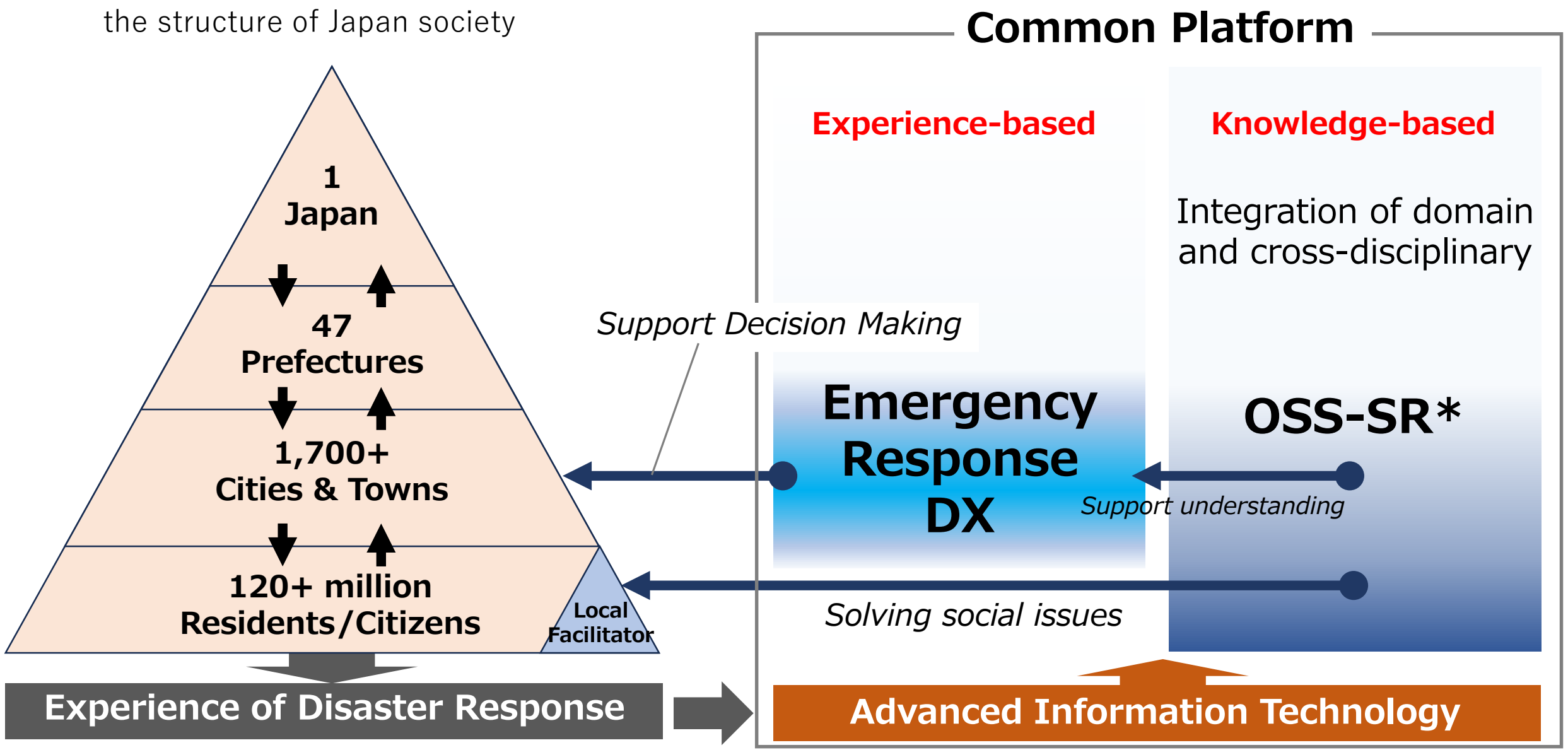
Necessity of Dynamic Simulation for proactive disaster management by utilizing AI and DX

Munenari Inoguchi (University of Toyama / NIED*)

* National Research Institute for Earth Science and Disaster Resilience

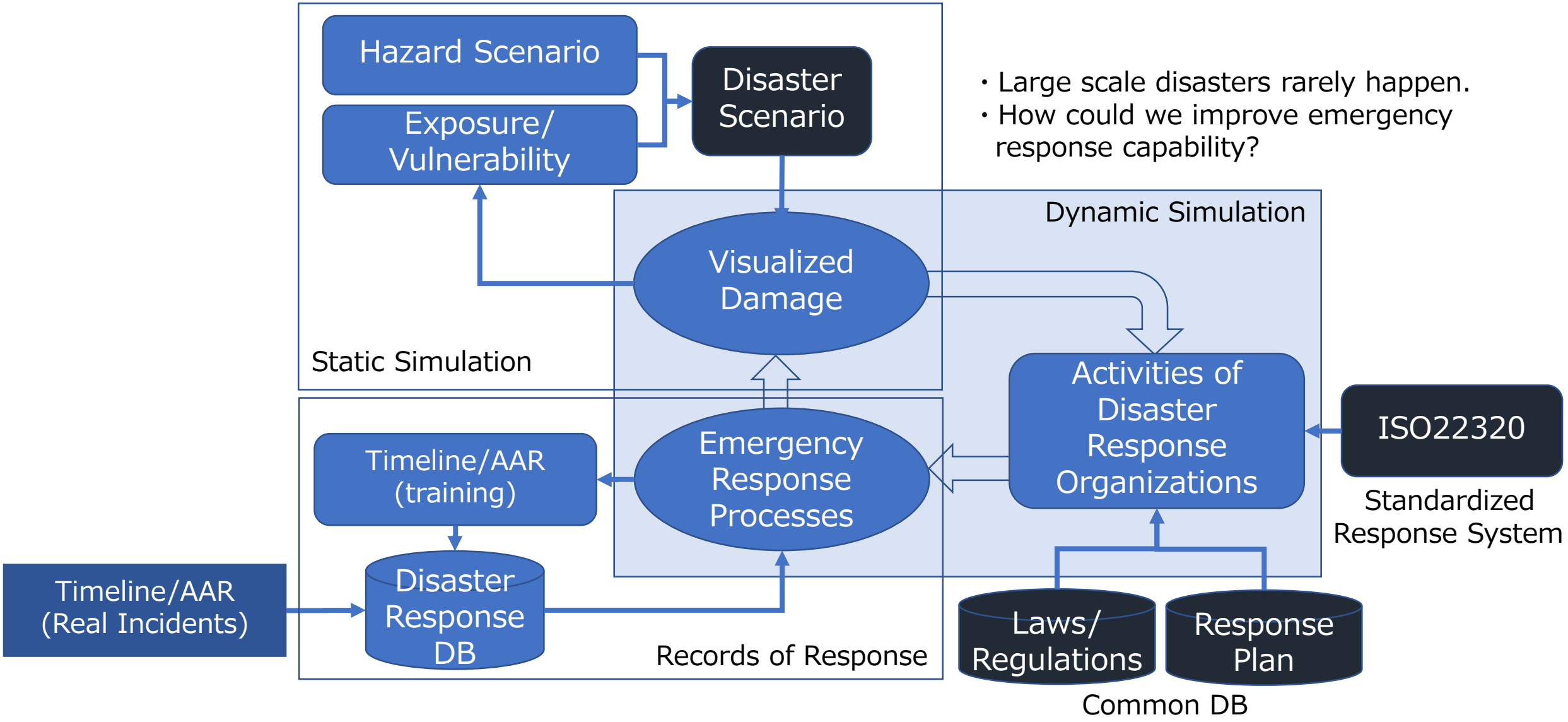
Necessity of 2 info tech. in common platform

* Online Synthesis System for Sustainability and Resilience

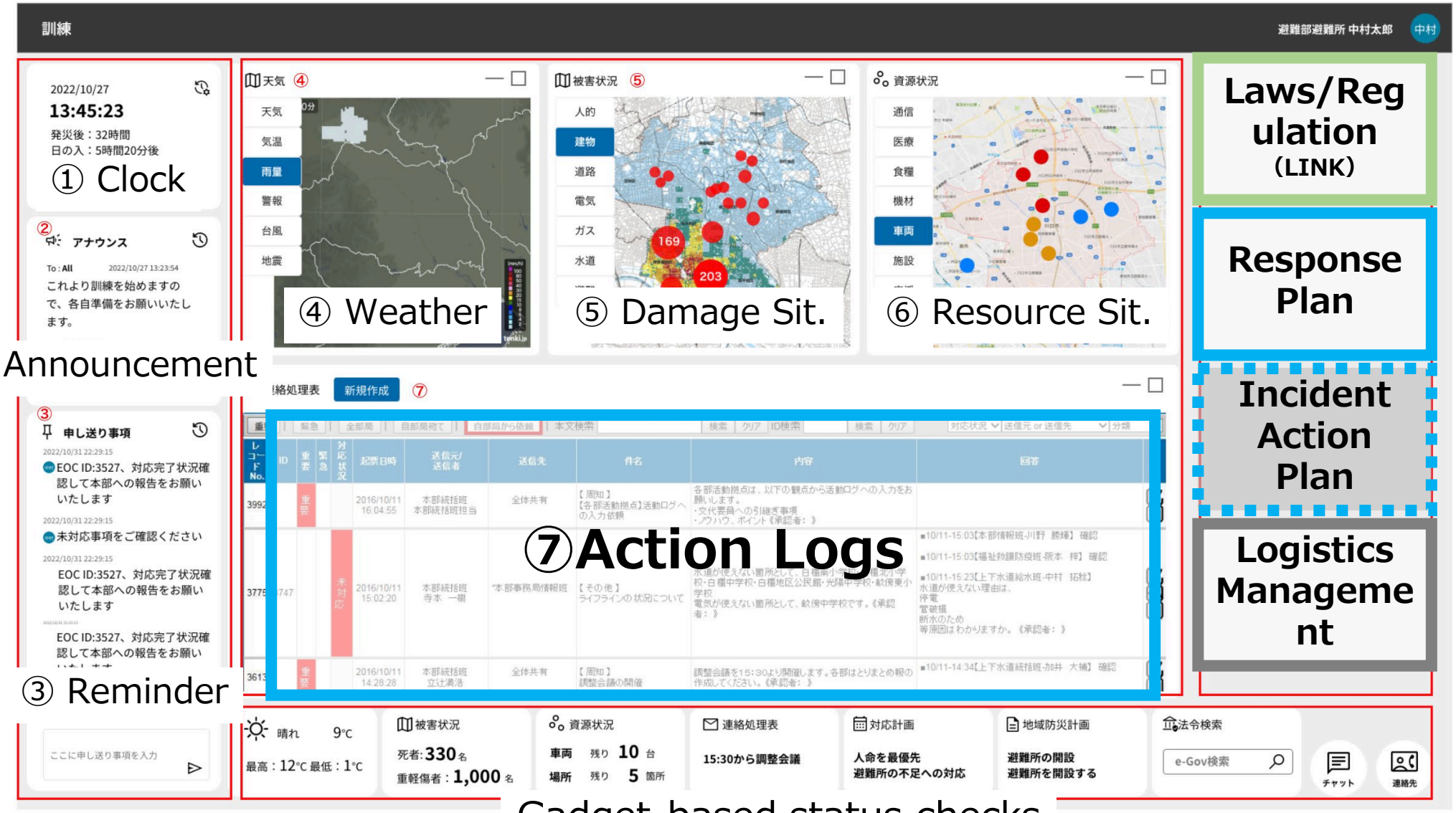


Emergency Response DX (ER-DX)

Emergency Response DX（ER-DX）
Standardization through Simulation for Disaster Responders



Example of UI Design



Gadget-based status checks

* NIED is developing this system named ”DxM4D” as a product of ER-DX

Expected Impacts of ER-DX

1. Support decision-making in emergency response

Response plans that do not rely on people, but are improved through experience, complement the lack of experience in disaster management.

2. Improve mutual cooperation between municipalities.

It is fully equipped with a set of functions and operability that enable anyone to grasp the disaster situation, enabling mutual support of local authorities and public-private cooperation, and realizing faster and more advanced emergency response.

3. Enhance automated disaster response records

Automatically record all disaster responses so that the disaster response process can be reproduced and points for improvement can be identified through review.

4. Create capacity-building opportunities

The system operates simultaneously in peacetime, disaster and training modes, and the training mode simulates the experience within this system to identify problems in implementation, communication and to capture the key points of the operation.

OSS-SR

Online Synthesis System for Sustainability and Resilience

Science Council of Japan emphasized the importance of “Consilience” and “Synthesis” in 2020

1. “**Consilience**” in DRR and Environment/ Development should be conducted in a comprehensive manner at the “on-site” where various issues arise.

2. It is necessary to create “**consilience knowledge base**” and cultivate and increase human resources who will undertake development and management of the knowledge base. For “Consilience”, it is recommended to develop “**Online Synthesis System (OSS)** for the Promotion of DRR and Sustainable Development”

RECOMMENDATION

Building a sustainable global society by strengthening disaster resilience:
- Developing an "Online Synthesis System (OSS)"
and fostering "Facilitators" to realize consilience -

September 18, 2020

Science Council of Japan
Committee on International Cooperation
for Promoting Science-Based Disaster Risk Reduction

https://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-24-t298-1en.pdf

The flow of utilizing OSS-SR

A tool of OSS-SR utilization

Knowledge from all people stored in OSS-SR

Location × Keyword

(Search)

Recommended Articles

Shared Framework

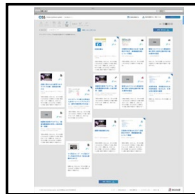
(Refer Articles)

(Refer Framework)

- matrix
- hierarchy
- chain structure

…

Smart Art



Source Pack

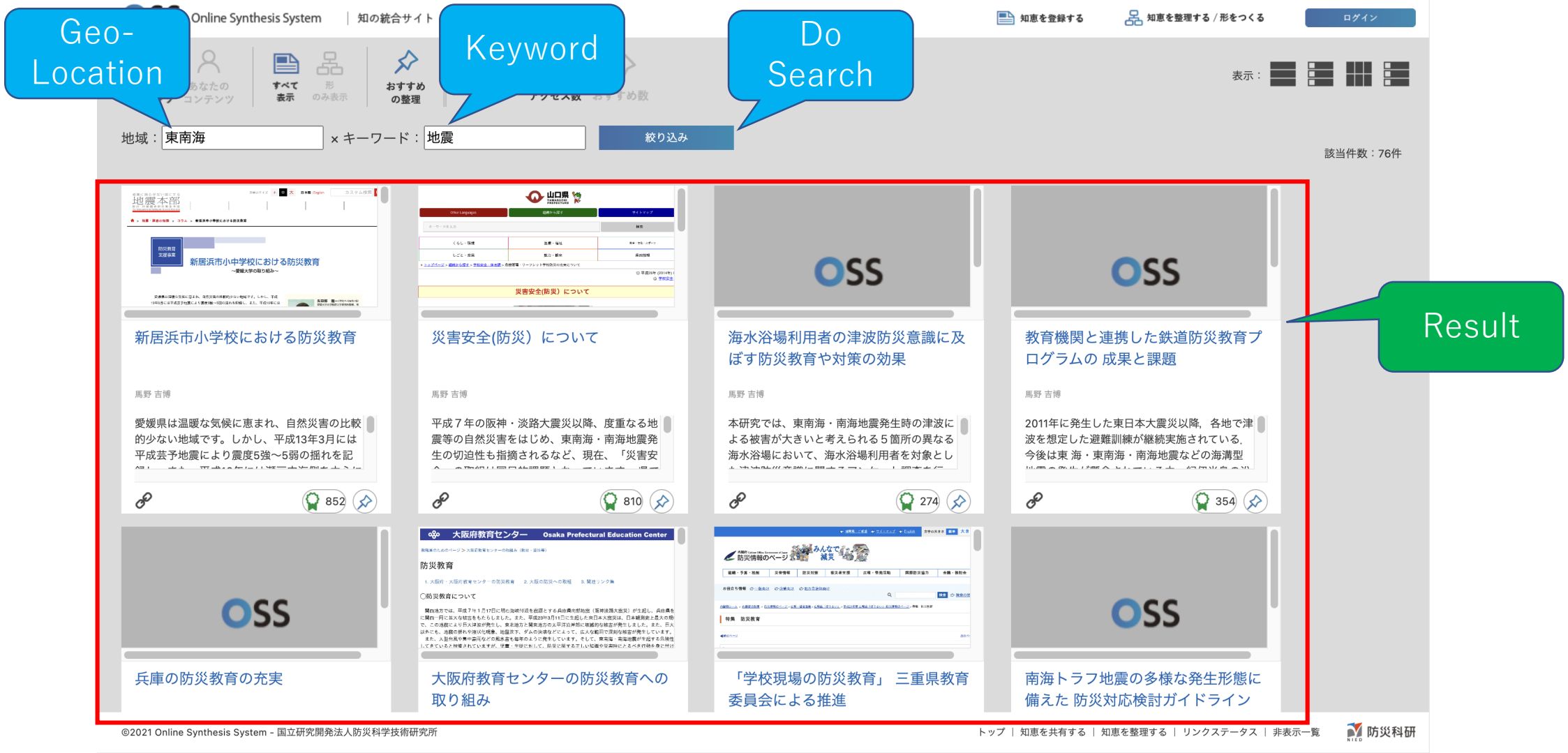
Framework

Sharing

(Designing Framework)

Workspace

Prototype System of OSS-SR for managing contents that users have

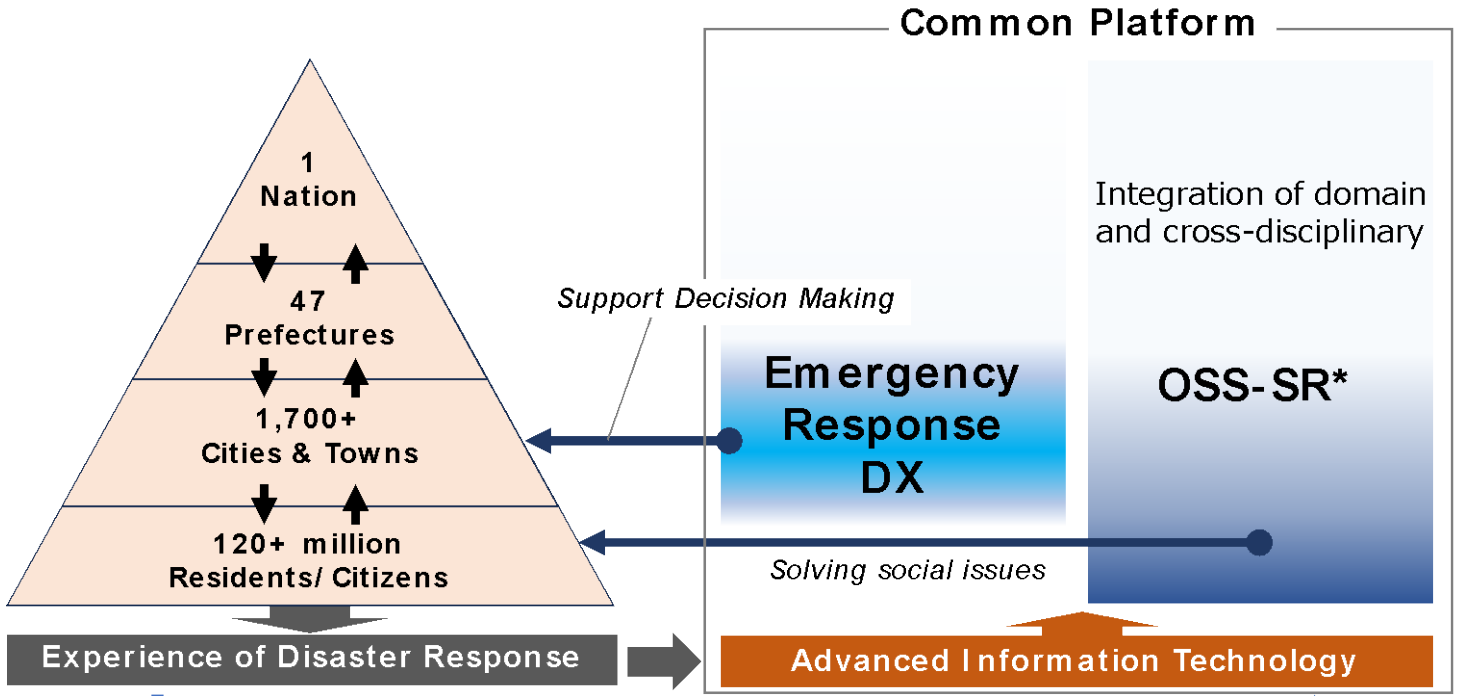


Introduce Framework & Knowledge to local facilitators as catalysts

(Educate local facilitators appropriately)

Reuse the contents stored in OSS-SR with the framework of understanding

Conclusion: Suggestions on what to do



Collaboration of Traditional AI & Generative AI

National Common Platform for Sharing Experience

Common Framework for Managing Data, Information and Knowledge

We should research & develop

- Common Framework for managing Data, Information and Knowledge
- Utilize traditional & generative AI actively
- Develop a national common platform for managing and sharing experience in past disaster
- Promote capacity buildings of local governments and citizens by Emergency Response DX and OSS-SR

International Collaboration

2 types of AI

	Traditional AI	Generative AI
Learning Perspectives	Organize, Categorize, and Search for Information	Learning Patterns and Relationships
Purpose of Output	Identification and Prediction	Creation
Business Impact	Automation of Predetermined Actions	Generate New Content
Training Data	Specific Data Sets	Unstructured Data Set

Semantic Image Segmentation

- When users uploaded (or shared) images, AI can recommend the keywords relating to those images using the advanced technology of sematic image segmentation.

Examples of the use of OFA (image captioning)

The roof of this house is badly damaged.
(Probs: 0.361)

The roof of the temple has collapsed.
(Probs: 0.406)

There are blue recycling bins by the roadside.
(Probs: 0.473)

View of the damaged road.
(Probs: 0.380)

Cracks in the road
(Probs: 0.398)

Roads are badly damaged.
(Probs: 0.314)

Water gushing from holes in the ground.
(Probs: 0.406)

These are the result of analysis by traditional AI, however it could be useful for categorizing images, and we can grab the whole picture of disaster damage situation.

Generative AI is still imperfect at reproducing or predicting human behavior and decision making in disaster events...

Harmonious Collaboration of Traditional AI and Generative AI could be realized by mediating Human support

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However…
In Japan, local governments have equipped disaster information system individually.
So, the actual logs, knowledge and experience in disaster response were scattered.

Against this issue, we have to :
1) Develop a common platform for storing those logs, knowledge and experience comprehensively.
2) Utilize AIs (traditional and generative AI) actively for managing those data to create response flow model.

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