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shaping tomorrow with you

Key Performance Indicators (KPIs) for assessment of Smart Sustainable City

November 21st, 2018

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Fujitsu Limited

Today's Agenda

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1. Key Concepts for Smart Sustainable City
2. Assessment and KPIs
3. Requirements for Assessment System
   for smart sustainable city (SSC)
4. KPIs systems in International Standard Standard
5. Assessment by Maturity Model
   - for Applying the criteria of ISO37153 to SSC -
6. Overview of a Project for smart city in Vietnam
7. Summary

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Fujitsu at a glance

Headquarters:
Tokyo, Japan

Established:
1935

President:
Tatsuya Tanaka

Principal Business Areas:
Technology Solutions
Ubiquitous Solutions
Device Solutions

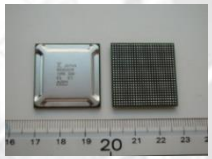
Employees:
155,000 worldwide

Revenue:
4,509.6 billion yen
(US$41.7 billion)

Operating profit:
128.8 billion yen
(US$1,192 million)

R&D Expenses:
173.9 billion yen
(Approx. 3.9% of Revenue)

Stock Exchange Listings:
Tokyo (Code:6702), Nagoya



Note:
All yen figures have been converted to U.S. dollars for convenience only at a uniform rate of US$1 = 108 yen, the approximate closing rate on March 31, 2017.

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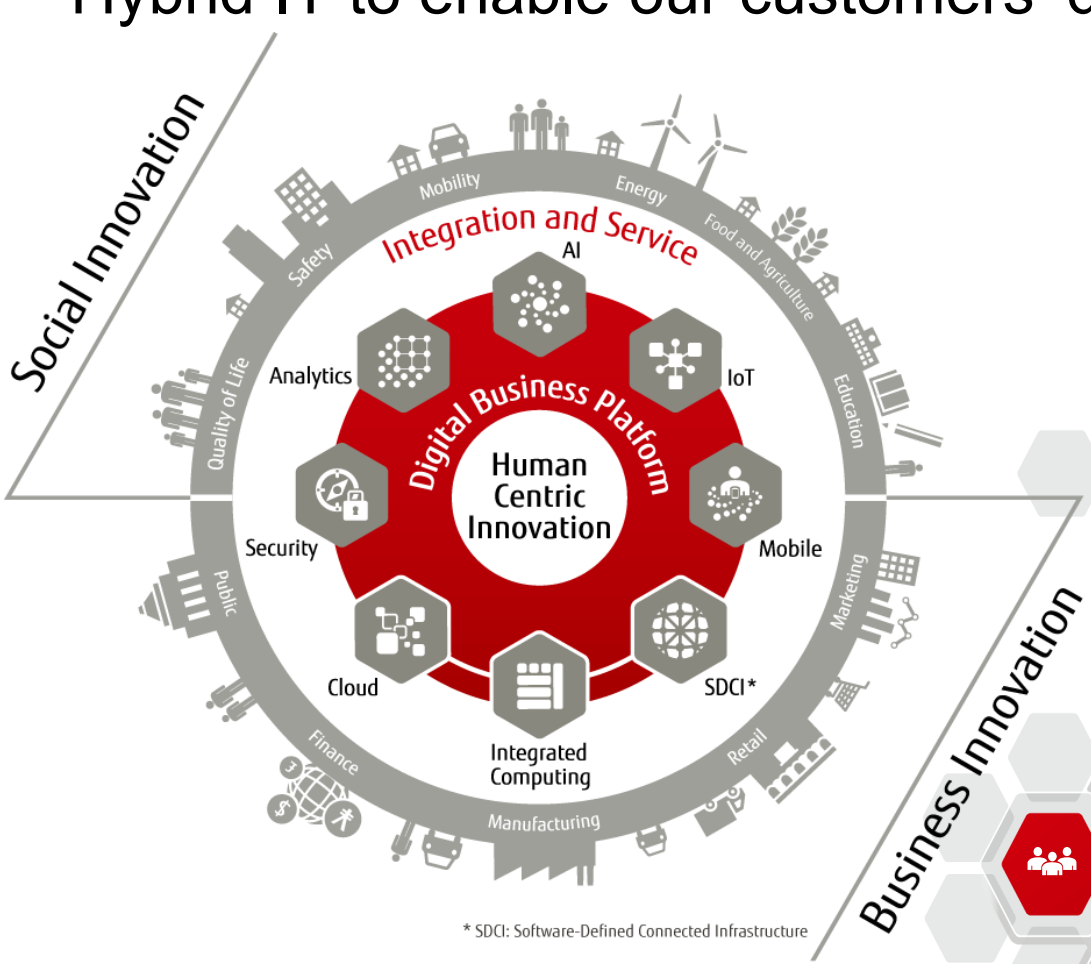
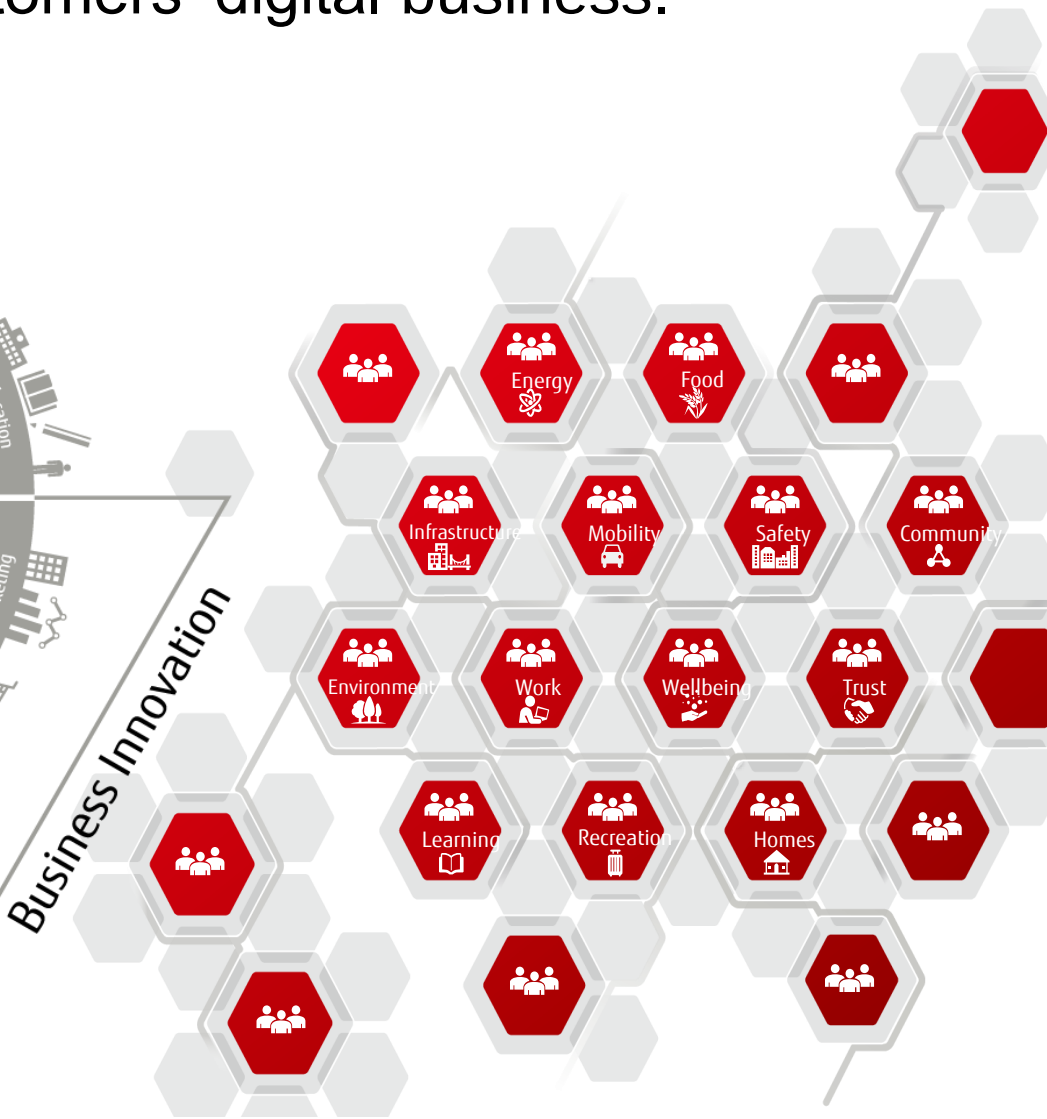
Human Centric Intelligent Society

- Fujitsu integrated a diverse spectrum of digital services and Hybrid IT to enable our customers' digital business.





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Key Concepts for Smart Sustainable City

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Approaches for Smart Sustainable City

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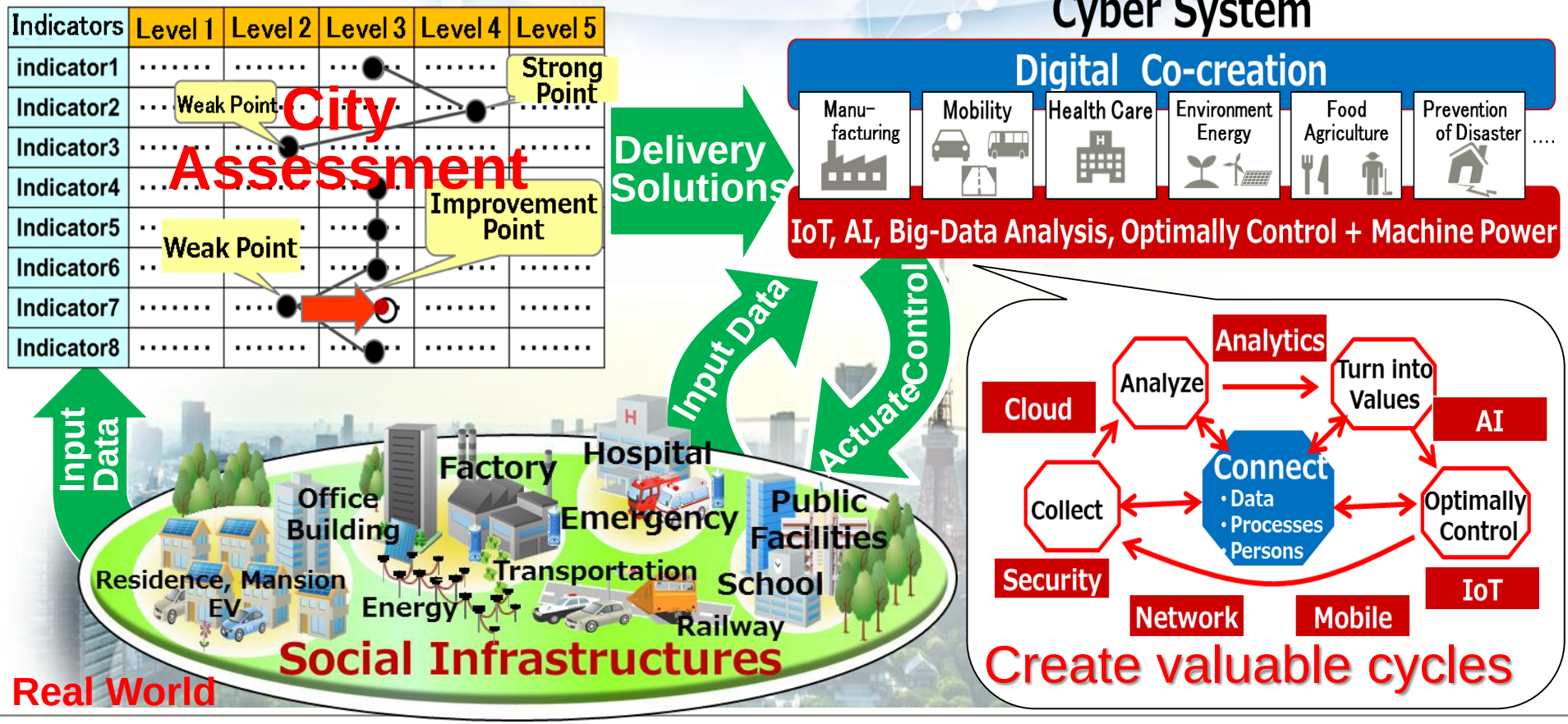
- **City Assessment**
  - Assess outcomes of measures for smart city by holistic viewpoints
- **For implementation of smart sustainable city**
  - Create valuable cycles (data collection → analysis → create values)
  - Digital Co-creation (connectivity and combination)



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City Assessment Methodology

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City Assessment based on the International Standards

- Indicators ; ITU-T (Y4901, Y4902, Y4903) , ISO (ISO37120), ・・・
- Methodology ; ISO 37153, ・・・

Indicators of City Assessment

Select indicators

City Assessment Methodology

Concept of ISO37153 (Maturity Model)

Indicators	Level 1	Level 2	Level 3	Level 4	Level 5
indicator1	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	
Indicator2	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・
Indicator3	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・
Indicator4	・・・・・・・	・・・・・・・	・・・・・・・		
Indicator5	・・・・・・・	・・・・・・・	・・・・・・・		
Indicator6	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・
Indicator7	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・
Indicator8	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・	・・・・・・・

Weak Point

Strong Point

Weak Point

Improvement Point

City Assessment

[Government] Make/Improve policies or measurements

[Vendors] Propose Solutions or Services

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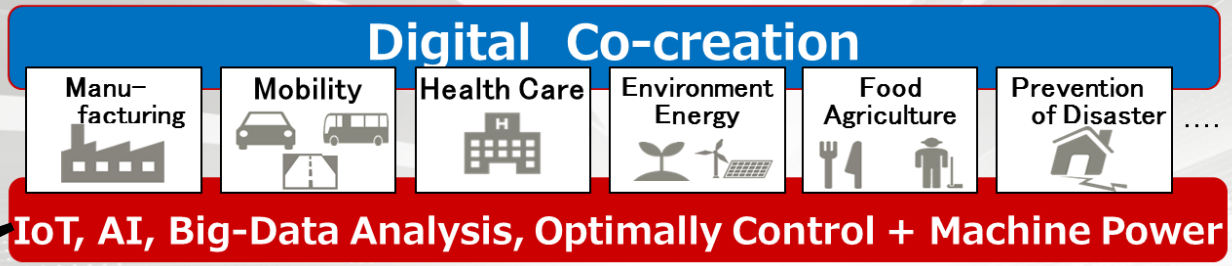
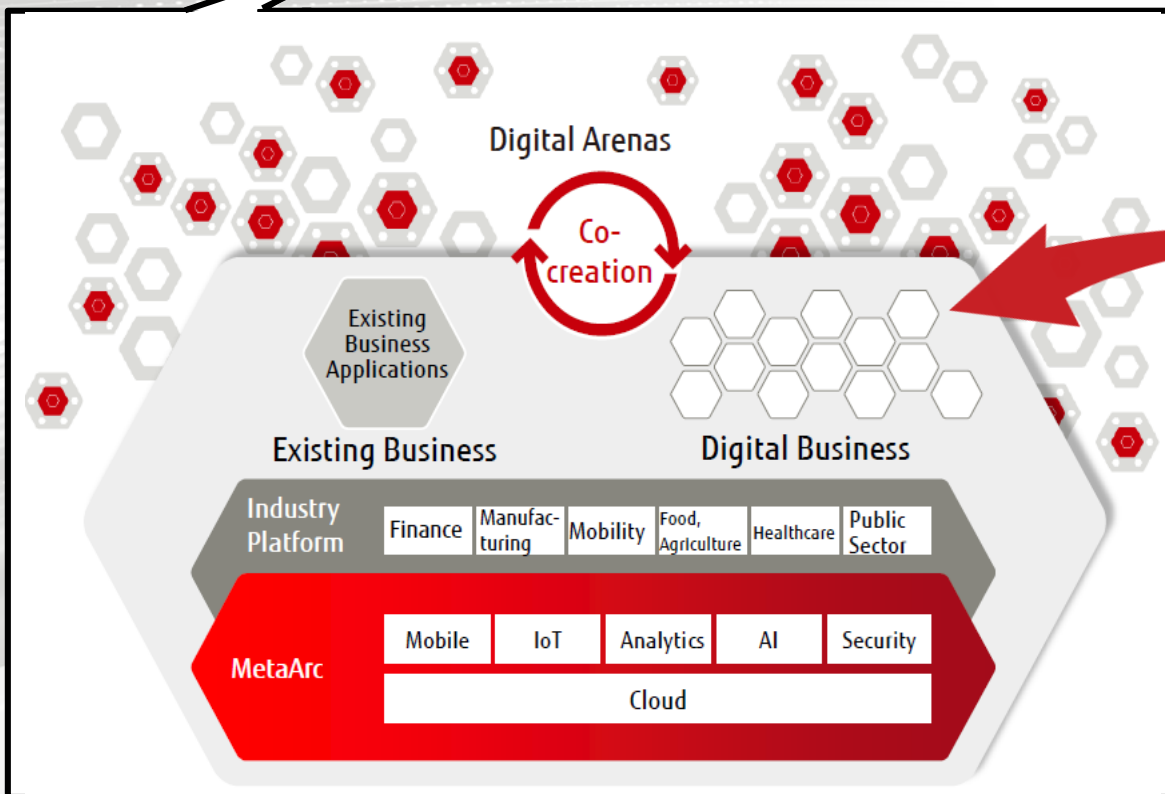
Digital Business Platform

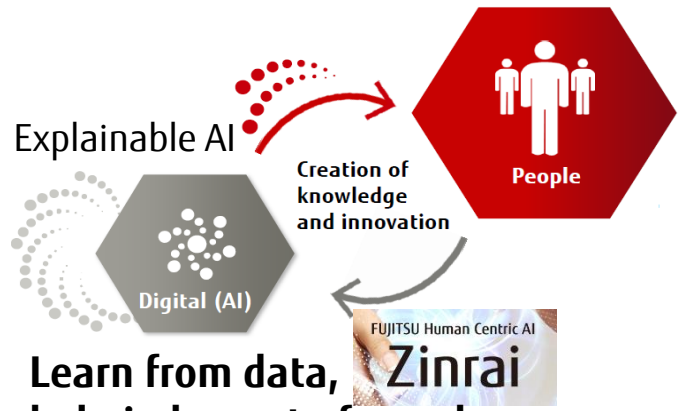
- **Creating value from data to enable digital business**
- **Achieving business outcomes from data**





【Example of using AI】

Learn from experience, interact with digital, create ideas and make decisions.



Learn from data, help judgment of people. Augment the capability of people

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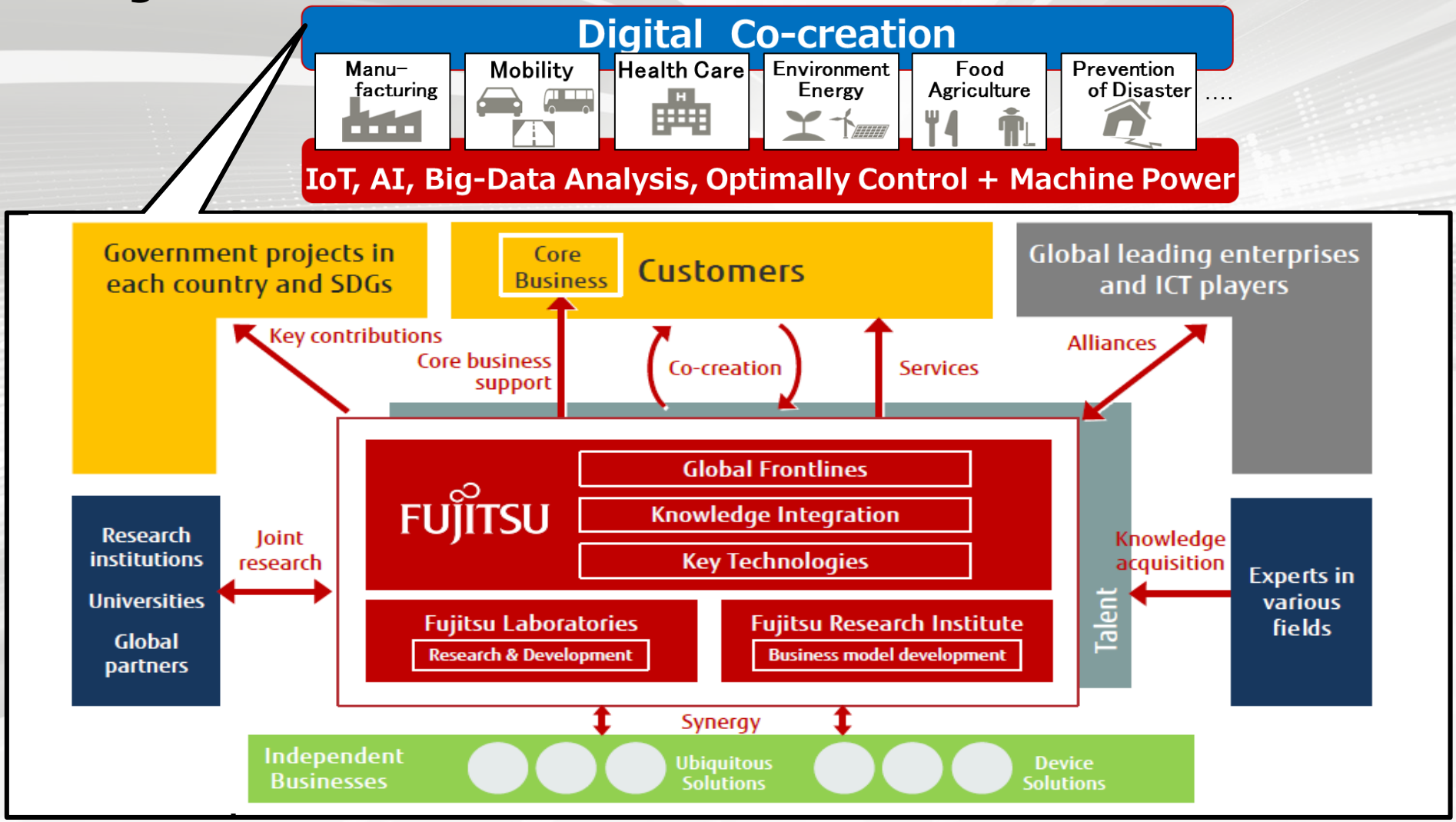
Digital Co-creation

- **Creating new value together with eco system partners and customers to shape a different future**
- **Together achieve business and social innovations**



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Assessment and KPIs

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Why do you assess/evaluate a city?

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Because of understanding the positioning as smart city

- Indicators : definition of viewpoints to assess or monitor its state
- how to assess : calculation of the values of the indicators
- example to use : cities ranking

City Ranking Type

Because of understanding how well your program (or policy) is working toward the city's goals/objectives

(Type-1) Identify program performance ;

- Indicators : definition of viewpoints to assess your program performance or progress, where the programs/projects have their goals/objectives
- how to assess : calculation of the values of the indicators
- example to use : monitoring and reporting of the program accomplishment

Performance measurement type

(Type-2) Identify gaps between current and goals/objectives in a city;

- Indicators : a thing that indicate how well the program (or policy) achieves the city's goals/objectives
- how to assess : calculation of possibility of realization of the city's goals/objectives
- example to use : assessment of the master-plan (for accomplishment of city's goals/objectives)

Program evaluation type

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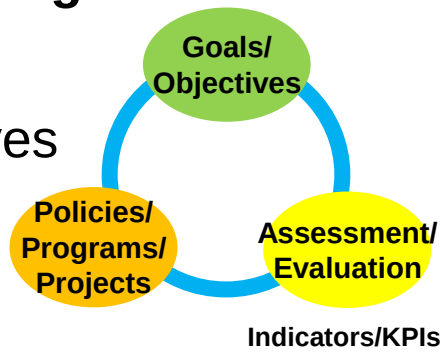
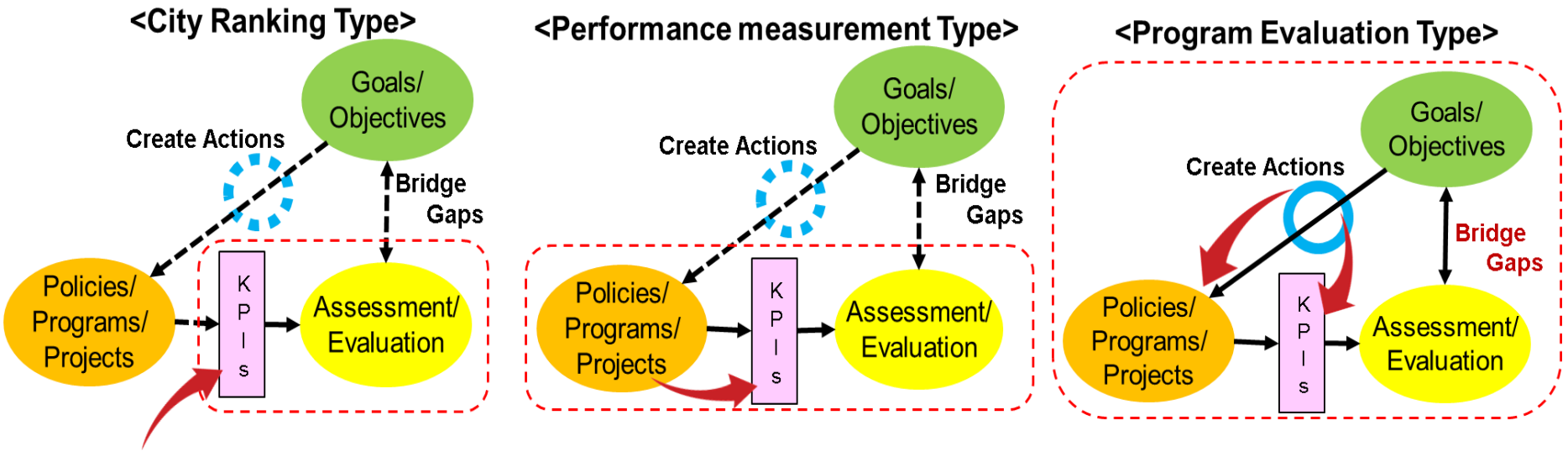
Assessment purpose

- It is important to identify your assessment purpose
  - **The purpose identifies the relation among the followings.**
    - City's Goals/Objectives
    - Policy/Programs/Projects toward City's Goals/Objectives
    - Assessment/Evaluation for City
  - **The purpose determines how to select KPIs**



- Types of Assessment/Evaluation Purposes



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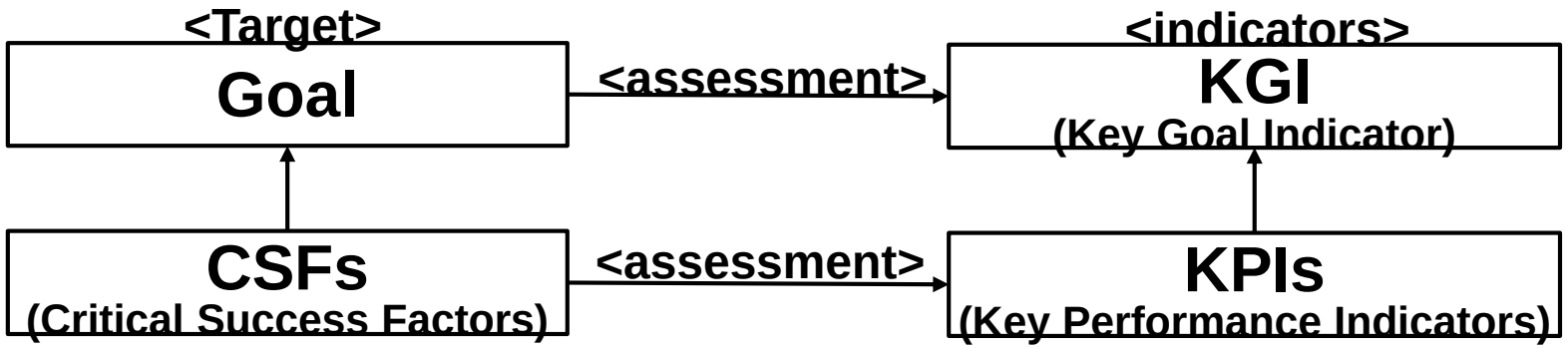
KPIs (Key Performance Indicators)

- ***KPIs are* measurable values that demonstrate how effectively a company is achieving key business objectives.**
- **How to create KPIs**
  1. Identify Goals/Objectives
  2. Identify Critical Success Factors (CSF) based on the Goals/Objectives
  3. Identify Key Performance Indicator (KPI) based on CSFs



- ✓ **The difference between KGIs and KPIs**
  - **KGIs**: **Key** metrics **indicating** the goal (=the desired final outcome)
  - **KPIs**: **Key** metrics **indicating** whether **performance** is good enough to **achieve goals**.
- ✓ **“Key” of KPIs is important**
  - **The more the number of KPI is, the more the load of evaluation activities increases.**
  - **It is important to select KPIs as critical assessment objects.**

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Requests to KPIs

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What is a good KPI? - SMART KPI -

- **Specific** Be clear what the KPI exactly measures
- **Measurable** Make it possible to measure the actual value
- **Achieved** Develop KPIs of success that are attainable and realistic
- **Relevant** Be relevant to its corresponding goal
- **Time-bound B**e measured against a time

General principles of KPIs selection in ITU-T Y.4901

- **Comprehensiveness :** The set of indicators should cover all the aspects of SSC and be aligned to “ICT and its impact on the sustainability of cities”
- **Comparability :** The KPIs should be compared scientifically between different cities according to different phases of urban development.
- **Availability :** The KPIs should be quantitative and the historic and current data should be either available or easy to collect.
- **Independence :** Overlap of the KPIs should be avoided as much as possible.
- **Simplicity :** The concept of each indicator should be simple and easy to understand
- **Timeliness :** The ability to produce KPIs with respect to emerging issues in SSC construction or stage or development

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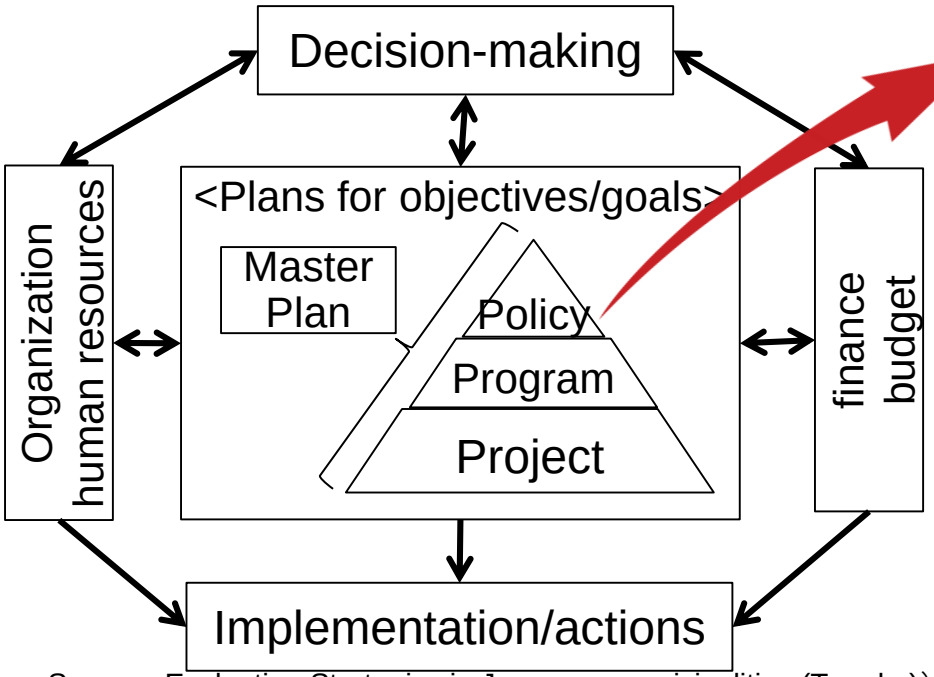
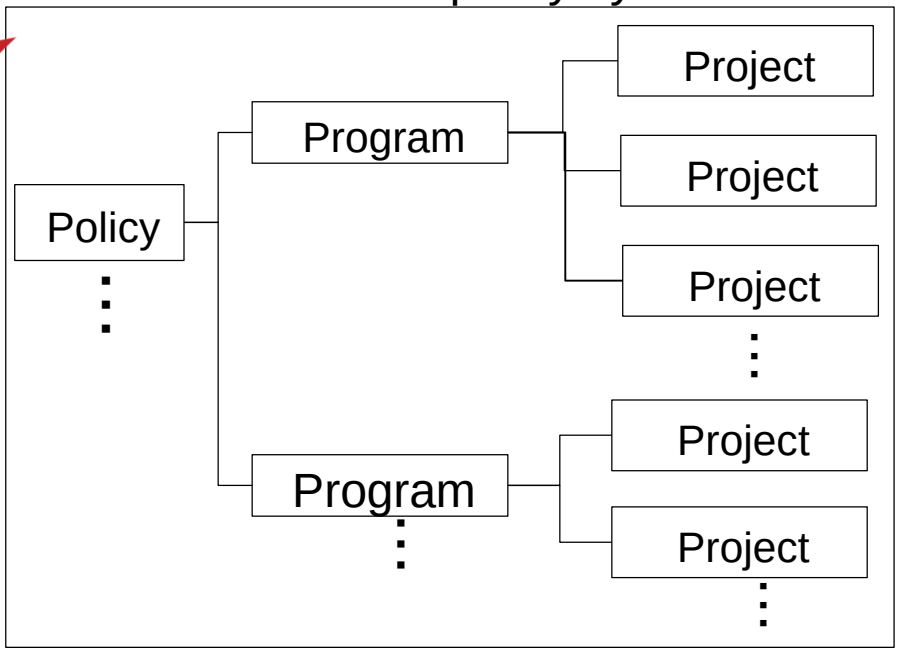
Administrative activities

Target of Administrative evaluation

<Functional Structure of Administration>



<Hierarchical policy system>



Source : Evaluation Strategies in Japanese municipalities (Tanaka)）

Public System ; hierarchical policy structure

	definition
Policy	a large set of administrative activities for the decisions designed to carry out administrative objectives or periodical goals;
Program	A set of administrative activities for concrete measures to realize policy
Project	administrative activity to carry out individual measures of program

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The theory of “Program Evaluation”

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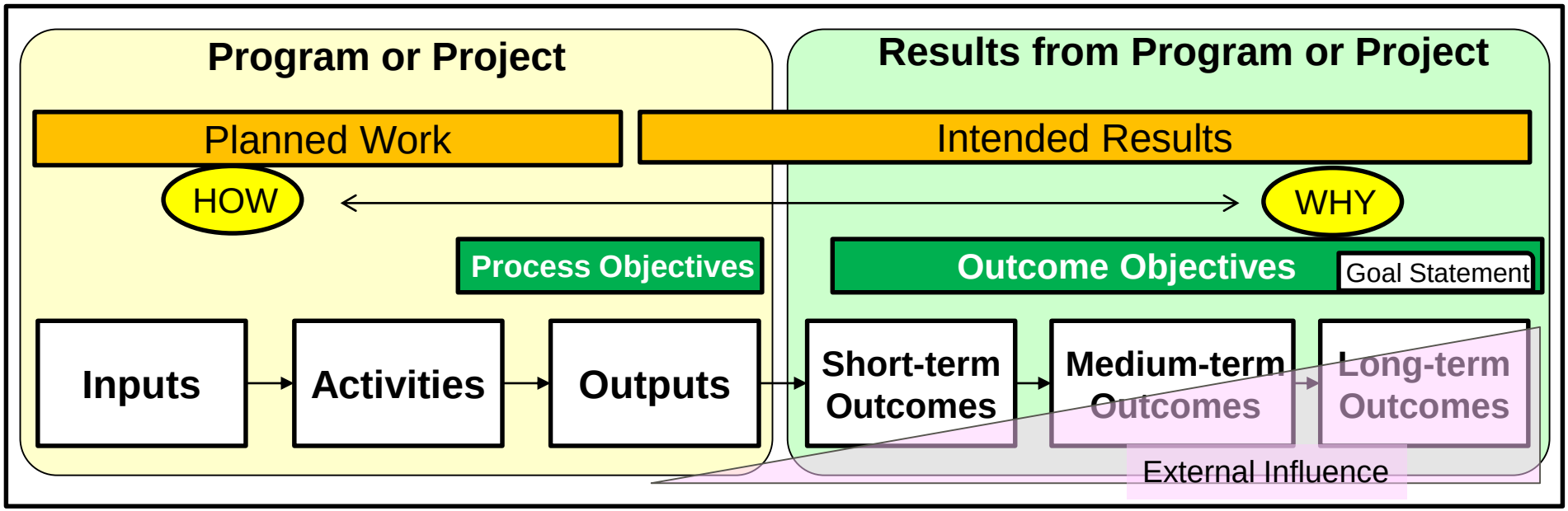
“Program Evaluation” for realization of goals/objectives

- ✓ Logic Model is effective to identify/select indicators.

What’s Logic Model?

- A logic model is a tool for program planning and evaluation, which represents a relationship between inputs, outputs (what we do), and outcomes (results).



Source : Logic Model Development Guide (W.K. Kellogg Foundation)

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Example ; Water supply business management logic model

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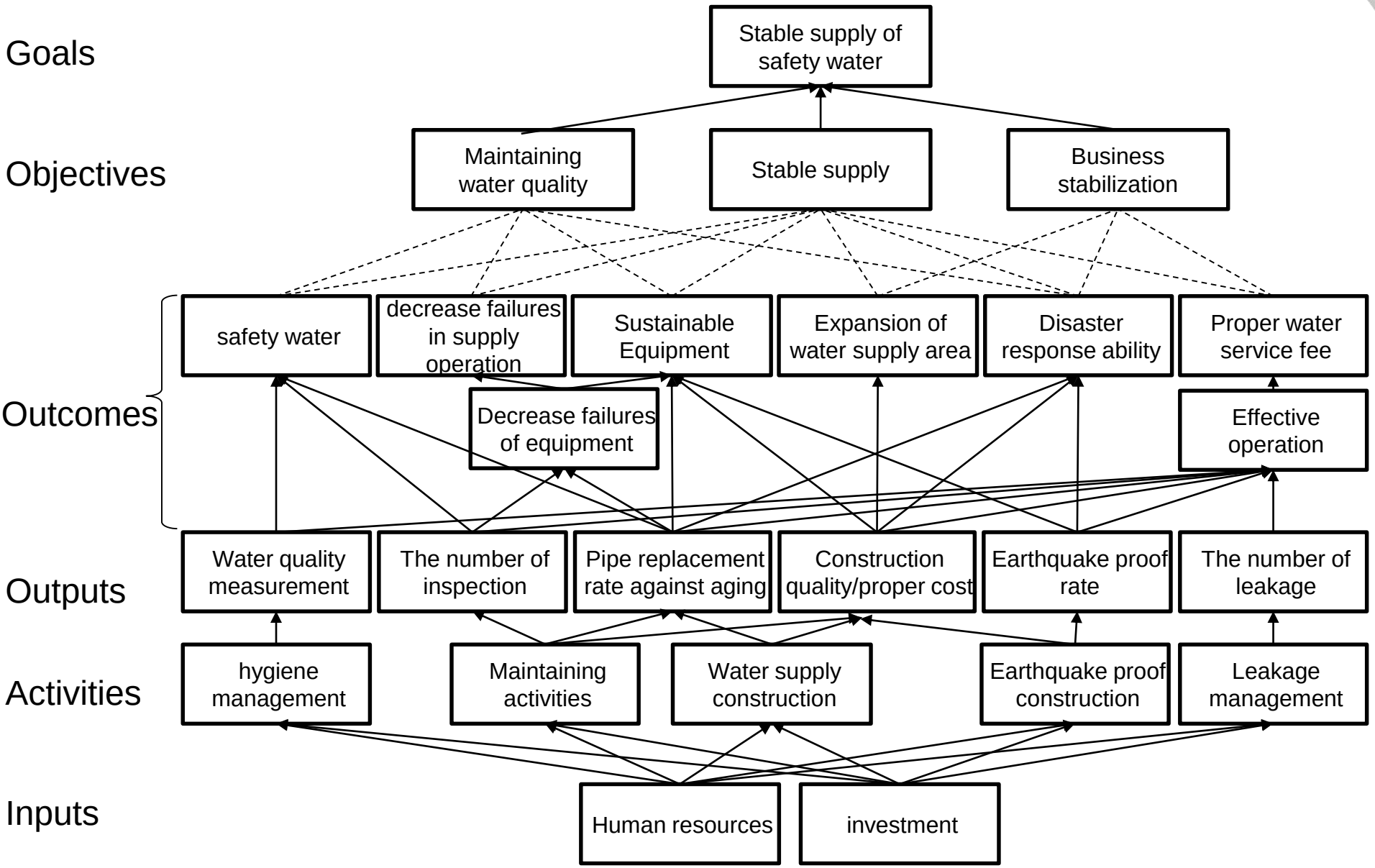

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How to build a logic model

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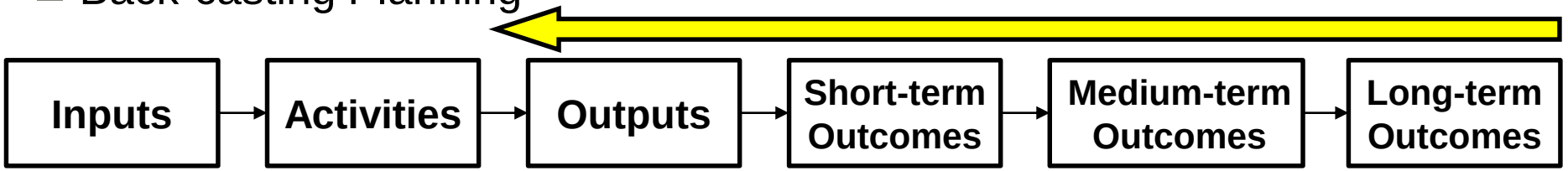
Procedure of building “Logic Model”

Source : Cabinet Office in Japan

- Back-casting Planning



Source : Logic Models and Their Applications to Research, Technology, Development , and Deployment Policies and Programs
http://www.mext.go.jp/component/a_menu/science/detail/__icsFiles/afieldfile/2015/05/19/1242333_009.pdf

Benefits and Limitations of Logic Model

Benefits

- Integrate planning, implementation, and evaluation
- Define a shared language and shared vision for community change
- Help planners to identify intermediate effects and define measurable indicators

Limitations

- Logic modeling can also be time consuming, requiring much energy
- Modelers will appreciate that the real effects could differ from the intended effects
- Establishing the appropriate boundaries of a logic model can be a difficult challenge.

Source : Community Tool Box (2018)
https://ctb.ku.edu/en/table-of-contents/overview/models-for-community-health-and-development/logic-model-development/main

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Logic Model and Program Evaluation

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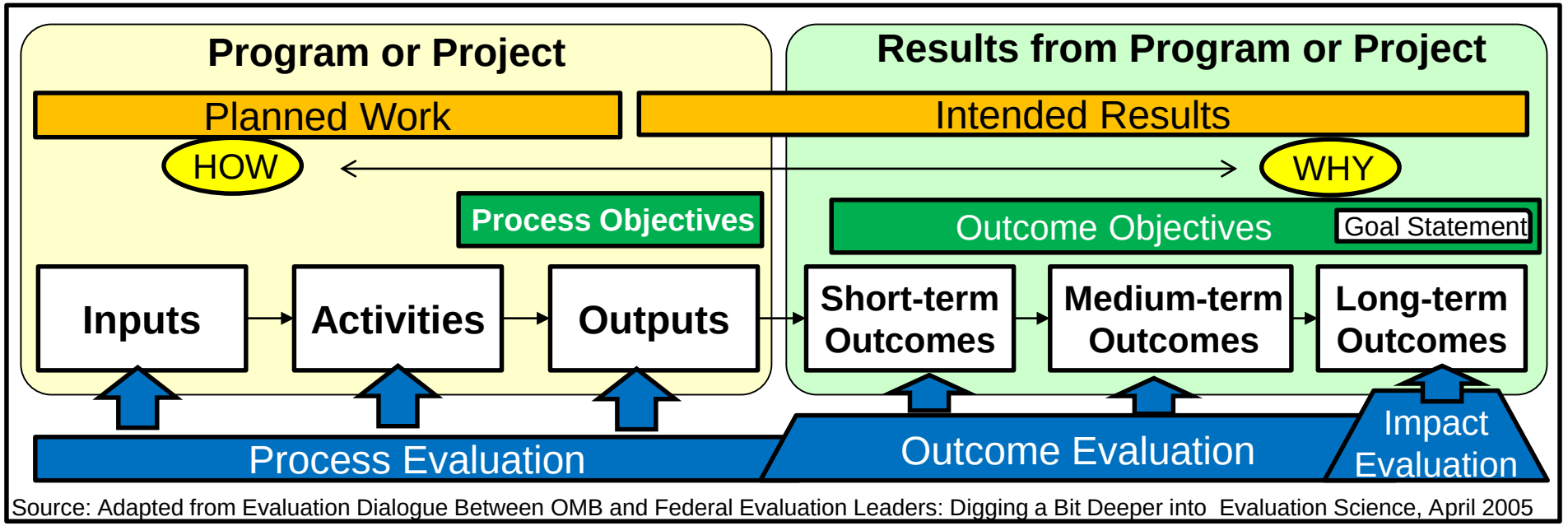
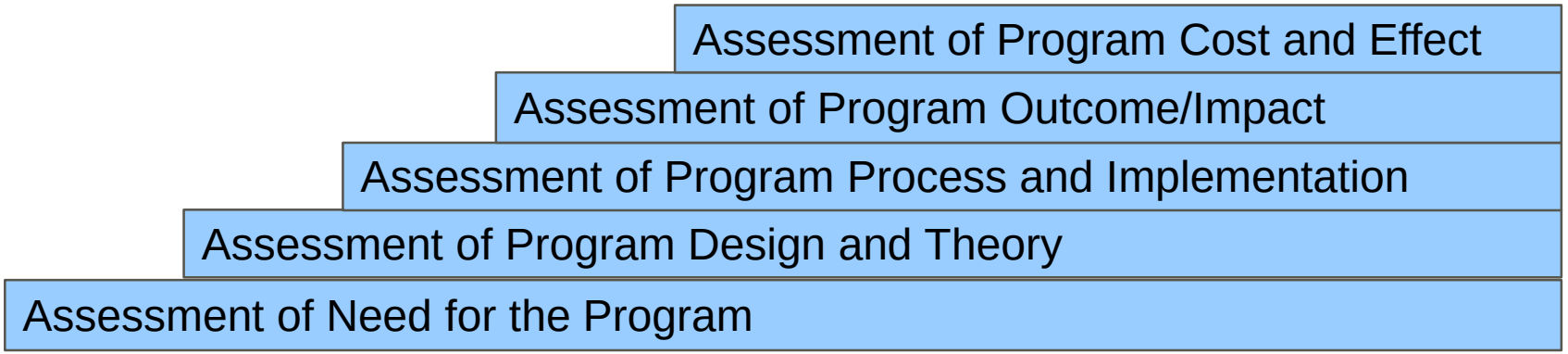
Relation between Logic Model and Program Evaluation



Source: Adapted from Evaluation Dialogue Between OMB and Federal Evaluation Leaders: Digging a Bit Deeper into Evaluation Science, April 2005

Program Evaluation Hierarchy



Source : Evaluation (Rossi, Lipsey, Freeman (2004))

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Selection of KPIs

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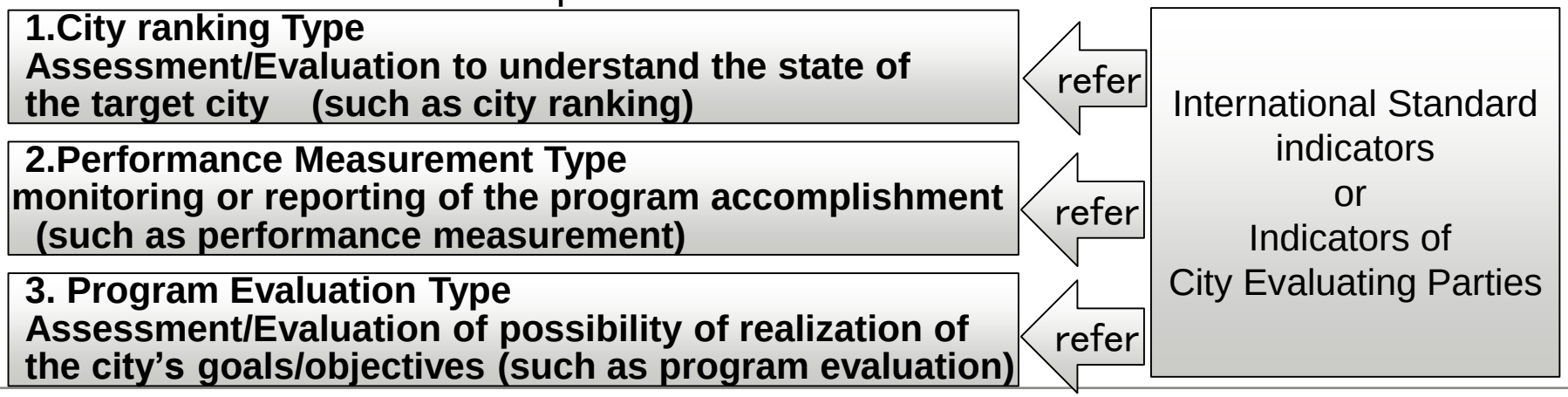
- **Logic Model is a tool that helps identify critical outcomes.**
  1. Logic Model provides logic tree and elements to realize goals/objectives
     - outcomes, outputs, activities and inputs
  2. Prioritize the outcomes or other elements and identify critical factors
  3. Create indicators to assess the critical factors according to “SMART KPI”

     ⇒ Indicators to assess the critical factors are KPIs.
- **Reference of existing assessment indicators**
  - For city/smart city assessment, many indicators are proposed by International Standard Parties or City Evaluating Parties. We can refer to them, but how much you can use them depends objectives.

<Assessment Purpose>



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Requirements for Assessment System for smart sustainable city (SSC)

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Assessment for smart sustainable city (SSC)

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Consideration Points of Smart Sustainable City Assessment

Assessment of activities toward Future Vision

- We have to identify Goals/Objectives as Future Vision/Future Needs clearly
- It is important to identify the Policies/Programs/Projects to realize Goals/Objectives. Besides, management of the Policies/Programs/Projects and relations among stakeholders are more important elements for SSC assessment.

⇒ ・Assessment of Needs

・Assessment of Management

・Assessment of Relation among stakeholders/other parties

The target field is very wide and includes various sectors.

- Assessment indicators are various

⇒ ・What are useful indicators to assess smart sustainable cities?

- We need a cross-sectional assessment methodology in the whole city.
  - It is difficult to build KPIs system for SSC in the whole city directly.

⇒ ・Apply logic model divided by sectors/fields (see next page)

  - But we have to prioritize among the Policies/Programs/Projects by assessment results

⇒ ・It is difficult to identify priorities among cross-sectional activities with only indicator values, so we need unified evaluation criteria.

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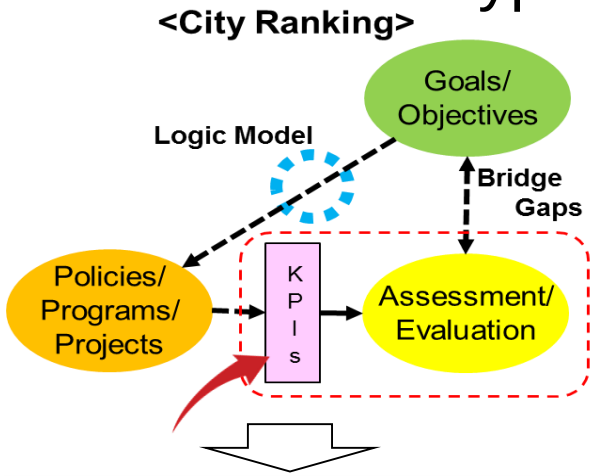
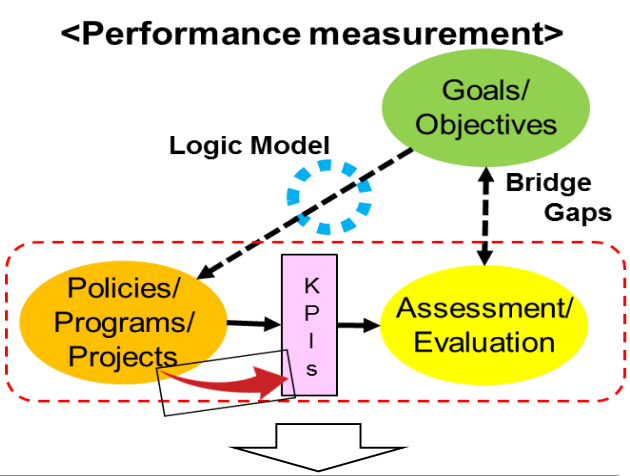
Assumption of this lecture

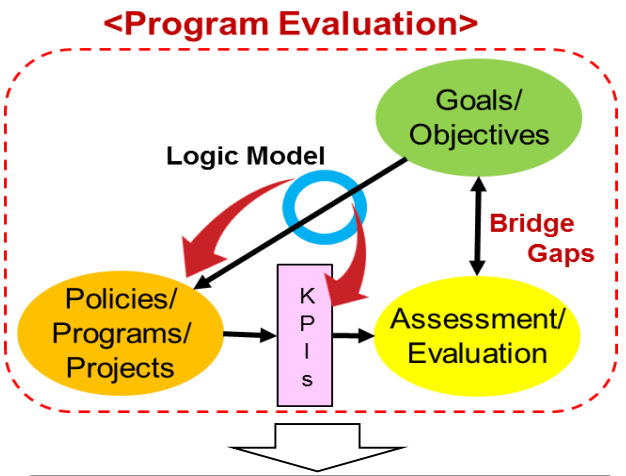
Assessment Type



Assessment of SSC by external KPIs for calculating city ranking

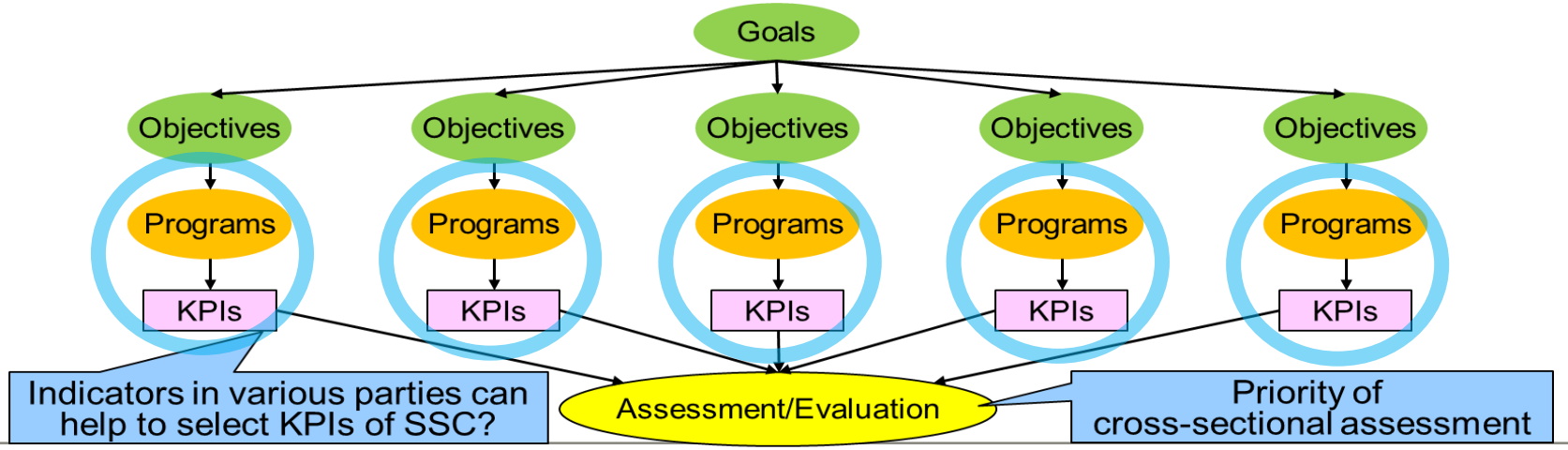


Assessment of SSC by KPIs for calculating performance of programs



Assessment of SSC by KPIs for identifying gaps between program outcomes and goals/objectives

Assessment of SSC in a whole city (image)



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KPIs systems in International Standard

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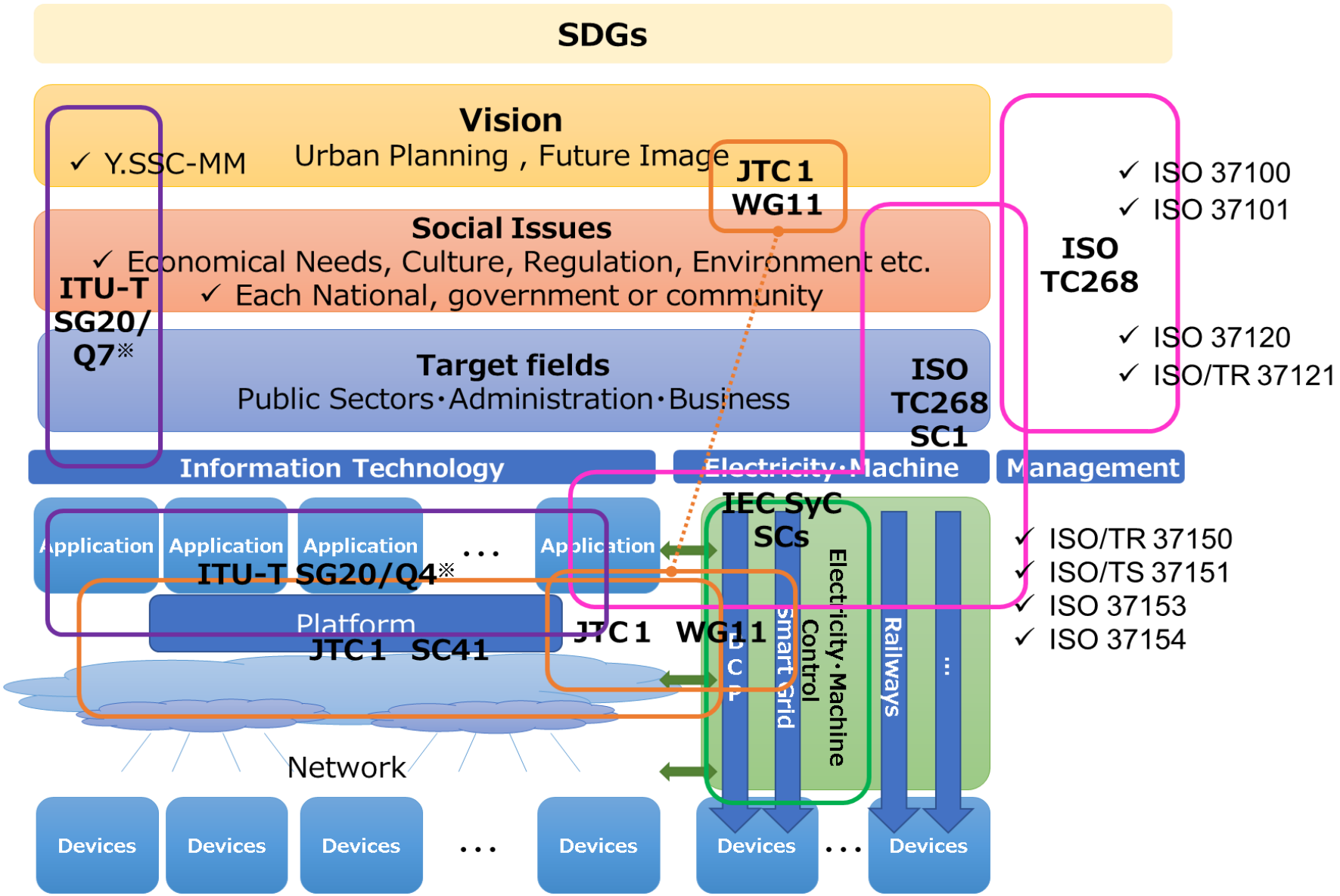
International Standards related to SSC



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KPIs for Assessment of Cities or SSC

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ISO37120 series in ISO

No.	title	Status
ISO37120	Sustainable Development in Communities — Indicators for City Services and Quality of Life	1st :Published in 2012 2nd:Developing(FDIS) 128
ISO37122	Sustainable Development in Communities - Indicators for Smart Cities	Developing(CD) 80
ISO37123	Sustainable Development in Communities - Indicators for Resilient Cities	Developing(CD) 49

ISO/IEC JTC1

No.	title	Status
ISO30146	Information technology - Smart city ICT indicators	Developing(CD) 58

Technical Report for Smart Sustainable City in ITU-T 200

No.	title	Status
Y.4901/L.1601	Key performance indicators related to the use of information and communication technology in smart sustainable cities	Published in 2016
Y.4902/L.1602	Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities	Published in 2016
Y.4903/L.1603	Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals	Published in 2016

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Indicator Systems for City Assessment (a part)

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No.	Title	Number of indicators	Organizations	Publication year
1	Key indicators for smart city projects and smart cities	77	Eurocities (Co-funded by the European Commission within the H2020 Program.)	2016
2	SMART CITIES INFORMATION SYSTEM	41	EU Smart Cities Information System	2017
3	ASCIMER (Assessing Smart City Initiatives for the Mediterranean Region)	133	Assigning smart city initiatives for the Mediterranean region	2017
4	IESE Cities in Motion Index	68	IESE business school University of Navarra	2017
5	The Global Innovation Index 2016	81	Cornell University, INSEAD, and WIPO	2016
6	Key Performance Indicators for Sustainable Digital Multiservice Cities	78	ETSI TS 103 463 V1.1.1	2017
7	SUSTAINABLE URBAN DEVELOPMENT INDICATORS FOR THE UNITED STATES	144	Office of Policy Development and Research, U.S. Department of Housing and Urban Development	2011
8	Indicators for Sustainability	32	Canadian industrial Development Agency	2015
9	China Urban Sustainability Indices	21	the Urban China Initiative	2014
10	European Green City Index	30	the Economist Intelligence Unit	2012
11	City Livability Index	74	The Ministry of Urban Development Government of India	2016
12	Summary of City Indicators	93	Smart Cities Sectional Committee, Bureau of Indian Standards	2016
13	Smart Cities Index (India)	58	Indian School of Business	2014
14	Smart Cities Council ranking framework	46	Smart city Council	2014
15	Smart cities Ranking of European medium-sized cities	74	the Department of Spatial Development, Infrastructure and Environmental Planning of Vienna University of Technology, the OTB Research Institute for Housing, Urban and Mobility Studies of Delft University of Technology	2007
16	ESPRESSO Smart City indicator platform	97	Systemic standardization approach to Empower Smart cities and communities	2016
17	UNECE-ITU Smart Sustainable Cities Indicators	72	Economic and Social Council	2015
18	Key Performance Indicators for Smart Sustainable Cities	91	The “United for Smart Sustainable Cities” (U4SSC) ; UN initiative coordinated by ITU and UNECE	2017
19	Global City indicators	74	University of Toronto,	2015
20	Key performance indicators from ITU-T FG SSC	94	ITU-T Focus Group on Smart Sustainable Cities	2014
21	Smart Cities and Social Governance	39	UNDP China	2017
22	Smart city maturity and Benchmark Model	225	TM-Forum	2016

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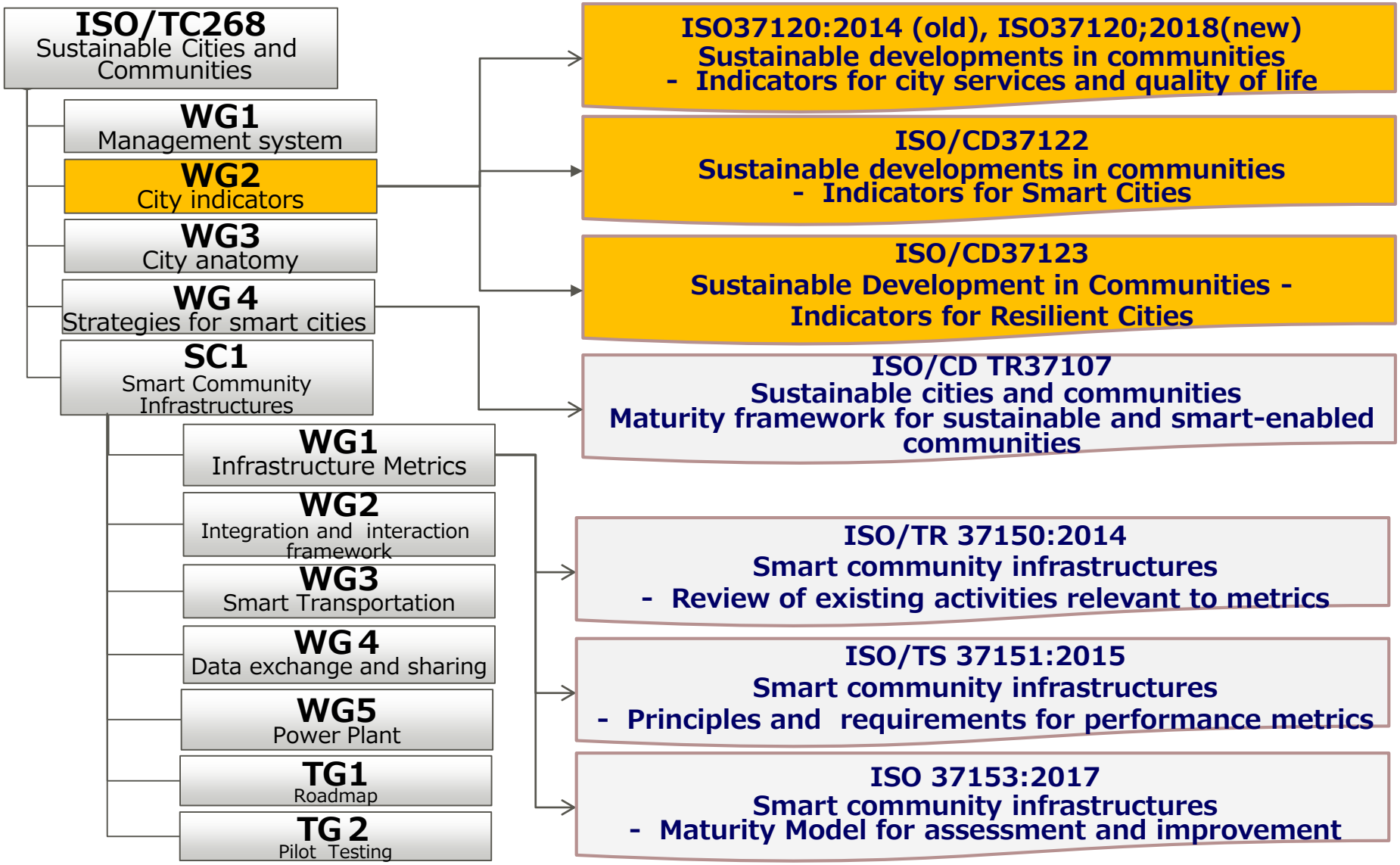
ISO/TC268

- ISO/TC268 is a technical committee to develop international standards related to sustainable development of cities and communities



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Sustainable Development of Communities: City Indicators – Family of Standards

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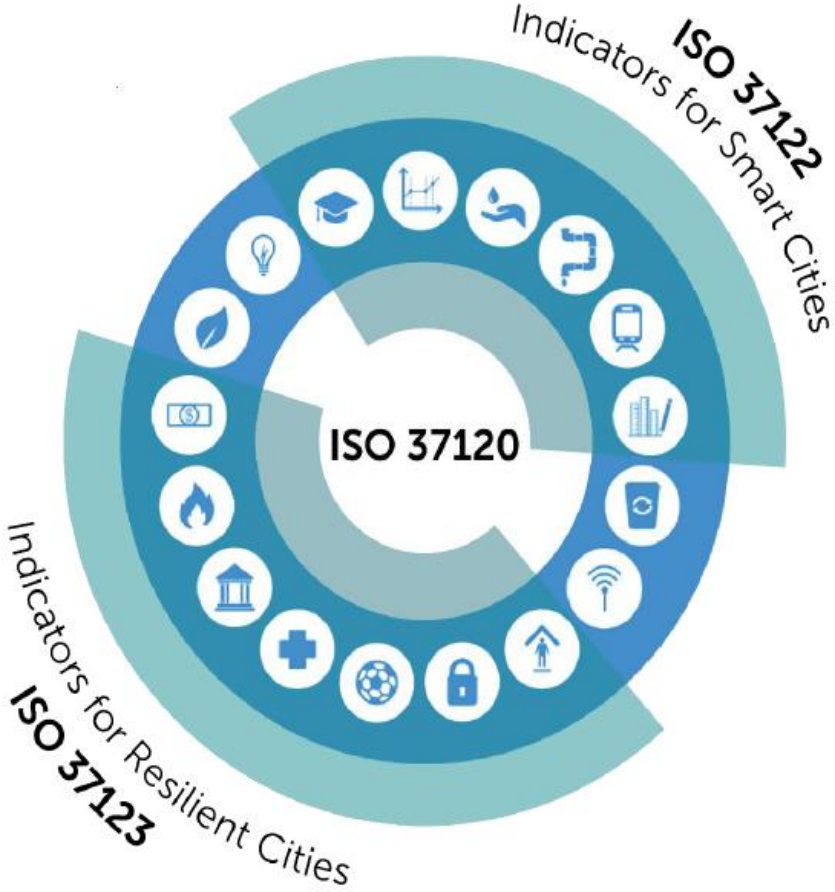
Creating a Family of Standards for City Data ; ISO37120 Series

- **ISO37120** : Indicators for City Services & Quality of Life
- **ISO37122** : Indicators for Smart Cities
- **ISO37123** : Indicators for Resilient Cities



Source : The New ISO Standard for Resilient Cities Indicators: Opportunities for City and Expert Input (WCCD, UNISDR;2018)

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Y.4901/L.1601 : KPIs related to the use of ICT in SSC

Over-view

- Provide KPIs for assessment how smart a target city is.
- A list of selections and explanations of KPIs that emphasize aspects in using ICT.

Dimension label	Dimension	Sub-dimension label	Sub-dimension
D1	Information and Communication Technology	D1.1	Network and access
		D1.2	Services and Information platforms
		D1.3	Information security and privacy
		D1.4	Electromagnetic field
D2	Environmental sustainability	D2.1	Air quality
		D2.5	Water, soil and noise
D3	Productivity	D3.1	Capital investment
		D3.4	Trade
		D3.8	Innovation
		D3.9	Knowledge economy
D4	Quality of life	D4.1	Education
		D4.2	Health
		D4.3	Safety/security public place
D5	Equity and social inclusion	D5.3	Openness and public participation
		D5.4	Governance
D6	Physical infrastructure	D6.1	Infrastructure/connection to services – piped water
		D6.2	Infrastructure/ connection to services – sewage
		D6.3	Infrastructure/ connection to services – electricity
		D6.8	Infrastructure/connection to services – road infrastructure
		D6.11	Building

Sub-dimensions of KPIs (examples)

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ITU-T Y.4902

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Y.4902/L.1602 :

KPIs related to the sustainability impacts of ICT in SSC

Over-view

- Provide KPIs for assessment how smart a target city is.
- A list of selections and explanations of KPIs that emphasize the aspect of what to assess impact by implementation of ICT application

Dimension label	Dimension	Sub-dimension label	Sub-dimension
D2	Environmental sustainability	D2.1	Air quality
		D2.2	CO_2 emissions
		D2.3	Energy
		D2.5	Water, soil and noise
D3	Productivity	D3.1	Capital investment
		D3.2	Employment
		D3.3	Inflation
		D3.5	Savings
		D3.6	Export/import
		D3.7	Household income/consumption
		D3.8	Innovation
D4	Quality of life	D4.1	Education
		D4.2	Health
		D4.3	Safety/security public place
D5	Equity and social inclusion	D5.1	Inequity of income/consumption (Gini coefficient)
		D5.2	Social and gender inequity of access to services and infrastructure
		D5.3	Openness and public participation
D6	Physical infrastructure	D6.1	Infrastructure/connection to services – piped water
		D6.2	Infrastructure/connection to services – sewage
		D6.3	Infrastructure/connection to services – electricity
		D6.6	Infrastructure/connection to services – health infrastructure
		D6.7	Infrastructure/connection to services – transport

Sub-dimensions of KPIs (examples)

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ITU-T Y.4903

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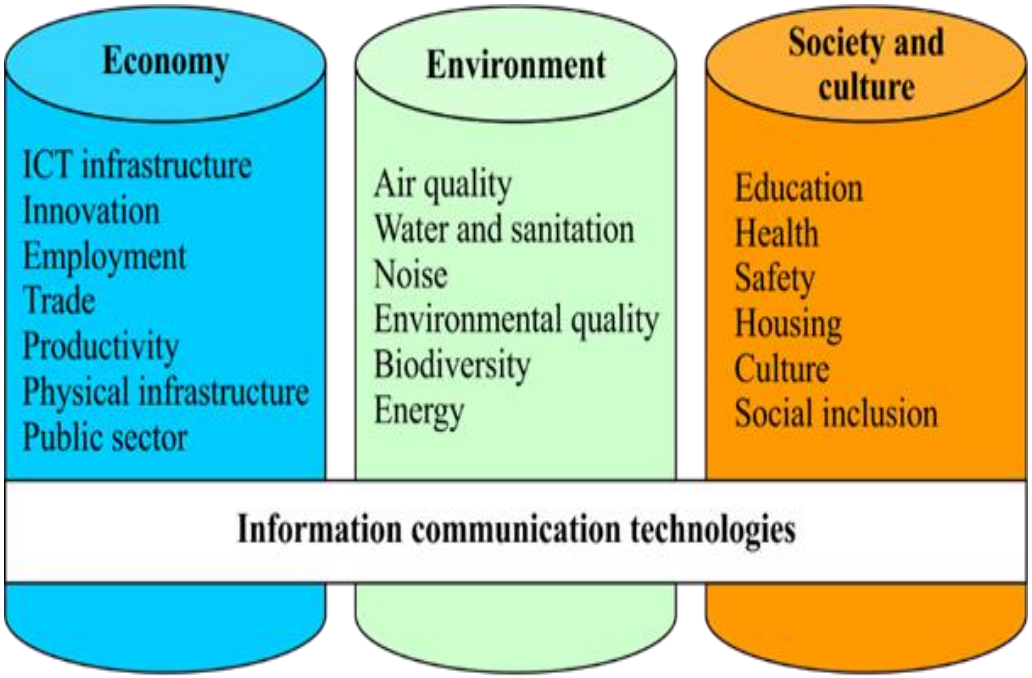
Y.4903/L.1603 :

KPIs for SSC to assess the achievement of SDGs

Over -view

- Outline of KPI in the context of SSC used to evaluate achievement of SDGs
- Cities and stakeholders understand the range recognized as smart sustainable Under the evaluation by KPI.



Areas and topics of KPIs for SSC

- ✓ ITU-T Y.4903 includes KPIs of UNECE（United Nations Economic Commission for Europe）and is based on ITU-T Y.4900, Y.4901, Y.4902.
- ✓ ITU-T Y.4903 is constructed with due regard to the followings.
  - SDGs
  - UNHABIT
  - ISO37120
- ✓ KPI system consists of Economy , Environment and Society and culture.

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United 4 Smart Sustainable Cities (U4SSC)

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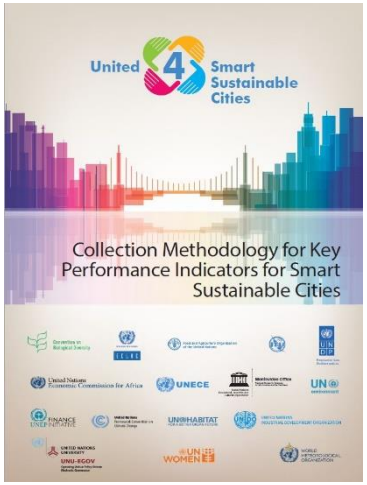
- **U4SSC is a United Nations Initiative coordinated by ITU and UNECE** that advocates for public policy to encourage the use of ICTs to facilitate and ease the transition to smart sustainable cities.

- **U4SSC develops KPIs for SSC**
  - The U4SSC Initiative has developed a set of international **key performance indicators (KPIs) for Smart sustainable cities (SSC)** to establish the criteria to evaluate ICT´s contributions in making cities smarter and more sustainable, and to provide cities with the means for self-assessments.



- **KPIs Project for Smart Sustainable Cities to Reach SDGs**

- ✓ To support cities in the implementation and use of the SSC KPIs
- ✓ To test and verify the applicability of SSC-KPIs in several cities of the world.
- ✓ To develop a global **Smart Sustainable Cities (SSC) Index**.

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U4SSC KPIs for SSC

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- **The U4SSC KPIs system consists of 3 Dimensions with the following Categories**

54 Core Indicators + 37 advanced Indicators

20 Smart + 32 Structural + 39 Sustainable

132 Data Collection Points

Dimension	Economy	Environment	Society and Culture
Category	▪ ICT Infrastructure ▪ Water and Sanitation ▪ Drainage ▪ Electricity Supply ▪ Transport ▪ Public Sector ▪ Innovation ▪ Employment ▪ Waste ▪ Buildings ▪ Urban Planning	▪ Air Quality ▪ Water and Sanitation ▪ Waste ▪ Environmental Quality ▪ Public Space and Nature ▪ Energy	▪ Education ▪ Health ▪ Culture ▪ Housing ▪ Social Inclusion ▪ Safety ▪ Food Security

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Smart city 6 Dimensions

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- **Dimensions/Categories for SSC are defined by some parties.**

Smart economy

- Innovative spirit
- Enterpreneurship
- Economic image & trademarks
- Productivity
- Flexibility of labour market
- International embeddedness
- Ability to tranform

Smart mobility

- Local and (inter-) national accessibility
- Availability of ICT-infrastructure
- Sustainable, innovative and safe transport systems

Smart environment

- Attractivity of natural conditions
- Pollution
- Environmental protection
- Sustainable resource management

Smart people

- Level of qualification
- Affinity to life long learning
- Social and ethnic plurality
- Flexibility and creativity
- Cosmopolitanism/open-mindedness
- Participation in public life

Smart living

- Cultural and educational facilities
- Health conditions
- Individual safety
- Housing quality
- Touristic attractivity
- Social cohesion

Smart governance

- Participation in decision-making
- Public and social services
- Tranparent governance
- Political strategies & perspectives

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International Standard KPIs for SSC

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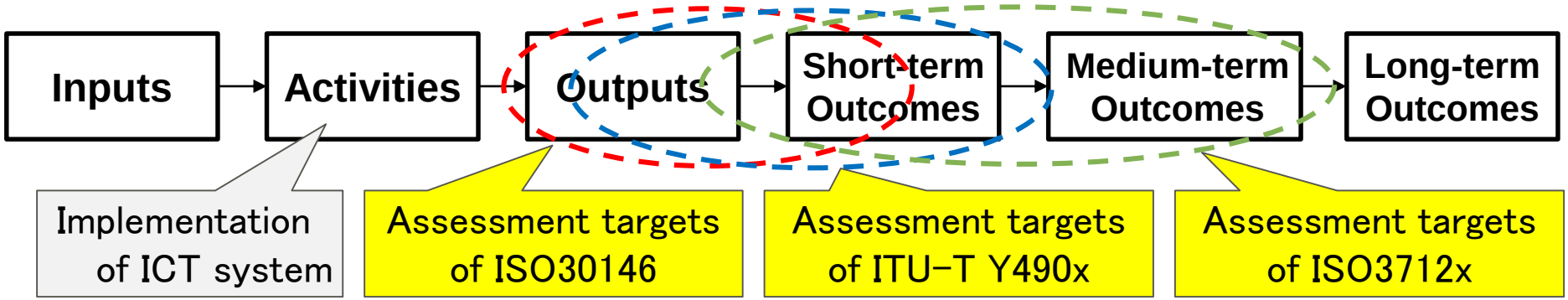
Mapping KPIs systems of the international Standard (My Image)



ISO30146 trends to have Assessment indicators for outputs by implementation of ICT system

ITU-T Y.490x trends to have Assessment indicators for outputs and short-term outcomes of ICT system

ISO3712x trends to have Assessment indicators for state of a city
・30122;output&short term
・37120:City outcomes

<Indicators title>

Percentage of one-stop government services
Percentage of government services which can be accessed via single web portal
Implementation of electronic or digital signature by administration
Percentage of citizen service requests which can be processed appropriately by government

Indicator examples
from “e-government services” in ISO30146

<Indicators title>

Online support for new city inhabitants
Existence of strategies, rules and regulations to enable ICT literacy among inhabitants
Provision of online systems for administering public services and facilities
Application of services to support persons with specific needs

Indicator examples
from “Equity and social inclusion” in Y.4901

<Indicators title>

Percentage of municipal datasets available to the public
Annual number of online visits to the municipal open data portal per 100 000 population
Percentage of city services accessible online
Average response time to relevant inquiries made through the city’s nonemergency inquiry system

Indicator examples
from “Governance” in ISO37122

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Assessment by Maturity Model
- for Applying the criteria of ISO37153 to SSC -

- ISO 37153

  “Smart community infrastructure

  -Maturity Model for assessment and improvement-"

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Maturity Model

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I'll introduce Maturity Model of ISO37153

- *They say that criteria of ISO37153 (Maturity Model) are consistent with the assessment of SSC and cross-sectional assessment in a whole city.*

What's Maturity Model ?

- Assessment model that identifies a set of phased development or progress levels as the assessment categories with unified/consistent criteria

Image of Maturity Model

	Level 1	Level 2	Level 3	Level 4	Level 5
Definitions	Conditions to satisfy in level1	Conditions to satisfy in level2	Conditions to satisfy in level3	Conditions to satisfy in level4	Conditions to satisfy in level5

Steps to realize the goal → *realization of the goal

*Maturity Model defines phased purposes toward the goal

Maturity Model is trendy?

- Maturity Model for community Infrastructure (ISO37153; 2017)
- Maturity Model for management for SSC (ISO/CD TR37107(developing))
- Maturity Model for SSC (ITU-T Y.SSC-MM(developing))
- Maturity Model for smart city (IDC, Urban TIDE,・・・, some parties)

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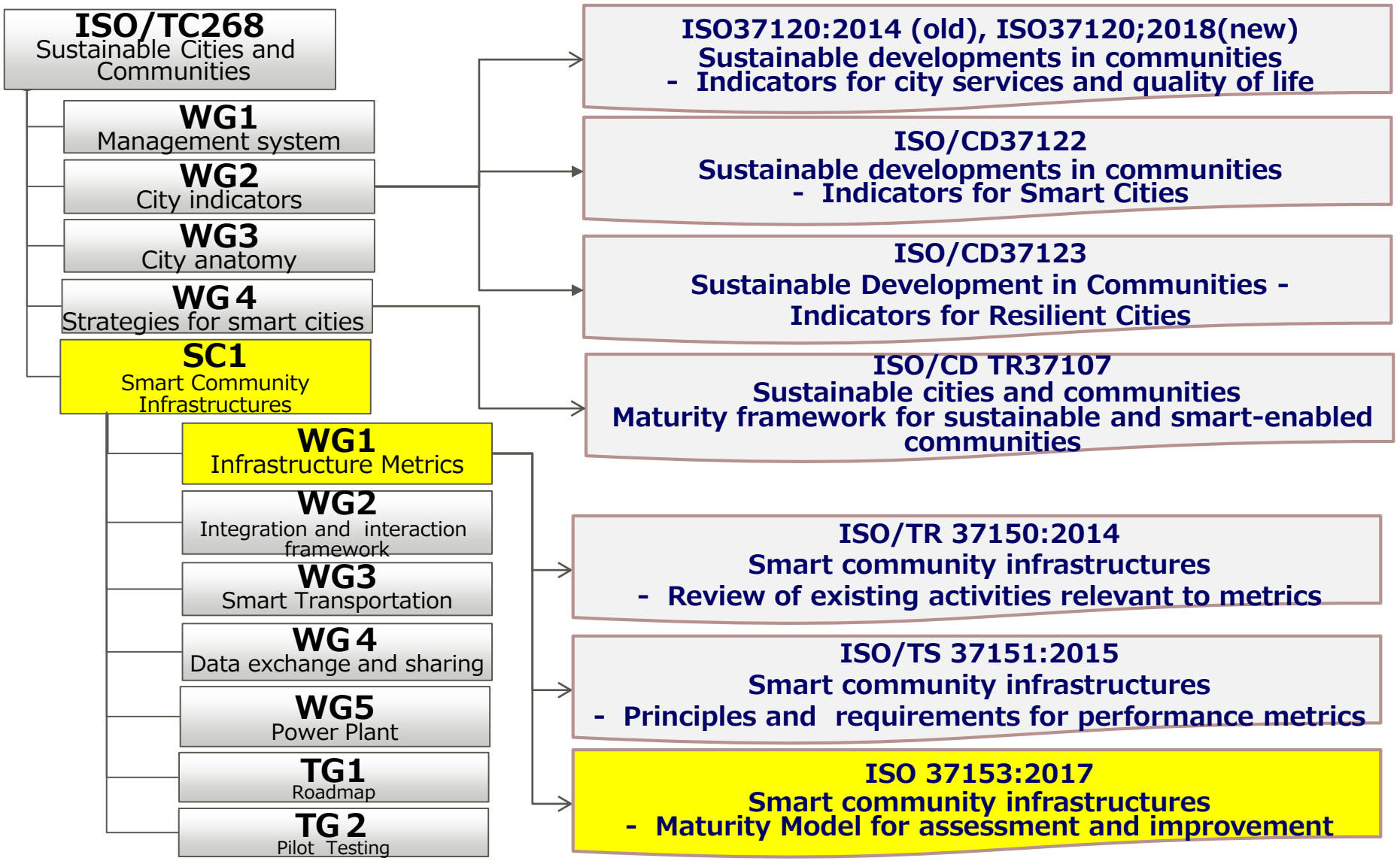
ISO/TC268/SC1

- ISO/TC268/SC1 is a sub-committee to develop international standards related to smart community infrastructure. And SC1/WG1 has developed their assessment system.



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Activities in ISO/TC268/SC1 WG1

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- ISO/TC268/SC1 WG1 discussed Indicator category system for Smart community infrastructures. The results are ISO/TR37150 and ISO/TS37151.
- Fujitsu proposed an assessment methodology using Maturity Model. (ISO37153)

Perspectives and Minimum Needs (Categories of Indicators) \ Community Infrastructure		Energy	Water	Traffic	Waste	ICT	Others
Residents	(1)Availability						
	(2)Accessibility						
	(3)…….						
	(4)Safety & Security						
	(5)Quality of Service						
Community Manager	(6)Operational Efficiency						
	(7)Economic ……..						
	(8)…….						
	(9)Maintainability						
	(10)Resilience						
Environment	(11)Mitigation of climate change						
	(12)Prevention of pollution						
	(13)						
	(14) ……						

TR37150

TS37151

ISO/TS37151 recommends ;
Selecting indicators for assessment of target infrastructures including one indicator at least from each category

Even if assessors calculate all values of indicators, it is difficult to set priority of infrastructures based on them. Because indicators are different from each infrastructure and there is no common criteria among all indicators.

We need an assessment methodology with common criteria

ISO 37153 provides a method using Maturity Model.

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5 levels Criteria of ISO37153

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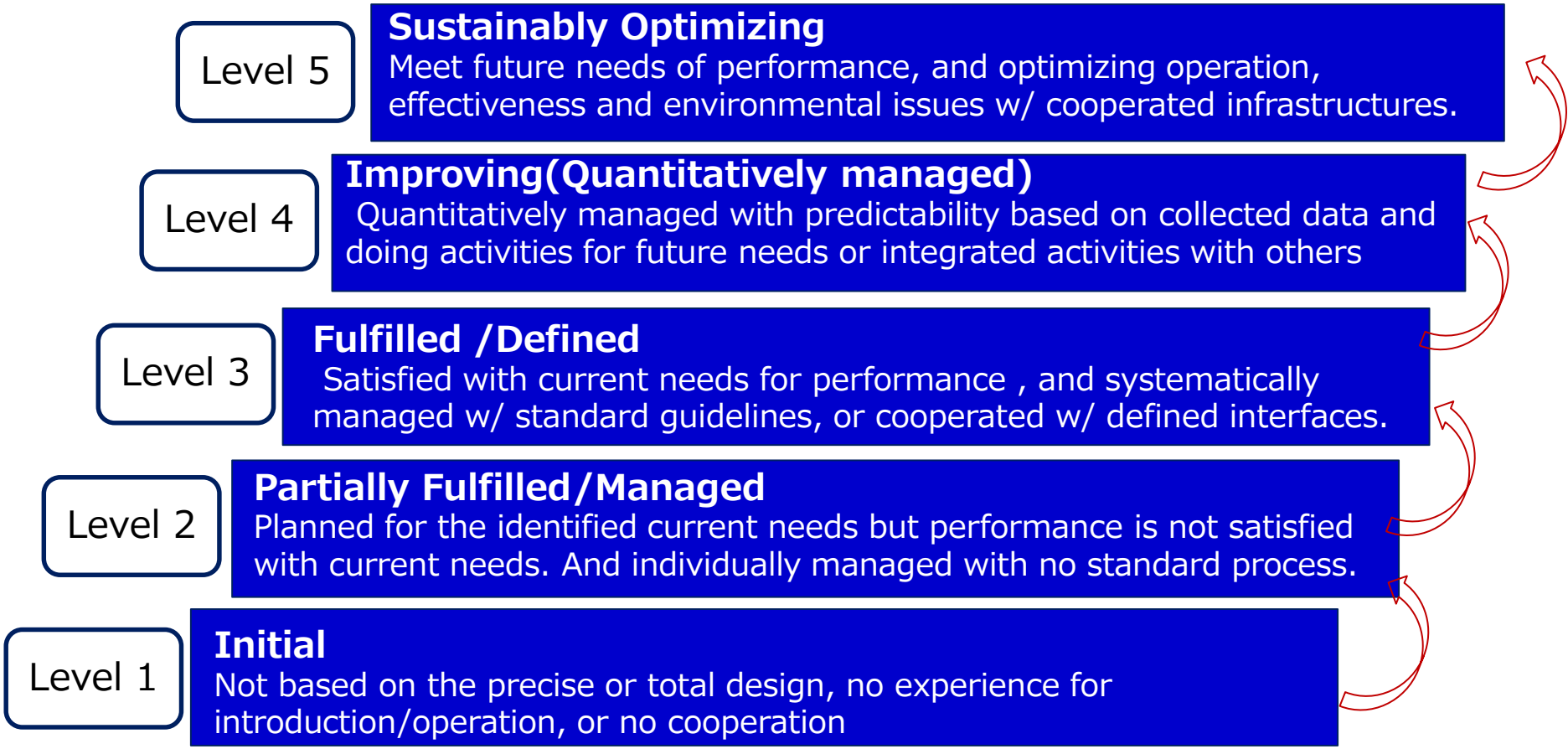
- Situation of infrastructure is very different at each community.
- Stepwise goal setting based on maturity level clarifies the contents of improvement for each community.



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Criteria for community Infrastructures

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【Characteristics of community Infrastructures】

1. Infrastructures are used in long-term period. So it is important to correspond to current and future needs for infrastructure and to do activities of maintenance and operation for them.
2. Infrastructures are interrelated with various stakeholders and various infrastructures.

【Assessment Aspects for community Infrastructures】

1. Assessments for current needs and future needs is important for community infrastructures. **(Assessment of Needs fulfilled assessment in time-series)**
2. Assessment for management mechanism and quality of organizational activities (maintenance or operation activities) is important for the accomplishment of goals.**(Assessment of management)**
3. Assessment for relationship among stakeholders and cooperation mechanism is important for the accomplishment of goals.**（Assessment of cooperation/collaboration among stakeholders）**

【Maturity Model Criteria (image of ISO37153 for community infrastructure assessment)】

	Level 1	レベル2	レベル3	レベル4	レベル5
Needs（Performance）	Initial	Partially fulfilled	Fulfilled	Improving	Sustainable optimizing
	initial	……	Current Needs	……	Future Needs
Management（Process）	Initial	Managed	Defined	Improving	Sustainable optimizing
	initial	……	Managed based on rules	Quantitative management	Optimal, Auto-control, sustainable, etc.
Cooperation/ collaboration (Interoperability)	Initial	Assessed	Fulfilled	Improving	Sustainable optimizing
	initial	……	Process cooperation /data linkage	Common platform	interoperability

Overview of ISO 37153 (1)

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Assessment process in accordance with ISO37153

(1) Build "Evaluation Table" ⇒ **(2)Assess target community infrastructures using "Evaluation Table"**

【(1)Building Process of Evaluation Table 】

① Select target infrastructures and Purpose of assessment
② Select indicators to assess the infrastructure according to the assessment purpose (referring ISO/TS37151)
③ Describe 5 levels of each indicator

【5 levels Criteria(Maturity Model)】 (ISO37153)

Indicator Type	Level1	Level2	Level3	Level4	Level5
Level Definition	Initial	Partially fulfilled	Fulfilled	improving	Sustainably optimizing
Performance	Initial	Partially Fulfilled	Fulfilled current need	Developing for future needs	Fulfilled Future need
Process	Initial	Management with plan	Defined Management	Quantitative Management	Sustainably optimizing
Interoperability	Initial	Peer to peer	Defined cooperation	Common platform	Inter-operability

③ Derivation

【Evaluation Table】

Indicators	Definition	purpose	Level1	Level2	Level3	Level4	Level5
Indicator1	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator2	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator3	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator4	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator5	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator6	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator7	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5
Indicator8	*******		def of LV1	def of LV2	def of LV3	def of LV4	def of LV5

① **Purpose of assessment**
Example)Sustainability of infrastructure

② **Select Indicators**

Reference

(ISO/TS37151 etc.)

Overview of ISO 37153 (2)

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Assessment process in accordance with ISO37153

(1) Build "Evaluation Table" → (2)Assess target community infrastructures using "Evaluation Table"

【(2) Assessment of target infrastructures using Evaluation table】

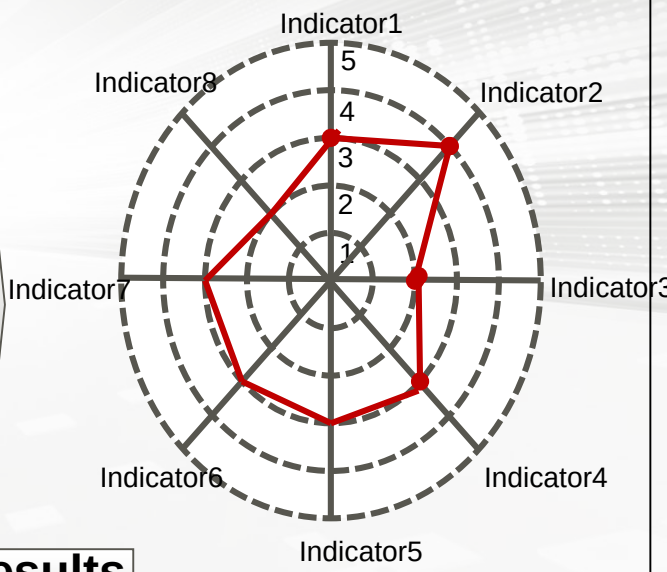
Indicators	Level 1	Level 2	Level 3	Level 4	Level 5
indicator1	.....	.....	.....	.....	
Indicator2	.....	.....	.....	.....	.....
Indicator3	.....	.....	.....	.....	.....
Indicator4	.....	.....	.....		
Indicator5	.....	.....	.....		
Indicator6	.....	.....	.....	.....	.....
Indicator7	.....	.....		.....	.....
Indicator8	.....	.....	.....	.....	.....

Strong Point

Weak Point

Improvement Point

Weak Point



Analysis of assessment results

- Select improvement points -> considering measures for level-up in the points
- Fix an order of priority of measures across some infrastructures

*improvement;
Conditions to satisfy in the level are descripted in Evaluation Table so that
1) it is easy to consider the direction to improve infrastructures referring to descriptions in upper levels
2) It is possible to prepare solutions/products for level-up

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for Applying the criteria of ISO37153 to SSC

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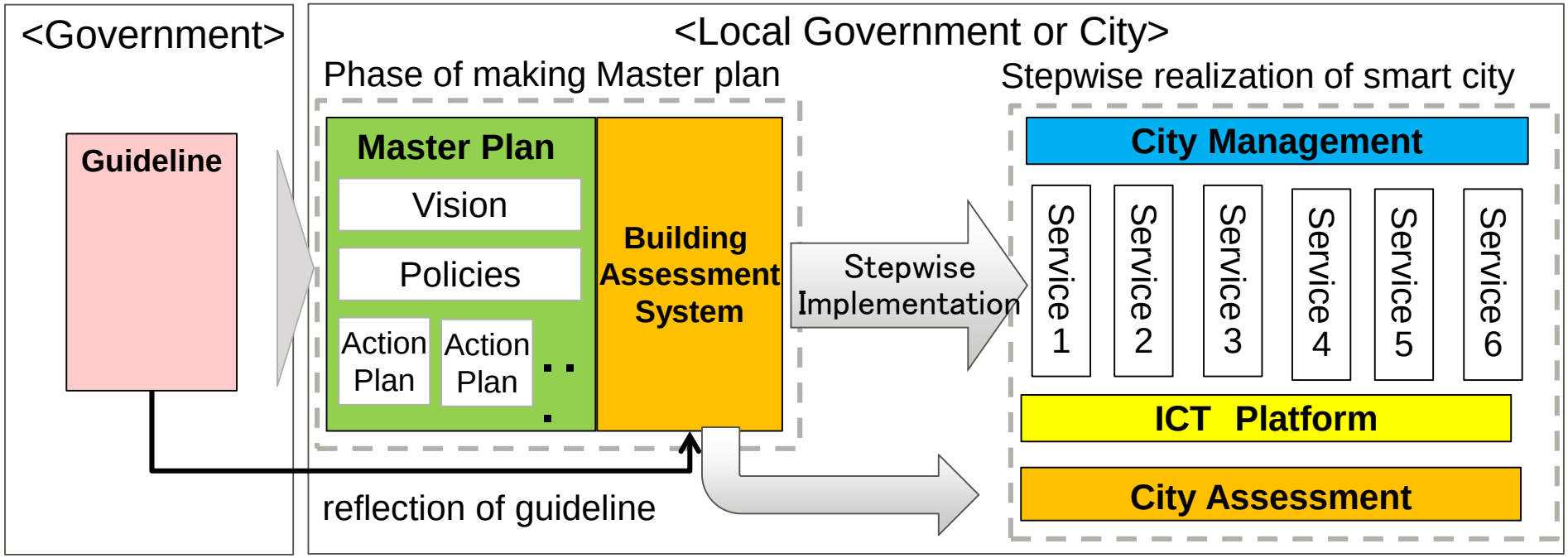
Benefits for building smart city

- **The assessment methodology of ISO37153 supports to build smart city**
  - The methodology can provide assessment procedures of smart cities in smooth cooperation with a master plan.
  - The criteria in ISO37153 can support to extract measures to build smart city according to city maturity levels.
  - The methodology facilitates continuous level-up of stepwise smart cities.



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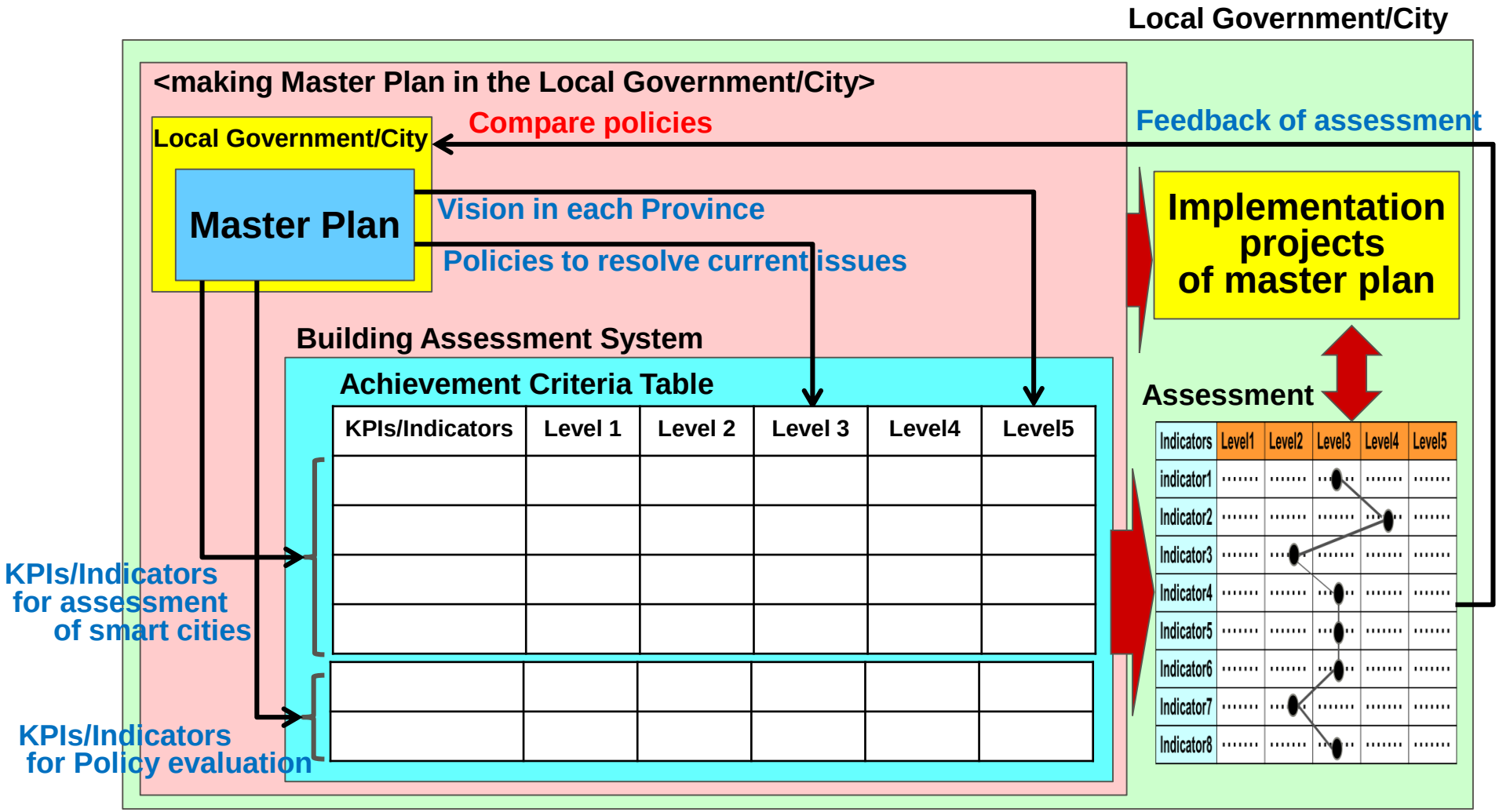
Master Plan with building Assessment System

- **It is easy that the assessment methodology is consistent with policies of the master plan in local governments/cities.**



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Overview of a Project for smart city in Vietnam

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Overviews of smart city project in Vietnam

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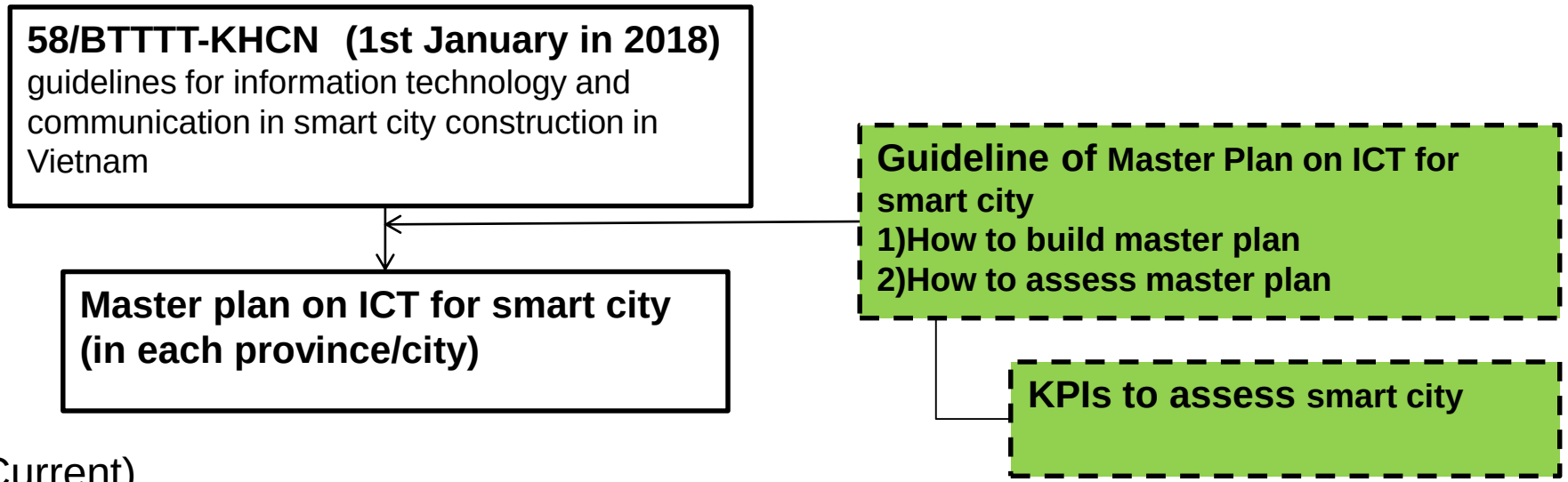
- Ministry of Information and Communications (MIC) in Vietnam is promoting smart city
- Guideline for smart city construction (MIC in Vietnam(2018))
  - Implement master plan on ICT for smart city (in each province/city)
  - Assessment of current status for establishing a smart city vision.



(Current)

- The Ministry of Information and Communications in Vietnam(MIC) is developing KPIs for smart city.
- Fujitsu supports developing national KPIs for smart city in Vietnam and smart city standardization and development in Vietnam.

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Overviews of smart city project in Vietnam

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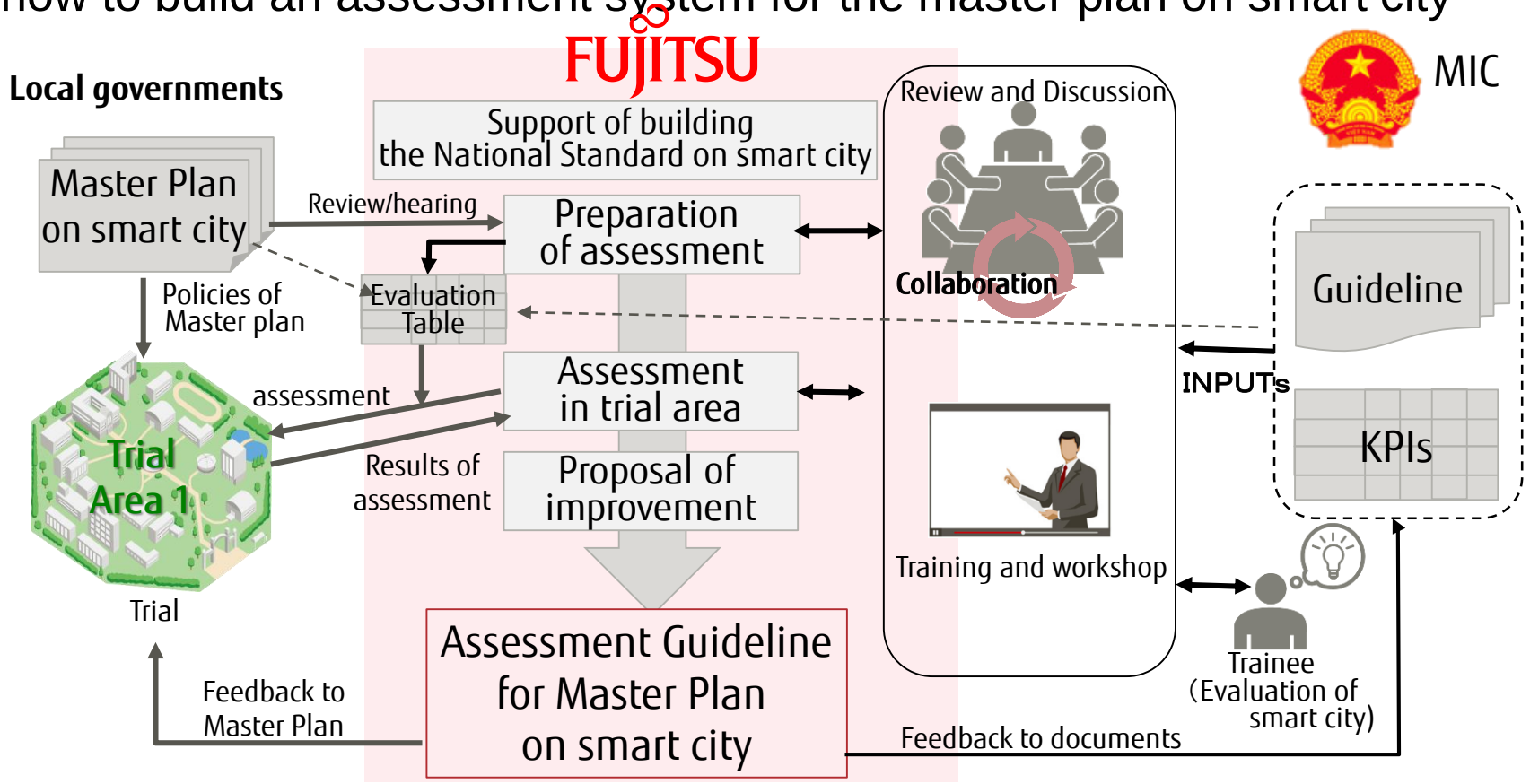
Fujitsu proposes the followings

- The procedure of developing KPIs for smart city
- Verification of developed KPIs in some local governments.
  - Measurable in local government　etc.
- how to build an assessment system for the master plan on smart city



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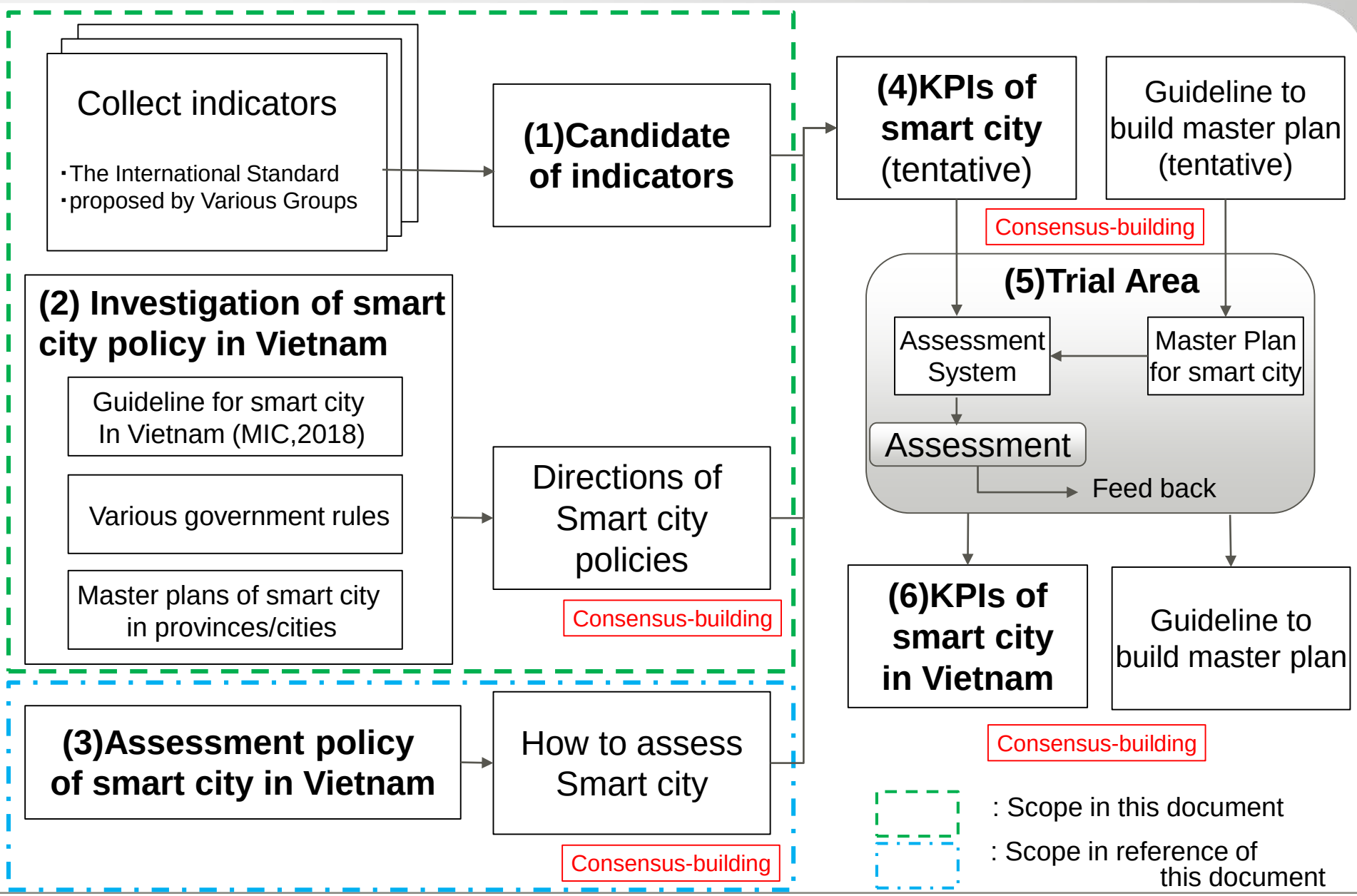
Procedure to Determine Smart City KPIs



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Smart City Assessment Process(draft)

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Central government

Local government

○Promotion of smart city assessment
- achieve smart city vision surely
- accumulate statuses for smart city in all provinces/cities

Guideline to build smart city in Vietnam

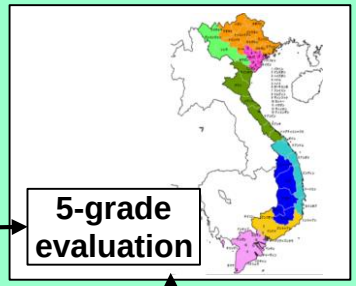
Guideline to build
- master plan on smart city
- assessment system for MP

5-grade evaluation criteria
Smart city KPIs (old version)

Revise

5-grade evaluation criteria
Smart city KPIs (new Version)

Assessment results



Collect KPIs' values

Master plan on smart city (old version)

Assessment system for master plan (old version)

Revise master plan

Master plan on smart city (new version)

Smart city KPIs for national standard

Proper KPIs for proper measures

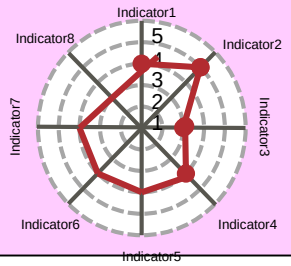
Assessment system for master plan

Activities

Assessment

Assessment results for smart city KPIs

Assessment results for apporopriate KPIs



Feed-back

○Assessment of master plan on smart city
- lead projects for smart city objectives and smart city vision to success
- prioritize various projects for measures in the master plan

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Summary

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Summary

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- The assessment purpose is important.
  - There are various assessment types with related to a city.
- It is to identify the goals/objectives of SSC (SSC goal).
- You need to build the assessment system as well as the plan to realize the SSC goal you set.
- Logic Model is effective to find critical activities, outputs, or outcomes toward goal.
- There are many KPIs of SSC by various parties or the international standards, which we can refer.
- An assessment methodology by maturity model especially is useful to assess a city.
- Especially ISO37153 provides the useful assessment criteria to assess Smart Sustainable Cities.

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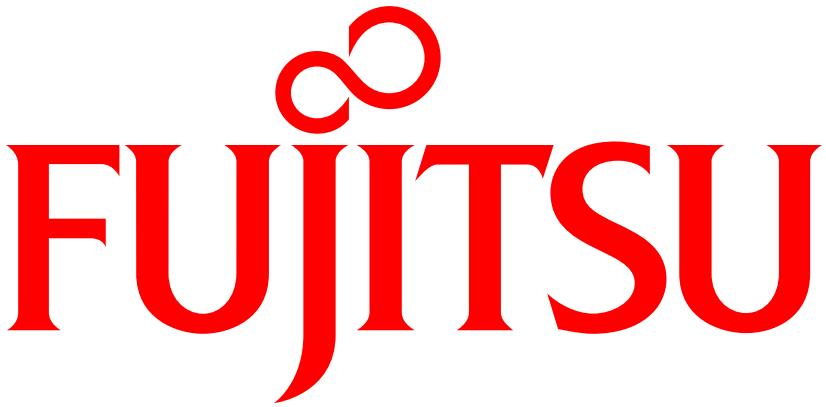

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