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Sustainable cities and communities — Management guidelines of open data for smart cities and communities — Part 1: Overview and general principles

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 268, *Sustainable development in communities*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The public sector is one of the most data-intensive sectors, since daily it produces a huge amount of public service information (PSI). Besides the need of transparency, the openness of this data can contribute to the growth of cities, the development of technological municipal infrastructure and to overcoming societal challenges. Many countries have established an online platform that discloses data collected by public sectors. Such 'open data' is freely available data that can be accessed, used, re-used, distributed, and re-distributed by any process of interest, without any restriction or limitation. Open data in smart cities includes rapid velocity of real-time data in large volumes, which may be accessible via an API.

For sustainable cities and communities, especially developed and managed under requirements specified in ISO 37101, adaptation and utilization of open data is expected to enhance smartness, resiliency, transparency, accountability, and sustainability by fostering business creation and development of solutions for the city, as well as creating a new value or benefiting people and stakeholders within.

However, despite of the benefit of use and necessity of open data, there is not enough information or standard in management of open data to be utilized in sustainable cities and communities.

Therefore, for those who are involved in a management process of open data, it is necessary to define the management framework of open data in terms of management processes such as strategic planning, evaluation, identification, preparation, publication, maintenance, and quality management.

The primary audiences for this document are officials in cities, public sectors, and civil society organizations, whereas the secondary audiences may be those who are in private sectors including non or for-profit organizations.
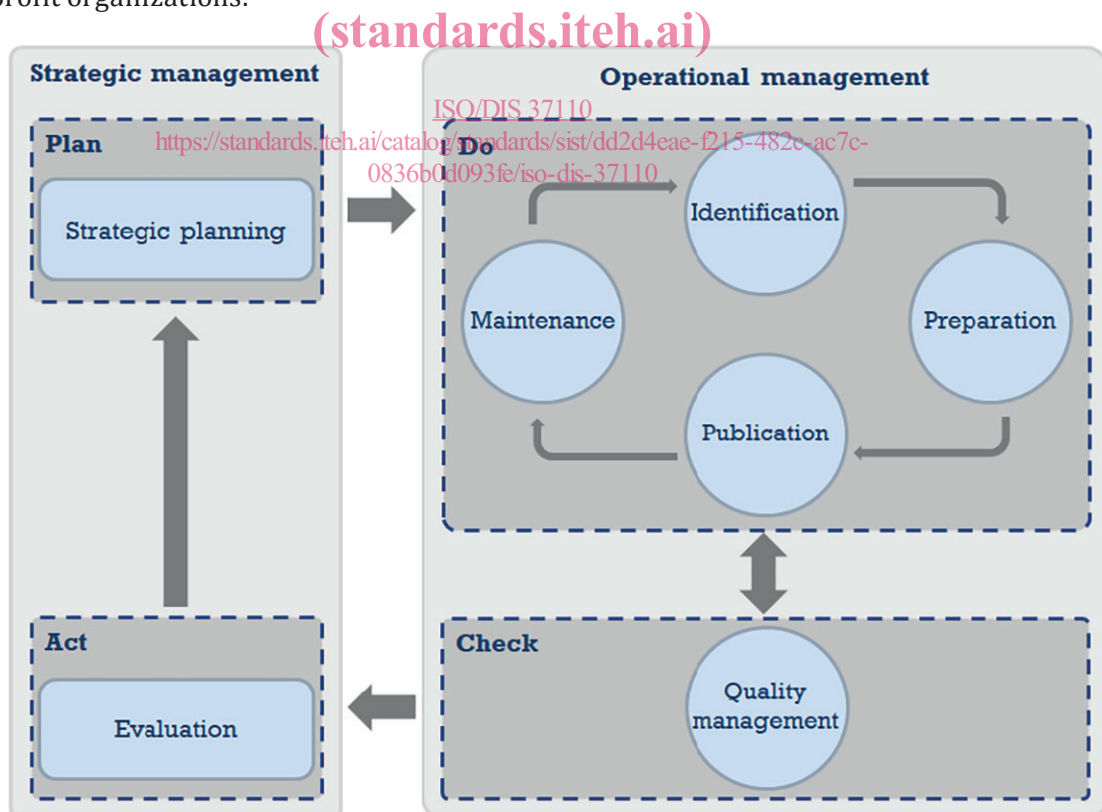
Figure 1 — PDCA model of open data management

These management processes are based on the Plan-Do-Check-Act (PDCA) model (Figure 1) and the processes are described and mapped as follows:

— Plan: strategic planning process that defines problems and goals to achieve;

— Do: identification, preparation, publication, and maintenance of open data to achieve predefined goals;

— Check: quality management process that monitors and measures other processes against predefined operational rules and lawful regulations and report to the necessary processes to act on the results;

— Act: evaluation process that recommend necessary actions to the planning process to improve overall usage and management performance of open data.

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Sustainable cities and communities — Management guidelines of open data for smart cities and communities — Part 1: Overview and general principles

1 Scope

This document provides overview and general principles of open data management for sustainable cities and communities to be used as a base document for open data management framework standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
open data
data available without restrictions from copyright, patents or other mechanisms of control or costs, regardless of access, or use

Note 1 to entry: "without restrictions" does not mean that there is no copyright, patents or ownership the data, simply that users of the data are able to make use of the data under license terms that make clear there are no restrictions on that use, other than potentially a requirement to attribute the source of the data.

[SOURCE: ISO/TR 21797:2019(en), 3.5, Note 1 has been added]

4 Overview of open data

4.1 Purpose of open data

Open data is freely available data that can be accessed, used, re-used, distributed, and re-distributed by any process of interest, without any restriction or limitation.

The purpose of making data openis to create a new value or benefit the dataset's originator and different groups of people and organizations.

In most cases, prospective open data is collected and managed by government agencies or public sectors and citizens are one of the main beneficiaries of open government data in cities, as well as the public sector, civil society organization and private sector, including and start-up companies.

Examples of possible new values and benefits of open data are:

— to improve transparency by enabling open government;

— to improve or create new value to public/private services;

— to improve efficiency of public/private services;

— to improve effectiveness of public/private services;

— and to inform public policy development to create, discard, or modify public policies.

For open data, owners of data or copyright of data are mostly government agencies or public sectors. However, if the dataset is owned by processes other than the ones mentioned, the owner shall provide license such that the data subject to be opened can be used freely or at the fee that does not exceed the cost under the usage guidelines of open data.

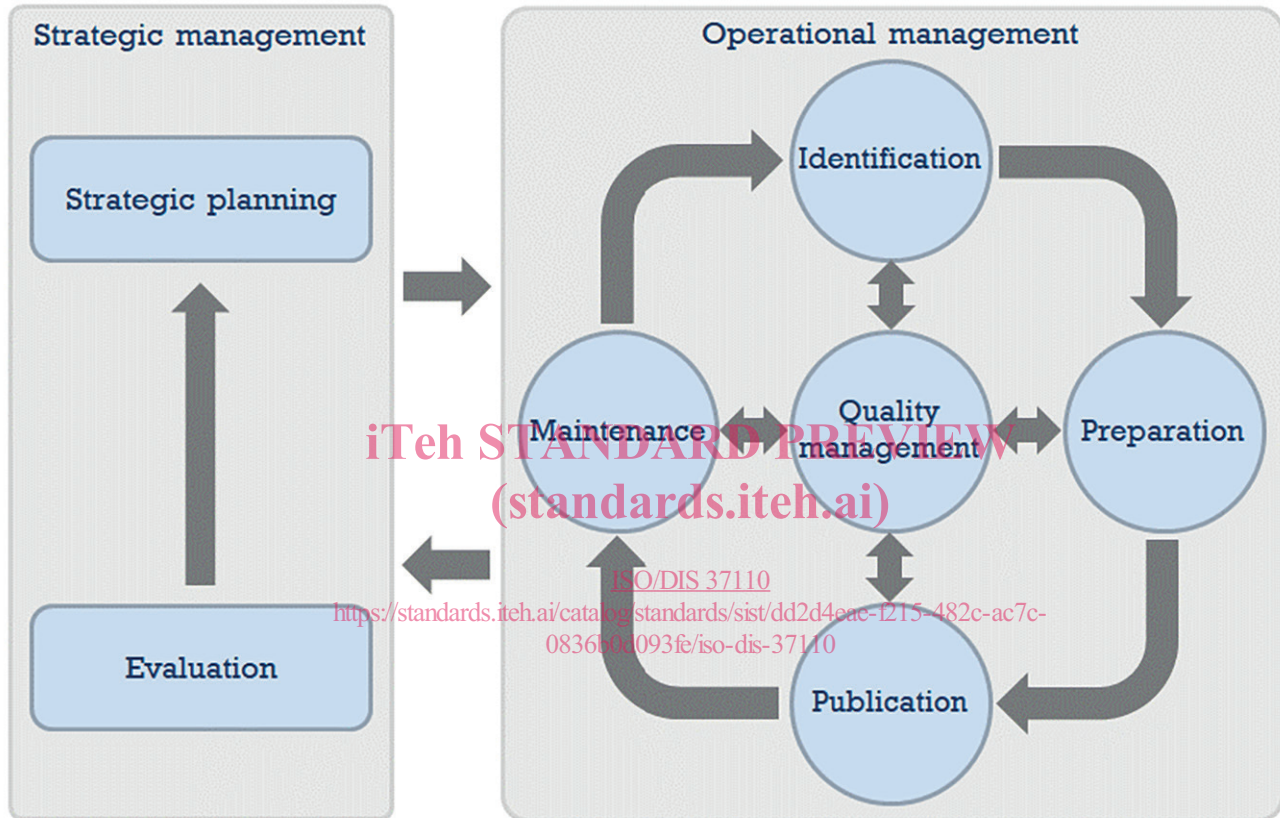## 4.2 General management principle

Figure 2 — Processes of open data management

Open data management is classified into two parts; strategic management and operational management. The strategic management consists of strategic planning process and evaluation process whereas the data management part consists of identification, preparation, publication, maintenance, and quality management processes.

5 Characteristics of open data

5.1 General

This clause lists and describes characteristics of open data that are necessary to be considered in designing of open data management framework.

5.2 Availability

Open data shall be available in a digitally modifiable form. If there is analogue data subject to be opened, it shall be transformed into a digitally modifiable form.

5.3 Accessibility

Open data shall be conveniently accessible on- or off-line, as a whole or a part. On-line accessibility means that the dataset is accessible via World Wide Web using valid URIs and URLs. Since open data can be freely modified and distributed, URIs and URLs of the dataset should be validated regularly.

5.4 Cost

The basic principle of open data is that the dataset shall be available at free of charge. However, depending on the license, the copyright owner may charge usage fee that does not exceed the cost.

5.5 Copyright

Use of open data shall not infringe copyright.

5.6 Distributability

Open data shall be distributed or redistributed on-line to any process of interest at any time. Off-line distribution is subject to an agreement.

5.7 Informative metadata

While all open data has potential value, in order to promote its effective usage, each open data dataset should be accompanied by informative metadata. The metadata should include sufficient detail about when and how it was collected, its accuracy, and provenance to enable potential users to evaluate its appropriateness for their purpose.

5.8 Integrity

Open data shall not be altered or destroyed in an unauthorized manner.

5.9 Interoperability

The open dataset shall provide capabilities to support seamless interoperability with other datasets - capabilities such as use of appropriate open formats, unique identifiers, data schema, and APIs.

5.10 License

Copyright owner of the dataset shall provide a form of license which describes cost, rules, and any other information that a user shall follow. This should use plain language, and ideally re-use well-established and widely used license models such as Creative Commons licenses.

5.11 Ownership

If open data is used to create a new dataset, ownership shall be determined based on the license or under the laws and regulations.

5.12 Privacy

Data that may invade privacy of an individual or a group in any form shall be excluded or anonymized in order to respect local data protection regulations. If a dataset created using open data has a possibility to invade privacy, the dataset shall not be opened. Both the owner and the user of open data have responsibility to check the possibilities of invasion of privacy.

5.13 Restriction or limitation

Open data shall have no restriction or limitation of any kind, in access, usage, and distribution within the boundaries of local laws and regulations that the copyright or owner of dataset abides by. However, the dataset shall not be opened to the processes if they cannot be controlled by the laws and regulations.

5.14 Security

Data that may threaten security of any kind shall be excluded.

5.15 Stakeholder

Stakeholders of open data are inclusive of, but not limited to general public, government agencies, and non-profit sectors, for-profit sectors represented by companies and start-ups.

5.16 Usability

Use of open data shall be seamless and effortless.

6 Open data management

6.1 Strategic management

6.1.1 Strategic planning

The strategic planning process is the first step of use and management of open data. The objective of this process is to: i) provide infrastructure and tools in order to have cities' data with a good availability, organized, and with easy to understand; ii) develop guidelines to define, use, and manage open data iii) ensure stakeholder engagement with civic agency, data owners, and all members of the data using community.

In development of the guideline, the process defines;

— the current situation and problems to be solved,

— stakeholder needs,

— the objectives and the key measurable goals,

— requirements, rules, and lawful regulations to abide by,

— evaluation criteria and indicators,

— timeline of each process and expiration of data,

— and other necessary things to have open data in action.

The planning process utilizes feedback reports from evaluation process to continuously update what had been defined before; problems, goals, requirements, and evaluation criteria.

6.1.2 Evaluation

The main purpose of evaluation is to send feedback to the strategic planning process based on the reports from quality management process in operational management.

For proper evaluation and feedback, the process should:

— develop detailed indicators to evaluate all processes based on the evaluation criteria and indicators defined by the planning process;