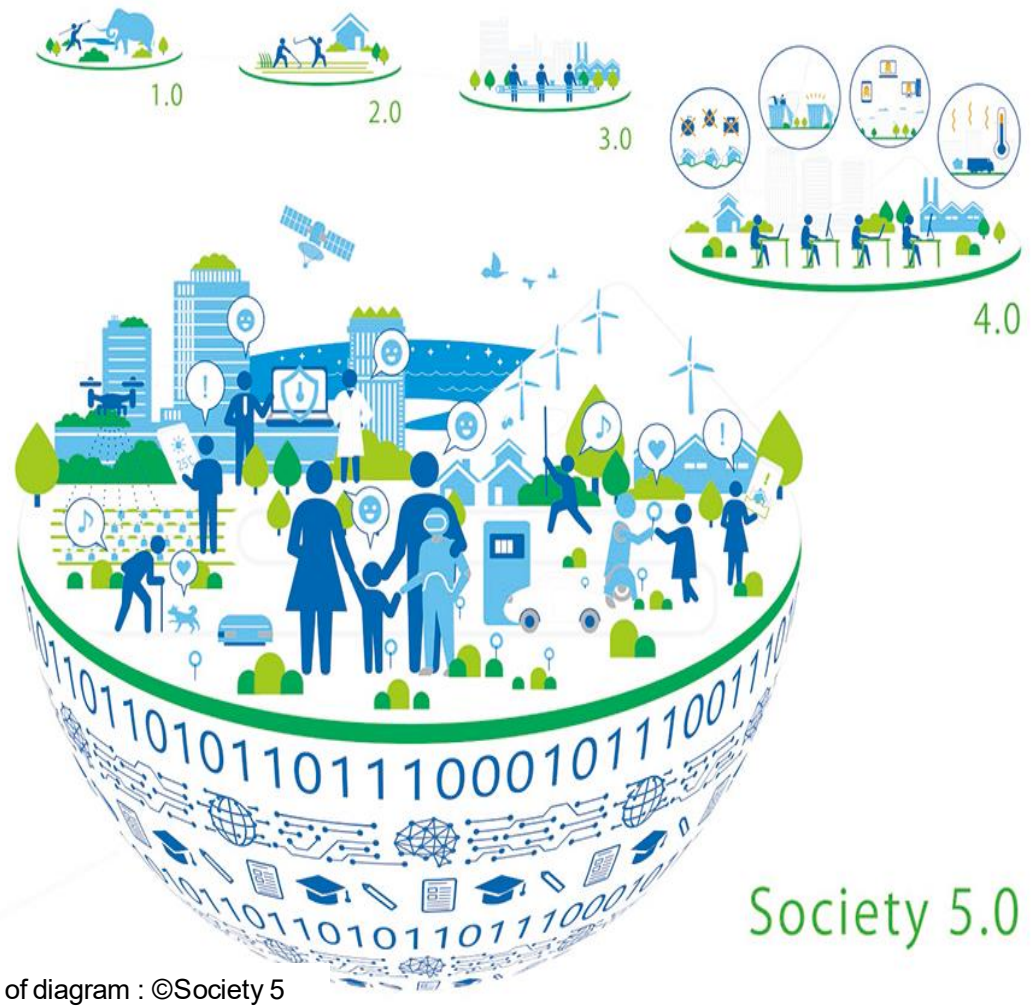
Society 5



Source of diagram : ©Society 5

Key to its realization is the advancement of science, technology, and innovation. Incorporating AI, quantum technology, IoT, and other cutting-edge technologies in all industries and social activities, and creating new value from innovation, will both achieve economic development and find solutions to social problems in parallel.

The strategy has three fundamental pillars.

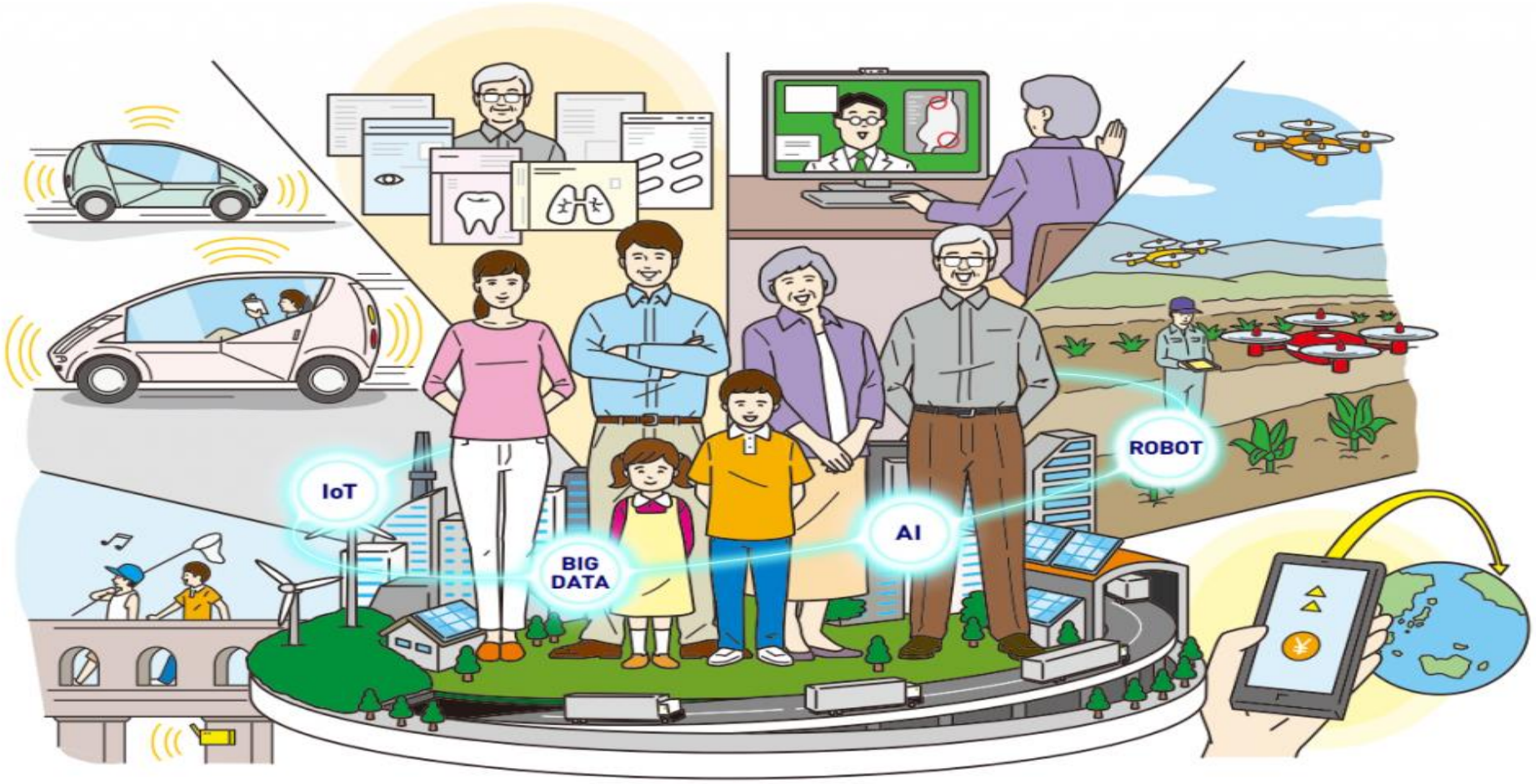
The first is strengthening research capabilities and developing human resources.

The second pillar is the strategic promotion of advanced and emerging technology.

With research capabilities and the seeds of technology developed through these two pillars, the creation of an innovation ecosystem—the third pillar—will be a game-changer in realizing the future society.

The integration of these three pillars is essential to realizing Society 5.0.

Society 5



Source of diagram : ©Society 5

- energy infrastructure;
- water supply and drainage infrastructure;
- transportation infrastructure;
- post and communication infrastructure;
- disaster risk-reduction infrastructure;
- cultural, sports and educational infrastructure;
- healthcare infrastructure; and
- social welfare infrastructure.

Classification of Urban Infrastructure, ITU

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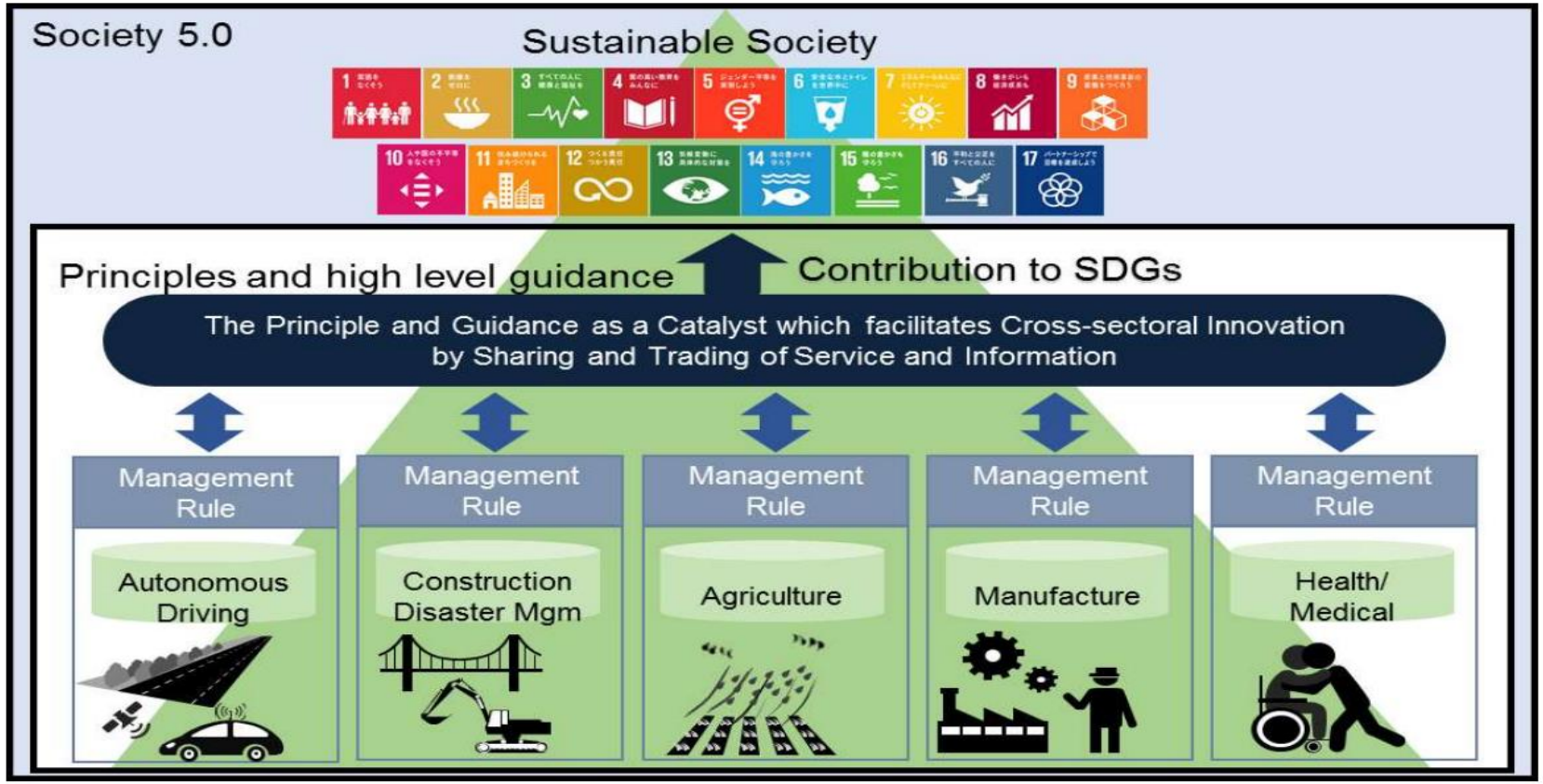
Society 5

Society 5.0 as an Ecosystem



Source of diagram : ©Society 5, Dr. Masahide OKAMOTO

IWA 39 *"Gap analysis for standardization in human-centred sustainable societies enabled with cyber physical systems"*, ISO/IWA 39:2022(E), Secretariat: JISC

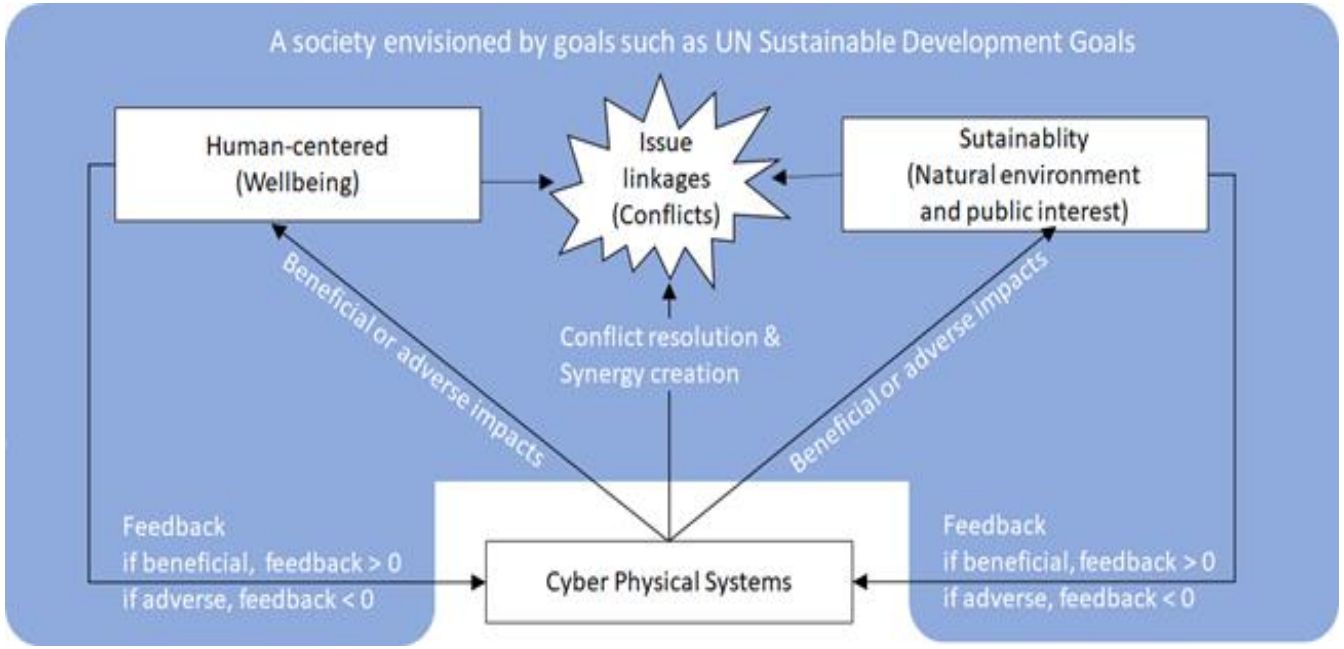


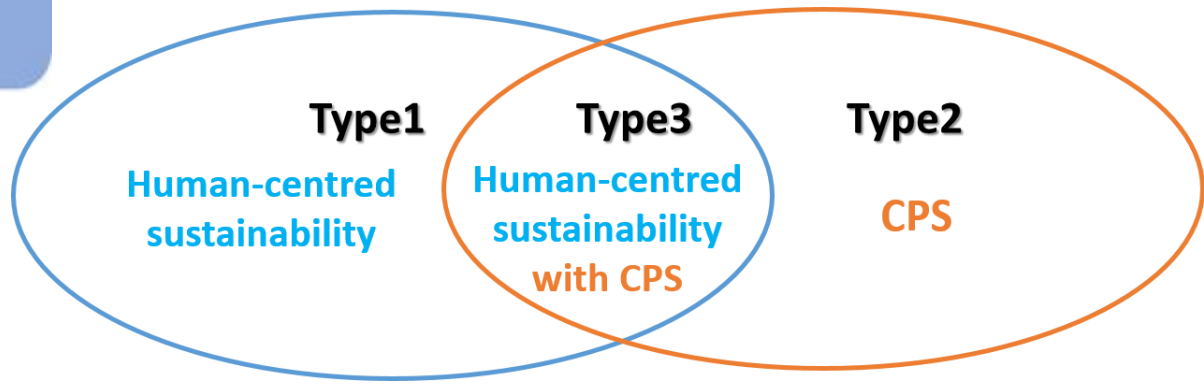
Figure - Perspectives of the gap analysis

IWA 39, along with 77 workshop participants, conducted a gap analysis between the existing areas of standardization and the goal of achieving human-centred sustainability.

In this document, standards issued by ISO, IEC, ITU-T are categorized by the following three types.

- Type 1: Standardization addressing human-centred sustainability which apparently has a potential relevance to Cyber Physical System.
- Type 2: Standardization addressing CPS which apparently has a potential relevance to human-centred sustainability.
- Type 3: Standardization addressing both human-centred sustainability and CPS.

Figure— Existing standardization mapping on human-centred sustainability with CPS



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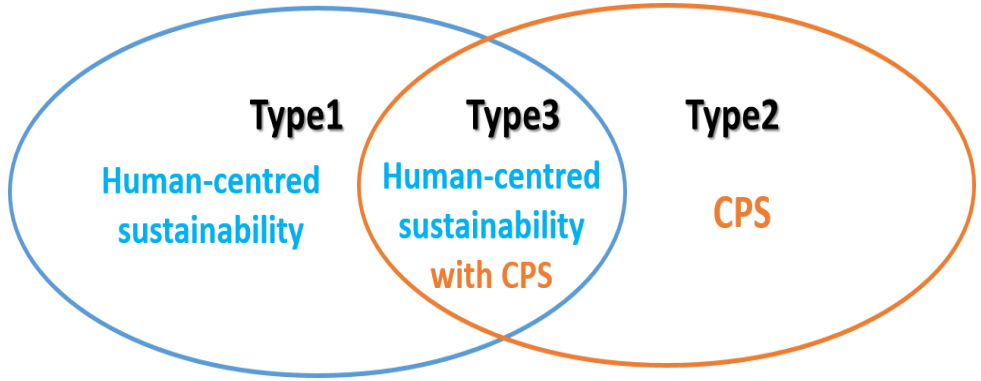
IWA 39 "*Gap analysis for standardization in human-centred sustainable societies enabled with cyber physical systems*", ISO/IWA 39:2022(E), Secretariat: JISC

No.	Title	Committee	SDGs	Type
ISO 37106:2021	Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities	ISO/TC 268	SDG 11 Sustainable cities and communities	3
ISO TS 37151:2015	Smart community infrastructures — Principles and requirements for performance metrics	ISO/TC 268/SC 1	SDG 11 Sustainable cities and communities	3
ISO 37153:2017	Smart community infrastructures — Maturity model for assessment and improvement	ISO/TC 268/SC 1	SDG 11 Sustainable cities and communities	3
ISO 37156:2020	Smart community infrastructures — Guidelines on data exchange and sharing for smart community infrastructures	ISO/TC 268/SC 1	SDG 11 Sustainable cities and communities	3
ISO 37160:2020	Smart community infrastructure— Electric power infrastructure — Measurement methods for the quality of thermal power infrastructure and requirements for plant operations and management	ISO/TC 268/SC 1/	SDG 11 Sustainable cities and communities	3
ISO/DIS 7817 [Under development]	Building Information Modelling — Level of Information Need — Concepts and principles	ISO/TC 59/SC 13	SDG 11 Sustainable cities and communities	3



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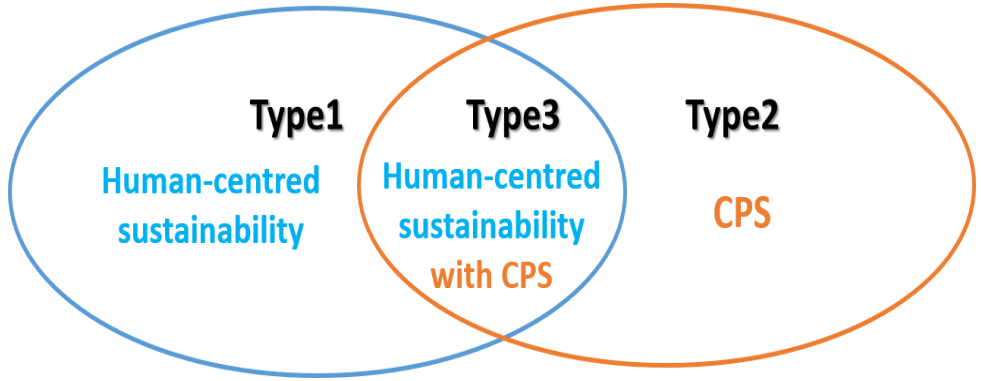
No.	Title	Committee	SDGs	Type
IEC SRD 63235:2021	Smart city system – Methodology for concepts building	IEC/SyC Smart Cities	SDG 11 Sustainable cities and communities	3
IEC 63205 [Under development]	Smart Cities Reference Architecture (SCRA)	IEC/SyC Smart Cities	SDG 11 Sustainable cities and communities SDG 9 Industry, innovation and infrastructure	3
IEC SRD 63188 [Under development]	Systems Reference Deliverable – Smart Cities – Smart Cities Reference Architecture Methodology (SCRAM)	IEC/SyC Smart Cities	SDG11 Sustainable cities and communities SDG 9 Industry, innovation and infrastructure	3
IEC SRD 63301 [Under development]	Use Case Collection and Analysis: Water Systems in Smart Cities	IEC/SyC Smart Cities	SDG 11 Sustainable cities and communities SDG 6 Clean water and sanitation	3
IEC 60050-831 [Under development]	International Electrotechnical Vocabulary (IEV) – Part 831: Smart city systems	IEC/SyC Smart Cities	SDG 9 Industry, innovation and infrastructure SDG 11 Sustainable cities and communities	3



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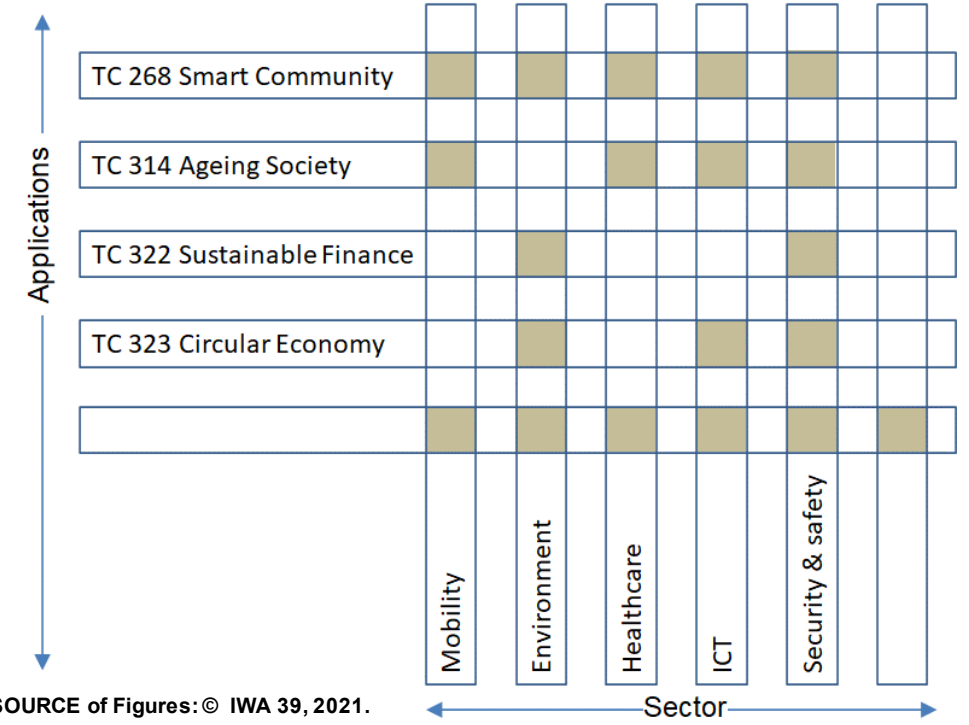
- Future standardization areas are envisioned in order to fill in the standardization gaps for contributing to HSCPS (human-centred sustainability enabled)
- More substantiated topics to contribute to HSCPS may include, but are not limited to;
  - Societal governance architecture
  - Plant remote and automated maintenance
  - Drone utilization
  - Disaster risk reduction
  - Hygiene and sanitation
  - Virtual power plant for sustainability
  - Harm reduction of products
  - Wellness enhancement
  - Food loss and waste reduction
  - Diversity and inclusion enablement
  - Business digital platform
  - ESG (environmental, social and governance) and sustainable finance platform
  - A meaningful and safe digital life
  - Circular economy
  - XR (Extended Reality) entertainment



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Standardization on HSCPS includes intrinsic cross-cutting nature and inevitably overlaps with existing standardization works. This is, however, becoming a common feature of recent standardization areas as shown in the Figure above (Cross-cutting nature of recent standardization areas (vertical columns represent existing technical sector-specific areas) . Those subjects can be a candidate for a new application (horizontal field of work) as well as addressed in existing committees.

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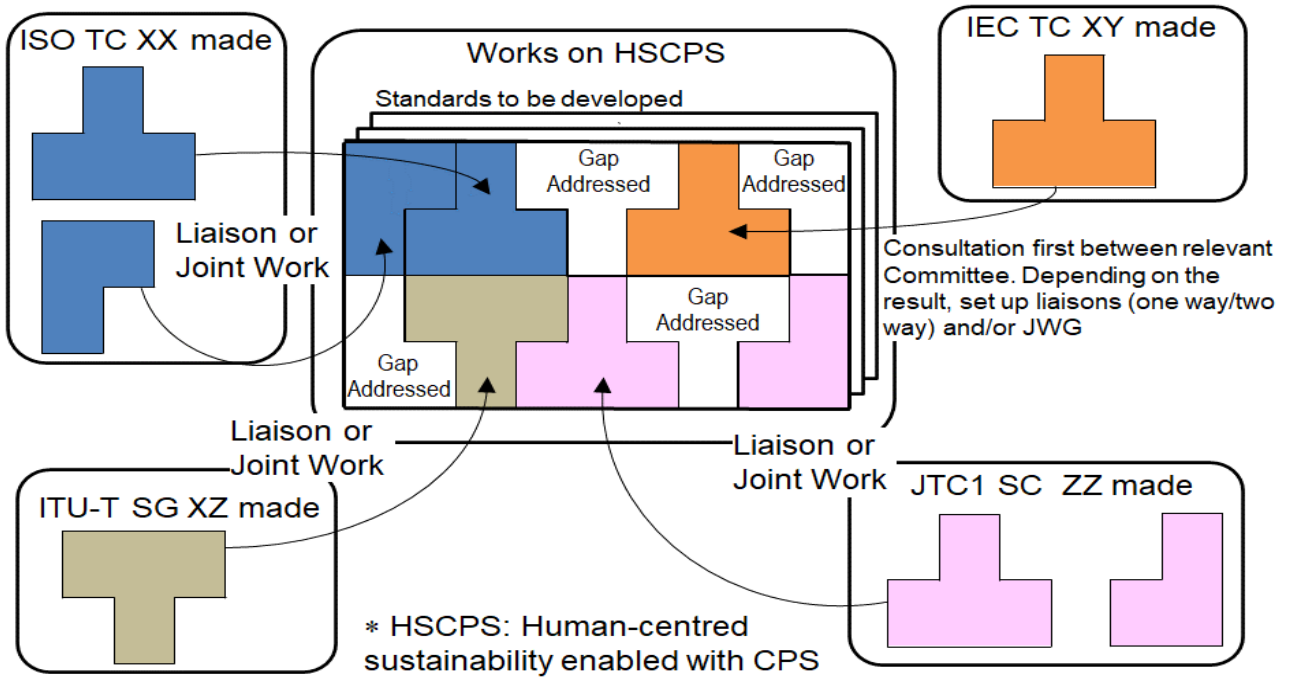
- Standardization on HSCPS will make sure that any requirements, guidelines and/or guidance which have been developed by other committees will not be recreated, but just referred to in its standards (see in the Figure "**Building block approach**" below). To put it simply, the standardization on HSPCS will borrow the contents of standards from other committees as necessary if they already exist. This can be achieved in either way, Liaison or Joint work.



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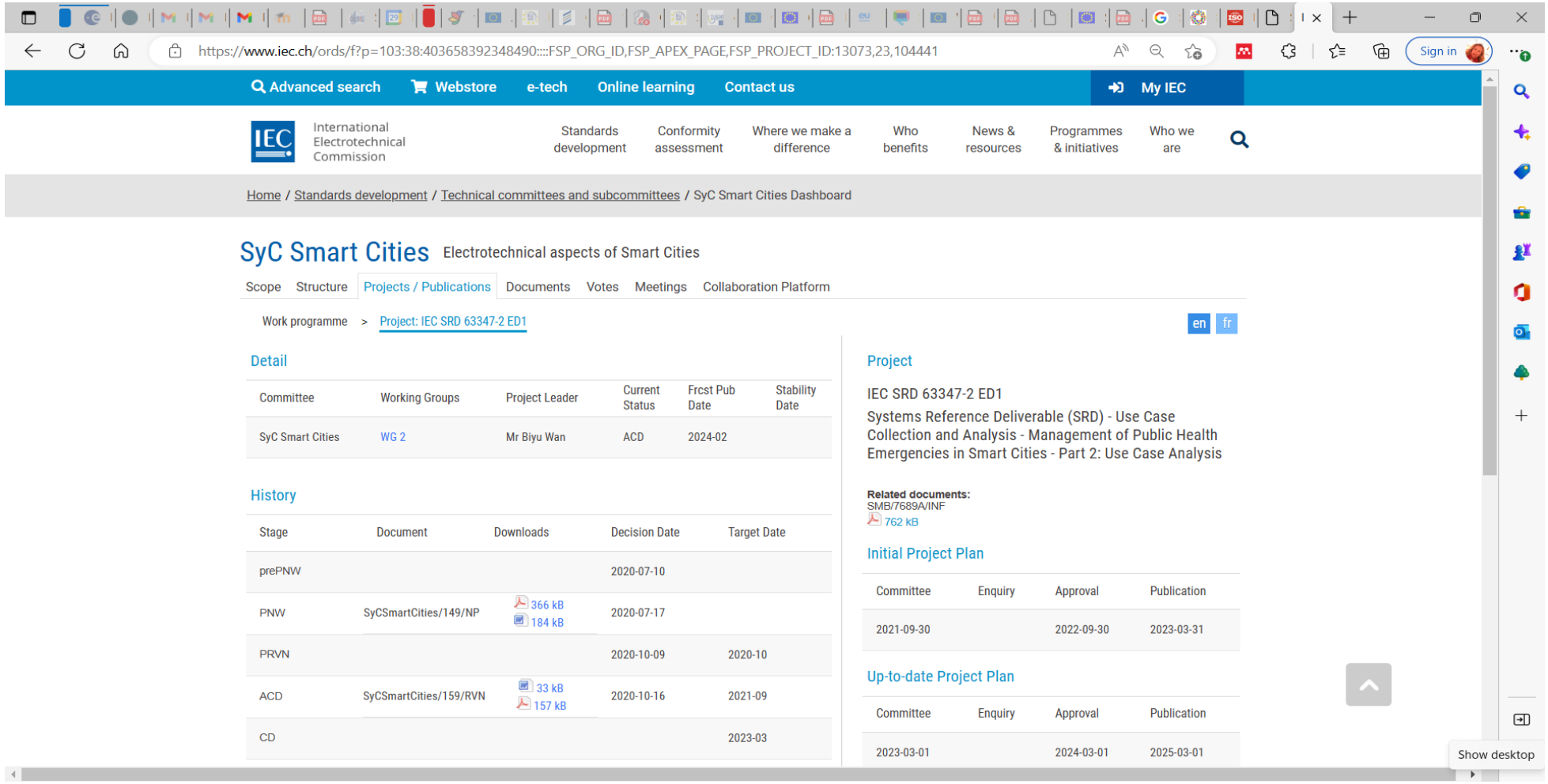
IEC- International Electrotechnical Commission



IEC - SyC Smart Cities Dashboard > Projects / Publications: Work programme, Publications, Stability Dates, Project files

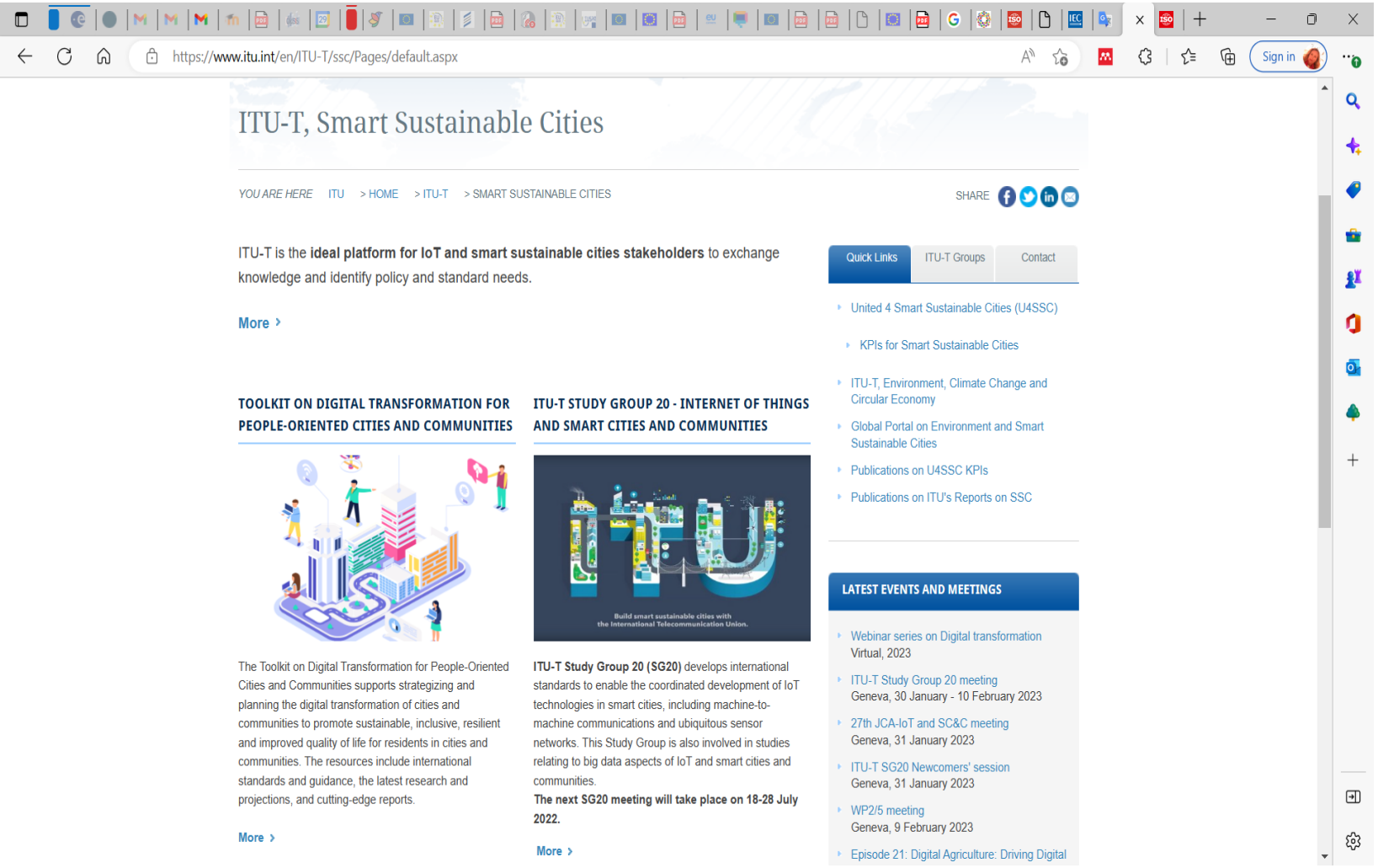
IEC- International Electrotechnical Commission

SyC Smart Cities

SyC Smart Cities Subcommittee(s) and/or Working Group(s)

WG 1 Terminology
WG 2 Market Relationship
WG 3 Reference Architecture P
roject Team
PT 63152-2 Smart Cities - City Service Continuity against disasters the role of the electrical supply
Joint Working Groups
JWG 14 Smart Cities Reference Architecture linked to ISO/TC 268
Advisory Groups
AG 10 Cooperation
AG 11 Communications, Outreach, Promotion & Advocacy based Strategy Advisory Group (COPAG)
AG 12 City Observatory & Research Advisory Group (CORAG)
Ad-Hoc Groups
ahG 6 Developing good working practice in the Governance Framework
ahG 8 Strategy
ahG 9 Sustainable Digital Transformation of the Urban Landscape
ahG 13 Decarbonization aspects of smart cities
Joint Project Teams
JPT 3 IEV part on terminology relating to systems, smart and digital Managed by TC 1
Joint ad-Hoc Groups
JAHG 5 Interdependencies between ICT and Electrotechnology in Smart Cities linked to ISO/IEC JTC 1
Chair's Advisory Group
CAG 1 Chair's Advisory Group
Open Forum
OF 1 Open Forum 1 - Smart Cities Events

ITU- International Telecommunication Union



- Smart sustainable cities - YouTube
- TOOLKIT ON DIGITAL TRANSFORMATION FOR PEOPLE-ORIENTED CITIES AND COMMUNITIES
- ITU-T STUDY GROUP 20 - INTERNET OF THINGS AND SMART CITIES AND COMMUNITIES
- The "United for Smart Sustainable Cities" (U4SSC) is a UN initiative coordinated by ITU, UNECE and UN-Habitat, and supported by other 14 UN agencies to achieve Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable".
- The U4SSC developed a set of international key performance indicators (KPIs) for Smart Sustainable Cities (SSC) to provide cities with the means for self-assessments in order to achieve the sustainable development goals (SDGs)
- ITU-T, Smart Sustainable Cities

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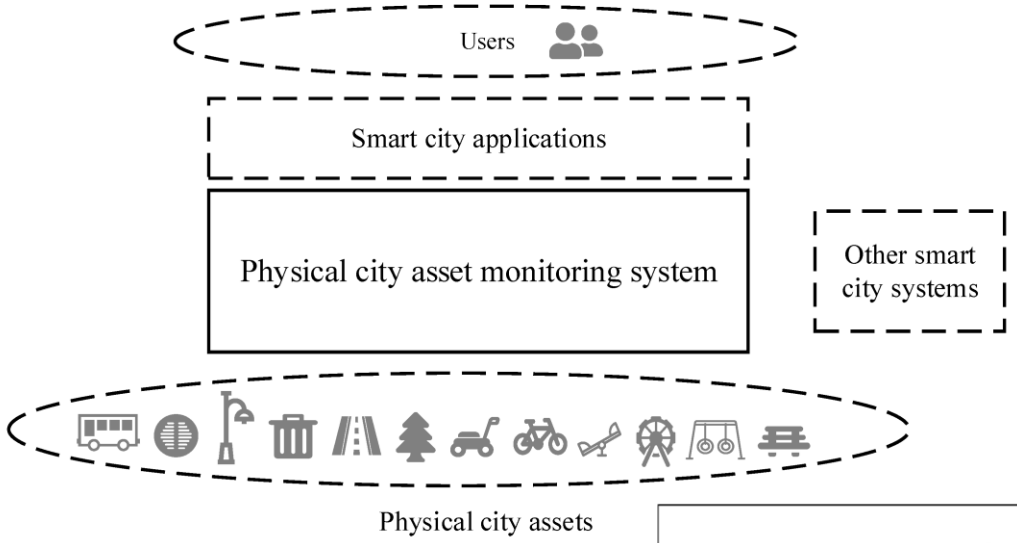
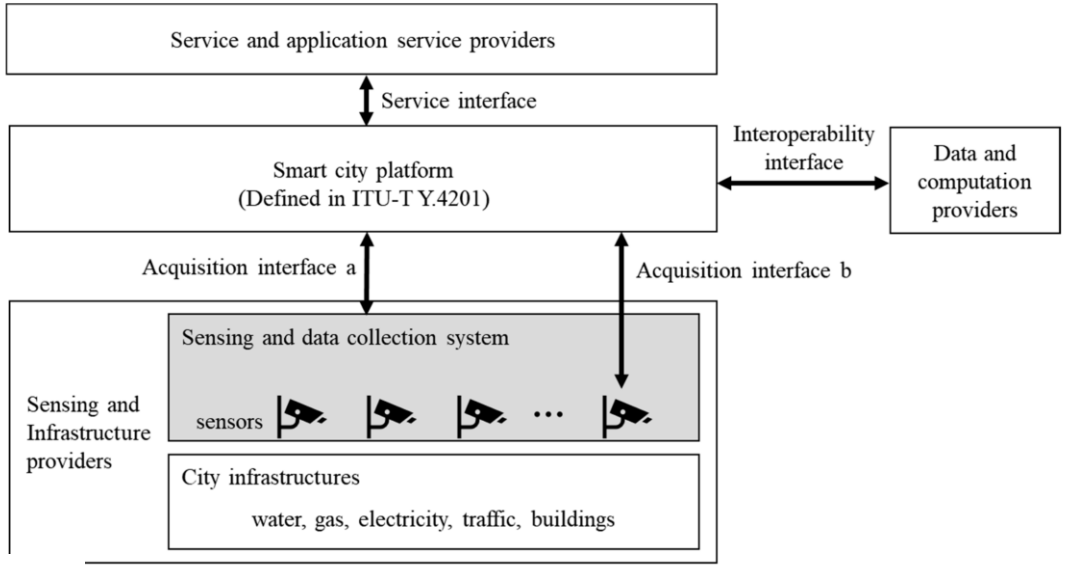
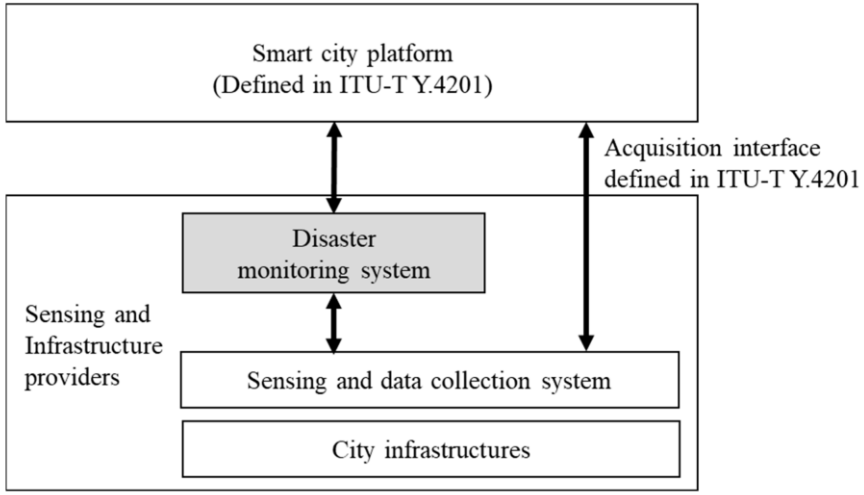
ITU - Interoperability

International Telecommunication Union (ITU) via its Study Group 20, in supporting the adoption of information and communication technologies (ICTs) in Smart City. These standards include the classification of urban infrastructure, the **interoperability between urban infrastructure and smart city platforms**, and the requirements of detailed infrastructure from the perspective of ICT and the Internet of things (IoT).







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CEN CENELEC

European Committee for Standardisation/Comité Européen de Normalisation
European Committee for Electrotechnical Standardization

- CEN-CENELEC-ETSI Smart and Sustainable Cities and Communities Sector Forum (SF-SSCC)
- the CEN-CENELEC-ETSI Sector Forum on 'Smart and Sustainable Cities and Communities' is the advisory and coordinating body for European standardization activities in this field. The Forum's objective is to help address cities' standardization needs and help them become smarter
- Secretariat : AFNOR (CEN)
- Activity sector: Digital society_General and more sustainable by using standards.

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CEN CENELEC

European Committee for Standardisation/Comité Européen de Normalisation
European Committee for Electrotechnical Standardization

- **Smart and sustainable cities and communities -** The work in this field is coordinated by the **CEN-CENELEC-ETSI Sector Forum on 'Smart and Sustainable Cities and Communities'** and the relevant standardization activities are developed by **CEN/TC 465 'Sustainable Cities and Communities'.** The work of the new TC is to assist cities and communities' decision making and support them in their sustainability efforts through the development of requirements, frameworks, guidance, supporting tools and techniques helping to achieve sustainability.
- The Technical Committee has started to involve all interested parties. In 2022, it continued addressing specific European needs through a consistent approach with ISO/TC 268 'Sustainable Cities and Communities'.
- The following topics were identified as potential candidates for European standardization: **localising UN Sustainable Development Goals, nature-based solutions, (Climate) resilience of cities & communities, co-creation & stakeholder engagement, digital transformation, citizen services and smart energy.**

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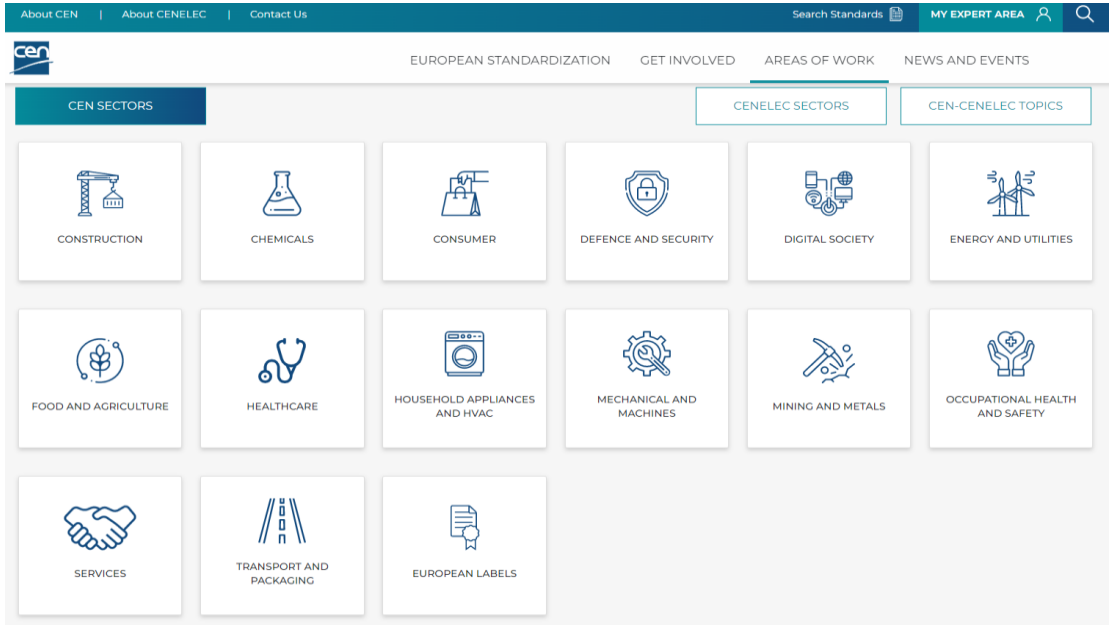
CEN CENELEC ETSI

European Committee for Standardisation/Comité Européen de Normalisation
European Committee for Electrotechnical Standardization

- **CEN BUSINESS SECTOR: ENERGY AND UTILITIES**
- **CEN/CLC/ETSI/SEG-CG** CEN-CENELEC-ETSI Coordination Group on Smart Energy Grids
  CEN/CLC/ETSI/SMCG =

CEN-CENELEC-ETSI Coordination Group on Smart Meters (disbanded)



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ETSI- European Telecommunications Standards Institute

Smart cities initiatives

- **CEN-CENELEC-ETSI Sector Forum on Smart and Sustainable Cities and Communities**
- ETSI Human Factors Technical Committee
- ETSI Smart Cities
- EU Urban Agenda Digital Transition Partnership
- OASC Open and Agile Smart Cities
- European Innovation Partnership on Smart Cities & Communities (EIP-SCC)
- Eurocities
- Smart cities and communities Standardization to meet citizen and consumer requirements, ETSI Smart City Task Force: the Newsroom

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SMART SPECIALISATION PLATFORM

- Smart specialisation has made a real difference in the way European regions are designing their innovation strategies, creating or reinforcing cooperation at all levels, especially with local business spheres.
- The smart specialisation (S3) approach offers a reinforced environment for increasing the interaction and cooperation among the different innovation ecosystems stakeholders, both at local, regional, national and international levels.
- 'Friends of Smart Specialisation'2

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SMART RESILIENCE (EU) PROJECTS

- Smart Resilience Indicators for Smart Critical Infrastructures | SmartResilience Project | Fact Sheet | H2020 | CORDIS | European Commission (europa.eu), , H2020-DRS-2015, **Coordinated by** STEINBEIS **EU-VRI** GMBH - EU-VRi – European Virtual Institute for Integrated Risk Management
- Prof. Aleksandar S. Jovanovic, Director
- **Deliverables :** Documents, reports (45)
- **Publications:** Conference proceedings (26)

  Book chapters (5); Peer reviewed articles (6)

SMART RESILIENCE INDICATORS FOR SMART CRITICAL INFRASTRUCTURES

- **SmartResilience e-Learning platform** , Steinbeis Advanced Risk Technologies e-Learning platform (risk-technologies.com)
- Directly at http://moodle.risk-technologies.com/moodle/, 2. Via the “Toolbox” tab at the top of the main SmartResilience webpage (http://www.smartresilience.eu-vri.eu/) that opens the ResilienceTool (which includes the link to the e-Learning platform, 3. Directly via the ResilienceTool webpage, and then following the e-Learning link (http://resiliencetool.eu-vri.eu).

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EU FUNDING FOR CITIES

Funding opportunities

- **European Structural and Investment Funds**
- **InvestEU Fund**
- **Urban Innovative Actions**
- **URBACT**
- **Horizon 2020**
- **LIFE**
- **18 041 results for 'smart' AND 'cities' , Search | CORDIS | European Commission (europa.eu)**

- ZONESEC (FP7)- Towards an EU framework for the security of Widezones
- ResiStand, Increasing disaster Resilience by establishing a sustainable process to support Standardisation of technologies and services
- STRATEGY (H2020), Facilitating EU pre-Standardisation process Through streamlining and vAlidating inTeroperability in systems and procEdures involved in the crisis management cYcle (11 CWAs + 2 TSs)
- Smart Cities and Communities | Programme | H2020 | CORDIS | European Commission (europa.eu);

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EU POLICIES

- **January 16, 2023 - the NIS 2 Directive (**Security of **Network and Information Systems** entered into force).
- **December 14, 2022, we have the final text - the Critical Entities Resilience Directive (CER) was published in the Official Journal of the European Union as Directive (EU) 2022/2557. Full name:** The full name is "DIRECTIVE (EU) 2022/2557 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC (Text with EEA relevance)". **Deadlines:** By **17 October 2024,** Member States shall adopt and publish the measures necessary to comply with this Directive. They shall immediately inform the Commission thereof. They shall apply those measures from **18 October 2024.** Each Member State shall adopt by **17 January 2026** a strategy for enhancing the resilience of critical entities (the 'strategy'). By **17 July 2027,** the Commission shall submit to the European Parliament and to the Council a report assessing the extent to which each Member State has taken the necessary measures to comply with this Directive.
- **EU New Standardisation Strategy** (The EU needs a fast, responsive, efficient and inclusive standardisation system to meet its objectives for the digital and green transitions of the EU economy, and to strengthen the resilience and the functioning of the Single Market 2022(COM)31-2/2/2022.
- **New Interoperable Europe Act,** proposal and its accompanying Communication to strengthen cross-border interoperability and cooperation in the public sector across the EU. and as such, it is an essential step to achieve Europe's digital targets for 2030 and support trusted data flows (November 2022).

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EU POLICIES

Understanding Cybersecurity in the European Union.

- 1. The NIS 2 Directive
- 2. The European Cyber Resilience Act
- 3. The Digital Operational Resilience Act (DORA)
- 4. The Critical Entities Resilience Directive (CER)
- 5. The Digital Services Act (DSA)
- 6. The Digital Markets Act (DMA)
- 7. The European Health Data Space (EHDS)
- 8. The European Chips Act
- 9. The European Data Act
- 10. European Data Governance Act (DGA)
- 11. The Artificial Intelligence Act
- 12. The European ePrivacy Regulation
- 13. The European Cyber Defence Policy
- 14. The Strategic Compass of the European Union
- 15. The EU Cyber Diplomacy Toolbox

Destination Earth (DestinE) aims to develop – on a global scale - a highly accurate digital model of the Earth to monitor and predict the interaction between natural phenomena and human activities. As part of the European Commission's Green Deal and Digital Strategy, DestinE will contribute to achieving the objectives of the twin transition, green and digital.

DestinE will be developed gradually through the following key milestones:

•By 2024: Development of the core service platform, the data lake and the first two digital twins on extreme natural events and climate change adaptation.

•By 2027: Further enhancement of the DestinE system and integration of additional digital twins and related services.

•By 2030: A 'full' digital replica of the Earth.

•EU space policy: Boosting EU competitiveness and accelerating the twin ecological and digital transition

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WAY FORWARD

ONCE UPON A TIME

- Political intuition
- The opportunism of businessmen
- The smart city utopia
- What will the new 2030 generation of smarter cities look like?

Source: UNESCO, Smart Cities 2030

NEW CONTEXT CHALLENGES

- Scale diversification
- New players
- The lab showcase
- The from-scratch trend

PROSPECRIVES

- A choice of purpose
- The business city trend
- The eco city trend
- The citizen city trend
- What smart cocktail?

A CHOICE OF ECOSYSTEM

Every city is an ecosystem
The cyborg city ecosystem
(a network city; a computing city; Datapolis; Cyber management; standard city)
Cyborg or human?
A CHOICE OF SOCIETY
A CHOICE OF GOVERNANCE
A CHOICE OF ECOLOGY
A CHOICE OF PRIVACY
A CHOICE OF PROGRAMMING

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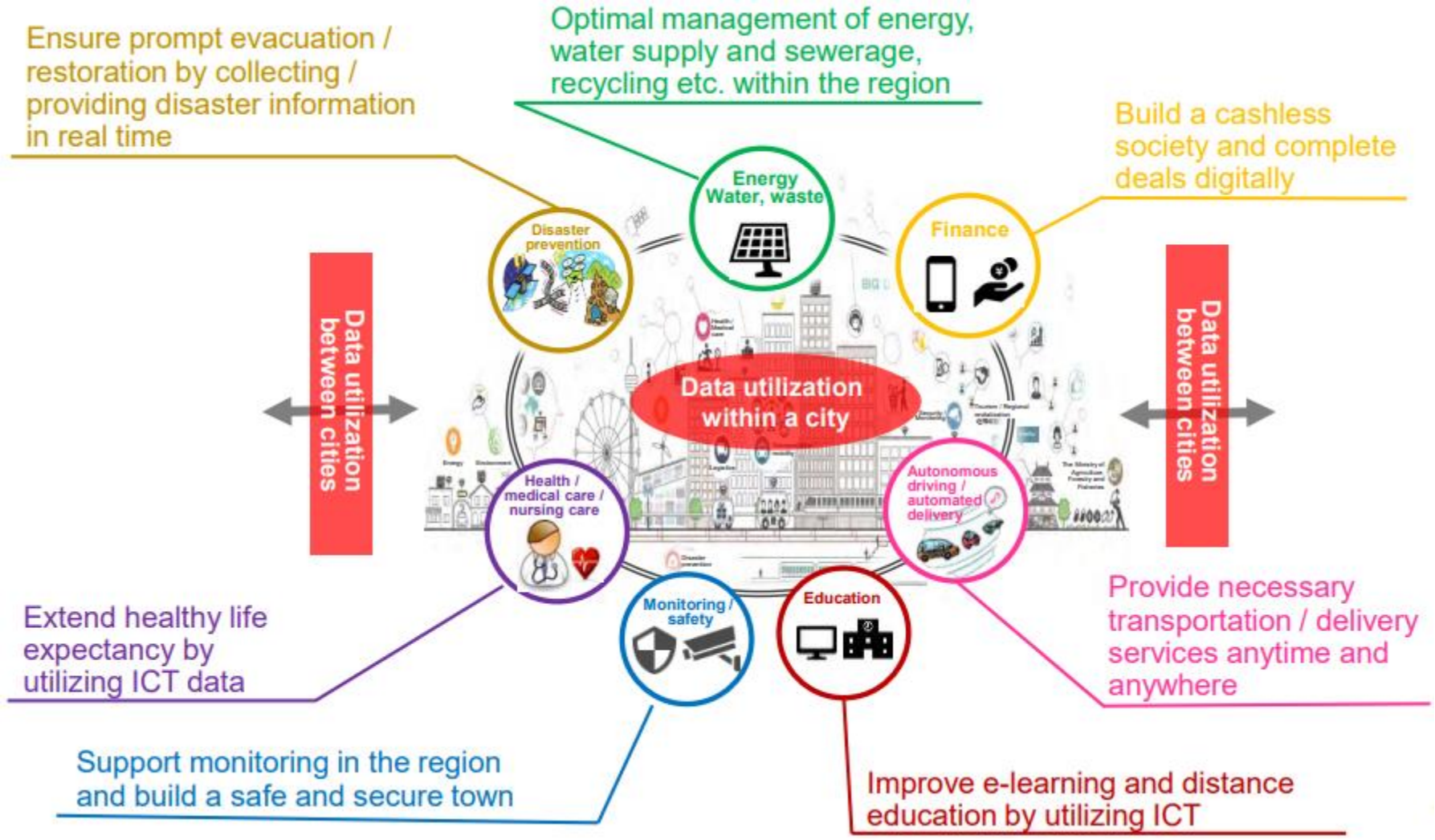
WAY FORWARD



Cities faced various social challenges such as population decline, aging, disasters, and infectious disease risk, but also digitalization, AI, and IoT are rapidly developing with COVID-19 and/or other biological threats. Governments aim to improve the quality of life of citizens and the efficiency of urban activities in creating smart cities. Human-centered societies that combine economic development and social task solving through a highly fused system between virtual and real space could be a balanced proposal.

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Biography

- European Trends in Standardization for Smart Cities and Society 5.0: NEC Technical Journal | NEC
- Title (jpi-urbaneurope.eu)
- ETSI Smart City Task Force: the Newsroom
- Work Programme 2022 (cencenelec.eu)
- Smart City standards for citizens | StandICT.eu 2023
- Smart cities and communities/ technologies and services for smart and efficient energy use | Joinup (europa.eu)
- SMART CITIES AND COMMUNITIES | Joinup (europa.eu)
- U4SSC Management team (itu.int)
- ICLEI Europe •• Projects (iclei-europe.org)
- Smart Cities – SESEC IV Archive 2016 – 2020
- Service Unavailable (eu-vri.eu)
- Home - Resilient Cities Network
- Homepage | IEC
- ISO – Search
- Smart City Institute Japan | HOME (sci-japan.or.jp)
- Smart Resilience Indicators for Smart Critical Infrastructures | SmartResilience Project | Results | H2020 | CORDIS | European Commission (europa.eu)
- SMART CITIES' STANDARDS - Webinar in Greek - Crisis (crisisproject.eu)
- ELOT 1457, Σχέδιο ΕΛΟΤ 1457, Βιώσιμη ανάπτυξη στις πόλεις - Δείκτες αναφοράς επιδόσεων βιωσιμότητας (elot.gr); ELOT1457_20180712_ENQ.pdf, ΠΡΟΤΥΠΑ_ΕΛΟΤ.pdf (deiktis.gr)
- The Critical Entities Resilience Directive (CER) (critical-entities-resilience-directive.com)
- Standards make cities smarter Smart Cities – Forum Meeting John Walter, ISO President Elect (ema.org.mx)
- Japanese Government's Guidebook for Smart City Construction | Herald English (heraldk.com)

- Future Smart Cities Planned By 2050 – YouTube
- AMAZING Future Cities Currently Being Built – YouTube
- Saudi Arabia's Line City Explained - YouTube
- India - 2023 | Emerging smart cities | ININ | 4k | Info World | - YouTube
- 15 Most Impressive Upcoming & Ongoing Smart Cities Projects in Africa – YouTube
- Future cities: Urban planners get creative | DW Documentary - YouTube
- #CES 2023 - Smart Cities – YouTube
- 15 Technology Predictions for 2030! – YouTube
- WORLD ECONOMIC FORUM - SMART CITIES - YouTube
- What is a smart city? | CNBC Explains – YouTube

…

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Thank you for your attention!

Dr. Aikaterini Poustourli

Presentation for the homonymous Webinar took place on January 30th 2023, and delivered in the framework of the Crisis Project, of the EU Erasmus + Program, and the UTH (Business Administration Dept.)

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