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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

Internet of things and smart cities and communities –
Evaluation and assessment

Smart sustainable cities maturity model

Recommendation ITU-T Y.4904

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For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T Y.4904

Smart sustainable cities maturity model

Summary

Recommendation ITU-T Y.4904 provides a maturity model for smart sustainable cities. This maturity model helps to identify the goals, levels and key measures that are recommended for cities to effectively examine their current situation and determine critical capabilities needed to progress toward the long-term goal of becoming smart sustainable cities (SSCs).

The Recommendation includes:

- Smart sustainable city maturity model (SSC-MM),
- Maturity dimensions in smart sustainable cities,
- Maturity levels for smart sustainable cities, and
- Mapping of key performance indicators in smart sustainable cities.

History

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Introduction

Maturity model provides a theoretical continuum where maturity increments from one level to the next.

A maturity model can be viewed as a set of structured levels that describe how well the behaviours, practices and processes can reliably and sustainably produce required outcomes. A maturity model can also be used as a tool to understand the current situation and set well-defined goals.

Smart sustainable cities maturity model identifies the levels, key measures, goals, and actions that are recommended for cities to effectively move through the levels and to examine their current situation and determine critical capabilities needed to progress toward the long-term goal of becoming SSCs.

The goal of this Recommendation is to help cities and related stakeholders to develop a common language, improve intra- and inter-city collaboration in defining and executing a city development strategy, and to promote and encourage the use of emerging technologies and solutions.



Documents

Rec. ITU-T Y.4904 (12/2019)

Document Sharing Hub

Recommendation ITU-T Y.4904

Smart sustainable cities maturity model

1 Scope

This Recommendation provides a maturity model for SSCs. A method of assessing and evaluating performance of various dimensions at the current and target maturity levels is necessary to plan and execute a continuous improvement strategy in pursuing a SSC. The goal of the SSC-MM is to help cities and all related stakeholders to use the maturity model to develop a common language, improve intra- and inter-city collaboration in defining and executing a city development strategy, and to promote and encourage the use of emerging technologies and solutions.

The following are some objectives of the SSC-MM:

- To describe general smart sustainable city goals, recognizing that these will vary from city to city.
- To assess the current situation in developing SSCs.
- To assist in formulating a development strategy and outline the necessary milestones.
- To learn the challenges and global best practices in developing SSCs.
- To help cities to do self-evaluation and enable them to share the results with other cities.

A detailed maturity assessment methodology is outside the scope of this Recommendation. Cities are recommended to identify a suitable detailed maturity assessment methodology by themselves.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T Y.4901] Recommendation ITU-T Y.4901/L.1601 (2016), *Key performance indicators related to the use of information and communication technology in smart sustainable cities*.
- [ITU-T Y.4902] Recommendation ITU-T Y.4902/L.1602 (2016), *Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities*.
- [ITU-T Y.4903] Recommendation ITU-T Y.4903/L.1603 (2016), *Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 city [b-ITU-T Y.4900]: A urban geographical area with one (or several) local government and planning authorities.

3.1.2 smart sustainable city [b-ITU-T Y.4900]: 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.

NOTE – City competitiveness refers to policies, institutions, strategies and processes that determine the city's sustainable productivity.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 city sustainability: The sustainability of a smart city based on its economic ability to generate income and employment for the livelihood of its citizens. The guarantee of equitably delivery of social welfare (safety, health, education, etc.) of the citizens despite differences in class, race or gender, the protection of existing environment as well as the future quality and reproducibility of natural resources and the governance of a city, that is, to maintain social conditions of stability, democracy, participation and justice.

3.2.2 maturity model: A model derived from one or more specified assessment model(s) that identifies the set of phased development or progress levels showing the assessment categories.

NOTE – Modified from [b-ISO 37153]:2017(en), 3.1

3.2.3 smart sustainable city maturity model (SSC-MM): A model derived to identify the set of phased development or progress levels for a specified city or cities in terms of smart sustainable development.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

EV	Electric Vehicle
ICT	Information and Communication Technology
IoT	Internet of Things
KPI	Key Performance Indicator
SDG	Sustainable Development Goal
SSC	Smart Sustainable City
SSC-MM	Smart Sustainable City Maturity Model

5 Conventions

None.

6 Smart sustainable city maturity model (SSC-MM)

In this Recommendation the smart sustainable city maturity model (SSC-MM) measures the achievement of sustainable development goals (SDGs) in accordance with the information and communication technology (ICT) development of the city. To align with SDGs, the SSC-MM includes the three pillars of sustainability: economic, environmental and social [ITU-T Y.4903].

This Recommendation also features the SSC-MM as a model with five maturity levels and three dimensions as guidelines for cities to progress in order to achieve the SSCs development goals, as shown in Figure 1. A maturity level can be determined for each dimension in a city. The city needs to accomplish all targeted achievements for each selected topic pertaining to a dimension in order to reach a certain maturity level for that topic. Subsequently, the city's SSC maturity level can be determined by combining the maturity levels of the dimensions. The topics used by the city and how they are organised into the three dimensions may be adapted to reflect the approach of each city. The city will incorporate all its ongoing and completed SSC projects and initiatives during its SSC strategy development phase in order to ensure alignment with the existing efforts. Additionally, appropriate safeguards should be put in place for data or information handled in relation to the maturity model. The key performance indicators (KPIs), among others, reflect the city's performance and achievements, thus, they are recommended to be used for assessing maturity levels.

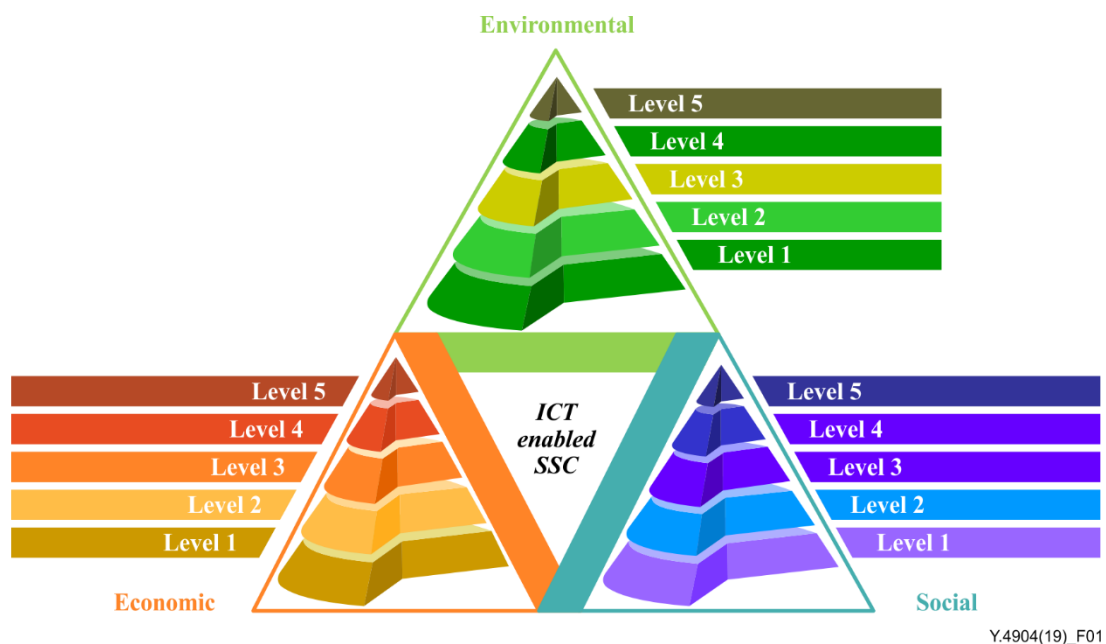


Figure 1 – Smart sustainable city maturity model (SSC-MM)

Based on the definition of SSC and the UN sustainable development goals [b-UN Resolution 288] the following are the maturity dimensions of the SSC-MM:

- Dimension 1 – Economic: The ability to generate income and employment for the livelihood of the citizens.
- Dimension 2 – Environmental: The ability to protect the existing as well as the future quality and reproducibility of natural resources.
- Dimension 3 – Social: The ability to ensure that the welfare (safety, health, education, etc.) of the citizens can be equitably delivered despite differences such as background, race or gender.

The SSC-MM shown in Figure 1 is recommended to

- describe the general goals of a smart sustainable city;
- identify development aspects and outline the necessary milestones;
- help cities to identify KPIs for the purpose of the maturity assessment.