

Translating Locally-led Resilience into Action
in the Age of Complex Risk and Digital Transformation
복합위험과 디지털 전환시대, 지역주도 복원력의 실행

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송도컨벤시아 그랜드볼룸 A
Songdo Covensia, Grand Ballroom A

Incheon's AI-Driven Disaster Management Model : Towards Institutionalization

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The Case for AI in Disaster Management

The Challenge



- Unpredictable disasters demanding rapid responses
- Substantial burden on disaster managers

The Imperative



- AI-assisted decision making in disaster response
- Alleviating cognitive overload

The Current Gap



- Numerous prior attempts
- Lack of practical integration with the disaster management domain

Research Objectives and Approach

Objective

**To design an AI system model for Incheon,
grounded in a deep understanding of the disaster management domain**

Approach 1

**Bridging practitioners and
developers** through
researchers

Approach 2

Surveying field practitioners
to understand disaster
management operations
and AI needs

Approach 3

Proposing an Incheon model
that matches AI technologies
to practitioner needs,
with a three-stage roadmap

AI Needs Assessment in Incheon: Design

Research Design

- **Target Group:** Disaster Management Practitioners in Incheon
- **Methodology:** Two-phase Mixed Methods (Interviews → Surveys)
- **Key Topics:**
 - (1) Current State: Mapping work processes and identifying operational challenges
 - (2) AI Readiness: Assessing current AI usage, support needs, and concerns regarding adoption

AI Needs Assessment in Incheon: Findings

Work Processes & Field Challenges

Work Processes

Operations follow crisis alert levels – for both natural and social disasters



- Monitoring & situation reporting
- Field response
- Post-event monitoring



Challenges

- Absence of a centralized database and limited real-time data access
- Repetitive administrative tasks
(writing report, contacting key personnel)
- Difficulty finding response procedures from manuals and past cases
- Limited field experience due to a 2-year rotation cycle

AI Needs Assessment in Incheon: Findings

Perceptions and Demand for an AI system

Current Use & Perception

Limited current usage of AI, but highly positive perception
(High on **usefulness, expected performance, speed, ease of use**)

Adoption Intent

Strong willingness to adopt the proposed AI system
Preferred **human-in-the-loop collaboration**

Demand by Function (top-choice response)

- 1 Real-time risk monitoring via data integration
- 2 Automated staff assignment & emergency contact
- 3 Search across laws, manuals & past cases
- 4 Auto-generation of situation reports & documents



These needs were incorporated
into the system design

AI Needs Assessment in Incheon: Findings

Anticipated Challenges in adopting an AI system

- Key barriers to current AI adoption and design considerations for the Incheon model

■ Information Reliability

Risk of hallucination and inaccurate output — high-stakes tasks like legal review require manual cross-checking, potentially increasing the administrative burden

■ Unclear accountability

Ambiguity in responsibility for AI-generated errors — requiring AI to remain a supportive tool while human officers retain final judgment and approval

■ Privacy & Security

Handling sensitive victim and internal data poses leakage risks → Necessitating a closed, on-premise AI infrastructure

Designing the AI system

What to build

From challenge & demand

- No database · repetitive tasks · hard-to-search manuals · limited field experience from rotation



**Integrated
Database**

**5 Core AI
Functions**

**Bridging the
Experience Gap**

How to build

From adoption concerns

- Reliability (hallucination) · unclear accountability · privacy & security



**RAG with
source citation**

**Human-in-the-
loop approval**

**A closed, on-
premise system**

Institutionalizing the AI system

1

Legal & Institutional Framework

[NATIONAL] Existing Legal Foundation

- AI Framework Act (effective Jan 22, 2026)
- AI and Data-Based Administration Act (effective Aug 28, 2026)

[INCHEON] Required Municipal Ordinance

- Establishing a legal foundation for the administrative use of AI in Incheon

[INTERNAL] Required Guidelines & Training

- Developing internal usage standards, user manuals, and ongoing officer training

2

Sustainable Operations & Management



• Dedicated Operations Team

Designating a specialized team for system operation, maintenance, and coordination



• Financial Sustainability

Securing stable funding for long-term operation



• Continuous Improvement

Implementing a feedback loop for iterative system updates and performance monitoring

The Incheon Model: AI for Disaster Management

Incheon-Tailored Design

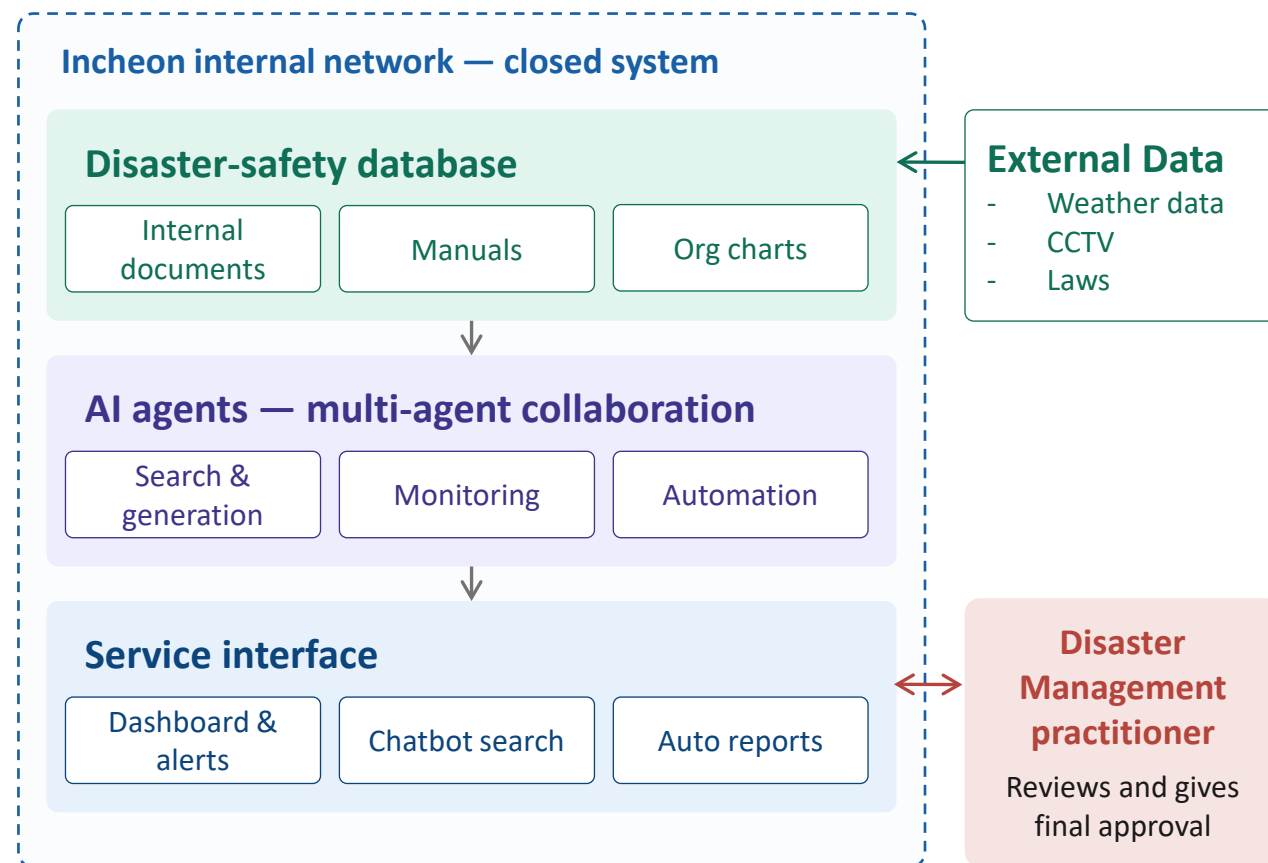
- Reflecting Incheon's disaster management workflows
- Operating securely within a closed internal network

Phased Scalability

- Prioritizing initial functions based on practitioner needs
- Executing a 3-stage roadmap: from an initial pilot to advanced agent integration
- Expanding into a full-cycle integrated system across the entire city and partner agencies

Continuous Self-Improvement

- Refining system performance continuously through an automated operational feedback loop



Lessons from the Incheon Model

1

Start from the field to enhance practicality and applicability

- Effective AI systems begin with a deep understanding of practitioners' workflow.

2

Match technology to needs and concerns

- Practitioners wanted AI to support human judgment, not replace it entirely.
- Their concerns about reliability, accountability, and security must be addressed through a human-in-the-loop, in-house design.

3

Improve and expand through use

- The system is never finished.
- Practitioner feedback continuously improves it, and its coverage can expand step by step.

4

Institutionalize for the long term

- Sustainability of AI systems rests on a legal framework, along with substantial human and material resources.

Thank you

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