National Development Plans and STI Strategies

This presentation mainly covers

**National Development Plans (NDPs)**

"**STI strategies**" are integral elements of NDPs

Based on STI strategies, to create STI RMs with Time/Resources

**STI for SDGs Roadmaps**

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**Challenges to Development and Implementation of STI for SDGs Roadmap -Lessons learnt from trials and reference cases-**

STI Roadmaps for SDGs – Expert Group Meeting
May 8-9, 2018/Miraikan Tokyo

Kazuhito Oyamada
Center for Research and Development Strategy, JST

National Development Plans and STI Strategies

UN agencies

- WB, UNCTAD, UNESCO, WIPO, UNEP...

On-line Platform, STI forum, etc.

Foresight exercise, Global indicators, Statistics, Analytical frameworks

<supports>

Science Community

Business

Society
Challenges to STI for SDGs Roadmap

- Enrich existing national development plans/strategies in harmony with SDGs
- Facilitate communications and build trust among various stakeholders and motivate them
- Utilize various policy tools
- Leverage existing technologies and promote the utilization of disruptive/rapidly changing technologies
- Promote public-private partnership and bottom-up initiatives
- Capacity building

Coordination & monitoring mechanism
- “Deep dive” of SDGs and their interlinkages for efficient investment and wise use of technologies
- Develop appropriate indicators
- Feedback & learning process
- Provide new agenda for policy and STI community

Trials to Develop STI Roadmap for SDGs

- Japan Science and Technology Agency (JST) and New Energy and Industrial Technology Development Organization (NEDO) collaborated in trails to develop STI Roadmaps for SDGs
- Goal 7: Affordable and Clean Energy
- Goal 11: Sustainable Cities and Communities

Cyclic process of 5+1 steps to develop and implement the RM

1. Mission Identification
2. Analysis
3. Co-design
4. Collaborative Action
5. Monitoring/Review
+ Deep Dive/Diagnostics

For details of the respective steps, see appendix.
Timeline of the trials

Mission Identification

1. Kickoff
   - Share recognition among stakeholders

   End of December 2017

2. Consider missions
   - Deepen the understanding of goals and targets
   - Hypotheses about mission candidates

   January 2018

3. Understand and collect existing materials
   - Reformulate and elaborate missions

   Approximately 1 month

4. Understand and sort through existing policies related to missions, socioeconomic and technology trends

Analysis

5. Exchange opinions with stakeholders and reflect the results
   - February to March 2018
   - Approximately 1.5 months

Co-design

6. Creating the roadmap ver.0 and brush-up

   March 2018

7. Exchange opinions with stakeholders and reflect the results

8. Version upgrade and brush-up to the roadmap ver.X

Roadmaps for Society 5.0 in urban cities

Common Visions & Values

Diversity x Creative City
(A city where diversity is respected, and therefore new value creation is generated sustainably.)

Compact City x Connected Society
(A city that is compact where new industries beyond industry 4.0 are generated despite declining population)

Zero Emission x Recycling City
(A city that is sustainable and realizes zero emission and the 3Rs)

Common Base

Active female participation, promotion of diversity, and barrier-free

“Creative City 2.0”
- Development of assistive technologies that allow no one to be subjected to physical constraints.
  - Robotics, BMI
- Development of technologies that support intellectual and creative activities
  - AI, human interaction, AR (Augmented Reality)

Public-Private ITS Initiative/Roadmaps 2017 (2017-2030)
Realization of the roadmap for the practical application of automated driving by the Council on Investments for the Future (2022-2026)

Japan Vision: Health Care 2035

Yokohama City
Action plan for global warming countermeasures

Realization of national resilience
- Realization of compact network
- Realization of infrastructure export
- Realization of i-Construction

Healthcare Policy
- Development of home medical care equipment
- Development of robotic care equipment

Sendai Framework for Disaster Risk Reduction
Four priorities: Understanding disaster risk; Strengthening disaster risk governance to manage disaster risk; Investing in disaster risk reduction for resilience; Enhancing disaster preparedness for effective response and to “Build back better” in recovery, rehabilitation and reconstruction.

Seven goals: Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030. Substantially decrease the number of countries with national and local disaster risk reduction strategies by 2020. Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030, etc.

Development of Digital Layer (Platform)
Examples: City of Toronto (participation in the waterfront redevelopment project by Google), City of Fukuoka (Urban Operating System)

March 2018

Feedbacks

Completion of the roadmap

Japan Science and Technology Agency

Made by JST STI for SDGs Task Team & NEDO
Visions & Values

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Elements</th>
</tr>
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</table>
| **Diversity x Creative City** | • Infrastructure  
• Electricity  
• Water  
• Telecommunication  
• Health-care delivery system  
• Real estate  
• Recycling economy  
• Engineering, construction  
• Aging  
• Chemical/materials industry  
• Forest  
• Future that lacks environment and natural resources  
• Climate change  
• Sustainable development  
• Risk and resilience  
• Biotechnology  
• Social media  
• Cybersecurity  
• Behavioral change  
• Information technology |
| **Compact City x Connected Industries** | • Citizen participation  
• Education, skills  
• Social innovation  
• Gender gap  
• Labor power, employment  
• Human rights  
• Immigration  
• Food security and future of agriculture  
• Individual investor  
• Innovation  
• International trade and future of investment  
• Entrepreneurship  
• The fourth industrial revolution  
• Digital economy and future of society  
• Corruption  
• Government finances, social protection system  
• Future of government  
• Global governance  
• Future of corporations |
| **Zero Emission x Recycling City** | • Human Capital  
• Business & Innovation  
• Society, Environment, Health & Culture  
• Infrastructure, Security & Resilience |

Ref: World Economic Forum Transformation Maps

CASE 1: Awareness-Raising Activities on Tsunami Disaster

Saved 2,926 Pupils of Elementary & Secondary Schools

Establishing a Foothold for Nationwide Expansion of

Tsunami Education Using a Comprehensive Tsunami Disaster Scenario Simulator

*Led by Prof. Toshitaka KATADA, Disaster Research Center, Gunma Univ.*

**Outline of implemented R&D Outputs**

An education tool "Comprehensive Tsunami Disaster Scenario Simulator" was developed, which can simulate a damage caused by Tsunami, with condition-settings such as crisis-awareness level of local residents triggered by earthquake motion, whether evacuation is recommended or not, daily awareness level of residents on disaster crisis, experience of past Tsunami disaster, in addition to simulating physical reach and height of Tsunami based upon epicenter and magnitude of triggering earthquake.

**Outcomes by Implementation**

Continued efforts were made using the simulator, for raising local residents’ disaster-awareness level and education in elementary and secondary schools, to create a robust community against Tsunami disaster. Consequently, in the wake of 2011 Great East Japan Earthquake in Kamaishi-City, senior-grade students have taken a leadership in evacuation, assisting junior-grade pupils and elderly persons, and made a further evacuation from a designated facility to a safer hill by their own judgment, not being trapped by initial prediction, thanks to their high awareness level. That has resulted in saving 2,926 students (99.8% of the total elementary and secondary schools) in Kamaishi (widely known as ‘Kamaishi-Miracle’).
CASE 2: Project to develop community disaster prevention system using IoT (National Research Institute for Earth Science and Disaster Resilience: NIED)

What is development model for IoT community disaster prevention?

1. Diverse members
2. Swift and cheap
3. Try many things

Need information useful for community disaster prevention/behavior
・ Also want to integrate this with regional/community revitalization.

Explosively spread cheap and good things in Japan and overseas

Through success of Nagaoka Model and horizontal expansion:
・ Empowering individual’s decision-making through disaster prediction information
・ Regional revitalization and nationwide/overseas development through local production for local consumption.

“IoT Community Disaster Prevention System Development Model” – led by community and young people, conducted verification experiment in Nagaoka City, Niigata Prefecture, to be expanded into other communities.

Identifying issues for community disaster prevention

Sensor development, system development, starting verification experiments

Fail Fast
Fail Cheap
Fail Smart

By Google ex-Chairman, Eric Schmidt

Challenge for further steps

・ Consistency with existing domestic governance systems, and embedment in the execution level of policies
・ Participation of multi-stakeholders
・ Coordination and monitoring of various stakeholders efforts at multiple levels while promoting bottom-up initiatives
・ Set and improve appropriate indicators
・ Feedback and learning mechanism

Two Reference Cases
1) Public-Private ITS Initiative/Roadmap
2) SDGs Guideline for Local Governments

Japan Science and Technology Agency
Two reference cases

**Case 1: Public-Private ITS* Initiative/Roadmap**

- **Mission-oriented Roadmap**: shared views, clear targets and timelines
- **Communication Tools**: government, industry, STI community and other stakeholders.
- **Embedded feedback process and learning mechanism** to meet technology development and social changes
- **Promote public private partnership**: identifying gaps and areas of cooperation

**Case 2: SDGs Guideline for Local Governments**

- **Aims to promote bottom-up initiatives** of individual cities/local governments which have different problems and contexts
- **Helps local governments** to plan and implement their own strategies, roadmaps and/or action plans for SDGs
- **Provides standardized procedures (5 steps)** for the planning and implementation, and **check list and localized indicators** for monitoring progress

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**Case 1: Public-Private ITS Initiative/Roadmap**

- **Vision**: “*Japan aims to build and maintain the world’s best ITS and thereby contribute to its people and the world.*”
- **Cross-Ministerial Initiative**
- **Time line**: ~ 2030 (Target year of SDGs)
- **Feedback and learning process** is officially embedded: the Roadmap is revised every year
- **Multi-stakeholder participation**
- **Identify gaps and promote public private partnership** in the areas of cooperation (e.g. development of dynamic map, field operational tests, etc.)
- **Regulatory reform** in parallel with cross-ministerial R&D program and field operational tests
- **Promote dialogues with public**
- **Global competition and destructive technology provide strong incentive**
Public-Private ITS Initiative/Roadmap 2017 (Roadmap Overview)


Updating roadmap to meet technology development and social changes

Updating roadmap to meet technology development and social changes
Indicators for Public-Private ITS Initiative/Roadmap 2017

**Social Objectives**

Objectives up to 2020 (Current indicators)
- Build a society with the world’s safest* road traffic by 2020
  - Indicator for a reduction in traffic accidents: Reduce the traffic fatalities to 2,500 or less by 2020

Objectives set by the Initiative
- Build a society with the world’s safest* and smoothest road traffic by 2030
  - Indicators related to a reduction in traffic accidents
  - Indicators related to traffic congestion
  - Indicators related to streamlining of logistics traffic
  - Indicators related to transportation support to the elderly

Popularization of driving safety support systems

Popularization of automated driving systems

**Industrial Objectives**

Become a global hub of automated driving systems innovation after 2020
- Diffusion rate of automated driving systems
  - Indicators related to the production and export of vehicles
  - Indicators related to the export of infrastructure

R&D, demonstration, commercialization, development of data

Build the world’s most advanced ITS by 2020

*Show that the proportion of traffic fatalities to the total population is smallest in the world.

Public private partnership in the areas of cooperation

(areas at the pre-competitive phase)

[1] Development/implementation of the automated driving system

Road transport system
- Technology to strengthen system security
- Technology to generate the prediction based on ITS information
- Sensing capability enhancement technology
- Map information enhancement technology (Dynamic map)

[II] Development of base technology for reducing traffic accident fatalities and traffic congestion
- Method to estimate the fatality reduction effect and the national shared database
- Microdata/microdata analysis and simulation technology
- Local traffic CO2 emission visualization technology

[III] Building international cooperation

Road transport system
- Development of an R&D environment open to the world and promotion of standardization
- Promotion of social acceptance of the automated driving system
- International package export system

Transport support system
- Development of the next-generation public road transport system
- Improvement of accessibility and deployment

[IV] Application to next-generation urban transport

Area of Cooperation

[V] Large-scale field operation test

Source: Public-Private ITS Initiative/Roadmap 2017
Public private partnership in the areas of cooperation (areas at the pre-competitive phase)

Dynamic Map

Field Operational Tests

http://www.sip-adus.go.jp/fot

Case2: SDGs Guideline for Local Governments

SDGs for Our Cities and Communities –Introduction Guideline- (2nd Edition, March)*

- Help local governments plan and implement their own strategies/roadmaps/action plans for SDGs while considering problems and contexts they face
- Identify 5 steps necessary for the local governments to take on SDGs
- Proposes
  - Check list for progress monitoring
  - Localized indicators
- Referring the SDSN’s “Getting Started with the SDGs in Cities” and other materials, modified to meet the local context in Japan

Step 1: Understand SDGs
1-1: Understand the general outlines of SDGs
1-2: Understand the three-layered structure in SDGs
1-3: Understand the relationship between SDGs and local government roles

Step 2: Structure to work towards SDGs
2-1: Understand the importance of vertical and horizontal integrations by local governments
2-2: Facilitate vertical integration at levels from niches to global scales
2-3: Clarify involved stakeholders and facilitate horizontal integration
2-4: Establish a structure to promote SDGs

Step 3: Policy goals, specific targets and indicators
3-1: Marshal projects at the local government level
  3-1-1: Situating the local governments in the context of the SDGs Implementation Guiding Principles by the national government
  3-1-2: Marshaling community-specific challenges
  3-2: Set policy goals
  3-2-1: Points to consider when setting policy goals and specific targets
  3-2-2: How to set policy goals and specific targets
  3-3: Organize indicators to measure the progress in policy goals and specific targets
  3-3-1: Having community SDG indicators ready
  3-3-2: Examples of existing indicators
  3-3-3: Determination of specific targets

Step 4: Action program
4-1: Create an action program for community SDGs
4-2: Execute the action program for community SDGs
4-2-1: Development of human resources in involved stakeholders
4-2-2: Acquisition of financing for making the project viable
4-2-3: Partnership between local governments

Step 5: Follow-up
5-1: Establish a follow-up system
5-2: Follow up the progress on a regular basis

* Downloadable from http://www.ibec.or.jp/sdgs/index.html
**Sustainable Development Solutions Network

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**Sustainable Development Solutions Network
Check List for Monitoring Progress

Table 1 Self-checklist for the assessment of progress in promoting local SDGs

<table>
<thead>
<tr>
<th>No</th>
<th>Relevant chapter of the guideline</th>
<th>Step 1: Understand SDGs</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-1.12</td>
<td>Understand that SDGs constitute the core of the “2030 Agenda for Sustainable Development” and are development goals that are to be achieved by 2030.</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>1-1.12</td>
<td>Understand the importance of integration of three dimensions (economy, society and environment) for sustainable development.</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>1-1.12</td>
<td>Understand that both developed and developing countries need to take up the challenge for sustainable development.</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>1-2.12</td>
<td>Understand the three-layered structure in SDGs: 17 Goals, 169 Targets and nearly 230 Indicators.</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>1-2.12</td>
<td>Understand each of the 17 Goals, in general.</td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td>1-2.12</td>
<td>Have a look through the 169 Targets of SDGs and understand the general direction.</td>
<td>x</td>
</tr>
<tr>
<td>7</td>
<td>1-2.12</td>
<td>Understand the necessity of measuring the progress in SDGs (17 Goals and 169 Targets) based on 230 Indicators.</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td>1-2.12</td>
<td>Obtain the latest information on SDG Indicators through the UN Information Centre or UN Statistical Commission websites.</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>1-3.17</td>
<td>Understand the roles that the local government should fulfill to achieve 17 Goals of SDGs.</td>
<td>x</td>
</tr>
<tr>
<td>10</td>
<td>1-3.24</td>
<td>Understand high expectations that are set for local governments contributing to achieving SDGs.</td>
<td>x</td>
</tr>
<tr>
<td>11</td>
<td>1-3.25</td>
<td>Have high expectations that are set for local governments contributing to achieving SDGs.</td>
<td>x</td>
</tr>
<tr>
<td>12</td>
<td>1-3.25</td>
<td>Understand the importance of selecting, from the SDG Goals and Targets, the issues, goals and projects relevant to the situations particular to the community.</td>
<td>x</td>
</tr>
<tr>
<td>13</td>
<td>1-3.25</td>
<td>Understand the possibility of producing positive effects on the community through promoting with SDG projects, including QOL improvement for the residents, creation of a city with inclusiveness, and promoting global partnerships.</td>
<td>x</td>
</tr>
<tr>
<td>14</td>
<td>1-3.25</td>
<td>Understand the possibility of producing positive effects on the community through promoting with SDG projects, including QOL improvement for the residents, creation of a city with inclusiveness, and promoting global partnerships.</td>
<td>x</td>
</tr>
<tr>
<td>15</td>
<td>1-3.25</td>
<td>Understand SDGs in comprehensive goals ranging across multiple areas and the necessity of working co-operatively in a cross-sectoral manner with various stakeholders inside and outside the local government.</td>
<td>x</td>
</tr>
<tr>
<td>16</td>
<td>1-3.26</td>
<td>Understand that working towards SDGs can lead to rebuilding local communities and overcoming the challenges.</td>
<td>x</td>
</tr>
<tr>
<td>17</td>
<td>1-3.26</td>
<td>Make sure that the above-mentioned issues are adequately understood by the staff in your own department.</td>
<td>x</td>
</tr>
<tr>
<td>18</td>
<td>1-3.26</td>
<td>Make sure that the above-mentioned issues are adequately understood by those in different departments through holding workshops, etc.</td>
<td>x</td>
</tr>
</tbody>
</table>

Localized Indicators

**Summary: Toward the effective implementation of STI for SDGs roadmaps**

- **Mechanism of coordination and monitoring of cross-ministerial/cross-sectoral initiatives**: Strong political leadership is necessary to break silos.
- **Competition and collaboration / private investment / incentive for voluntary initiatives**
- **Monitoring by indicators is still progressing**
  - Many initiatives/strategies/action plans set indicators for monitoring progress. However, most of them are set separately from SDGs and do not fully reflect them.
  - Upgrading indicators and developing localized indicators in line with SDGs are necessary.
- **Promote the bottom-up initiatives**: Standardized procedures (e.g. guidelines), which are flexible enough to allow localization and customization, may be helpful.
- **Feedback and learning mechanism**: Integration into the official process is desirable.
  - Deepening understanding of interlinkages of SDGs and diagnostics of effectiveness roadmaps and policy tools provide a foundation.

- Developed countries, UN family and other international organization can support least developed countries in addressing these challenges (especially in the points with *)
- Developed countries (including Japan) also can learn lessons from international community so that they can avoid being trapped in the existing systems and overcome institutional inertia.

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**Thank you**

Kazuhito Oyamada  
Fellow, Center for Research and Development Strategy (CRDS)  
Japan Science and Technology Agency
Appendix:
Steps to Develop and Implement STI for SDGs Roadmap

Targets, Time Frames and Other Considerations

Targets and Time Frame

• Targets: Initiatives at the national and local government and sector levels: Goal/Mission-oriented Roadmaps
• Time frames: 2030 and beyond

Other considerations

• STI roadmap and its making process should be based on methods, processes, and technologies that can be utilized in other countries and regions.
• Initiatives leading to achieving SDGs should be realized based on and incorporated with existing national development plans (e.g. long-term plans, strategies, and action plans, etc.) of each country.
Analyses of Goals and Targets of SDGs
- Deepen the understanding of goals and targets of SDGs and the synergies and trade-offs among them
- Deep dive of SDGs and diagnostics by UN families and other international organizations can provide useful information and insights to this process.

Mission Setting
- Set missions to be addressed for achieving SDGs.
- Stok taking
  - Existing needs, policy challenges, constraint factors, etc.
  - Existing strategies, roadmaps, and action plans
  - Other policy documents, analysis reports, etc.
- Consider beyond the boundaries of goals and targets
- Also consider Interlinkages between goals and targets
- Set it based on contexts and priorities of each country
- "No one size fits all" - methodologies/procedures according to each circumstance should be adopted.

Mission Identification
- Review and analyze existing policies
  - Collect policy documents related to the missions (government's medium to long term plans, strategies, white papers, action plans, local government/municipality plans, etc.)
  - Analyze the correspondence relationship with each missions, timeframe, and targets of policies, etc.
- Understand socioeconomic trends, and review future prospects
  - Understand trends related to socioeconomic aspects: policy, markets, regulations, and finance, etc.
  - Review various future prospects, etc.
- Understand trends in technological aspects, and review various forecasts
  - Collect and analyze information on technological trends and forecasts (e.g. Technology Foresight/Forecast, Technology Roadmaps, Bibliometrics, Scenario Analysis, etc.)
  - Hearing of experts etc.
- Identify key drivers and key technologies
- Collect and analyze related indicators, statistics and other data.
Co-design

- Create a prototype roadmap based on analysis results
  - Consider milestones and outcomes
  - Consider data sets and indicators for monitoring and reviewing progress
- Consider and describe various policy measures and expected outcomes
  - [Example] Strategies/plans, funding, government R&D, procurement, education/human resource development, taxes, regulations/rules, subsidies/policy finance, promotion of private investments/finance, infrastructure, market development, standards, etc.
  - Pay attention to correspondence relationship between missions – measures – outcomes
- Brush-up through dialogues with various stakeholders
  - Consideration by expert teams
  - Exchange opinions with government officials, related organizations, various stakeholders etc.
  - As appropriate, return to the previous phase (Mission Identification and Analysis)

Collaborative Actions

- Implementation based on the roadmap
  - Both of top-down and bottom-up approaches
  - Embed the approach in individual measures
- Roadmap as a communication tool
  - Disseminate and spread knowledge/information
  - Promote cross-sectoral cooperation
  - Promote bottom-up and voluntary initiatives and activities
  - Learning and feedback
  - Interaction between layers
- Utilize networks of various stakeholders
Monitoring and Review

- Monitoring and review the progress
  - By indicators, check list, expert panels, etc....
  - Making indicators and data open so that various stakeholders can use them for their own efforts
- Improve indicators and propose new appropriate indicators
  - Based on the circumstances of each country, improve or customize indicators and data sets (e.g. localized indicators)
  - Propose the indicators to be utilized globally
- Ensuring the reliability, transparency and accessibility of indicators and related data
- Integration of learning and feedback mechanism into the official process

Deep Dive / Diagnostics

- Deepen the understanding of interlinkages between goals and targets
  - Analysis based on scientific knowledge
  - At Global/Regional/National/Sub-national (Local) levels
  - By sector and field
- Understand innovative technologies and consider their applicability
- Identify areas and problems requiring additional policy intervention
- Reflect it in the contents of the roadmap and in the design for the creation and entire implementation process
- In collaboration with the efforts by UN family and international organizations