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Key performance indicators related to the use of information and communication technology in smart sustainable cities

Recommendation ITU-T Y.4901/L.1601



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Recommendation ITU-T Y.4901/L.1601

Key performance indicators related to the use of information and communication technology in smart sustainable cities

Summary

Recommendation ITU-T Y.4901/L.1601 gives a general guidance to cities and provides the definitions of key performance indicators (KPIs) related to the use of information and communication technology (ICT) in the context of smart sustainable cities (SSCs).

This Recommendation is one of series of the Recommendations and Supplements that define KPIs. The series of KPI definitions documents also include:

- Recommendation ITU-T Y.4900/L.1600 on overview of key performance indicators (KPIs) in smart sustainable cities.
- Recommendation ITU-T Y.4902/L.1602 on key performance indicators (KPIs) related to the sustainability impacts of information and communication technology (ICT) in smart sustainable cities. This Recommendation lists the KPIs used for ICT impact on sustainability.
- Supplement ITU-T Y-Suppl. 39 on key performance indicators (KPIs) for smart sustainable cities. This document provides information regarding KPIs and evaluation index systems of smart cities, KPIs of sustainable cities, etc.

History

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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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Key performance indicators related to the use of information and communication technology in smart sustainable cities

1 Scope

This Recommendation forms part of a series of Recommendations and Supplements focusing on the key performance indicators (KPIs) for smart sustainable cities (SSCs). It specifically provides the KPIs related to ICT adoption and use in the context of SSCs. Evaluating these indicators can help cities as well as their stakeholders understand the extent to which they may be perceived as SSC. The Recommendation describes applicability of KPIs, principles and dimensions as well as the definitions of corresponding indicators. To fit into the overall framework of city indicators the present Recommendation re-uses the categorization of UN Habitat's City Prosperity Index.

The sustainability of a smart city is based on four main aspects:

- **Economic:** The ability to generate income and employment for the livelihood of the inhabitants.
- **Social:** The ability to ensure that the welfare (safety, health, education) of the citizens can be equally delivered despite differences in class, race or gender.
- **Environmental:** The ability to protect future quality and reproducibility of natural resources.
- **Governance:** The ability to maintain social conditions of stability, democracy, participation, and justice.

This Recommendation can be utilized by:

- Cities and municipal administrations, including the SSC-relevant policy-making organizations, and government sectors, enabling them to develop strategies and understand the progress related to the use of ICT for making cities smarter and more sustainable.
- City residents and their non-profit organizations, enabling them to understand the development and progress of SSCs.
- Development and operation organizations of SSC, including planning units, SSC-related producers and service providers, operation and maintenance organizations, helping them to fulfil the tasks of sharing information related to the use of ICT in the city.
- Evaluation agencies and academia, supporting them in selection of relevant KPIs for assessing the contribution from ICT in the development of SSC.

The intention of identifying the KPIs is to establish the criteria to evaluate ICT's contributions in making cities smarter and more sustainable, and to provide the cities with the means for self-assessments. It is desirable that cities can quantify their achievement according to their goals.

This Recommendation lists the core indicators that are chosen to be applicable for all cities. The goals for moving towards increased smartness and sustainability differs between cities. Thus, based on their population growth, geographical locations, environmental conditions, demography etc., the cities can also select appropriate indicators among those listed in Appendix I and/or add new ones.

This Recommendation is applicable for both cities and city regions, which could be organized in different ways:

- A single city organized as one or more administrative units, or
- A union of cities in the neighbouring area that can share some services.

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.4900] Recommendation ITU-T Y.4900/L.1600 (2015), *Overview of key performance indicators 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 K.Sup.4] ITU-T K-series Recommendations – Supplement 4 (2015), *Technical Report on EMF consideration in smart sustainable cities*.
- [ITU-T Y-Sup.39] ITU-T Y-series Recommendations – Supplement 39 (2015), *ITU-T Y.4900 Series – Key performance indicators definitions for smart sustainable cities*.
- [ISO 37120] ISO 37120:2014, *Sustainable development of communities – Indicators for city services and quality of life*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

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

3.1.2 knowledge economy [b-OECD KE]: Economies which are directly based on the production, distribution and use of knowledge and information.

3.1.3 smart sustainable cities [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 term:

3.2.1 ICT companies: Companies that provide products and/or services with respect to information and communication technologies.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

- COP Child Online Protection
- DSL Digital Subscriber Line