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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

Assessment framework for digital transformation of sectors in smart cities

Recommendation ITU-T Y.4906

ITU-T

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Recommendation ITU-T Y.4906

Assessment framework for digital transformation of sectors in smart cities

Summary

The ultimate objective of this Recommendation is to enhance the sustainability of identified priority sectors in smart cities, in order to optimise economic, environmental and social benefits.

Cities will decide on their digital transformation priorities. For example, cities might also want to encourage collaboration to deliver desired outcomes.

This kind of engagement based on the assessment framework can incentivize industry engagement and investment.

Recommendation ITU-T Y.4906 contains the following:

- 1) Introduction of the assessment framework and its components
- 2) Identification of indicators – Examples of categories of indicators to assist in this objective for the assessment frameworks include:
 - Digital infrastructure;
 - Digital transformation initiatives for sectors;
 - Collaboration efforts on digital transformation;
 - Economic, environmental and social benefits according to sector digital transformation.
- 3) Sector assessment and analysis

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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Assessment, digital transformation, smart sustainable cities.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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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.

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Recommendation ITU-T Y.4906

Assessment framework for digital transformation of sectors in smart cities

1 Scope

This Recommendation formulates an assessment framework for digital transformation of sectors in smart sustainable cities (SSCs). This assessment framework specifically provides the assessment indicator system, assessment indicator set and assessment method. Assessments based on this framework can help SSCs as well as their stakeholders to identify the priorities of sectors' digital transformation, investigate the current states of selected sectors' digital transformation, and then explore the suitable paths and measures to promote the digital transformation in these sectors.

This assessment framework will:

- Help cities identify their priority sectors for digital transformation;
- Provide indicators (examples of the indicators are included in the Summary) that may help cities identify what is needed to assist in promoting digital transformation of the identified priority sectors;
- Help cities assess sector development.

This framework is intended to reinforce dialogue between cities and the solution providers on identified digital transformation priorities.

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 (2016), *Overview of key performance indicators in smart sustainable cities*.
- [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.4903] Recommendation ITU-T Y.4903/L.1603 (2016), *Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals*.
- [ITU-T Y.4905] Recommendation ITU-T Y.4905/L.1605 (2019), *Smart sustainable city impact assessment*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 smart sustainable city [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.

3.1.2 sector [b-ISIC Rev.4]: Sector is a category of companies that are related based on their primary business activities. A single sector is often named after its principal product.

3.1.3 integration of informatization and industrialization [ITU-T Y-Sup.52]: The integration of informatization and industrialization (III) is an interaction, converging and merging process of informatization development course and industrialization development course, and is also the evolution path of transformation from industrial society to information society. Focusing on building new competitiveness in all areas of economy and society, the III emphasizes the interactive innovation and systematic transformation of productivity and production relationship enabled by the in-depth application of emerging ICTs, during which the data resources gradually become a new driven factor.

3.1.4 spillover effect [b-E CPNRE]: Spillover effect is the cost or benefit that affects a party who did not choose to incur that cost or benefits during economic activities.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 sectors' digital transformation: A process during which, by advanced applications of ICTs in sectors' business activities such as R&D, production, services, etc., the sectors' business activities are optimized, reconstructed and integrated, and sectors' development modes are disruptively reformed and innovated. The digital transformation is vitally useful for sectors to optimize resource configuration, improve operational efficiency and innovation capability, and hence realize sectors' sustainable development.

3.2.2 smart sustainability city (SSC) manager: An executive in charge of the administration of a smart sustainable city's government. SSC manager is sometimes referred to as the municipal administrator, governor or the chief executive of a smart sustainable city.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AHP	Analytic Hierarchy Process
ANP	Analytic Network Process
SSC	Smart Sustainable City
III	Integration of Informatization and Industrialization
ICTs	Information and Communication Technologies
GDP	Gross Domestic Product
R&D	Research and Development

5 Conventions

None.

6 High-level objectives for digital transformation of sectors in SSC

In the context of rapid development of digital economy, concentrating on achieving the sustainable development goals, SSC should enhance business integration and interaction, and accelerate reformation of sectors' development pattern based on the advanced applications of digital technologies in all areas of sectors. These efforts will promote sector's competitiveness, improve the economic, environmental and social benefits, and achieve the sustainable development of SSC.

Effective and efficient achievement of sector's digital transformation should be in alignment with the following core concepts:

- **Innovation driving:** Sector's digital transformation should attach great importance to the innovations of product, service, technology, management, and business processes based on ICTs applications, and subsequently boost the sector's sustainable development.
- **Seamless data sharing:** Sector's digital transformation should emphatically promote communication, interoperability and sharing of data among equipment and facilities, information systems, users, etc., to achieve efficient circulation and optimized allocation of production factors.
- **Coordinated development:** Sector's digital transformation should fully consider the resource endowment and vision of a smart city, promote business collaborations among entities in the supply chains, to achieve coordination and alignment with smart city development.
- **Value creation:** Sector's digital transformation should consider value creation as the ultimate goal, continually promote the sector's core competitiveness to enhance sector's productivity and economic value creation.

7 Assessment framework for digital transformation of sectors in SSC

7.1 Overview of the assessment framework

The assessment framework for digital transformation of sectors in SSC contains three components. These are the component to help SSC to determine the catalogue of sectors to be assessed, the component to clarify the assessment indicator system, and the component to implement the assessment and analyses. The overview of the assessment framework is shown in Figure 1.

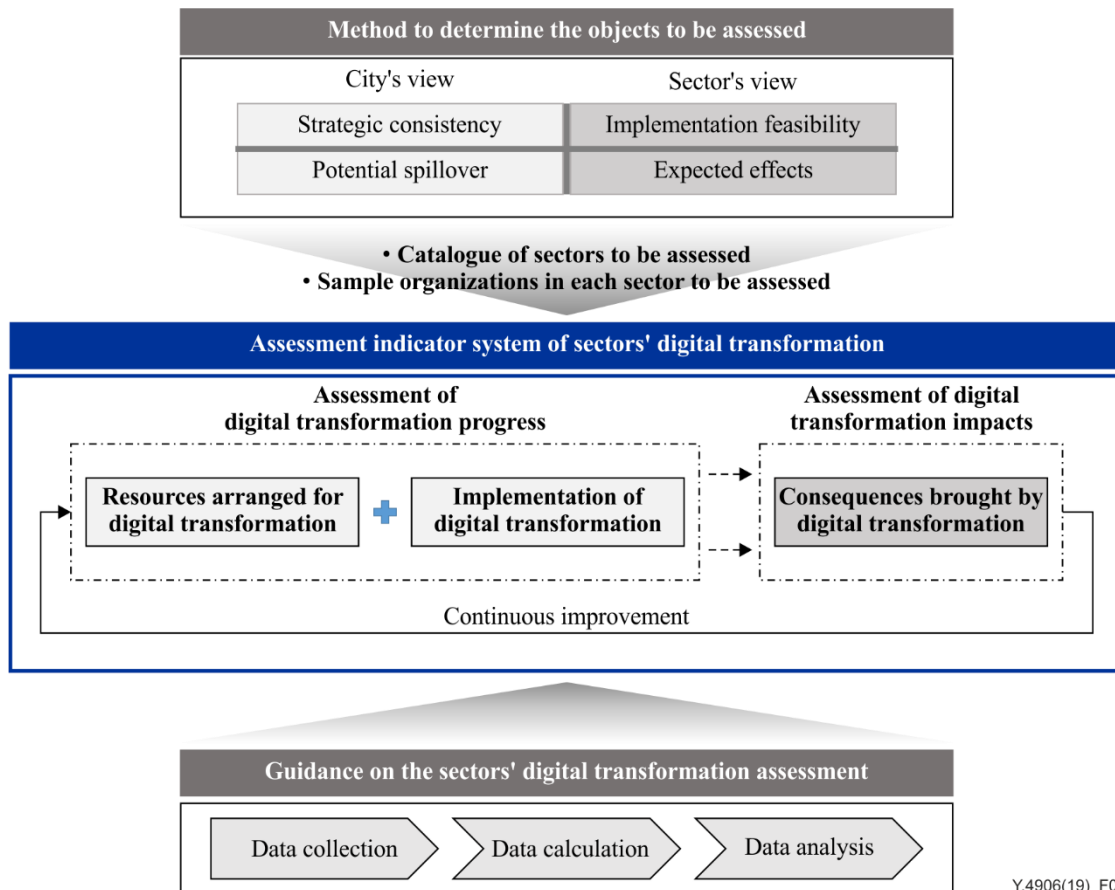


Figure 1 – Overview of the assessment framework for digital transformation of sectors in SSC

The SSC, intending to conduct sectors' digital transformation assessment based on this framework, should begin with determining the catalogue of sectors to be assessed.

To generate the catalogue of sectors, the SSC can do a preliminary qualitative research on the concerned sectors, according to the research model in Figure 2. This model proposes four aspects which the SSC should consider when it determines whether a sector's digital transformation should be promoted or not. These four aspects are the strategic consistency, implementation feasibility, expected effects, and the potential spillover. This research model will also help to clarify which sample organizations of these sectors will be assessed within a city.