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Sustainable cities and communities — Guidance for managing a public-health emergency response in smart city operating models

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

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Introduction

~~Dealing with~~Managing public-health emergencies (PHEs) and eliminating their impact on sustainable development has become a common challenge for all countries in the world. In recent years, various types of ~~public health emergency,~~ PHEs (e.g. Ebola virus disease (EVD) in West Africa, the Middle East Respiratory Syndrome (MERS), Zika virus disease, new crown pneumonia COVID-19, and monkeypox~~,~~), have caused severe consequences to countries around the world. This has critically challenged the public-health emergency management (PHEM) systems of many countries, especially developing countries. Eliminating the impact of sudden public-health events is an important goal for achieving sustainable development globally.

The rapid development of the Internet, Internet of Things~~,~~ (IoT), Artificial Intelligence~~,~~ (AI), cloud computing and other information and communication technologies is accelerating change across the economy and society at large. In smart cities and communities, new network facilities, new data environments, and new technology applications offer the potential to transform the effectiveness of ~~public health emergency management.~~PHEM. This enables monitoring and analysis, virus tracing, prevention and control treatment, resource allocation and other aspects of ~~public health emergencies~~PHEs, to be managed ~~with faster response speed,~~more quickly. It also allows more efficient and transparent reporting systems, and more effective medical, social and economic outcomes.

Equally, however, ~~it is clear that~~ technology can only make a difference when accompanied by innovative ways of working through smart governance processes, supported by interoperable standards~~,~~ that enable organizations to collaborate in new ways to deliver integrated action, efficiently, effectively and at scale~~, and to do this~~. This is done through partnership across the public sector and private sector, and across local, regional, national and international levels of government.

This document brings together practical recommendations to community authorities on how to plan and deliver this type of smart response to ~~public health emergencies~~PHEs, combining innovation in technology with innovation in governance processes. These recommendations are designed to be flexible, enabling tailored implementation by the local governments of cities and communities in ways that recognize their unique situation and policy context.

This document helps leaders of cities and communities to:

— use smart technologies, in accordance with the principles of ISO 37106, to manage relevant facilities and resources for ~~public health emergencies~~PHEs, enabling dynamic real-time monitoring and management of relevant data~~.~~;

— support a more effective response to ~~public health emergencies~~PHEs and promote more effective cooperation among all interested parties, based on each stage of the command-and-control process for emergency management and incident response set out in ISO 22320~~.~~;

— help cities to assess the current level of maturity of ~~public health emergencies~~a PHE response in smart city operating models~~.~~;

— improve urban resilience so that the cities or communities can adapt to all risks in ~~public health emergencies (~~PHEs~~)~~ and lead towards sustainability with the help of smart city operating models.

NOTE   This document was informed by research ~~with~~from cities around the world on how smart operating models supported effective responses to the Covid-19 pandemic, as described in ISO~~/~~TR 37112.

The document is structured as follows:

— Clause 1 describes the scope.

— Clause 2 lists normative references.

— Clause 3 sets out the terms and definitions used in the document.

— Clause 4 illustrates the framework for smart city operating models in response to PHEs.

— Clause 5 describes how to implement smart city operating models in response to PHEs.

— Clause 6 describes the way to improve the maturity of smart city operating models in response to PHEs within a community.

— Annex A describes the maturity model for smart city operating models in response to PHEs.

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Sustainable cities and communities — Guidance for managing a public-health emergency response in smart city operating models

1 Scope

This document provides guidance to community authorities on how to use smart technologies and smart ways of working to improve their ability to anticipate, manage and mitigate public-health emergencies (PHEs), including through transparent, interactive and citizen-centric communications with citizens. It does ~~so~~this by ~~showing~~demonstrating how the principles and good practices for smart city operating models recommended in ISO 37106 can deliver improved outcomes in ~~PHE~~public-health emergency management~~,~~ (PHEM), at every stage of the command-and-control process for emergency management and incident response set out in ISO 22320.

This document sets out recommendations for community authorities and provides ~~a tool~~tools that can be used to assess the maturity of ~~communities'~~community systems for smart ~~PHE management~~PHEM.

This document applies to all types of cities and communities that are willing to apply smart city operating models to respond to PHEs.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 37100~~:2016~~, *Sustainable cities and communities — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 37100 and the following apply.

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

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

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

3.1
public-health emergency
PHE
sudden occurrence of major infectious diseases, diseases of unknown causes, major food and water and occupational poisoning and other events that seriously affect ~~public health that~~and cause~~,~~ or can cause ~~serious,~~ damage to public-health

3.2
public-health risk
likelihood of an event that can adversely affect the health of the human population, with an emphasis on one which can spread internationally or can present a serious and direct danger

4 Framework for smart city operating models in response to PHEs

This document supports the United Nations Sustainable Development Goals (UN SDGs) of making cities and human settlements inclusive, safe, resilient and sustainable, and is an enabler for all six strategic purposes of a sustainable community described in ISO 37101. It does so by providing an overall framework for smart city operating models in response to PHEs, as summarized in Figure 1.
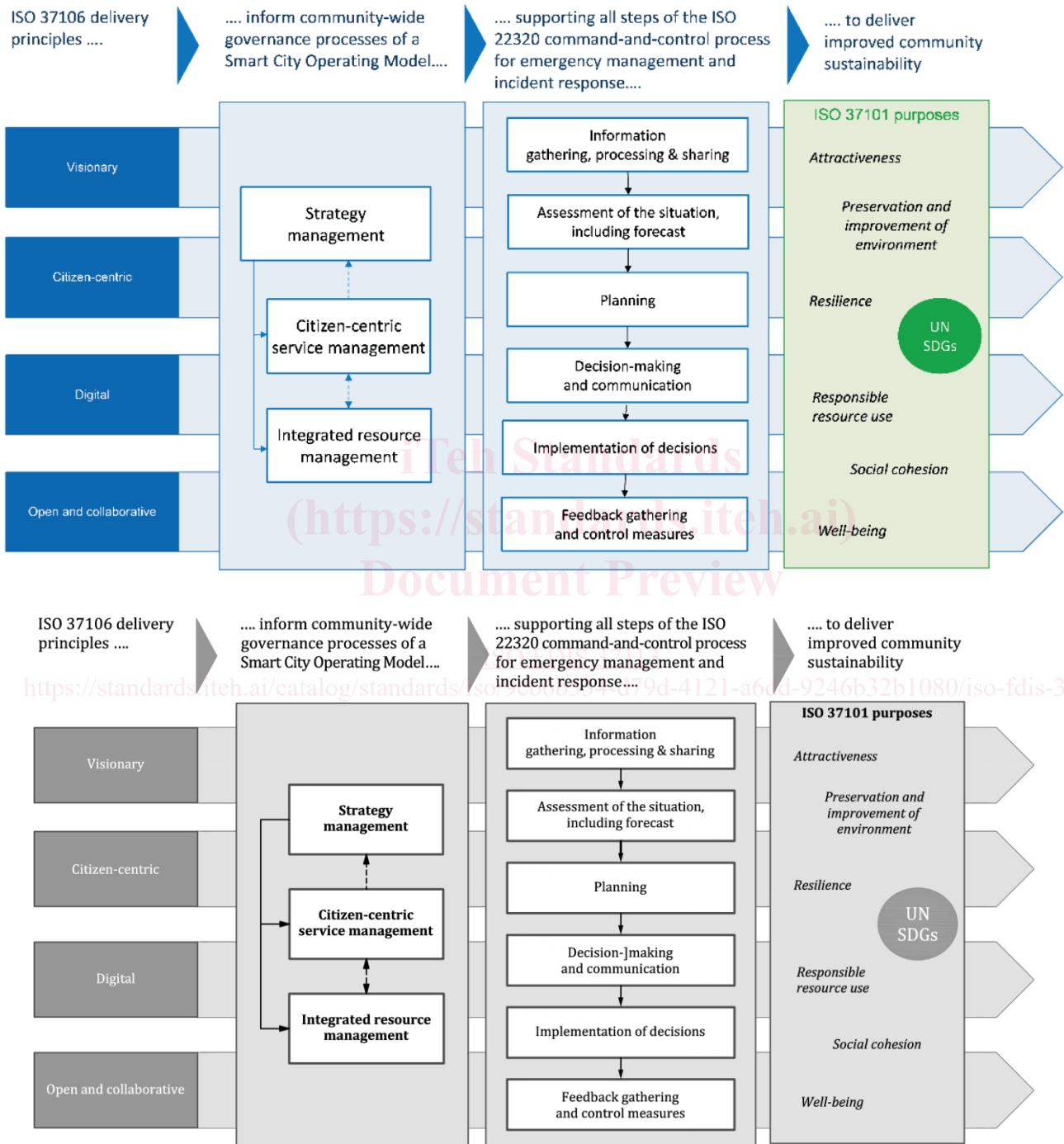

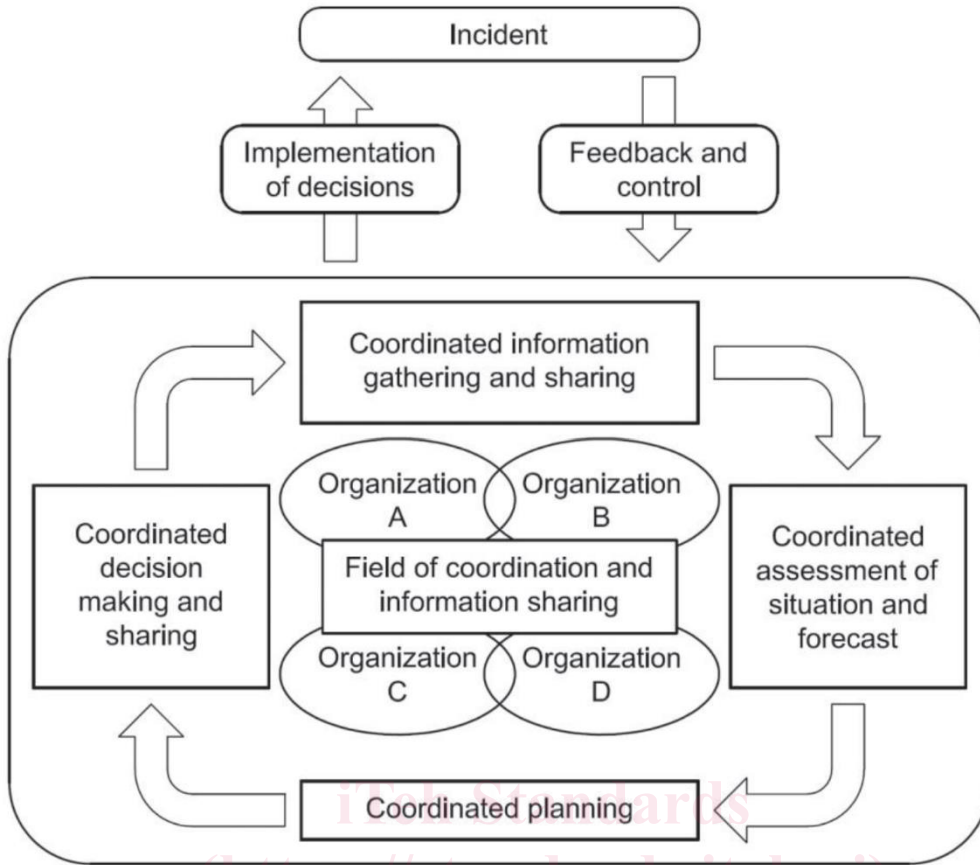Figure 1 — Framework for smart city operating models in response to PHEs

In particular, this document:

a) Is informed by the four delivery principles for a 'smart city operating model' described in ISO 37106:

   1) establishing a clear, compelling and inclusive vision for the sustainable future of the community;

   2) taking a citizen-centric approach to all aspects of service design and delivery;

   3) enabling a ubiquitous, integrated and inclusive digitization of community spaces and systems;

   4) embedding openness and collaboration in the way the community works.

b) Provides recommendations for community authorities on how each of the three community-wide governance processes for a smart city operating model established by ISO 37106 (e.g. strategy management, citizen-centric service delivery, and digital and physical asset management) can support more effective ~~PHE management~~PHEM at each stage of the command-and-control process for emergency management and incident response set out in ISO 22320:

   — information gathering, processing and sharing;

   — assessment of the situation, including forecasting;

   — planning;

   — decision-making and communication;

   — implementation of decisions; ~~and~~

   — feedback and control measures (which also covers monitoring and evaluation).

~~It is important to note that~~ Although Figure 2 illustrates the ISO 22320 command-and-control process as a simplified, linear one, in practice it is a non-linear process with multiple feedback loops across multiple stakeholders, as illustrated in Figure 3.
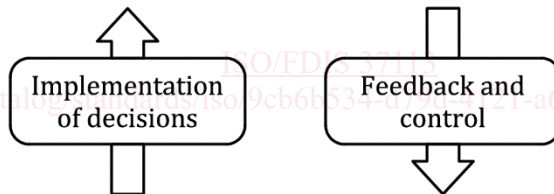
~~3~~

Incident

Implementation of decisions

Feedback and control

Coordinated information gathering and sharing

Organization A

Organization B

Field of coordination and information sharing

Organization C

Organization D

Coordinated decision making and sharing

Coordinated assessment of situation and forecast

Coordinated planning

Incident

Implementation of decisions

Feedback and control

Coordinated information gathering and sharing

Organization A

Organization B

Field of coordination and information sharing

Organization C

Organization D

Coordinated decision making and sharing

Coordinated assessment of situation and forecast

Coordinated planning