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Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities

Villes et communautés territoriales durables — Lignes directrices pour l'établissement de stratégies pour les villes intelligentes et les collectivités

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Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 cities and communities*.

This second edition cancels and replaces the first edition (ISO 37106:2018), which has been technically revised.

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

This document helps cities deliver their vision for a sustainable future, by providing a toolkit of "smart practices" for managing governance, services, data and systems across the city in an open, collaborative, citizen-centric and digitally-enabled way. It defines a "smart operating model" for cities, which enables them to operationalize their vision, strategy and policies at a faster pace, with greater agility and with lower delivery risk.

This means, in particular, a focus on enabling cities to:

a) make current and future citizen needs the driving force behind investment decision-making, planning and delivery of all city spaces and systems;

b) integrate physical and digital planning;

c) identify, anticipate and respond to emerging challenges in a systematic, agile and sustainable way;

d) create a step-change in the capacity for joined-up delivery and innovation across organizational boundaries within the city.

Although many of the principles and methodologies established by this document are relevant within specific vertical sectors of cities (e.g. water, waste, energy, urban agriculture, transport, IT), the focus is very much on the issues and challenges involved in joining all of these up into a whole-city strategic approach to the use of smart data, smart ways of working and smart technologies. Central to this document is therefore a strong emphasis on leadership and governance, culture, business model innovation, and the active role played by citizens, businesses and civil society in the creation, delivery and use of city spaces and services.

This document is aimed at city leaders. Much of the guidance can also be helpful to leaders of communities other than at city-scale, including both smaller urban areas and larger, regional-scale initiatives. But the prime intended audience, with whom the guidance has been developed and validated, is city leaders, including:

— policy developers in city authorities – both those responsible for the authority's service design, commissioning and delivery role, and also those responsible for its community leadership role, in particular:

  — elected leaders;

  — senior executives of local authorities (including chief executives, chief information officers and directors of key departments);

  — senior executives of other public bodies with a city-wide remit;

— other interested parties interested in leading and shaping the city environment, including:

  — senior executives in the private sector who wish to partner with and assist cities in the transformation of city systems to create shared value;

  — leaders from voluntary sector organizations active within the city;

  — leaders in the higher and further educations sectors;

  — community innovators and representatives.

In addition to this leadership audience, the document will be of interest to all parties engaged in smart cities, including individual citizens.

The working definition of a smart city used for the purposes of this document is the following:

A smart city should be described as one that 'dramatically increases the pace at which it improves its sustainability and resilience… by fundamentally improving how it engages society, how it applies

collaborative leadership methods, how it works across disciplines and city systems, and how it uses data and integrated technologies… in order to transform services and quality of life to those in and involved with the city (residents, businesses, visitors).'

NOTE This is deliberately presented as a working definition rather than intended as a definitive definition which all cities are to follow. While there is a strong degree of commonality among the smart city strategies that are being developed around the world, there is also significant diversity. All cities embarking on the development of a smart city strategy can define their own reasons for doing so, in their own language; the process of discussion and debate between interested parties to define what, for them, is meant by "Smart Paris", "Smart Tokyo" or "Smart Toronto" is an important one. Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities.

In the development of this document, ISO Guide 82 has been taken into account in addressing sustainability issues.

Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities

1 Scope

This document gives guidance for leaders in smart cities and communities (from the public, private and voluntary sectors) on how to develop an open, collaborative, citizen-centric and digitally-enabled operating model for their city that puts its vision for a sustainable future into operation.

This document does not describe a one-size-fits-all model for the future of cities. Rather, the focus is on the enabling processes by which innovative use of technology and data, coupled with organizational change, can help each city deliver its own specific vision for a sustainable future in more efficient, effective and agile ways.

This document provides proven tools that cities can deploy when operationalizing the vision, strategy and policy agenda they have developed following the adoption of ISO 37101, the management system for sustainable development of communities. It can also be used, either in whole or in part, by cities that have not committed to deployment of the ISO 37101 management system.

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, *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
innovation ecosystem
complex system of interdependent components from the public and private sectors that work together to enable innovation within a city or community

3.2
silo
group of individuals/teams/organizations that collaborate to deliver a specific function within a city

EXAMPLE Education, energy, transport.

3.3
citizen-centric
<design and delivery of city services> driven by the needs of citizens rather than the functional structures of a city’s silos

Note 1 to entry: The term citizen in this context includes residents, visitors and businesses within the city.

3.4
smartness
Note 1 to entry: quality of contributing to sustainable development and resilience, through soundly based decision making and the adoption of a long- and short-term perspective

[SOURCE: ISO 37101]

3.5
smart community infrastructure
Note 1 to entry: community infrastructure with enhanced technological performance that is designed, operated, and maintained to contribute to sustainable development and resilience of the community

Note 2 to entry: [SOURCE: ISO/TS 37151]

4 Overview of this document

4.1 Transforming the traditional operating model for cities

The traditional operating model for a city is based around functionally oriented service providers that operate as unconnected vertical silos, which are often not built around user needs. This document defines best practices in moving to a “smart city operating model” – one which enables cities to drive innovation and collaboration across these vertical silos and hence operationalize their vision, strategy and policies at a faster pace, with greater agility and with lower delivery risk.

Traditionally, budget-setting, accountability, decision-making and service delivery have been embedded within vertically-integrated delivery chains inside cities – delivery silos which are built around functions, not user needs. This is illustrated in Figure 1:

— the individual citizen or business has had to engage separately with each silo, making connections for themselves rather than receiving seamless and connected service that meets their needs;

— data and information have typically been locked within these silos, limiting the potential for collaboration and innovation across the city, and limiting the potential to drive city-wide change at speed.

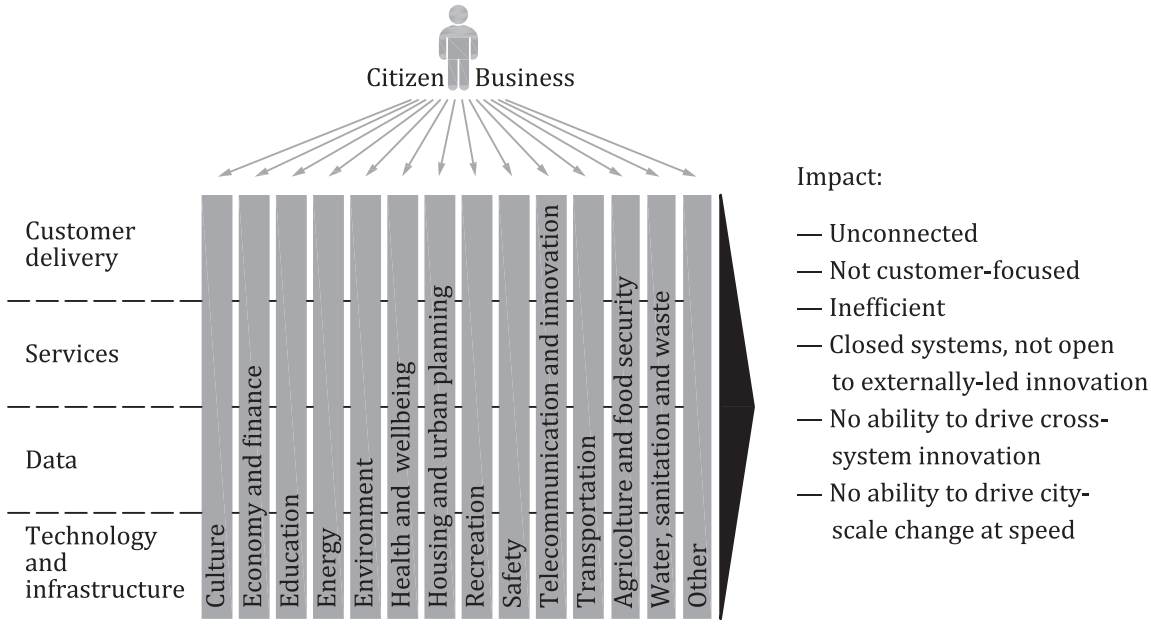

Figure 1 — Traditional operating model: where cities have come from

Figure 2 summarizes the change to this traditional way of operating, which smart cities are seeking to implement.

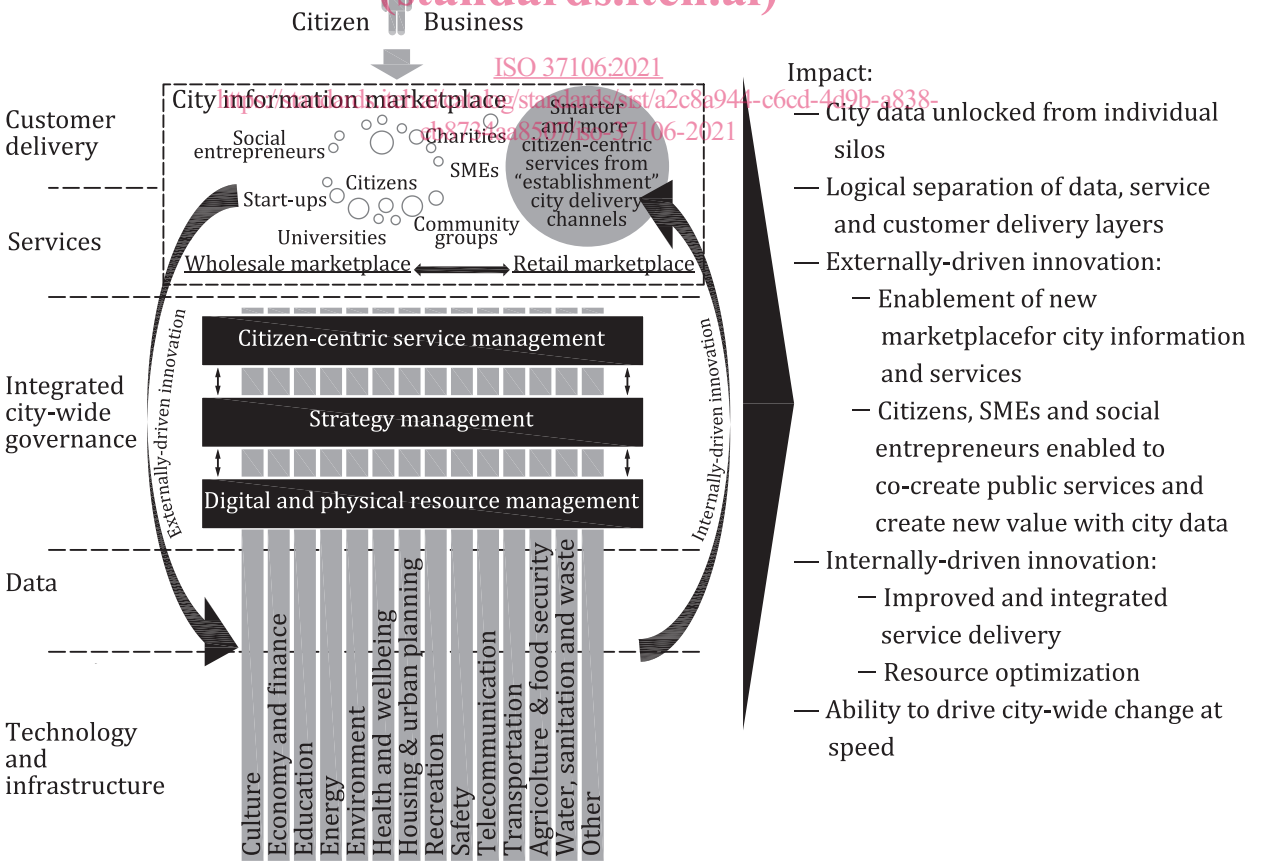

Figure 2 — A smart city operating model: where cities are moving to

Key features of this shift to a smart city operating model include:

a) investing in smart data, i.e. ensuring that data on the performance and use of the city's physical, spatial and digital assets is available in real time and on an open and interoperable basis, in order to enable real-time integration and optimization of city resources;

b) managing city data as an asset, both within the local authority and in collaboration with other significant data owners across the city;

c) enabling externally driven, community-led innovation by citizens, businesses and civil society, by opening up city data and services for the common good:

   1) both at a technical level, through development of open data platforms; and

   2) at a business level, through steps to enable a thriving market in reuse of public data together with release of data from commercial entities in a commercially appropriate way;

d) enabling internally driven, city-led innovation to deliver more sustainable and citizen-centric services, by:

   1) providing citizens and businesses with public services, which are accessible in one stop, over multiple channels, that engage citizens, businesses and communities directly in the creation of services, and that are built around user needs, not the city's organizational structures;

   2) establishing an integrated business and information architecture which enables a whole-of-city view of specific customer groups for city services (e.g. commuters, elderly people, troubled families, disabled people);

e) setting holistic and flexible budgets, with a focus on value for money beyond standard departmental boundaries;

f) establishing city-wide governance and stakeholder management processes to support and evaluate these changes.

These features of a smart city operating model are described in more detail throughout the rest of the document. Together, they combine to deliver important new ways of working governance changes within the city that transform the city's capability and capacity to drive city-wide change at speed, enabling city leaders to deliver transformational impacts against priority outcomes.

These six key governance changes are summarised in Table 1, and Annex A maps out in detail how they flow through to deliver improved social, economic and environmental outcomes - and, ultimately, improved performance against the six purposes of a sustainable community described in ISO 37101.

Table 1 — Key governance changes within a city that result from adoption of a smart city operating model

New ways of working	Governance change	Summary description
Openness and collaboration: City systems are opened up so that all city stakeholders can collaborate in driving change	— Stakeholder alignment	City stakeholders are now aligned behind a clear vision for the future of the city, and are committed to shared principles on how they will work together to deliver that vision.
	— Improved transparency	Citizens and businesses are better able to hold city authorities to account, empowered by access to city data and effective feedback mechanisms.
	— Citizen engagement	Increased civic participation and co-creation of city services.

Table 1 *(continued)*

New ways of working	Governance change	Summary description
Integrated smart working: Internal city systems are joined up, enabling real-time integration	— Cross-silo collaboration	City organisations have the skills, tools, business processes and incentives to respond effectively to customer needs and city challenges that cut across organisational boundaries.
	— Real-time city management	City services are able to respond in real-time to changing demand and circumstances
	— Shared use of common resources	City organisations are now sharing and re-using interoperable digital building blocks to meet common needs, managed as a city-wide service

4.2 Structure of this document

The content of this document can be seen schematically in Figure 3. At the top-level, it is made up of four components needed to support this shift to a smart city operating model:

[A] Delivery principles: a statement of values which city leaders can use to steer decision-making as they seek to operationalize their vision and strategy for the city;

[B] Key cross-city delivery processes: a set of practical guidance notes on how to address city-wide challenges of joining-up across city silos;

[C] Benefit realization strategy: guidance on how to ensure clean line of sight between smart city investments and the social, economic and environmental outcomes the city aims to achieve, and that the intended benefits are clearly articulated, measured, managed, delivered and evaluated in practice;

[D] Risk management: a checklist of issues which a city should regularly monitor to ensure that it is effectively managing the major risks to delivering its vision and strategy.

These components are described in more detail in Clauses 5 to 8. Detailed guidance notes are given on each of the subcomponents illustrated in Figure 3, with each guidance note structured using a common pattern language.

For ease of reference, in 4.3 there is a summary of all the recommendations contained in this document. These are then described in more detail in the subsequent clauses of this document.

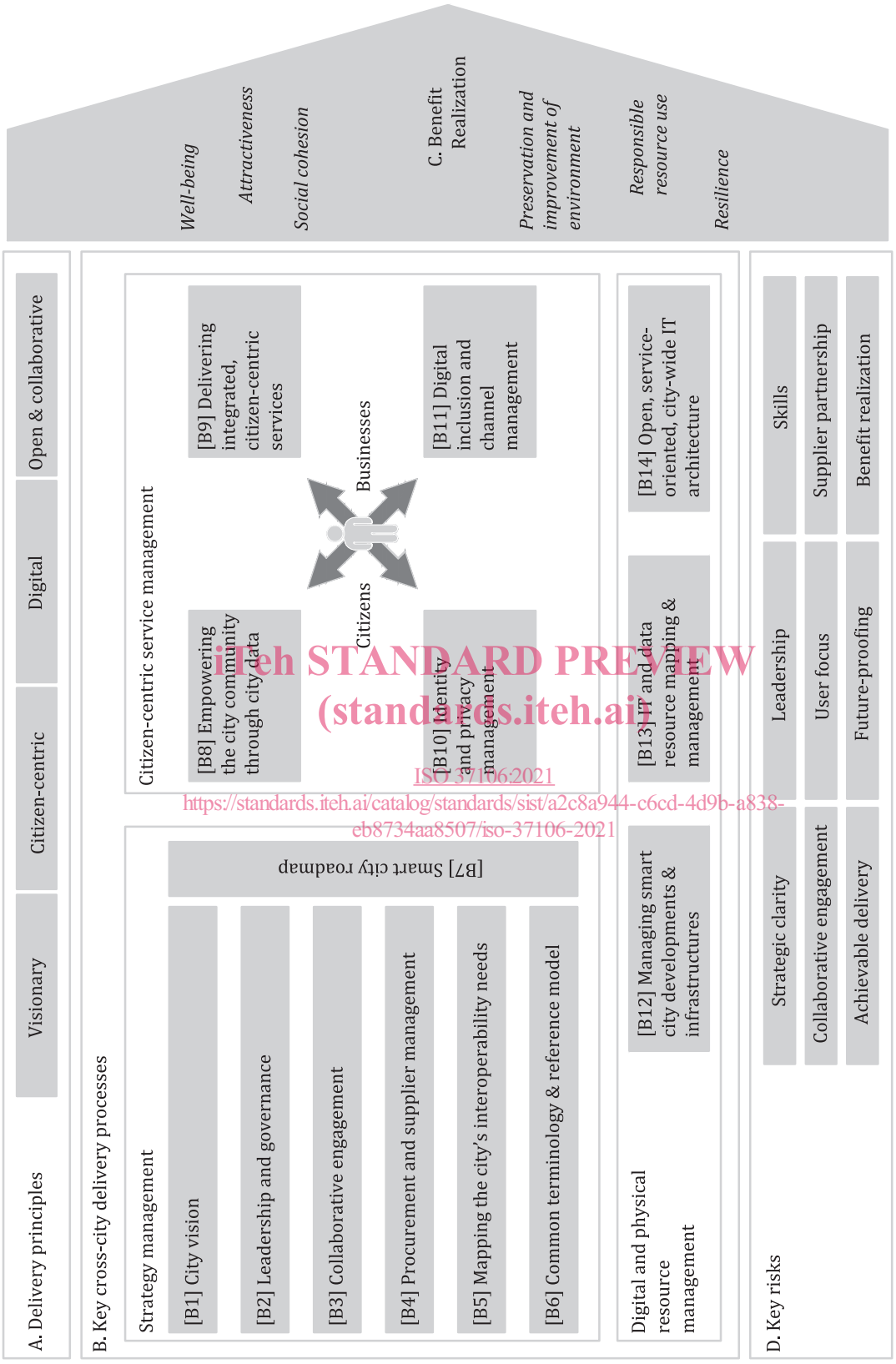

Figure 3 — High-level structure of this document

4.3 Summary of recommendations

Smart city leaders should do the following:

[A] Delivery principles

a) Collaborate with interested parties to develop and agree a set of delivery principles that include, as a minimum, the need to:

   1) establish a clear, compelling and inclusive vision for the sustainable future of the city;

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

   3) enable a ubiquitous, integrated and inclusive digitization of city spaces and systems;

   4) embed openness and sharing in the way the city works.

b) Use the delivery principles given in Annex B as a key input and starting point for that process.

[B] Key cross-city delivery processes

[B1] City vision

Create a vision of "what good looks like" for the city, today and in the future, that:

a) is aligned with the purposes for sustainable communities set out in ISO 37101, reflecting local priorities;

b) is developed in an iterative and collaborative manner (that is, inclusive of all interested parties and informed by user research and engagement, with social media and other technologies used to enable public participation in the process);

c) embraces the opportunities opened up by smart technologies, smart data and smart collaboration;

d) does so in a way that integrates these with the core socio-economic, political and environmental vision and purpose for the city's future, rather than seeing them as somehow separate from the city's core strategic objectives;

e) uses digital modelling, data visualization and/or other technologies to "bring to life" what it will be like to live and work in the city's vision for the future;

f) is measurable.

[B2] Leadership and governance

Establish leadership and governance arrangements that ensure:

a) a clear focus of accountability within the local authority;

b) a broad-based leadership team across the city;

c) city leaders are brought together on a cross-sectoral basis into effective governance arrangements, at both the strategic and delivery levels;

d) deployment of formal programme management disciplines;

e) the right skills mix in the leadership team;

f) the possibility of evolution over time among stakeholder organizations;

g) an open and transparent governance process, including through digitally-enabled public participation.

[B3] Collaborative engagement