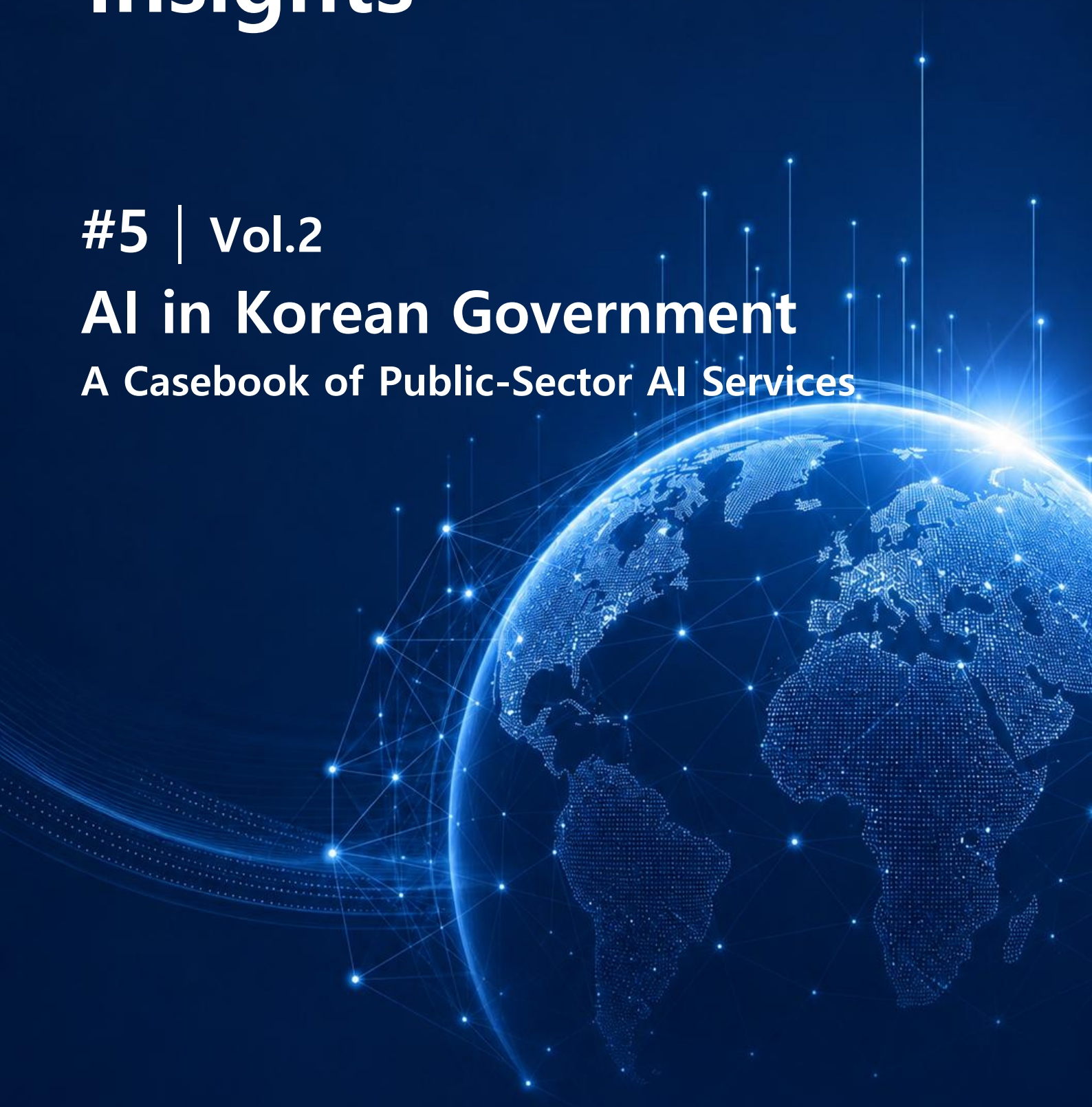
NIA Digital & AI Insights

#5 | Vol.2

AI in Korean Government

A Casebook of Public-Sector AI Services



Overview

Why This Casebook

Across the Korean public sector, interest in artificial intelligence has moved quickly from “whether” to “how.” Yet for the officials who must actually plan an AI initiative, the first step is often the hardest: deciding which problem to solve, what data is needed, how to select a model, how to secure a budget, and how to keep the service running after launch. Policy documents and technical guidelines rarely answer these questions in the concrete terms that planners need.

This casebook was produced to fill that gap. Compiled by the Ministry of the Interior and Safety (MOIS) and the National Information Society Agency (NIA), it documents 16 AI services that central ministries, local governments, and public institutions in Korea have actually built and operated. Rather than presenting success stories alone, each case records the problems that prompted the project, the choices made along the way, the obstacles encountered in the field, and the measures taken to overcome them.

What the Cases Cover

The 16 cases span six areas of government function and a wide range of AI technologies, from deep learning–based forecasting and computer vision to large language models, retrieval-augmented generation (RAG), and speech recognition.

Area	Cases
Environment	AI flood forecasting; AI-based smart water treatment plant
Employment and Labor	AI classification of industrial accident investigations; AI support for labor inspectors
Social Welfare	AI initial consultation for households in welfare crisis; AI-enabled care services
Public Order and Safety	AI driver qualification verification; AI detection and analysis of illegal deepfake content
General Administration	Generative AI–based public data search; hyperscale AI research support; AI night duty system; AI multilingual interpretation for civil requests; AI parking control; AI passenger flow management at Incheon International Airport
Legislation	AI-based patent examination support; generative AI legal information service

How Each Case Is Organized

Each case follows a common structure so that readers can compare cases and find the information they need quickly:

- **Case opening and key functions:** The case number and field, a short tagline, the case title, and a one-page summary of what the service does
- **Background:** The field problem and policy context that led to the project
- **Key features and implementation process:** How the service works, the models and data used, and how the project progressed step by step
- **Outcomes and future plans:** Measurable outcomes and the agency’s plans for advancement and expansion

- **Service profile and summary table:** The implementing organization, launch date, budget, and the key points on model selection, data, and operation at a glance
- **Expert recommendations:** Assessments and suggestions from experts in law, academia, and industry
- **Interview with the project officer:** First-hand accounts of the difficulties faced in planning, budgeting, securing data, selecting models, and addressing security

Lessons Across the Cases

Although the services differ widely in purpose and scale, several common lessons emerge:

- **Start from the field problem:** The most successful projects began with a clearly defined operational bottleneck, such as delayed flood warnings, repetitive document screening, or recurring civil complaints, rather than with the technology itself.
- **Data quality comes before model choice:** Many agencies found that standardizing, cleaning, and enriching their data, including metadata and field-specific training data, mattered more to performance than the choice of model.
- **Keep people in the loop:** Across the cases, AI handles detection, search, and analysis, while officials retain final judgment and accountability, supported by clear procedures for escalation and human review.
- **Build in phases:** Pilot projects and proofs of concept, followed by gradual expansion, allowed agencies to validate results, gain internal support, and secure budgets step by step.
- **Plan for operation, not just development:** Continuous retraining, monitoring, security review, and dedicated staff and budget are needed long after launch.
- **Leverage partnerships:** Collaboration with private companies, research institutes, and other agencies helped overcome limitations in technology, data, and resources.

Note on the English Edition

This English edition is part of the NIA Digital & AI Insights Series, which makes Korean digital government and AI policy publications available to international partners. The content follows the Korean original published in March 2026. It is published in two volumes: Volume 1 contains Cases 1–8 (Environment; Employment and Labor; Social Welfare; Public Order and Safety), and Volume 2 contains Cases 9–16 (General Administration; Legislation). Both volumes include this Overview and the full Table of Contents. Details specific to domestic administrative procedures have been kept to a minimum, while budget figures and department names are retained for reference. Official English names are used for government organizations where available; otherwise, names have been translated by meaning. Figures, diagrams, and screen captures have been translated or adapted for English-speaking readers.

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CASE 9 | ADMINISTRATION

The moment you search, it delivers!

AI-Driven Data Innovation: From Search to Use in an Instant

Gyeonggi Province: Gyeonggi Data Dream, a Generative AI Partner

Gyeonggi Data Dream is an integrated service that uses generative AI to help users quickly explore and use public data held by Gyeonggi Province. Moving beyond data administration focused simply on opening data to the public, it provides practical support across administrative, research, and private-sector use through question answering, summarization, and recommendation functions. Residents and public institutions can find and use the data they need directly through a conversational AI interface without a complicated search process, making this an innovative case that has greatly improved the accessibility and efficiency of data administration.

Gyeonggi Data Dream – Key Functions

- **Conversational Q&A:** Quickly finds the desired data through natural-language question answering based on generative AI
- **Data summarization and recommendation:** Summarizes large volumes of public data and automatically recommends related materials
- **Integrated search:** Searches public data from Gyeonggi Province, its cities and counties, and affiliated public institutions in one place
- **Data analysis assistant:** Suggests analysis ideas based on the data retrieved

Model used: OpenAI – ChatGPT / GPT-4.1

Background

Scattered Data, Fruitless Searches: What Is the Answer?

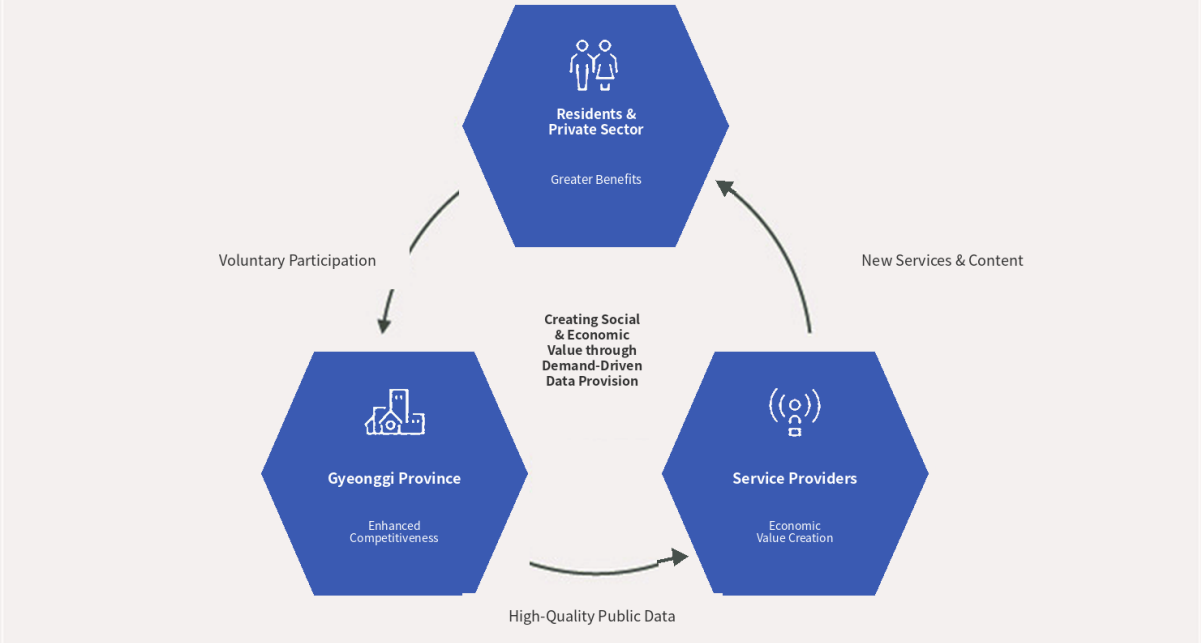
Resident A: *"I'm trying to find the statistics I need, but no matter how much I search the portal, I can't find them!"*

Public Official B: *"Unless you know the exact keyword, it's hard to find the materials you want."*

To make public data more usable and strengthen administrative efficiency, Gyeonggi Province introduced Gyeonggi Data Dream, an AI-based search service. Previously, the province's Gyeonggi Data Dream portal offered only simple keyword search, which limited users' ability to find exactly the information they wanted. Data was hard to access unless a specific keyword was entered precisely, and finding the necessary information in a vast pool of data took considerable time.

In response, Gyeonggi Province introduced a natural-language search function based on a large language model (LLM). The service was improved so that residents and administrative staff can find relevant data immediately by asking questions in everyday sentences. The aim was to improve access to public data and maximize its use. As a result, residents can use data more intuitively, and faster, more precise support has become available for data-driven decision-making in both the public and private sectors.

< What Is the Gyeonggi Data Dream Portal? >



Key Features

Intelligent Search That Puts Data at Your Fingertips

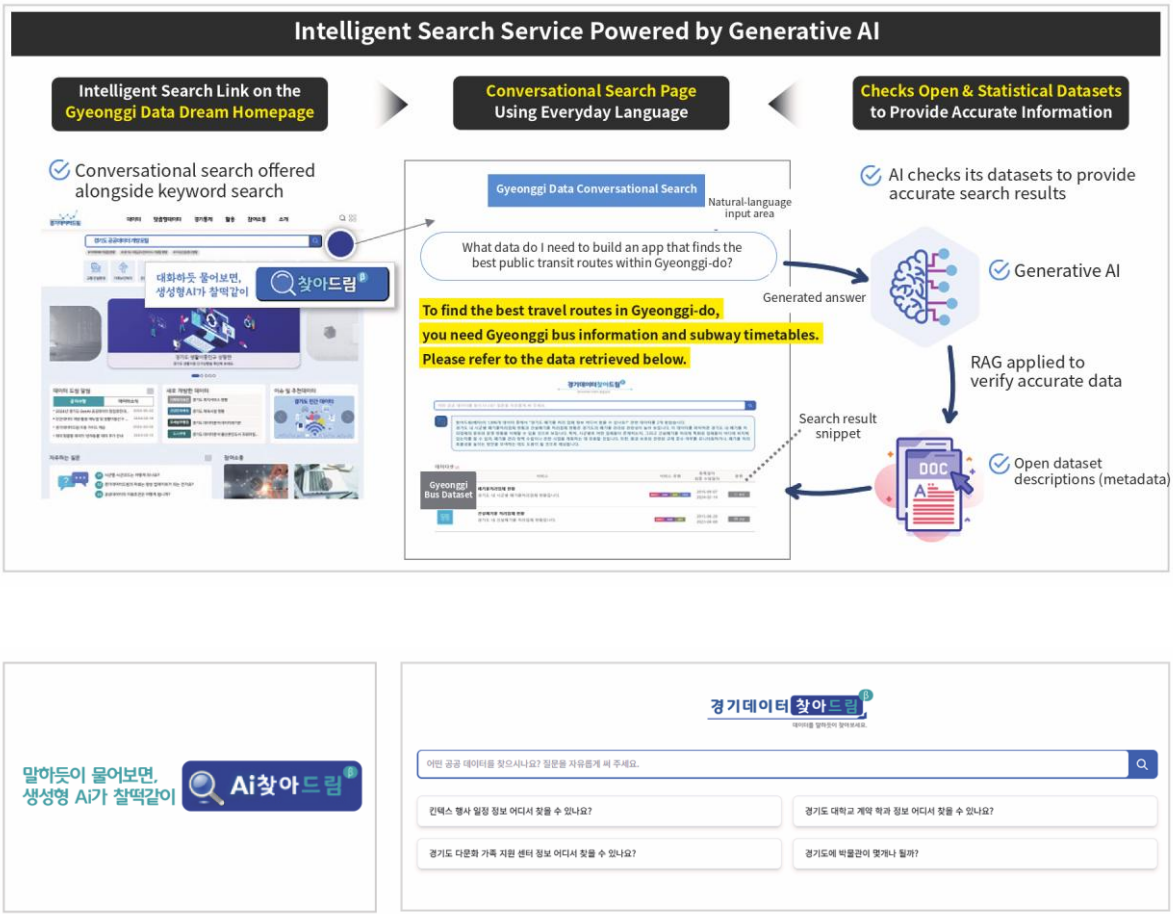
Going beyond the limitations of conventional keyword-based search, Gyeonggi Data Dream is designed so that anyone can easily explore public data through natural-language search based on generative AI and retrieval-augmented generation (RAG).

Natural-language Q&A

Users can ask questions in everyday language or full sentences, and the AI understands the context to find and provide relevant data. A simple request such as “Show me the statistics” is enough to find the desired data.

Integrated search

Data from Gyeonggi Province, its cities and counties, and affiliated public institutions can be searched in one place. Search results come with data descriptions for quick understanding, and users can go directly to the original page to download the data or use it via API.



Gyeonggi Data Dream search button (left) and main screen (right)

Data summarization and recommendation

The service summarizes only the key points of large volumes of data, and additional useful datasets are automatically recommended at the bottom of the search results to increase their use.

Data analysis assistant

Based on the characteristics of the retrieved data, the service suggests analysis methods and ideas for use. For example, by presenting sample analyses that combine multiple datasets, it helps even users with little data experience start their analysis easily.



Gyeonggi Data Dream search results

Building an integrated data platform

An integrated data platform combining the statistics and analysis platforms will be built, laying the foundation for convenient use of not only open data but also statistical and analytical data.

Model and data used

- **Model and version:** OpenAI – ChatGPT / GPT-4.1
- **Data used:** Service list of the Gyeonggi Data Dream portal (consisting of fields such as public data name, description, and tags)

Implementation Process and Challenges

Bringing Order to Disorganized Data by Setting Standards

Gyeonggi Province has carried out the project in stages to innovate data administration. The service has gradually taken shape as the challenges that emerged each year were resolved.

Year	Phase	Details
2024	Pre-consulting and pilot service development	Reviewed the province's data status through pre-consulting for the "Gyeonggi Generative AI Data Platform," while developing and operating a pilot service through a proof of concept (PoC) to verify the technical feasibility of generative AI.

Year	Phase	Details
2025	Strengthening public data opening and quality management	During operation, a need to improve data quality was identified, including insufficient data standardization and inadequate quality management. To address this, the scope of searchable data was expanded and systematic quality management was carried out in conjunction with the 2025 Public Data Opening and Quality Management Project.
2026	Building an integrated data platform and advancing the AI model	With the construction of an integrated data platform, the service is moving into full-scale expansion. The goal is to provide a stable and advanced service through integrated use of statistical and analytical data in addition to public data, and through a transition to a Gyeonggi Province LLM.

Impact and Expected Results

Gyeonggi Data Dream, Evolving by the Second

From its early stages, Gyeonggi Data Dream has brought noticeable changes to administration, residents, and research. Public officials have reduced time spent on repetitive searching and organizing and can prepare policy materials faster, while residents' satisfaction has risen significantly because they can find the information they need right away without knowing specific keywords. In addition, summaries and recommendations of large datasets have created an environment in which researchers can focus solely on analysis.

Key results

- **Greater administrative efficiency:** Faster policy responses through reduced time for data searching and organizing
- **Higher resident satisfaction:** A more tangible public data experience through intuitive search
- **Stronger research support:** Higher research productivity through data summaries and analysis ideas

Gyeonggi Data Dream is a leading public AI model with great potential. In addition to driving administrative innovation through data-driven policymaking, Gyeonggi Province's AI data service is expected to spread to other local governments and institutions as a new model for public data innovation. Private companies, including startups, will also be able to use data easily to accelerate industrial innovation.

Expected effects

- **Data-driven policy:** Faster and more precise policymaking and implementation
- **Leading public data model:** Wider adoption of Gyeonggi Province's generative AI data utilization model
- **Promotion of private-sector use:** Support for data-driven industrial innovation by companies and startups

Future Plans

The Dream of Data Utilization, Now in Progress

Although Gyeonggi Data Dream opened a new path for data utilization from its launch, follow-up tasks are being set to strengthen the completeness of the service. In particular, data quality management, application of the latest technologies, and improvement of the user experience are being pursued as key tasks for the stable establishment and expansion of the service. Building on these, Gyeonggi Province is preparing concrete action plans to enhance the reliability and scalability of data administration.

Key issues

- **Insufficient data quality management:** Lack of consistency because the format and level of data produced vary by institution
- **Need for service stabilization:** As the service is in its early stage, system stability and continuous updates are required
- **Limited user experience:** Simple search and summarization functions alone cannot meet diverse administrative, research, and private-sector needs

Future plans

- **Data integration and advancement:** Building an integrated data platform to enable integrated search and use of public, statistical, and analytical data
- **AI model replacement:** Switching to an in-house Gyeonggi Province LLM to secure operational stability and improve cost efficiency
- **Improved data quality and search performance:** Enhancing search performance by improving data quality through richer qualitative content such as data descriptions
- **Service reliability and wider use:** Maintaining quality through regular system checks and updates, and laying the groundwork for wider use by sharing best practices

Organization	Gyeonggi Province
Department	AI & Data Administration Division
Service Launch	August 2024
Budget (2024–2026)	KRW 120 million (KRW 20 million in 2024; KRW 50 million in 2025; KRW 50 million in 2026)
Application Area	Public Services / Internal Administrative Innovation
Service Type	Q&A / Analysis and Utilization
Technology Type	Language Intelligence

Key Summary: Gyeonggi Data Dream

Category	Key Details
AI Model Selection and System Configuration	• AI model used: OpenAI's ChatGPT 4.1 model selected and in use • Core functions: Natural-language Q&A, data summarization and recommendation, automation, and other functions • Integrated platform: Integrated search and use of administrative data, public data, and research outputs planned
Data Acquisition and Utilization	• Use of datasets: Fields such as public data name, description, and tags from the Gyeonggi Data Dream portal were used as data, maximizing the use of existing open data • Analysis assistant: A proactive service that analyzes the characteristics of the data and suggests ideas for use and analysis methods
Quality Improvement and Operation/Enhancement Plans	• Standardized search quality: Improved search performance through qualitative quality management and standardization, such as enriching data descriptions • Model advancement: Planned transition to Gyeonggi Province's own LLM to reduce reliance on external APIs

Appendix 1: Expert Recommendations

Hwi-woong Jung | Director, 42Maru

Because LLMs are specialized in text generation, they have structural limitations in producing precise statistics. I therefore propose the following key strategies for advancing the service by addressing the fundamental issues of “data quality” and “statistical accuracy.”

Statistical data belongs to the domain of deterministic “calculation,” not probabilistic “generation.” I therefore recommend an agent-based architecture in which the statistical calculation logic is built as a separate, normalized calculation module and the AI accesses this module to retrieve results. This strategy ensures data integrity by limiting the AI to the role of a language interface while verified algorithms produce the actual values.

The approach of “integrating all scattered information” is ideal, but it may be inefficient given the practical limitations of managing unstructured data, such as human error. Rather than pursuing comprehensive integration for its own sake, the priority should be a detailed analysis of the core statistical needs actually arising from civil requests and administrative work. Building and linking “specialized statistics agent servers” for each frequently used, high-demand type of statistics would be a sound approach that reduces system complexity and improves real user satisfaction.

Kilkon Ko | Professor, Graduate School of Public Administration, Seoul National University

Gyeonggi Province’s Gyeonggi Data Dream is an exemplary case that has dramatically improved access to public data through years of continuous development and data cleanup without a large budget. It is particularly significant in that it shifted the policy paradigm away from provider-centered “simple data opening” toward user experience (UX) and “practical use.”

Compared with conventional rule-based search or simple statistical search techniques, LLM-based natural-language search is better at interpreting queries and can comprehensively handle diverse expressions and contexts, greatly reducing the cognitive burden of data exploration for both citizens and public officials. Internally, this has the potential to accelerate data-driven administration through faster access to data; externally, it can promote private-sector research and service development, revitalizing the public data ecosystem as a whole. Furthermore, if the service can present relationships between datasets or recommend similar data during the Q&A process, it could evolve beyond a simple search tool into an intelligent data exploration assistant.

However, for these technological advances to deliver real results, the quality and degree of structuring of the metadata that the LLM references must be adequately supported. If descriptions, variable definitions, units, or time-series coverage of public data are inaccurate or insufficient, even the most advanced language model will be limited in providing appropriate search results. Therefore, the project’s results should be assessed not simply by whether an LLM was adopted, but in close connection with quality improvements across the existing data management system. Other challenges to be addressed include vector database update technology in the RAG model and the instability of search results caused by the GPT engine.

Yong-min Park | Team Leader, LG AI Research

Gyeonggi Data Dream is a meaningful policy initiative in that it combines generative AI with public open data, which has accumulated in vast quantities but remained difficult to access, to instantly retrieve data and summarize key content according to users’ specific purposes and intentions. In

doing so, it has dramatically lowered the invisible yet very real barriers that have hindered the use of public data.

In particular, it has successfully created an environment in which even individuals without specialized knowledge of data analysis can easily find and immediately use the data they want through simple natural-language queries, without a complicated search process. This makes it an exemplary case that demonstrates the effectiveness and direction the public sector should pursue in adopting AI.

Building on this successful operation and technical validation, it is well worth examining in depth how to broaden the scope and target of openness so that the service's core functions, which currently focus mainly on convenience for individual users, can also be flexibly implemented within companies' own business systems and the various generative AI environments offered by the private sector. If the functions for linking and retrieving public data were provided in a standardized form that anyone could easily use, so that they could be immediately integrated into diverse corporate business and work environments, the value and scope of public data use could expand significantly, beyond providing administrative convenience to the public, to boosting corporate productivity and strengthening the real competitiveness of the industrial ecosystem as a whole.

Appendix 2: Interview with the Project Officer

Eun-a Bae | Assistant Director, AI & Data Administration Division, Gyeonggi Province

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. Gyeonggi Data Dream is the AI search service built into the province's public data portal of the same name. It began not simply as an effort to gather data, but from the question of how to lower the barriers to using data. The existing search was keyword-based, so users had difficulty finding the materials they wanted unless they entered the exact terms. This led us to consider introducing natural-language search based on a large language model (LLM).

During development, however, we found that the data itself had to be put in order before applying AI technology. When data management was insufficient due to a lack of standardization, inconsistent metadata, and variations in quality, even the best AI technology had limits in accurately understanding the context of users' questions and providing appropriate results.

Q. What budget and organizational support systems were in place for sustainable project advancement?

A. Because the service was selected as a proof-of-concept (PoC) task under the 2024 Information Strategy Planning (ISP) project for building the Gyeonggi Generative AI Data Platform, we were able to carry out the initial development without allocating a separate additional budget. In addition, by using data whose quality had already been verified through the existing public data opening and quality management project, we were able to reduce the initial burden of data cleanup.

Going forward, we plan to reduce our reliance on external APIs and cut operating costs by switching to Gyeonggi Province's own LLM in connection with building the Gyeonggi integrated data platform. We will also continue to increase the value of the service by advancing its functions, such as expanding the search scope to include statistical and analytical data.

Q. What efforts have you made to secure data for building an agency-specific AI service?

A. The data used in Gyeonggi Data Dream is the result of continuous management through the public data opening and quality management project. When opening data, we have managed basic metadata such as the classification system, services provided, and descriptions as required fields.

In the course of building the AI service, however, we found that the quality of metadata has a major impact on search accuracy. Accordingly, we plan to focus on enhancing metadata, such as making data descriptions more specific and diversifying tags, so that the AI can understand user intent more accurately.

Q. Were there specific criteria or reasons for selecting the AI model, and were there any related security issues?

A. In the initial development stage, we used OpenAI's GPT-4 model. This choice was made to quickly implement generative AI–based natural-language Q&A, complementing the limitations of conventional keyword search and improving access to public data. In terms of security, because the underlying data of the service is public data already open to the public, concerns about sensitive information leaks or other security issues were relatively minimal.

Q. Please describe any other key considerations during implementation or challenges you overcame.

A. We placed great importance on supporting users with little experience in data use so that they could move naturally from searching for data to analyzing it. By presenting multiple highly relevant datasets through natural-language search and summarizing the key content of each, we helped users quickly identify the right data. In particular, through the data analysis assistant function, which suggests analysis methods and ideas for use based on the characteristics of the retrieved data, we sought to create an environment in which even users without much experience in using data could easily begin their analysis.

CASE 10 | ADMINISTRATION

The final piece of the policy research puzzle

An AI Partner That Fills the Gaps in Policy Research

Office for Government Policy Coordination (National Research Council for Economics, Humanities and Social Sciences): Hyperscale AI-Based Integrated Research Support Service

The Hyperscale AI-Based Integrated Research Support Service is a digital innovation platform that supports the entire research cycle, from topic discovery and planning to research execution and dissemination of results. AI integrates vast amounts of research materials and supports everything from planning to summarizing research reports, drafting policy briefs, and preparing materials to disseminate results. Complex administrative procedures and document organization are streamlined, improving both the quality and speed of research.

Hyperscale AI-Based Integrated Research Support Service – Key Functions

- **Research planning support:** AI suggests research topics and automates the drafting and validation of research proposals
- **Report writing and summarization:** Automatically generates research reports, policy briefs, and trend analysis materials
- **Dissemination of results:** Visualizes relationships with similar studies and automatically drafts presentation materials and press releases
- **Research assistance:** Supports proofreading and translation, meeting minutes, and news collection and summarization
- **Technology engine:** Multi-LLM RAG, multi-step reasoning, hybrid search, and data standardization

Background

From Policies That Lag Behind to Policies That Lead

Researcher A: *"There are mountains of reports, but I can't find the materials I actually need."*

Administrative Officer B: *"It seems similar studies keep being repeated, but there's no way to check."*

Policy research serves as a compass that sets the direction of national strategy and plays a key role in determining national competitiveness. However, it has been pointed out that policy responses have not kept pace with rapidly changing global conditions and increasingly complex social issues.

Although a vast number of research reports accumulate every year, data scattered across ministries and institutions has remained fragmented and unintegrated. Because analysis has relied on manual work, similar and duplicate studies have been repeated, making it difficult to develop and reflect timely policies.

Fundamental innovation in the research administration process is essential to develop policies that keep pace with accelerating change. Using hyperscale AI, the NRC aims to open a new paradigm for research administration: "Researchers focus on analysis, while AI handles administration."

Key Features

Digital Innovation across the Entire Research Cycle, Designed by AI

The Hyperscale AI-Based Integrated Research Support Service is an all-in-one platform that supports the entire research process. Previously, researchers had to collect materials, review literature, and write reports manually; now, AI works alongside researchers from planning to the dissemination of results.

Research planning support

Researchers explore new research topics with AI through a conversational interface. The AI searches related documents, automatically generates draft research proposals, and checks for legal issues and whether similar or duplicate studies exist. This provides reliable support for the entire process, from exploring ideas to drafting and validating proposals.

Research execution support

Based on the research proposal, the service automatically generates draft reports and produces field-by-field summaries and policy briefs. Through relationship analysis, it visualizes connections with similar studies so that users can quickly identify key points even in vast amounts of material.

Dissemination of results

Administrative processes have been streamlined through intelligent administrative support services such as press release generation and policy brief summarization.

Supporting services

By automating repetitive administrative tasks such as proofreading, translation, and meeting minutes, researchers can focus on analysis and strategy development.

Technology engine

- A scalable platform built mainly on domestic private-sector LLMs, with the option to apply foreign and private models, creating an AI service structure that can expand flexibly according to research purposes and uses
- Combination of retrieval-augmented generation (RAG), hybrid search, and multi-step reasoning to strengthen in-depth analysis and forecasting
- Application of data standardization and partitioning to enable precise searches across vast amounts of policy data

Implementation Process

From Challenges to Solutions: A Growth Story Powered by Hyperscale AI

By bringing together scattered data and overcoming the limitations of conventional search, the Hyperscale AI-Based Integrated Research Support Service has established an AI support system optimized for policy research. In particular, it has continued to evolve and improve by systematically resolving the challenges that arose at each stage.

Year / Phase	Challenges	Solutions	Results
2023: Planning and preparation	Research outputs scattered across institutions, making access difficult for researchers; low level of data standardization	Developed a plan for an integrated research support platform at the NRC level; reviewed ways to link it with the government-wide AI administrative innovation initiative	Built consensus on the need for data integration; laid the groundwork for launching the project
2024: Platform development and first service launch	Conventional keyword search made it difficult to find needed information among hundreds of thousands of research reports; limited ability to support the research process as a whole	Implemented a generative AI service that applies generation, search, and summarization technologies based on an LLM suited to the public research environment, selected from various domestic and foreign language models, to generate research proposals, reports, and presentation materials, explore similar studies, and summarize research reports	Pilot service launched in December 2024; first stage of a researcher-centered, AI-based research support system realized
2025: Function expansion and full-scale operation	The initial service focused on policy research support and could not fully meet diverse field needs (links with administrative work, project management, expansion of institutional work, etc.)	Formed an AI officers' council in 2025 to systematically reflect field input and fully expand the following functions: automatic policy brief generation and research trend identification; AI-based contract and review support to prevent duplicate research; AI linkage with internal audit cases, regulations, and guidelines	Expanded into a full-scale service actively used not only by researchers but also by policy officials and administrative staff, strengthening the organization's policy responsiveness and administrative efficiency
2026 onward: Organization-wide expansion and institutionalization	Need to expand from research support services to administration as a whole	Expand the service scope to affiliated research institutes as well as research by central ministries and local governments; establish a customized research support system	Complete an AI-based decision-making system linking research and policy; establish the service as a model for digital innovation in public research support

Outcomes

Policy Research That Achieves Both Speed and Quality

The Hyperscale AI-Based Integrated Research Support Service is an innovative platform that rapidly analyzes and summarizes vast amounts of policy materials, improving both efficiency and accuracy in research.

AI saves time

- Introduced semantic search, summarization, and document generation technologies centered on domestic private-sector LLMs, optimized for the public research environment

- Significantly reduced time spent collecting and organizing materials through sentence- and context-level analysis
- Created an environment where researchers can focus on key policy judgments and planning

Data brought together

- Integrated research data from the NRC and its affiliated government-funded research institutes
- Reduced the fatigue of searching each institution separately by using a single platform

Greater research efficiency

- Relieved the burden of repetitive literature organization and searching
- Reduced duplicate research and improved the productivity of policy analysis

< Platform Structure of the Integrated Research Support Service >

Category	Demand Agency (NRC)	NAVER Cloud Consortium (Lead and Participating Organizations: NAVER Cloud × AhnLab CloudMate)	End Users (Researchers)
Role	Provides NRC administrative materials, materials registered on the National Policy Research Portal, and data held by affiliated research institutes	Supports integration with the HyperCLOVA X–based hyperscale AI platform and develops services to support researchers	Generates, manages, and supports the research resources needed for research activities
Components	Administrative materials, research reports, policy research materials, periodicals, seminar materials, video materials, project plans, budget requests, and other administrative materials; linked with nationally approved statistics and other external data	Platform: CLOVA Studio (Segmentation API, Embedding API, Tuning API, Explorer, Playground, Forum, etc.), powered by HyperCLOVA X; data preprocessing, tuning, and prompt engineering. Services: vector DB construction, integration with related systems, and conversational AI search development; research activity support services on the National Research Institutes Digital Library (proposal draft generation, legal research support, research notes by affiliated institute, etc.)	Generation of basic research materials; recommendation of and support for research methodologies; drafting of research reports

< Conventional Search vs. Generative AI–Based Search >

Category	Conventional Search	Generative AI–Based Search
Overview	Fragmented, one-way search	A more intelligent and relevant search experience
Technical features	Speed: very fast search through indexing of large datasets; Simplicity: simple and intuitive keyword matching; Keyword limitations: difficulty grasping intent due to lack of natural-language understanding; Lack of accuracy: low relevance due to simple keyword matching; Lack of knowledge: provides only fragmented information, making it difficult to connect knowledge	Natural-language understanding: grasps the intent of user queries; Knowledge understanding and reasoning: provides relevant knowledge by reasoning over vast amounts of data; Personalization: presents customized results that reflect the user's context; Multimodal integration: comprehensive results by processing diverse data such as images and audio as well as text (under review for future application)
Data type	Database	Hyperscale LLM + vector DB (RAG) + API
Service method	Keyword-based, one-way service	Natural-language conversational service
Expected benefits	—	Provides researchers in various fields with all the information they need through a conversational search service built on the NRC's rich data and advanced AI technology: fast and accurate search, customized results, diverse results, and greater search convenience, leading to the expansion of the service model to other NRC-affiliated institutes and broader applicability

Opening up future scalability

- Potential to evolve into customized AI research support services for each institution
- Establishment as a model for digital innovation in public research support systems

Future Plans

A High-Speed Research Ecosystem Built by AI

The Hyperscale AI-Based Integrated Research Support Service has only just taken its first step and will gradually incorporate more data and the latest models to improve the reliability and speed of policy research.

- **Data enhancement:** Strengthening precise analysis by expanding to all NKIS (National Knowledge Information System) data, overseas research data, and public data
- **Model and architecture enhancement:** Flexibly selecting and operating domestic LLMs suited to the public research environment, foreign models, and private models, and applying next-generation policy analysis algorithms with in-depth analysis and forecasting functions
- **Service expansion:** Extending support from affiliated research institutes to research by central ministries and local governments
- **Operational stability and expertise:** Strengthening the platform's operating system and providing AI training for researchers and policy officials

The ultimate goal is to build “an integrated ecosystem in which AI supports policy research from start to finish.”

Organization	National Research Council for Economics, Humanities and Social Sciences
Department	Digital Transformation Department
Service Launch	December 2024
Budget (2024–2026)	KRW 1.7 billion (KRW 1.6 billion in 2024; KRW 100 million in 2025; KRW 0 in 2026)
Application Area	Internal Administrative Innovation
Service Type	Q&A / Analysis and Utilization / Document Drafting / Planning and Creation
Technology Type	Language Intelligence / Expert Systems

Key Summary: Hyperscale AI-Based Integrated Research Support Service

Category	Key Details
AI Model Selection and System Configuration	• LLM adoption: Adopted a model based on NAVER Cloud’s HyperCLOVA X (HCX-007) • Combined technology engine: Combines the latest AI technologies such as RAG (retrieval-augmented generation), hybrid search, and multi-step reasoning to go beyond simple search and generate in-depth analysis and reliable responses • Function expansion: Phased expansion from initial search and summarization to functions supporting the entire research cycle, such as research topic suggestions, drafting research proposals, and checking for legal issues
Data Acquisition and Utilization	• Data integration: Integrated scattered research data from government-funded research institutes under the NRC • Precise search: Designed to grasp accurate context and enable precise searches through data standardization and partitioning and relationship graphs
Quality Improvement and Operation/Enhancement Plans	• Sustainability: Continue enhancing data with NKIS data and overseas research data, and expand use across the public research ecosystem through cooperation with research institutes

Appendix 1: Expert Recommendations

Jeong-hee Kang | Attorney, Bae, Kim & Lee LLC

I believe the Hyperscale AI-Based Integrated Research Support Service is a highly meaningful best practice in public-sector AI, having dramatically resolved structural inefficiencies in research administration by providing practical support across the entire policy research cycle, from planning to the dissemination of results.

In particular, by integrating and analyzing vast amounts of research data scattered across institutions on a single platform, and by organically linking research planning, report writing support, policy brief generation, and public dissemination of results, the service has improved both the quality and speed of research and greatly enhanced the effectiveness of timely policy responses. Above all, it is an encouraging achievement that has driven productivity innovation in the public research sector by preventing customary duplicate research in advance and creating an environment in which researchers can move beyond routine administrative work and fully concentrate on core policy analysis and strategic judgment.

For the service to develop further, clear reference standards for the scope of AI use and citation should be established, along with concrete “AI Operational Guidelines for Research Support” that include fact-checking and verification systems for generated and summarized outputs. With such institutional safeguards in place, this case could firmly establish itself not merely as an example of administrative efficiency but as a standard model for trustworthy, intelligent national policy research infrastructure.

Kyung-jin Cha | Professor, Hanyang University

I see the Hyperscale AI-Based Integrated Research Support Service as an AI transformation (AX) case that accurately diagnoses the core problem: the bottleneck in policy research lies not in researchers’ lack of expertise but in a lack of speed and connectivity amid vast amounts of data.

Until now, many researchers and policy officials have spent excessive time searching scattered materials and handling repetitive administrative procedures. As a result, they have been unable to fully focus on in-depth analysis and strategic judgment, which are at the heart of research. To address these pain points, the project redesigned the entire research cycle as a single integrated “customer journey” and organically positioned AI as an “invisible partner” throughout the research process, attempting a fundamental overhaul of the research environment.

The technical completeness and user experience (UX) design are particularly impressive. Above all, the structure that seamlessly connects automatic document generation, summarization, and relationship analysis of similar studies into a single flow deserves recognition as an excellent example of AX design that optimizes technology around the user’s research experience.

Its practical impact is also considerable. It has not only dramatically reduced the time spent on research preparation, organizing materials, and disseminating results, but has also generated tangible cost savings by reducing duplicate research and streamlining administrative work. In conclusion, this case demonstrates how dramatically AI can raise both work productivity and policy quality when introduced into public research.

Jung-soo Kang | Director, AI Research Center, BLUEDOT AI

This project directly tackles productivity bottlenecks in public research administration, such as searching for materials, reviewing for duplicate research, and writing reports and briefs, and accurately captures the pain points researchers experience through AI technology. In particular, its specification of advanced technology engines such as multi-LLM-based RAG, hybrid search, and data standardization shows a clear design intent to build “national knowledge infrastructure” rather than a simple chatbot service.

However, the success of this project depends not on the richness of its functions but on controls that do not compromise research quality. Evidence, sources, and consistency are central to policy research, yet by its nature generative AI carries the major risk of “plausible errors” (hallucinations). From an evaluation perspective, I propose three key improvements.

First, the system needs a RAG policy that requires source evidence for every generated output, along with a design that refuses to generate or reverts to search when evidence is insufficient. Second, detecting similar and duplicate research is very useful, but if data standardization is weak, false positives and false negatives will increase and may actually cloud administrative judgment. Given the emphasis on “data standardization and partitioning,” data governance, including metadata consistency across institutions, document quality, and version control, must take precedence over functionality. Third, caution is needed because research materials may include non-public materials, contracts, audits, and internal regulations. The plan to “flexibly select” foreign, domestic, or private models is both a strength and a risk. Security boundaries and the division of responsibilities must be clearly defined, including which data is processed by which model, how prompts and logs are stored, and how data export is controlled.

Given its sound direction and scalability, an LLM for public research support can lead to innovation if used well, but can weaken the evidence base if used poorly. I believe the key to success is not more functions, but an evidence-based (RAG) approach and an accountable operating system.

Appendix 2: Interview with the Project Officer

Ji-eun Kim | Deputy Research Fellow, National Research Council for Economics, Humanities and Social Sciences

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. Each research institute had a different structure and format, and variations in metadata made it difficult to design an integrated data lake. Planning began without sufficient internal consensus on what problems to solve with AI and how far AI could help. Because stakeholders had different priorities—researchers prioritized accuracy, policy officials prioritized productivity and speed, and the administrative organization prioritized security—considerable time was needed to define goals and coordinate priorities.

Initially, excessively high expectations coexisted with anxiety about what would happen if AI gave wrong answers, which made it difficult to define the scope of the service. However, to bridge the gap between the development timelines and procedures of conventional project structures and the pace of change in AI technology, the NRC adopted a phased adoption strategy of starting small and validating quickly (agile PoC).

Q. What budget and organizational support systems are in place, or needed, for sustainable project advancement?

A. We used the incubation structure of NIA's 2024 hyperscale AI support program to secure the minimum funding and infrastructure needed for pilot development and functional validation. Going forward, we aim to build a long-term foundation by reflecting operations, data quality management, and the development of expanded functions in our internal budget. Because AI requires continuous improvement after deployment, we maintain an ongoing collaborative relationship with the developer and are working to secure additional budget for operation and improvement.

Q. What efforts have you made to secure data for building an agency-specific AI service?

A. The key to building an agency-specific service was securing standardized, high-quality data. We first established common metadata standards, such as classification systems by research field, policy keywords, and information on the institutions responsible for each project, and designed the system so that this metadata is automatically assigned when documents are stored and registered. Because this preprocessing and metadata assignment directly improves the search accuracy and answer quality of RAG-based AI, we treated data standardization as the most important factor from the early design stage. Since context and accuracy are especially important in policy research, researchers and policy officials participated directly in reviewing data quality and selecting key materials.

Q. Were there specific criteria or reasons for selecting the AI model, and were there any related security issues?

A. Because policy research services require understanding the context of long documents and producing accurate summaries, we made accuracy, stability, and cost efficiency our key criteria in selecting the model. We comprehensively reviewed the model's ability to process context for in-depth analysis of research documents (accuracy), its stability and explainability in determining whether errors fall within an acceptable range for the public policy environment, and a comparison of token and infrastructure costs needed for sustained operation. Based on these criteria, we

compare high-performance commercial AI models with open-source models and continue to adjust the models we use. At the same time, considering the nature of policy research materials, we are reviewing a gateway-based security service to prevent personal, sensitive, and confidential information from leaking externally.

Q. Please describe any other key considerations during implementation or challenges you overcame.

A. Our main focus was to take a work-centered rather than a function-centered approach. Because we designed functions based on where researchers and policy officials actually spend their time, rather than on what AI can do, the service flows naturally from automatic document generation to similar research search, policy brief generation, contract support, and audit linkage. Rather than searching for a perfect model from the start, we applied an agile approach of rapid pilot development followed by repeated improvement, conducting real-world use tests every three to four months to achieve both speed and quality.

Because policy research relies heavily on domain knowledge, the direct participation of researchers and practitioners in data validation, result evaluation, and setting functional priorities was another important success factor. In 2025, we operated an AI officers' council to create a communication structure between the policy field and the technical team. Amid both the expectation that AI will solve every problem and the concern about who is accountable when AI is wrong, we are working to ensure reliability and accountability by requiring source attribution for AI outputs and mandatory human review for important documents and decision-making stages.

CASE 11 | ADMINISTRATION

A city hall without night duty: citizen convenience safeguarded by AI

The Duty Room Lights Are Off, but AI Is On!

Gwangju Metropolitan City: AI Night Duty System

The AI Night Duty System is an administrative innovation model introduced by Gwangju Metropolitan City for the first time in Korea. It fully abolishes the traditional night duty system and is designed to have AI take over its role. AI immediately handles the simple civil requests that recur at night and on holidays, while urgent matters are automatically linked to the Disaster and Safety Situation Room, creating a 24-hour administrative system with no gaps in handling civil requests.

While significantly reducing the budget and personnel previously required for night duty, the system has simultaneously achieved three results: ① convenience for civil applicants, ② administrative efficiency, and ③ employee satisfaction. Through this initiative, Gwangju has set a new standard, "a city where administration never stops even after employees go home," and is establishing itself as a leading example of AI-based internal administrative innovation.

AI Night Duty System – Key Functions

- **Automatic response to civil requests:** AI immediately handles simple civil requests at night and on holidays (public transportation complaints, lost items, everyday living issues, etc.)
- **Automatic routing to responsible agencies:** Automatically connects callers to the responsible department, such as district offices, the Metropolitan Waterworks Authority, or the General Construction Headquarters, for a rapid response
- **Visual ARS:** Supports text-based submission of civil requests when voice recognition is difficult
- **Call record management:** Automatically records calls and converts them to text to manage the history of civil request handling
- **Continuous learning and improvement:** Improves accuracy by learning diverse speech patterns, including dialects and accents

Model used: KT A'Cen (AI Contact Center)

Background

Resolved Right Away, Even at Dawn!

Civil Applicant A: *"Isn't it true that even urgent matters can't be resolved until morning?"*

Public Official B: *"Now AI answers right away, so there's no need to wait."*

Despite being in place for many years, Gwangju's night and holiday duty system had not been an effective way to close gaps in handling civil requests. Although more than 80% of all civil requests were simple inquiries seeking information, people often had to wait until the next day for a resolution, leading to persistent complaints about administrative services.

To address this, Gwangju set the goal of "immediate responses to civil requests, 24-hour administration." The aim was to resolve both delays in handling civil requests and administrative gaps by building a system in which AI immediately answers phone requests without staff on site

and automatically connects callers to the responsible agency when needed. As a result, Gwangju became the first local government in Korea to fully abolish its night duty system and pursued a groundbreaking administrative innovation by introducing an AI-based night duty system.

Key Features

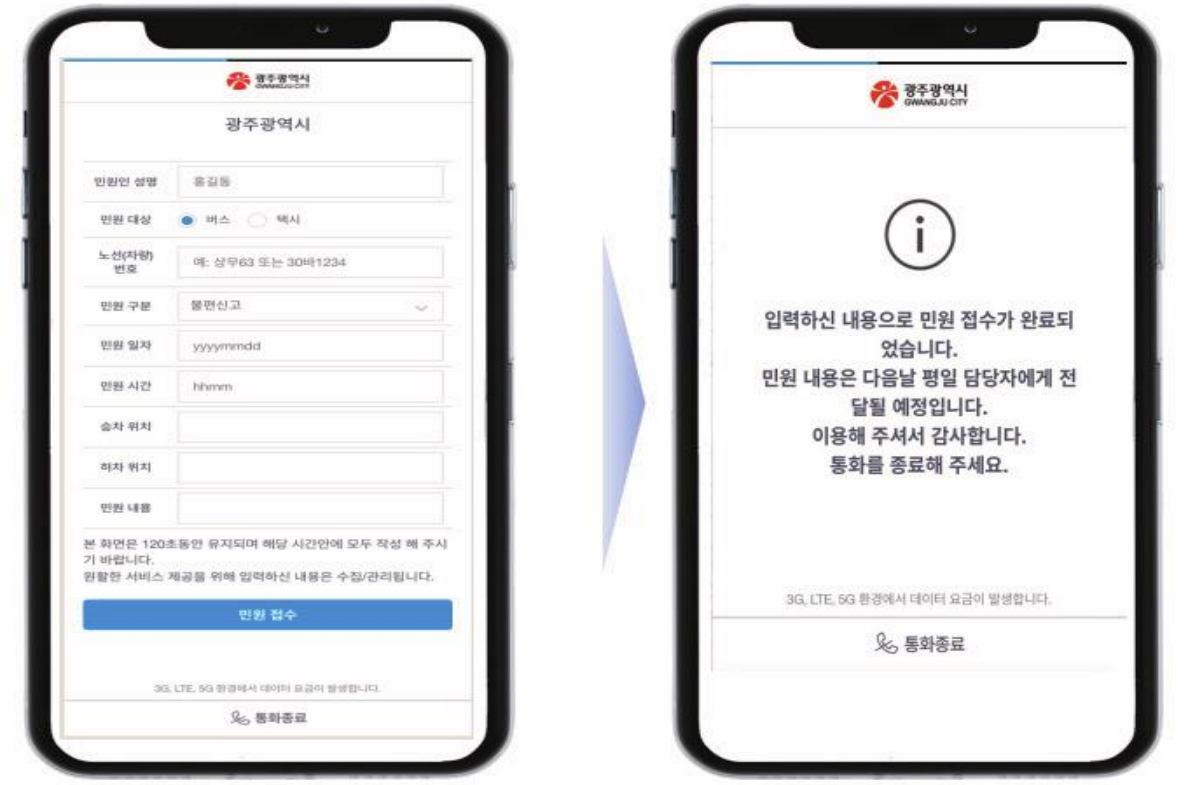
Korea’s First AI-Based System for Handling Late-Night Civil Requests

The AI Night Duty System is a model customized for Gwangju, developed in collaboration with KT, which holds Korea’s largest customer contact center database. After the 120 Call Center closes for the night (10 p.m. to 8 a.m.), an AI agent answers duty calls, and dedicated staff step in when needed to eliminate blind spots in handling civil requests.

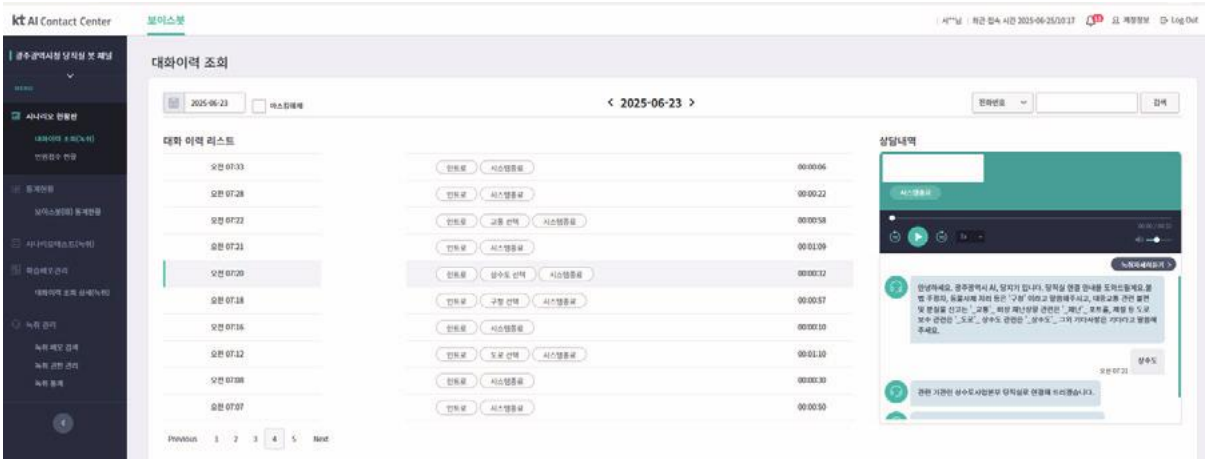
AI response service

- Records civil request calls in real time, converts them to text, and saves them automatically
- Automatically connects callers to the responsible duty agency according to the type of request (five district offices, the Metropolitan Waterworks Authority, the General Construction Headquarters, etc.)
- Supports text-based submission through visual ARS (multimodal) when voice recognition is difficult
- Continuously improves response accuracy based on self-learning deep learning

< Civil Request Submission Screens >



1. Visual ARS submission screen



2. Voice submission screen

Dedicated staff support

- Respond directly to urgent safety-related situations
- Respond to requests from civil applicants who have difficulty using AI, such as older adults
- Handle special civil requests beyond the limits of AI processing

AI System Response	Direct Response by Dedicated Staff
Receives public transportation complaints, lost item reports, and other civil requests: AI automatically receives and processes requests in a Q&A format Guides and connects callers to the responsible duty agency by request type: five district offices, the Metropolitan Waterworks Authority, the General Construction Headquarters, etc.	Cases requiring an urgent response, such as safety-related matters Cases where it is difficult to use the AI system, such as for older adults Other cases where the caller unavoidably wishes to be connected to a duty officer

Model used

- Gwangju's AI Duty Keeper model is based on KT A'Cen (AI Contact Center)
- An AI phone consultation service exclusively for public institutions, optimizing responses to civil requests through links with multiple channels such as mobile and web

The AI Night Duty System delivers 24-hour administrative services with no gaps through a hybrid structure in which AI automatically handles simple civil requests, such as public transportation complaints and lost item reports, while dedicated staff directly handle urgent requests and those from vulnerable groups.

Implementation Process

Beyond the Controversy over Abolition: An AI Night Duty System Perfected in the Field

Noting that most civil requests received during night duty were simple inquiries, Gwangju became the first in Korea to abolish its night duty system and introduce an AI-based system. The mayor personally inspected the site, a customized model was developed in collaboration with KT, and official operation began in August 2024.

Stage	Details
Stage 1: Problem identification (2023)	Of 1,592 civil requests received during night duty annually, 86% were simple inquiries Unnecessary night duty caused employee fatigue, poorer work–life balance, and delays in handling civil requests
Stage 2: Review of AI adoption	Mayor-led on-site inspection of the duty room concluded that “AI can replace it” Collaboration with KT, which holds Korea’s largest customer contact center database
Stage 3: Model development and pilot operation	One year spent designing AI consultation scenarios and training a model based on KT A’Cen August 2024: Official launch of the AI Night Duty System (AI Duty Keeper) AI fully handles night duty calls (10 p.m. to 8 a.m.)
Stage 4: Field-based improvements	Introduced visual ARS to address limitations in voice recognition Assigned one dedicated staff member to address AI limitations in cases such as older adults and emergencies

Challenges and solutions in adopting AI

- **Recognition errors with specialized terms and proper nouns:** Continuously improved by collecting error cases and reflecting them in training data
- **Lower recognition due to noise in civil affairs offices:** Addressed with unidirectional microphones and visual ARS (multimodal) functions
- **Limits in responding to vulnerable groups and emergencies:** Dedicated staff were assigned to complement AI and eliminate administrative blind spots

Outcomes

Administrative Innovation That Delivers Efficiency, Budget Savings, and Satisfaction

From its early stages, the AI Night Duty System has brought clear changes, improving administrative efficiency, convenience for citizens, and employee satisfaction.

Results in handling civil requests

- From August 2024 to October 2025, AI handled 83% (24,108 calls) of a total of 29,057 night duty calls
- After the night duty system was abolished, calls handled directly by employees fell by 50% to 10 per day (average of 20 per day before adoption → average of 10 per day after adoption)

< Night Duty Landline Calls in 2024 >

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
633	761	664	485	623	543	537	289	257	290	182	157

- Handled calls smoothly even during surges in civil requests, such as heavy rainfall and bus strikes

Budget savings

- Annual night duty costs fell from KRW 143 million to KRW 9 million per year after the system was introduced
- A reduction of more than 93%, maximizing cost efficiency

Staffing efficiency

- The system replaced an average of 122 duty staff per month with an AI system plus three dedicated staff

< Night Duty Staff in 2024 >

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug–Dec
117	125	132	117	129	123	117	3 dedicated staff + AI processing system

- Provides continuous civil request services without administrative gaps

Improved employee satisfaction

- **Work–life balance:** Time with family on weekends and holidays and personal leisure time are guaranteed
- **Greater work focus:** Eliminates gaps caused by compensatory days off after duty, allowing continuous work during the week
- **Better living conditions:** Fewer disruptions to family life, such as taking children to and from school or attending medical appointments
- **Less psychological burden:** No need to adjust duty schedules or find substitutes

Future Plans

Coming Soon: From Local to Nationwide

Since its introduction, the AI Night Duty System has proven its value for both administrative efficiency and citizen convenience. The next goals are to advance the technology, strengthen disaster response capabilities, and expand nationwide through stable operation. Gwangju also plans to share the model it pioneered with the Ministry of the Interior and Safety to develop it into a standard model for administrative innovation.

Technology advancement

- Improve recognition accuracy by reflecting diverse speech patterns such as dialects and accents
- Improve response speed and add civil request data analysis functions

Stronger disaster response

- Introduce a function to rapidly expand phone lines in unexpected situations such as heavy rain, heavy snow, and bus strikes
- Further strengthen links with the Disaster and Safety Situation Room

Operational stability

- Regularly check the quality of AI consultations and continuously reflect error cases in training
- Maintain dedicated staff support to respond reliably to civil requests from older adults and vulnerable groups

Nationwide expansion

- Share the Gwangju model with other local governments such as Seoul, Busan, Daegu, and Jeju
- Work with the Ministry of the Interior and Safety to expand it into a standardized nationwide AI night duty system

Organization	Gwangju Metropolitan City
Department	General Affairs Division
Service Launch	August 2024
Budget (2024–2026)	KRW 33 million (KRW 15 million in 2024; KRW 9 million in 2025 (annual cost); KRW 9 million in 2026)
Application Area	Public Services / Internal Administrative Innovation
Service Type	Q&A / Analysis and Utilization / Counseling Support
Technology Type	Visual Intelligence / Language Intelligence

Key Summary: AI Night Duty System

Category	Key Details
AI Model Selection and System Configuration	• Addressing technical limitations: Used a model based on KT A'Cen (AI Contact Center), with technical limitations such as recognition errors for dialects and accents continuously improved through a self-learning deep learning system • Hybrid structure: Established a hybrid operating system in which an AI agent handles simple civil requests (over 86%) and three dedicated staff handle emergencies and requests from older adults, complementing the limits of AI • Multimodal support: Introduced visual ARS to address the limits of AI voice recognition and eliminate blind spots in receiving civil requests, and systematized record management through automatic call recording and text conversion
Data Acquisition and Utilization	• Scenario design: Based on an analysis of night duty civil requests (86% of 1,592 were simple requests), completed automatic response scenarios containing algorithms for resolving civil requests through multiple consultations with the officials responsible for each request type
Quality Improvement and Operation/Enhancement Plans	• Automation functions: Supports rapid responses by recording civil requests in real time, converting them to text, and automatically connecting callers to the responsible duty agency, such as district offices or the Metropolitan Waterworks Authority, by request type

Category	Key Details
	• Expanded scope of operation: Preparing a function to temporarily expand phone lines during disasters, with plans to develop the system into a nationwide standard model for administrative innovation and expand it to other local governments in cooperation with the Ministry of the Interior and Safety

Appendix 1: Expert Recommendations

Hwi-woong Jung | Director, 42Maru

First, for the AI Night Duty System to serve on the front line of public safety, its technical sensitivity must be greatly strengthened. Beyond simply recognizing the speech of civil applicants, AI should be able to detect and analyze background sounds (ambient sounds) at disaster scenes, such as screams, heavy rain, or flooding, on its own.

This would enable an intelligent response system that secures the “golden time” by automatically linking calls to the situation rooms of relevant agencies, such as 119 or 112, when an emergency is identified.

Above all, however, it is essential to establish “proactive work governance” so that these technologies lead to actual administrative action. When a crisis occurs at night or on a holiday, AI should not merely notify the duty officer; emergency call-out criteria and contact systems should be formalized so that AI can directly call the officials or managers who have actual authority over the matter. It must be kept in mind that no matter how dramatically the AI system’s performance improves, its real effectiveness will be halved without clear reporting procedures and work governance to support it.

Kilkon Ko | Professor, Graduate School of Public Administration, Seoul National University

Among the many challenges facing the public service, the effort to solve the problems of the night duty system using AI is particularly noteworthy.

The most important improvement in introducing an AI night duty system is a clear definition of the scope of AI’s role and the limits of its responsibility.

Night duty involves not only conveying simple information but also tasks that carry accountability, such as assessing situations, deciding whether to report, and calling in superiors. If AI is mistaken for the decision-maker, there is a risk that accountability will become unclear when an incident occurs.

Therefore, AI should be clearly positioned not as a decision-maker but as an “auxiliary decision support tool,” and the system should be institutionally designed so that final decisions and responsibility for action always rest with the human duty officer. To this end, explicit labels such as “AI recommendation,” “automatic summary,” and “risk reference information” should be used on system screens and outputs, along with safeguards to prevent AI responses from being mistaken for official judgments or instructions.

The AI night duty system should be designed not as a means of replacing staff but as a tool to complement and strengthen the human duty system. In particular, because the limits of AI may become evident in crises or complex incidents, the system must be built on the premise that a human duty officer can intervene immediately at any time.

To this end, I recommend introducing a dual structure that always includes a “human confirmation step” when a civil applicant requests confirmation after an AI response, along with an escalation function that immediately transfers the call to a human duty officer or superior when a high-risk situation is automatically detected, as well as a manual response protocol.

Yong-min Park | Team Leader, LG AI Research

Gwangju's AI Night Duty System is a highly innovative best practice that deserves high praise, as it goes beyond simply introducing new technology to boldly redesign an existing administrative system on the premise of AI.

What stands out is that while the system is based on existing AI contact center technology, it does not limit AI to a simple supporting tool but elevates it to the effective "primary responsible party" for handling civil requests at night and on holidays. Furthermore, the decision to fully abolish the customary night duty system accordingly is a bold attempt at innovation rarely seen in conservative public administration.

The design is particularly sophisticated in that it analyzes the nature of civil requests to clearly distinguish simple, repetitive requests from urgent requests and those from vulnerable groups that require immediate action, and structurally separates the roles of AI and dedicated staff accordingly. This two-track response system clarifies accountability that could otherwise become ambiguous and is regarded as an important precedent that has secured both the successful establishment of AI in administrative settings and the stability of the service.

Ultimately, this case is an outstanding achievement in that AI was not applied after the fact; rather, the overall administrative operating structure was flexibly reorganized with AI as a core constant from the initial institutional design stage. Its significance lies in offering a practical and concrete answer to the fundamental institutional question of how public administration should work in the age of AI, going beyond the technology-centered, functional discussion of how far AI can be used.

Appendix 2: Interview with the Project Officer

Su-hyeon Kim | Assistant Director, General Affairs Division, Gwangju Metropolitan City

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. Deciding to abolish a night duty system that had been in place for a long time was not easy, given concerns about possible administrative gaps at night. However, the Mayor of Gwangju, serving in the 8th popularly elected term, personally inspected the duty room every morning on arriving at City Hall and found that the number of civil requests was small and that most of those received were simple phone inquiries. Based on this, we boldly pursued the administrative innovation of abolishing the night duty system, the first among Korea's special and metropolitan cities to do so.

Q. Were there specific criteria or reasons for selecting the AI model, and what security considerations did you take into account?

A. The most important consideration in selecting the AI night duty model was security. Accordingly, we introduced KT A'Cen (KT AI Contact Center), which holds Korea's largest customer contact center database and provides an AI phone consultation service exclusively for public institutions certified by the National Intelligence Service.

Q. What are your plans for future advancement?

A. Given the region's characteristics, Gwangju plans to continue developing functions that minimize recognition errors caused by dialect accents and pronunciation and that speed up responses to civil requests. We are also reviewing the option of building a separate system that can respond in a tailored way to disasters and emergencies.

Where administration for a global Korea begins

AI-Powered Administration That Breaks Down Language Barriers

Yongsan-gu, Seoul: AI Multilingual Simultaneous Interpretation Service for Civil Requests

The AI Multilingual Simultaneous Interpretation Service for Civil Requests is an AI-based administrative service that recognizes and translates 13 languages, including English, Chinese, and Japanese, in real time, enabling immediate consultations without interpreters. AI recognizes and translates what civil applicants say and conveys it to staff, then converts staff responses back into the foreign language, enabling real-time two-way communication. This allows a wide range of foreign users, including multicultural families, international students, and tourists, to use civil services without language barriers, and the service is spreading as a global administrative model.

AI Multilingual Simultaneous Interpretation Service for Civil Requests – Key Functions

- **Real-time multilingual interpretation:** Supports 13 languages, including English, Chinese, and Japanese
- **Tailored guidance for civil requests:** Provides guidance that reflects the administrative context rather than simple translation
- **Multi-channel support:** Interpretation based on fixed equipment in the district office's civil affairs office, with the introduction of a mobile "On-Site AI Interpretation" service using portable tablets
- **Administrative efficiency:** Reduces reliance on interpreters and shortens response times for civil requests
- **Links to tourism and daily life:** Reflecting Yongsan's character as a global tourist destination, the service also supports requests related to daily life and tourism

Model used: KONAN LLM ENT-11

Background

Language Barriers: An Obstacle to Resolving Civil Requests

Foreign Civil Applicant A: *"Is there anyone here who speaks Vietnamese?"*

Civil Affairs Officer B: *"We don't always have interpreters available, so it's hard to know how to help."*

Yongsan-gu is a leading multicultural district, home to a concentration of foreign embassies as well as places such as Itaewon, Seoul Station, and the National Museum of Korea that attract many foreign residents and visitors. In particular, as the number of registered foreign residents alone exceeded 13,000 as of 2025 (according to the Korea Immigration Service Monthly Statistics of the Ministry of Justice), inconvenience in administrative services caused by language barriers has been raised consistently.

Previously, the district had to rely on interpreters, but limitations in translating proper nouns and administrative terms made it difficult to provide accurate guidance. With demand for global administration growing, the limits of the existing approach were clear. Accordingly, Yongsan-gu

introduced the AI Multilingual Simultaneous Interpretation Service for Civil Requests to ease the inconvenience faced by foreign civil applicants and deliver open administration befitting its status as an international city.

Implementation Process

Facing Obstacles, Solved through On-Site Learning

Yongsan-gu, Seoul, carried out project planning and contracting from January to September 2024 and officially launched the AI Multilingual Simultaneous Interpretation Service for Civil Requests at its integrated civil affairs office in October of the same year. In 2025, following a survey of new demand sites, the district selected the Itaewon Global Village Center and Yongsan Kkumnamu Complex for service expansion and began pilot operations in September. The various technical and environmental challenges that arose during implementation were addressed step by step, developing the system into a stable service.

Recognition errors for proper nouns and administrative terms

- In the early stage of the service, specialized administrative terms and proper nouns were not translated accurately
- Error cases that occurred during operation were reflected on the server, and manual training was applied repeatedly
- Translation quality was gradually improved through continuous refinement

Noise in the civil affairs office

- Because many civil applicants wait in the same space at once, ambient noise affected interpretation accuracy
- Anticipating this, the district introduced noise-reduction equipment such as unidirectional microphones and audio interfaces
- Site-specific equipment created a stable and optimized interpretation environment

By quickly addressing issues that arose from the planning stage through on-site operation, Yongsan-gu is going beyond simple technology adoption to build a global administrative model optimized for real-world civil service settings.

Key Features

AI Multilingual Interpretation That Works Right on the Spot

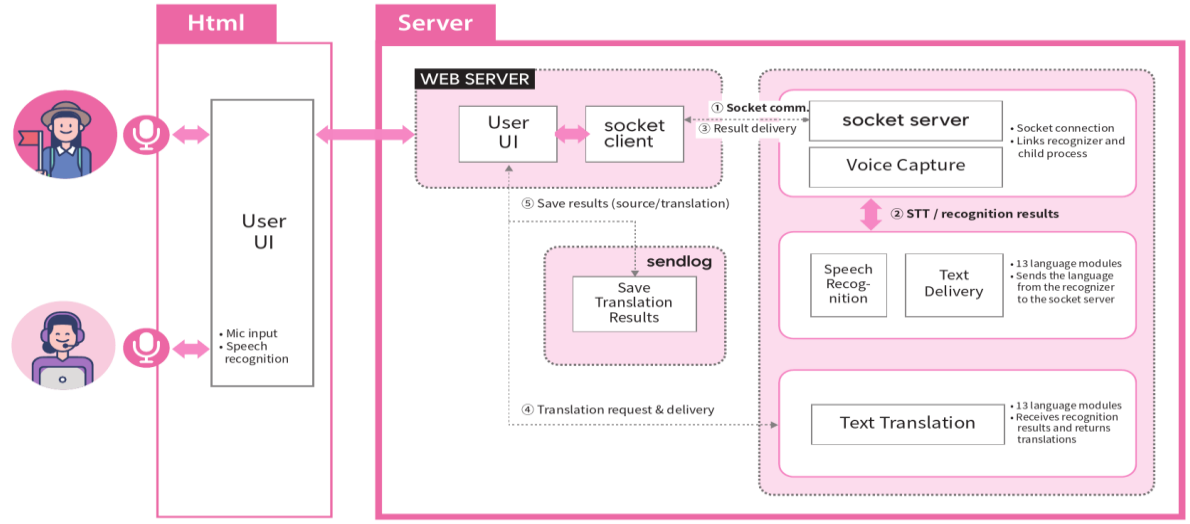
Yongsan-gu's AI Multilingual Simultaneous Interpretation Service for Civil Requests combines a cloud-based interpretation engine with site-specific equipment to provide an interpretation environment that can be used immediately at civil service counters. Its notable features go beyond simple translation: support for 13 languages tailored to the administrative setting, continuous improvement through on-site learning, and plans for portable expansion.

AI interpretation engine

- Real-time interpretation engine based on IDC cloud GPU servers
- Combined structure of speech recognition (STT) → machine translation (MT) → dialogue management (chatbot)

- Application of KONAN LLM ENT-11 (trained on 13 languages centered on Korean and English, with over 8 TB of data and 800 billion tokens)

< Interpretation System Architecture >



On-site equipment configuration

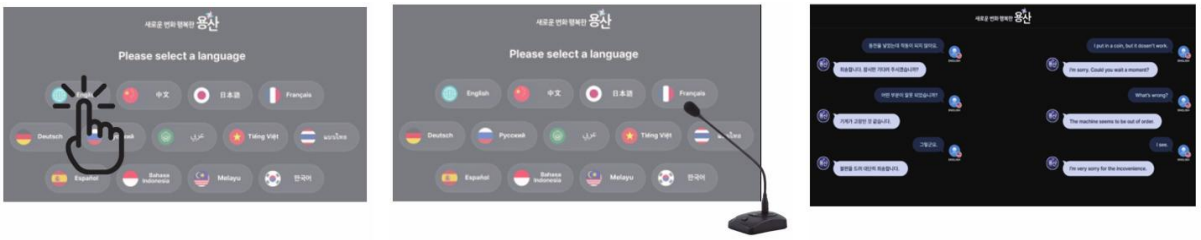
- Installation of directional condenser microphones, audio interfaces, and large displays
- Interpretation quality optimized for the civil affairs office environment by blocking ambient noise

Supported languages (13)

Korean, English, Chinese, Japanese, German, Vietnamese, Thai, Indonesian, Malay, Arabic, French, Russian, and Spanish

How it works

- Select a language on the information desk monitor → speak → two-way text is displayed
- Civil applicants and staff can talk immediately, minimizing waiting and misunderstandings



1. (Civil applicant side) Touch the language you want to use. (Recognition works best when the applicant selects their native language.)
2. Press the microphone button and speak. (Start speaking when the red light comes on 1–2 seconds after pressing the button; speaking immediately without waiting may reduce recognition.)
3. Check the text displayed on the screen.
4. When the conversation is over, press the EXIT button at the lower right to finish.



Continuous performance improvement

- Manual training reflecting error cases involving proper nouns and administrative terms
- Improved translation accuracy and response speed based on on-site feedback

Service scalability

- **2025:** Expansion to the Itaewon Global Village Center and Yongsan Kkumnamu Complex
- **January 2026:** Introduction of the portable tablet-based “On-Site AI Interpretation” service, enabling responses anywhere civil requests arise

Model used

- **AI model:** KONAN LLM ENT-11, trained on 13 languages based on Korean and English, using more than about 8 TB of data and more than 800 billion tokens
- **Operator:** Konan Technology Inc.

Outcomes

The Start of Global Administration, Proven by the Numbers

From its launch, the AI Multilingual Simultaneous Interpretation Service for Civil Requests has satisfied foreign civil applicants and brought tangible changes.

Usage

- A total of 715 uses from the official launch in October 2024 through July 2025

(Unit: cases / Oct. 2024 – Jul. 2025)

Total	Oct. 2024	Nov. 2024	Dec. 2024	Jan. 2025	Feb. 2025	Mar. 2025	Apr. 2025	May 2025	Jun. 2025	Jul. 2025
715	134	110	105	66	53	45	57	28	51	66

- Used an average of 71 times per month, with steady use at the civil affairs office
- **Usage by language:** English was used most (382 cases), followed by Japanese (55) and Chinese (24), with other languages such as French and Spanish also used

(Unit: cases / Oct. 2024 – Jul. 2025)

Language	Cases
English	382
Japanese	55
Chinese	24
Vietnamese	6
Thai	2
Russian	21
French	10
German	14

Language	Cases
Spanish	13
Malay	4
Indonesian	3
Arabic	30
Total	564

※ Uncounted cases are Korean–Korean tests.

Higher satisfaction with civil services

- Immediate consultations without relying on interpreters
- Greater convenience for foreign users such as multicultural families, international students, and tourists
- Reduced workload for officials and shorter response times

External recognition

- Widely covered by major media as “the first multilingual simultaneous interpretation service for civil requests among Seoul’s autonomous districts”
- Spreading as a case symbolizing the internationalization and openness of public administration

In this way, Yongsan-gu has lowered language barriers through an AI-based interpretation service, improving both the accessibility and efficiency of civil services and demonstrating new possibilities for global administration.

Future Plans

On-Site Interpretation for Broader Global Administration

Moving beyond pilot operation, Yongsan-gu plans to fully pursue the expansion of the service on a stable basis.

More service locations

- **October 2025:** Official launch at the Itaewon Global Village Center and Yongsan Kkumnamu Complex
- Gradual expansion of service locations, focusing on areas with many foreign residents and tourists

Introduction of a mobile service

- Moving beyond fixed monitors, the portable tablet-based “On-Site AI Interpretation Service” will be launched in January 2026
- Improved access to administrative services even in places civil applicants find hard to visit

Continuous quality management

- Monthly checks of key indicators such as translation accuracy, response delays, and usage rates

- Collection of inconvenience and error cases to reflect in AI training and continuously improve performance

Going forward, Yongsan-gu plans to operate a stable global civil service free of language barriers and develop it into a leading administrative innovation model that can be expanded to other autonomous districts and central ministries.

Organization	Yongsan-gu Office, Seoul
Department	Smart Information Division
Service Launch	October 2024
Budget (2024–2026)	KRW 177 million (KRW 87 million in 2024; KRW 80 million in 2025; KRW 10 million in 2026 for maintenance)
Application Area	Public Services / Internal Administrative Innovation
Service Type	Counseling Support / Service Processing
Technology Type	Visual Intelligence / Language Intelligence

Key Summary: AI Multilingual Simultaneous Interpretation Service for Civil Requests

Category	Key Details
AI Model Selection and System Configuration	• Model strategy: Uses KONAN LLM ENT-11 and combines speech recognition, machine translation, and dialogue management engines to enable two-way communication • Environment optimization: Introduced noise-reduction equipment such as unidirectional microphones and audio interfaces to create an interpretation environment optimized for the civil affairs office
Data Acquisition and Utilization	• Specialized training: Uses a model trained on 13 languages centered on Korean and English to deliver a customized interpretation service that reflects the administrative context rather than simple translation • Learning from on-site data: Error cases that occurred during operation were reflected on the server and manual training was applied repeatedly to gradually and continuously improve translation quality
Quality Improvement and Operation/Enhancement Plans	• Responding to demand: Considering Yongsan-gu's large foreign population, the service supports a total of 13 languages to proactively meet diverse global civil service needs • Service expansion: Plans to maximize on-site accessibility by introducing the portable tablet-based "On-Site AI Interpretation" service in January 2026, so that civil applicants do not need to visit in person • Continuous improvement: Monthly checks of key indicators such as translation accuracy and response delays, with error cases reflected in AI training to improve performance

Appendix 1: Expert Recommendations

Hwi-woong Jung | Director, 42Maru

I propose the following technical optimizations for faster and more convenient communication.

First, introducing automatic language identification is worth considering to improve ease of use. If AI can recognize the user's language on its own based on pre-trained data, it can provide an intuitive service in which interpretation begins as soon as the user speaks into the microphone, without the inconvenience of selecting a language.

Second, data processing should be improved to make conversations more natural. The current method of waiting for a period of silence (2–3 seconds) after speech ends before recognition not only frustrates users but also carries a high risk of missing the end of speech when ambient noise is mixed in.

Third, preprocessing technology should be advanced to deal with noise in the field. Rather than simply receiving louder voice input, applying technology that removes noise in real time and precisely isolates the speaker's voice before speech recognition should enable accurate and fast responses even in noisy environments.

Kilkon Ko | Professor, Graduate School of Public Administration, Seoul National University

Yongsan-gu's AI Multilingual Simultaneous Interpretation Service for Civil Requests is a pioneering attempt to solve language barriers in a multicultural urban administrative environment through technology. Its combination of a cloud engine and site-specific equipment to enable immediate communication, and its design reflecting the specific context of administrative terminology, demonstrate a very high level of policy completeness.

In particular, adopting a quality improvement structure based on learning from on-site data is regarded as having the potential to overcome the chronic problem in public services of stagnation after adoption and to bring about tangible service improvements. However, for this service to go beyond simple technology adoption and safeguard trust in public administration, the following improvements are essential.

First, managing mistranslation risk. Explanations directly tied to administrative rights and obligations can easily lead to disputes if mistranslated, so the accuracy of interpretation should be monitored continuously and users should be informed of it in advance. Second, closing quality gaps between languages. Low quality in minority languages with insufficient data among the 13 languages can undermine trust in the service as a whole, so performance indicators for each language should be managed and quality should be evaluated periodically. Third, strengthening personal data protection. Data protection measures should be institutionalized to prevent sensitive information included in civil consultations from leaking during cloud processing, and user consent procedures should be made clear. Fourth, building staff capabilities. Beyond simply distributing equipment, practical training should be provided so that officials can use the tool skillfully, for example by recognizing the possibility of interpretation errors and asking follow-up questions to confirm.

In conclusion, this service is an exemplary case of public AI with a design suited to the administrative field and a feedback structure. If the challenges raised above regarding accuracy, security, and organizational acceptance are systematically addressed, it will become an important

milestone as an “inclusive digital administration model” at the local government level.

Yong-min Park | Team Leader, LG AI Research

Yongsan-gu’s AI Multilingual Simultaneous Interpretation Service for Civil Requests is a highly meaningful case that has removed language barriers at civil service counters, helping foreign civil applicants use administrative services more reliably and accurately. It is regarded as an exemplary model of AI use in public administration, as it has reduced reliance on interpreters while improving both the efficiency of on-site responses and satisfaction with civil services.

Going forward, accessibility should also be considered at the stage before foreign civil applicants reach the service counter. Since many foreigners have difficulty even visiting because they do not understand the location of government offices or the procedures for civil requests in advance, it would be worth considering gradually adding advance guidance functions through external channels such as mobile, building on the results of this service.

For example, if the service were expanded into a structure in which foreigners first inquire about their civil requests in multiple languages from wherever they are, receive guidance on which office to visit and what to prepare, and then use the on-site interpretation system when they actually visit, the service’s perceived value and scope of use are expected to grow considerably.

Appendix 2: Interview with the Project Officer

Jeong-seop Kim | Assistant Director, Smart Information Division, Yongsan-gu Office, Seoul

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. There were concerns that the system might not accurately recognize special terms such as proper nouns and administrative terms related to civil requests. However, we were able to gradually resolve these problems through ongoing error correction, such as reflecting error cases collected during operation on the server through manual training.

Q. What budget and organizational support systems are in place, or needed, for sustainable project advancement?

A. Securing a stable budget is essential for the continuous advancement of the AI Multilingual Simultaneous Interpretation Service for Civil Requests. Even after the service is introduced, ongoing maintenance and model updates, along with expansion of the service scope, are needed to ensure stability and accuracy.

Q. What efforts have you made to secure data for building an agency-specific AI service?

A. We judged that securing the language actually used frequently in handling civil requests was most important. To this end, we gathered input from staff who handle civil requests and directly recorded cases in which specialized administrative terms were mistranslated during use, as well as types of civil requests that came up repeatedly. We are accumulating these materials as AI training data and using them to improve translation quality.

Q. Were there specific criteria or reasons for selecting the AI model, and were there any related security issues?

A. In selecting the AI model, we made stability and security required in the public sector our most important criteria, rather than performance alone. Accordingly, at the procurement stage, we clearly specified in the request for proposals that the project must use a private cloud computing service for public institutions with CSAP (Cloud Security Assurance Program) certification, and we proceeded by selecting a model that met this requirement.

CASE 13 | ADMINISTRATION

Here comes the AI parking enforcement chief!

Not “You’re Caught,” but “Not Here, Please”

Gangnam-gu, Seoul: AI-Based Integrated Control System for Residents’ Priority Parking Zones

The AI-Based Integrated Control System for Residents’ Priority Parking Zones is an AI-based parking management system designed to shift parking administration away from after-the-fact enforcement toward immediate on-site guidance and prevention.

It is an intelligent parking administration model that reduces unnecessary violations by instantly determining whether parking is permitted and providing guidance on site, while helping ease urban parking shortages through smart sharing during hours when residents are not using their spaces.

AI-Based Integrated Control System for Residents’ Priority Parking Zones – Key Functions

- **AI-based on-site parking verification and guidance:** Determines whether parking is permitted using vehicle and license plate recognition technology and provides automatic guidance on site
- **Contactless on-site guidance and phased response to violations:** Minimizes direct intervention by enforcement staff through real-time contactless guidance when illegal parking occurs
- **AI-based shared parking management:** Manages the sharable time schedules of permit holders to expand the scope of public parking services and help ease parking shortages
- **Integrated payment and administrative processing:** An integrated platform providing one-stop service from parking fee payment to administrative processing



Background

Mounting Parking Conflicts: Is AI the Answer?

Resident A: *"I came home from work and another car is parked in my space."*

Parking Civil Affairs Officer B: *"We issued a ticket, but the same thing happens again a moment later."*

Parking administration has traditionally focused on enforcement and administrative penalties after violations occur. While this approach temporarily curbed illegal parking, it did little to ease parking shortages and did not align with the purpose of the residents' priority parking sharing program.

Because of illegal parking, permit holders could not properly use their assigned spaces, and shared parking users also had difficulty parking despite paying the proper fee. As a result, related civil requests continued to arise, increasing the workload of the officials in charge.

Ultimately, a structural problem emerged in which stronger enforcement increased conflict between citizens and the administration, and repeated parking-related civil requests continued to accumulate. In particular, although the shared parking program was introduced to increase available spaces by using permit holders' idle time, it had not fully won public trust due to difficulties in managing shared hours and the problem of illegal parking.

In response, Gangnam-gu became the first in Korea to introduce an AI parking control system, launching a full-scale shift in parking administration that reduces illegal parking and increases parking space turnover through smart sharing.

Key Features

A High-Efficiency Project to Solve Parking Shortages

The AI-Based Integrated Control System for Residents' Priority Parking Zones is a parking administration service that redefines residents' priority parking zones not as mere objects of management and enforcement but as public assets that reallocate parking supply and demand through smart sharing. Its goal is to structurally ease urban parking shortages without physically adding parking spaces.

The system organically links AI control devices, a mobile app, a public cloud, and the government administrative network to integrate the entire process, from on-site determination to shared operation, guidance, and administrative processing, into a single system.

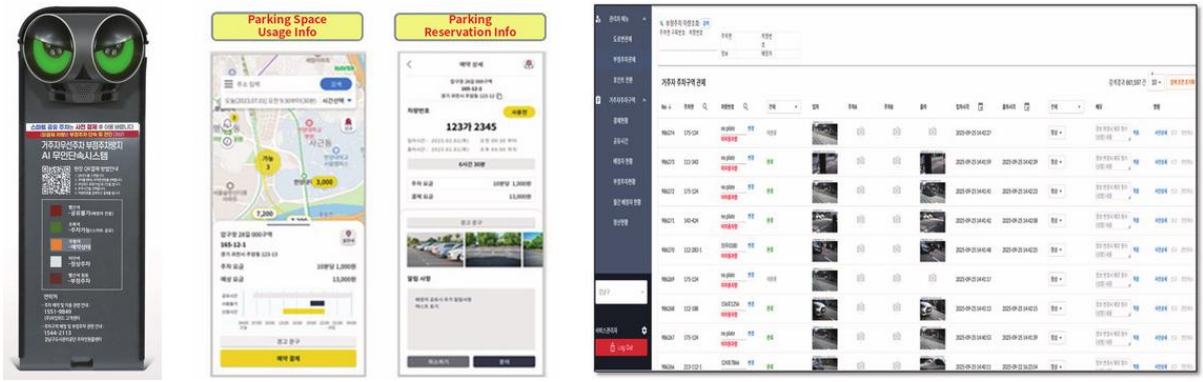
Function	Details
① Instant determination and guidance the moment a car parks (the starting point for easing parking shortages)	Determines on the spot whether parking is permitted through license plate recognition Makes determinations that comprehensively reflect resident assignment hours, shared hours, and reservation information Reduces unnecessary waiting, circling, and illegal parking through voice and visual guidance

Function	Details
② Guidance instead of enforcement, with a phased response (minimizing enforcement and securing parking space turnover)	Immediate contactless on-site guidance when illegal parking occurs Phased response over time: repeated guidance → warning → link to administrative action Contactless operating system that minimizes direct intervention by enforcement staff
③ AI-managed smart shared parking (substantially expanding the supply of previously untapped spaces)	Manages non-compliance with shared hours, duplicate use, and private appropriation of spaces Increases the use of parking spaces by utilizing permit holders' sharable hours
④ From fees to administration in one go (one-stop parking administration)	Automatic app-based fee payment Automatic link to enforcement, towing, and administrative processing if violations continue Data integration and security through links between the public cloud and the government administrative network

What is AI-based smart sharing? A way to reduce parking shortages without adding spaces

The core of the AI-Based Integrated Control System for Residents' Priority Parking Zones is "smart sharing." Rather than simply opening up parking spaces, AI determines and manages in real time who can use a space, when, where, and for how long, creating a structure in which multiple people can share a single parking space in an orderly way. This effectively increases the actually available parking spaces and parking turnover in the city without physically adding spaces.

Going beyond simple enforcement, the AI-based integrated control system for residents' priority parking zones is evolving into an integrated parking administration model that raises parking turnover without adding spaces and structurally eases urban parking shortages through AI-based smart sharing.



On-site device designed around user needs (left) / App for reservations (center) / Web for real-time monitoring (right)

Implementation Process

A Change in Parking Administration Driven by Collective Intelligence

Gangnam-gu had already been operating a shared parking system for its residents' priority parking zones, but because of the limitations of its sensor-based approach, civil requests about illegal parking continued. Permit holders and reservation users repeatedly found themselves unable to use their spaces, resulting in a steady stream of on-site civil requests.

Meanwhile, noting that control systems were already operating in parking zones for persons with disabilities and electric vehicle charging zones, staff in the field suggested that civil requests could be reduced if the existing control devices could be used to accurately identify permit holders and reservation users. This prompted Gangnam-gu to share the idea with the system operator and begin developing a new parking control system.

Three principles as the starting point for development

- Permit holders and shared parking reservation users should not experience any inconvenience in using parking spaces
- Illegal parking should be prevented in advance through on-site guidance rather than after-the-fact enforcement
- The system should be designed so as not to detract from the city's appearance

Technical review and design proceeded on the basis of these conditions, resulting in a concrete system based on AI-driven parking determination and guidance.

An implementation structure completed through public–private cooperation

From planning to pilot operation, the project was carried out through a cooperative structure in which the public and private sectors shared roles.

Stage	Details
Planning (public-led)	Based on an analysis of on-site civil requests about parking shortages and the limits of shared parking operations, the district developed policy ideas for prevention-oriented parking administration and the promotion of sharing
Development (private-led)	A private specialist company invested in and developed the technology, researching and developing the AI control devices and system and implementing technology with on-site application in mind
Securing intellectual property (public–private cooperation)	By combining administrative ideas with private-sector technical capabilities, the partners jointly filed for and secured a patent on the AI-based method of parking determination, sharing, and guidance
Pilot operation (division of public and private roles)	The district office provided the pilot environment, while the private company installed and operated the system and reflected on-site feedback, creating a structure in which policy and technology advance together based on real-world use

Gangnam-gu's AI-Based Integrated Control System for Residents' Priority Parking Zones is a public–private cooperation model that combined an administrative idea born from on-site civil requests with private-sector technology and carried it through to pilot operation, putting a new way of running parking administration into practice in the field.

Promotion Strategy

Some Haven't Tried It, but No One Who Has Goes Back?!

The AI-Based Integrated Control System for Residents' Priority Parking Zones is more than a technology deployment; it is a service premised on changing citizens' parking behavior and encouraging participation in shared parking. Accordingly, rather than promotion focused on explaining the program, the district pursued a field-oriented, experiential promotion strategy that allows citizens to experience and understand the system naturally on site.

Strategy	Details
① "You'll know at a glance!" Field-oriented promotion	Using the AI control device's voice and visual guidance functions themselves as a means of promotion Enabling intuitive recognition of whether parking is permitted through the color signals and guidance messages displayed on the device Installing on-site banners to encourage immediate understanding and natural learning about the program
② App-based guidance woven into daily life	Providing real-time information on parking availability, shared hours, and fees through the app Providing situation-specific notifications, such as alerts on shared parking availability and available spaces Linking the provision of parking information itself to service promotion to encourage both use and participation
③ Easing parking shortages: visible results	Using results-oriented messages, such as fewer illegal parking incidents, fewer civil requests, and higher parking turnover, rather than "stronger enforcement" Sharing operating results through the district office website and social media to spread policy effects that citizens can feel
④ Parking we share, parking we solve together	Delivering empathetic messages so that residents see shared parking as "parking spaces we use together" Emphasizing that this is a resident participation project to solve parking shortages together Encouraging participation in shared parking by highlighting a structure that benefits both permit holders and users

This promotion strategy goes beyond explaining the program and focuses on naturally encouraging participation in shared parking through an experience-based approach in which citizens see, hear, and use the system themselves.

Distinctive Features

Beyond Enforcement: Parking Administration Designed for Sharing

The AI-Based Integrated Control System for Residents' Priority Parking Zones differs fundamentally from conventional parking control systems and sensor-based shared parking systems in that it does not treat parking problems simply as illegal acts to be enforced against, but approaches them as an administrative model that reallocates parking supply and demand through smart sharing.

Feature	Details
① Addressing the root causes of parking shortages	Designed to ease parking shortages without physically adding parking spaces Expands parking opportunities for both residents and users through smart sharing
② On-site guidance rather than after-the-fact enforcement	Conventional enforcement-centered management produces repeated civil requests and conflicts Immediate on-site guidance through automatic determination by AI devices Administrative action kept to a minimum and taken only when unavoidable
③ Using technology to make the shared parking program work	Conventional shared parking had structural limits in preventing and managing illegal parking Persistent problems such as private appropriation of shared spaces and a breakdown of usage order AI control system automatically manages shared hours, availability, and space status
④ Joint intellectual property through public–private cooperation	A project based on public-led planning rather than simple technology adoption Technology development and investment carried out by a private specialist company Project results translated into a joint patent on the AI-based parking determination and guidance method
⑤ Potential to expand from “parking management” to a “parking policy platform”	Lays a smart administrative foundation that can be used for future parking policymaking and budgeting

The AI-Based Integrated Control System for Residents’ Priority Parking Zones is a distinctive public AI case that has shifted parking management from enforcement-centered management to parking administration based on smart sharing, using technology to make the program more effective and creating room for policy expansion.

Future Plans

Gangnam’s Parking Attendant Heads Nationwide!

Rather than ending as a single project, the AI-Based Integrated Control System for Residents’ Priority Parking Zones aims to continuously advance and spread a model for structurally easing parking shortages through smart sharing. To this end, the district plans to pursue technology advancement, expanded application, and policy linkages in stages, continuing the digital transformation of parking administration as a whole.

Plan	Details
① Advancing the system based on AI data	Expanding deep learning–based license plate recognition and the learning of usage pattern data Continuously improving the accuracy of parking determination and situational awareness Regularly checking the security and stability of the public cloud environment
② Phased expansion of smart shared parking	Prioritizing areas with frequent civil requests and high parking demand Continuously increasing available parking spaces by encouraging participation in shared parking
③ Stronger links to big data–based parking policy	Advancing parking demand analysis using accumulated parking data Using data as objective evidence for improving parking policy, budgeting, and selecting projects
④ Sustaining and spreading the public–private cooperation model	Stably maintaining and developing the cooperative structure based on the joint patent Establishing a project operating model that links private technology investment with administrative needs
⑤ Expansion into smart parking administration	Exploring links between parking management and related policies such as transportation, environment, and safety Building an integrated parking administration platform linked with smart city policies

Going forward, the project will develop into a parking administration model in which technology, policy, and administration are organically connected around smart sharing, expanding into a foundation that not only eases parking shortages but also improves the efficiency of city operations as a whole.

Organization	Gangnam-gu Office, Seoul
Department	Parking Management Division
Service Launch	August 2024
Budget (2024–2026)	KRW 700 million (KRW 300 million in 2024; KRW 200 million in 2025; KRW 200 million in 2026)
Application Area	Internal Administrative Innovation
Service Type	Q&A / Service Processing
Technology Type	Visual Intelligence / Expert Systems

Key Summary: AI-Based Integrated Control System for Residents' Priority Parking Zones

Category	Key Details
AI Model Selection and System Configuration	• Core model: Uses the AI object recognition model YOLOv8 and the TensorFlow framework to provide clear, deep learning–based guidance

Category	Key Details
	and enforcement for illegal parking • Hardware: AI control devices using a dual-camera system with a built-in optical license plate recognition engine
Data Acquisition and Utilization	• Problem solving: Complements the limitations of conventional staff-based enforcement (conflicts with citizens, insufficient management) and solves the low accuracy of floor sensors, GPS, and similar methods with deep learning technology
Quality Improvement and Operation/Enhancement Plans	• Quality management: Continuously upgrades the system by increasing the volume of data learned through deep learning, and regularly checks the security and stability of cloud services • Service expansion: Based on verification of the project's effectiveness, reviewing the deployment of the system in areas with frequent civil requests and expanding data use by linking with the district office's information network (website, etc.)

Appendix 1: Expert Recommendations

Jung-soo Kang | Director, AI Research Center, BLUEDOT AI

This project is a case with clear public value and policy relevance, as it seeks to shift everyday public conflicts (illegal parking and the breakdown of trust in shared parking) from “stronger enforcement” to “immediate on-site guidance and prevention.” In urban environments where it is difficult to physically add parking spaces, the approach of using technology to make the program work and reallocate parking supply is highly persuasive in terms of the necessity and sufficiency of public AI.

Technically, the design stands out for combining practical object recognition technology such as YOLOv8 with reservation information to implement “on-site determination → contactless guidance → phased response to violations → administrative linkage” as a single system, reducing the direct intervention of enforcement staff and keeping administrative processing to the minimum necessary. This is a clear strength, as it is not the common public AI pattern of adopting technology while leaving processes unchanged, but an attempt to transform the very way administration works at the point of contact with citizens. In addition, the approach of dividing roles between the public sector (policy ideas and pilot environment) and the private sector (investment and technology development), and structuring results through a joint patent, is also significant for future expansion strategies.

However, because this system directly notifies citizens of “permitted” or “not permitted” in their daily living spaces, the key to future success lies not in simple performance improvements but in securing reliability and institutionalizing a framework for protecting rights.

First, uncertainty management needs to be refined. What matters more than the average recognition rate (99.93%) is how to minimize conflicts caused by false detections. Considering various field conditions such as nighttime and rain, the algorithm should be designed to switch to a re-recognition request or a deferred decision rather than definitive enforcement when the determination is ambiguous.

Second, privacy protection and remedy procedures should be strengthened. Standards for the collection, storage, and disposal of video and license plate data should be clearly defined, and objection and consultation transfer procedures should be institutionalized as operating rules so that damages to citizens, such as fees or towing caused by false detections, can be quickly remedied. Only then can the policy intent of “guidance first” be maintained.

Third, measures to prevent vendor lock-in are needed. Given the risks of a subscription-based (SaaS) structure, if future expansion is anticipated, standardization of data formats and APIs, performance SLAs (false detection rates and recovery times), log access rights, data migration rights, and the ability to replace models and rule engines should be clearly secured through contracts and governance.

Overall, the project’s direction is excellent in that it redefines parking problems as a matter of “prevention and sharing” rather than “enforcement,” and it has great potential to spread as everyday public AI. However, if trust and accountability frameworks, such as handling uncertainty, rights procedures (objection, correction, and remedy), data minimization, and vendor lock-in management, are institutionalized before advancing the model, citizens will experience this system not as a “surveillance device” but as a “guidance device that reduces conflict.”

Appendix 2: Interview with the Project Officer

Jeong-uk Yeon | Assistant Director, Parking Management Division, Gangnam-gu Office, Seoul

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)? (We hope your answer will help administrative and public institutions considering AI adoption.)

A. We have operated the residents' priority parking program since 1997 to address parking problems in the Seoul metropolitan area, and in 2019 we also introduced a shared parking program based on it. However, civil requests about illegal parking in these zones steadily increased, and disputes between permit holders and users frequently arose because users did not keep to their shared parking hours. Gangnam-gu Office managed this through guidance and enforcement against illegal parking, but there were clear limits in terms of budget and staff. Accordingly, in June 2022 we began reviewing various technologies for managing residents' priority parking zones. We looked at several alternatives, including floor sensors, GPS sensing, and CCTV, but they fell short in accuracy and clarity.

Then, in August 2023, we introduced a dual-camera system with AI control devices and a built-in optical license plate recognition engine, which enabled stable monitoring even of parallel parking spaces with a vehicle recognition rate of about 99.93%.

In addition, to reduce the burden of budgeting and the administrative burden of expanding maintenance and management staff, we adopted a subscription (lease) model. As a result, the vendor became responsible for system maintenance and repairs, and work efficiency improved significantly. We now believe that this everyday AI is providing real benefits for both citizen convenience and the way administrative work is handled.

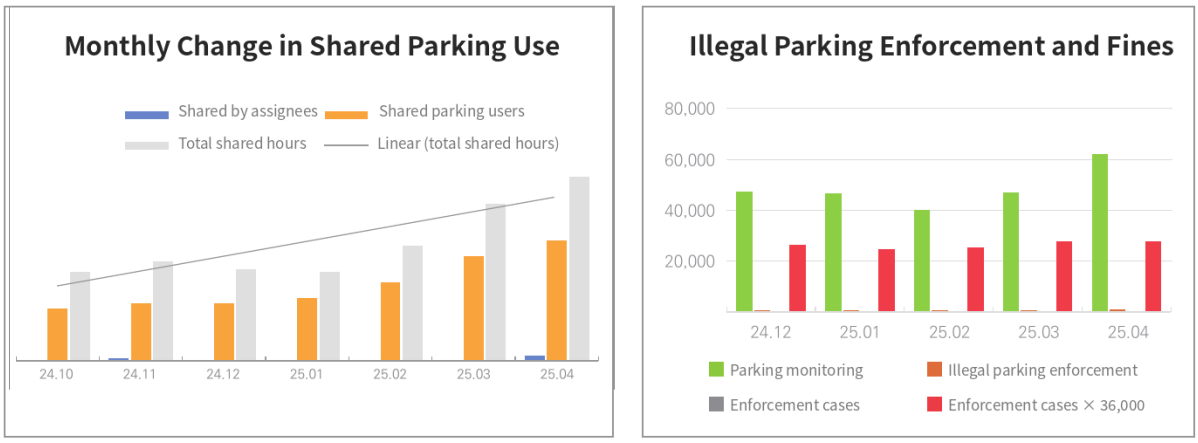
Q. Were there specific criteria or reasons for selecting the AI model, and were there any related security issues?

A. Under the previous staff-centered approach, conflicts with citizens occurred during enforcement, and the burden of managing enforcement officers was also repeatedly raised. To address this, we looked for a way to provide more intuitive and clear parking guidance to citizens. In the process, we concluded that a deep learning–based approach using the AI object recognition model YOLOv8 and the TensorFlow framework was suitable for providing simple yet clear guidance and enforcement for illegal parking.

In terms of security, we built web and app servers linked to the government administrative network using a vendor certified for G-Cloud service security by the government, and we are operating in a more secure network environment as a result.

Q. What are your plans for future advancement?

A. Based on the results of operation so far, we believe the project's effectiveness and stability are being verified, and on that basis we are considering further deployment.



Expanded use of smart shared parking (left) / Parking control data for residents' priority parking (right)

Going forward, we plan to expand the system's scope of use by linking it with the district office's own information channels (the district office website, public communication networks, etc.) and to reflect the accumulated data in district policy. We also plan to continue increasing the volume of deep learning–based training data to upgrade the system and to regularly check the security and stability of the cloud services. In addition, we are considering gradually expanding the system, focusing on areas with frequent civil requests.

CASE 14 | ADMINISTRATION

The secret of a wait-free airport serving the most passengers in Asia-Pacific

Smart Airport Control That Acts Before the Crowds Build

Incheon International Airport Corporation: AI-Based Passenger Flow Management System

The AI-Based Passenger Flow Management System is an AI-based airport operating system designed to move away from the conventional approach of responding to passenger congestion after it occurs, and instead to predict congestion in advance and proactively manage passenger flows.

By comprehensively analyzing passenger movement data and facility operation information, it predicts the likelihood of congestion by time period and process in advance and adjusts departure area operations and staff and facility deployment ahead of time. This enables airport operations that minimize waiting times even while handling one of the largest passenger volumes in the Asia-Pacific region.

AI-Based Passenger Flow Management System – Key Functions

- **Real-time congestion monitoring:** Collects and analyzes, in real time, the number of people waiting and waiting times in the departure area, security screening, and immigration inspection zones through about 663 IoT sensors
- **AI-based congestion forecasting:** Combines historical passenger flow data with real-time usage information to predict the likelihood of congestion (number of people waiting and waiting times) by time period and zone in advance
- **Visualization of passenger flows:** Converts congestion levels into intuitive visual information so that managers can see passenger density by zone at a glance
- **Operational decision support:** Provides information for operational decisions, such as how to run departure areas, when to open facilities, and how to use passenger routes, based on congestion forecasts
- **Integrated management of airport operation data:** Integrates passenger flow information and facility operation data into a single system to ensure consistent congestion management and stable airport operations

Models used: AI-based passenger pattern analysis and congestion forecasting, using IoT sensors

Background

Three to Four Days Just to Analyze Passenger Data?! AI Gets It Done Fast

Airport User A: *"What? My flight is boarding soon, but the line is way too long."*

Airport Operations Officer B: *"Passenger data analysis takes so long that it's hard to respond in real time."*

Incheon International Airport Corporation, which handles one of the largest passenger volumes in the Asia-Pacific region, had been experiencing recurring congestion in its departure areas during peak seasons and certain times of day as passenger demand recovered. In particular, as passengers concentrated at certain times during national holidays and long weekends, the limits

of managing congestion effectively with the existing operating approach became clear.

- **Annual passengers in 2024:** about 70.67 million
- **2025 Lunar New Year holiday:** average of 219,026 passengers per day
- **2025 Chuseok holiday:** average of 217,613 passengers per day

Even as passenger numbers surged, passenger flow analysis relied on manually collecting and organizing data from multiple systems, taking three to four days for analysis alone. As a result, rather than predicting congestion in advance, the airport had no choice but to respond after congestion occurred by deploying staff or taking temporary measures.

In an airport environment where passenger demand changes rapidly, this approach limited real-time decision-making and proactive adjustment of staff and facilities, and the operational burden grew even heavier during peak seasons when large numbers of passengers converged.

In response, Incheon International Airport Corporation introduced the AI-Based Passenger Flow Management System to quickly analyze and forecast passenger flow data with AI and adjust airport operations before congestion occurs. This was a choice to move away from airport operations based on experience and manual work toward a proactive operating system grounded in data and forecasting.

Key Features

Congestion Forecasting, Information, and Operational Adjustment, All at Once!

The AI-Based Passenger Flow Management System is an operating system that proactively adjusts airport operations as a whole based on AI forecasts, moving away from the conventional approach of responding after congestion occurs.

- **Real-time information system:** Informs passengers of waiting times and congestion in real time through display boards in the departure and security screening areas and the flight information display system
- **Multi-channel public information:** In addition to in-airport guidance, provides congestion information in advance through private platforms (NAVER, Kakao T, Korean Air, and KB Kookmin Bank) and the airport's official website and app
- **Flexible resource operation:** Operates flexibly according to the situation based on AI forecasts, such as opening check-in counters and departure areas early and expanding facility operations
- **Stronger response to peak seasons and busy times:** Manages zones expected to be congested in advance, even during periods of heavy passenger concentration such as the Lunar New Year and Chuseok holidays and the summer peak season, to prevent sharp increases in waiting times

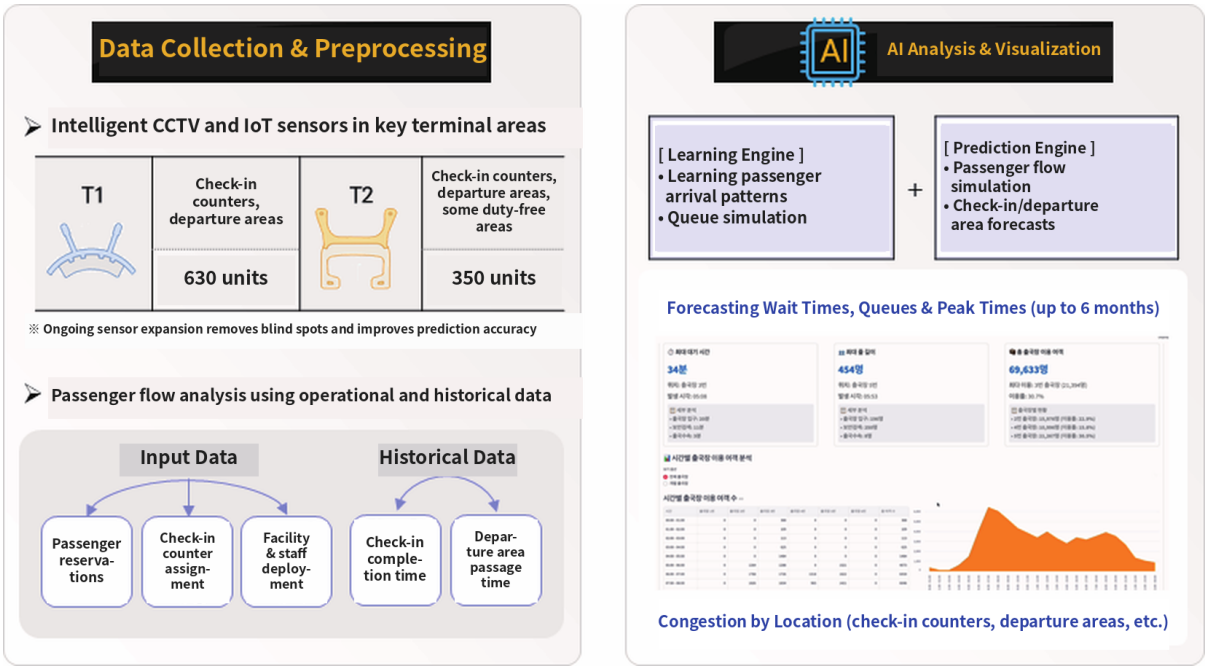
In this way, the AI-Based Passenger Flow Management System does not merely "check" congestion but organically links forecasts to information provision and operational adjustment, enabling stable airport operations even as passenger numbers grow.

Models and data used

Models used: AI-based passenger pattern analysis and congestion forecasting, using IoT sensors

Category	Details
Main data used	About 500 million records from the past five years, including passenger, flight, check-in, and number-waiting/waiting-time data
Applied technology	Simulation-based machine learning (combines physical simulation and machine learning to predict complex phenomena quickly and accurately)
Learning passenger arrival distributions	Statistical parameter estimation (estimates the parameters of statistical models, e.g., mean, variance, and regression coefficients, from measured data)
Passenger route simulation	Queueing simulation (a modeling methodology for estimating waiting times in complex queueing systems)
Forecast output	Future congestion (waiting time and number of people waiting) by location and time, depending on facility and staff deployment

< Historical Performance Analysis / Congestion Forecasting and Simulation System >



< Real-Time Congestion Monitoring >



※ Terminal 1: operation began in July 2025 / Terminal 2: construction scheduled for completion by the end of 2026

Implementation Process

No More After-the-Fact Responses: Smooth Passenger Flows through Advance Forecasting

Passenger congestion at Incheon International Airport was a complex operational challenge that no single department could solve on its own. In a structure where multiple departments and related agencies, including terminal operations, security, and transportation, each responded separately, there were limits to making integrated judgments and responding proactively to congestion.

Accordingly, Incheon International Airport Corporation pursued a phased approach centered on AI-based passenger flow forecasting and an inter-agency collaboration system.

Stage	Details
① A clear trigger for addressing congestion (January 2025)	Departure area congestion worsened during the 2025 Lunar New Year holiday The limits of the existing reactive approach were confirmed amid a surge in passengers
② Building an integrated response system (February 2025)	Formed the “Departure Area Passenger Flow Management Council,” covering all areas including terminal operations, security, and transportation Established a system for sharing data and discussing peak-season responses through a joint council with related agencies Established a structure for identifying improvements through debriefings after each peak season

Stage	Details
③ In-house development of the AI congestion forecasting system (February–July 2025)	Adopted direct development by in-house experts rather than outsourcing (simulation development: 2 staff; airport congestion forecasting R&D: 4 staff; operations staff: 12) Selected, refined, and trained on about 500 million passenger and operational records from the past five years Separated and adjusted data from before and after COVID-19 Shortened administrative procedures and saved about KRW 1.06 billion in budget
④ Field application and validation (July–August 2025)	Launched the AI-based congestion forecasting system at Terminal 1 (T1) (July 2025) Continuously validated and improved forecast accuracy and operational usefulness by applying the system to actual operations during the summer peak season
⑤ Confirming peak-season results (October 2025)	Maintained departure area waiting times at normal levels during the 2025 Chuseok holiday, even as passenger numbers reached a record high Confirmed the effectiveness of the advance forecasting and operational adjustment system based on the integrated council

Project budget

(Unit: KRW million)

Year	2020	2021	2022	2023	2024–2025	2026
Project cost	3,600	–	1,400	–	2,000	4,600
Activities	Building the T1 passenger flow management system	–	Upgrading the T1 passenger flow management system (expanded sensor installation)	–	Upgrading the T1 passenger flow management system (expanded sensor installation, congestion forecasting system)	Building the T2 control platform

Outcomes

92% Forecast Accuracy! A New Standard for Airport Operations Set by AI Forecasting

The AI-Based Passenger Flow Management System has maintained stable airport operations even during extreme congestion such as peak seasons and holidays, clearly demonstrating results that the public can feel.

Easing peak-season congestion

Departure area waiting times were kept at normal levels during the 2025 summer peak season (July 25–August 10, about 3.87 million passengers) and the Chuseok holiday (October 2–9, about 2.45 million passengers), even as record numbers of passengers used the airport. Compared with the Lunar New Year holiday in January 2025, operating conditions improved so substantially that there was virtually no media coverage of congestion.

Wider public use and impact

Through links with major private platforms such as NAVER, Kakao T, Korean Air, and KB Kookmin Bank, the service recorded a total of 8.87 million uses (API calls, etc.). An average of about 200,000 passengers and people seeing them off or greeting them each day benefit directly or indirectly from congestion information.

Platform	Reach
NAVER	62.8% share of the search portal market
Kakao T	95% share of the domestic taxi-hailing market; about 13 million monthly active users
Korean Air	About 1 million members on the flag carrier's app
KB Kookmin Bank	About 13.63 million monthly active users

Greater operational efficiency

By quickly forecasting congestion through AI analysis and deriving optimal deployment plans through simulation, the airport has built a real-time on-site response system and improved overall satisfaction with service levels.

Economic value creation

Reflecting a reduction of about 10 minutes in processing time per passenger, the system is estimated to generate economic value totaling KRW 81 billion over the five years from 2026 to 2030.

※ Value of travel time per air passenger: KRW 21,874 per hour (KRW 364 per minute)

※ Estimated annual benefits: KRW 14.7 billion in 2026 → KRW 17.2 billion in 2030

Future Plans

K-Smart Airport, Built on AI Passenger Forecasting

Although the AI-Based Passenger Flow Management System has reached the stage of stably managing peak-season congestion, Incheon International Airport Corporation aims to develop it into a sustainable airport operating system rather than a one-time achievement. To this end, it is pursuing development across technology, organization, and operations in the following directions.

Improving forecast accuracy and strengthening data quality

The congestion forecasting model is being continuously improved based on about 500 million passenger and operational records from the past five years. Reflecting forecasting errors identified during initial operation (such as overestimated waiting times), the following improvements are being carried out in parallel: installing additional IoT sensors, strengthening the logic for handling exceptional situations, and continuously expanding training data. As a result, forecast accuracy for the number of people waiting is now stably maintained at about 92%, and further improvements to increase forecast reliability will continue.

Advancing integrated operation of Terminals 1 and 2

- Building the Terminal 2 (T2) control platform and expanding links based on the AI congestion forecasting and management system proven at Terminal 1 (T1)
- Applying customized forecasting models that reflect the operating characteristics of each terminal to ensure consistent operations across the departure area, security screening, and immigration inspection zones

Embedding forecast-based operations in the organization

Rather than responding after congestion occurs, the airport is establishing advance operational decision-making based on forecasts as its standard operating practice. To this end, it continues to run an integrated passenger flow management council involving related departments such as terminal operations, security, and transportation, and repeatedly improves forecast accuracy and operating strategies through debriefings after each peak season.

Sustained operation on a stable investment base

- Maintaining stable operations based on total development investment of about KRW 11.6 billion, including about KRW 7 billion for the T1 IoT sensor-based system and about KRW 4.6 billion for the T2 CCTV video analysis–based system
- Continuously ensuring security and stability in line with public institution standards through a maintenance system costing about KRW 700 million per year
- An economic analysis projects benefits of about KRW 81 billion over the five years from 2026 to 2030, also confirming the medium- to long-term investment feasibility

Expanding into a world-class airport operating model

By accumulating experience in AI passenger forecasting and congestion management, the airport plans to expand the system into a global standard airport operating model applicable even to mega hub airports.

Organization	Incheon International Airport Corporation
Department	Operations DX Team
Service Launch	July 2025
Budget (2024–2026)	Total project cost of KRW 6.6 billion; annual maintenance cost of KRW 700 million
Application Area	Public Services / Internal Administrative Innovation
Service Type	Analysis and Utilization
Technology Type	Visual Intelligence / Expert Systems

Key Summary: AI-Based Passenger Flow Management System

Category	Key Details
System Configuration and Operating Method	• System development: T1 was built on IoT sensors (about 663 units) and T2 on CCTV video analysis, developed directly by in-house experts rather than through outsourcing to save budget and internalize technology • Operating method: Shifted from reactive response to advance forecasting to proactively adjust departure area operations and staff deployment
Data Acquisition and Utilization	• Data scale: About 500 million records from the past five years, including passenger, flight, check-in, and waiting-time data, were used as training data, with pre- and post-COVID data separated and adjusted to ensure consistency • Information provision: Linked via API with private platforms such as NAVER, Kakao T, Korean Air, and KB Kookmin Bank to provide real-time congestion information and expected waiting times to about 200,000 people per day on average • Security management: Personally identifiable information such as passport numbers is anonymized from the collection stage and used only as statistical data
Quality Improvement and Operation/Enhancement Plans	• Quality management: To address initial forecasting errors (such as overestimation), added IoT sensors and strengthened exception-handling logic, achieving about 92% forecast accuracy for the number of people waiting • Collaboration system: Formed the “Departure Area Passenger Flow Management Council,” through which terminal operations, security, and transportation departments share forecasts and continuously improve through debriefings after each peak season

Appendix 1: Expert Recommendations

Jeong-hee Kang | Attorney, Bae, Kim & Lee LLC

The AI-Based Passenger Flow Management System uses a forecasting model that combines real-time IoT sensor data with large volumes of historical passenger data in a multidimensional way. In that it goes beyond simply “detecting” congestion and links directly to practical operational decisions such as adjustments to staffing, facilities, and passenger routes, it is regarded as an exemplary case showing that the use of public AI has moved past the initial adoption stage and into a stage of maturity.

In addition, the airport has secured and internalized its own technological capabilities through in-house development, and has greatly enhanced the benefits the public feels through flexible links with private platforms that people use frequently. These points carry significant implications for the potential expansion of the model to other transportation sectors and to the management of large-scale public facilities.

However, as AI and data are used as key grounds for decisions in operating public facilities, institutional safeguards against unexpected errors and ethical issues need to be considered more carefully. In using IoT and video-based data, the principles of de-identification and prohibition of use for purposes other than the stated purpose must be consistently observed, and in the area of public safety and order management, it is important to maintain an emergency response system in which human judgment can intervene, so that operations do not depend excessively on AI forecasts.

Furthermore, in linking with private platforms, it is advisable to establish transparent institutional management standards to prevent dependence on specific companies and to ensure that the principles of equitable access to public information and the use of data for the public interest are not undermined.

Kyung-jin Cha | Professor, Hanyang University

Incheon International Airport’s AI passenger flow management system is a leading example of AI transformation (AX) at the level of national infrastructure, successfully shifting the paradigm of airport operations from “response-centered operations on the ground” to a data-driven “forecast-centered operating system.” The conventional approach to airport operations relied on reactive responses, deploying staff or taking temporary measures only after congestion occurred. This had the structural limitation of causing repeated overloads of the operating system and passenger anxiety in a large-scale passenger environment.

In response, the project redefined congestion not as something to be managed and relieved but as a key operational variable to be controlled in advance through proactive response. The core of the system lies in going beyond detecting current congestion levels to combine simulation-based machine learning and queueing models, turning the expected waiting time at a future point into a practical operational variable.

As these AI forecasts are organically linked to staff deployment, facility opening, route operation, and public information services, airport operations have been transformed into a proactive, pre-adjusting system centered on the passenger experience. As a result, departure area waiting times were stably maintained at normal levels even during extreme surges in demand such as peak seasons and national holidays, and the reduction in average waiting time per passenger has been

translated into social benefits worth tens of billions of won. In conclusion, this case clearly demonstrates that AI-based digital transformation (AX) can simultaneously create operational stability, customer trust, and substantial economic value even in very large, highly complex public infrastructure environments.

Jung-soo Kang | Director, AI Research Center, BLUEDOT AI

This project is a case of very high public value that precisely connects problem definition and work redesign in the area of very large infrastructure, where public AI can have its greatest impact. By redefining airport congestion not as a simple matter of convenience but as a key challenge directly tied to safety and operational efficiency, and by shifting from “after-the-fact staff deployment” to “advance forecasting and proactive adjustment,” it has fundamentally transformed how the airport operates.

Technically, the project uses 663 IoT sensors and about 500 million passenger and operational records, while separating and adjusting pre- and post-COVID patterns and combining them with a simulation-based queueing model, securing both data consistency and technical suitability. In particular, the greatest strength of the project is that it goes beyond simple congestion forecasting to analyze how changes in deployment affect future congestion, and is designed to link directly to actual operational decisions and on-site action. However, the future completeness of the system depends not on further improvements in average accuracy but on advancing trust design and governance, and the following three improvements are needed.

First, introducing an uncertainty management system. More important than numerical accuracy (92%) itself is how errors are handled when they occur. Safeguards are needed at the operational stage, such as presenting confidence intervals with forecasts or requiring manager approval when uncertainty is high.

Second, formalizing privacy safeguards that build trust. Because Terminal 2 is scheduled to be built on CCTV video analysis, explanations of personal data protection should go beyond “anonymization.” Whether video is stored, how long it is retained if stored, access rights, audit logs, and the principle of real-time processing without storage should be clearly set out in operating rules and external communications.

Third, institutionalizing operational governance. The “Departure Area Passenger Flow Management Council” and the structure of debriefings after each peak season, which are strengths of this project, should be developed into an MLOps system. The more model update cycles, data drift detection (seasonal, weather, and cumulative delays), rollback procedures for performance degradation, incident response, and audit systems are institutionalized, the more trust in long-term operations will grow.

Overall, this case is regarded as a top-tier public AI case with a balanced combination of public value, work redesign, data use, results, and operational internalization. The key to the next stage is not “smarter forecasting,” but putting in place institutional mechanisms, including trust design that allows forecasts to be managed safely and transparently even when they miss, a privacy framework for video-based data, and MLOps and audit systems.

Appendix 2: Interview with the Project Officer

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)? (We hope your answer will help other ministries and public institutions considering AI adoption.)

A. The biggest difficulty was a fragmented response system for managing congestion. Many departments, including terminal operations, transportation, and security, are involved in airport congestion management, and because each department responded separately, there were limits to making integrated judgments and responding proactively.

To solve this, we immediately formed the “Departure Area Passenger Flow Management Council” in February 2025. We created an integrated council covering all areas, including terminal operations and security, establishing a system for sharing information and responding together.

The internal council advanced the congestion management system by implementing AI congestion analysis and forecasting simulation models, while the external council, involving related agencies, shared data analysis results and jointly discussed peak-season response plans. In particular, we created a structure in which improvements are always identified through a debriefing after each peak season and reflected in the next peak season. I believe this collaborative system was key to the results achieved during the Chuseok peak season.

Another major challenge was ensuring the consistency of data accumulated over a long period. Because passenger booking patterns, boarding behavior, and the scale of aircraft operations changed significantly before and after COVID-19, deciding which data to use and how was an important task. We solved this by limiting the scope to about 500 million records from the past five years and separating and adjusting data from before and after COVID-19.

Q. What budget and organizational support systems are in place, or needed, for sustainable project advancement?

A. The Terminal 1 IoT sensor-based system cost about KRW 7 billion to build, with annual technical support costs of KRW 700 million, and about KRW 4.6 billion is being invested in building the Terminal 2 CCTV video analysis–based system. Overall, total development costs amount to about KRW 11.6 billion, with annual maintenance costs of about KRW 700 million.

Incheon Airport is the nation’s gateway airport, used by more than 70 million people a year, and a public institution whose top priority is improving passenger convenience. Since an economic analysis projects benefits of about KRW 81 billion over the five years from 2026 to 2030, we consider this a fully justified and necessary investment.

Q. What efforts have you made to secure data for building an agency-specific AI service?

A. Over about 25 years of operation, Incheon Airport has naturally accumulated data on passenger flows and its operations as a whole. From this, we selected and used about 500 million records from the past five years, including passenger, flight, check-in, and number-waiting/waiting-time data.

Q. What were your criteria for selecting the AI model, and what security considerations did you take into account?

A. We selected the AI model by analyzing related research papers and models used in similar industries, then implementing a modeling methodology suited to the Incheon Airport environment

and developing it further in-house (including algorithm improvements). In terms of security, all data is anonymized in accordance with public institution and National Intelligence Service standards. For passenger data, information that can identify individuals, such as passport numbers and names, is excluded from the collection stage.

The data we use is statistical information, such as the number of booked passengers, check-in completion times, departure area passage times, and the number of people waiting and waiting times. Data collected through IoT sensors and CCTV is also limited to identifying headcounts and flows and does not include personally identifiable information.

Q. How did you overcome other difficulties during implementation?

A. In the early stages, there were technical errors, such as the AI incorrectly indicating an expected waiting time of more than 10 hours. This resulted from a combination of insufficient training data, inadequate handling of exceptional situations, and noise in sensor data.

We addressed this in three ways. First, we installed additional IoT sensors to improve data quality. Second, we continuously refined the forecasting algorithm and exception-handling logic. Third, we steadily added training data to improve the model’s stability.

As a result, we have now achieved about 92% forecast accuracy for the number of people waiting and are able to provide forecast information that both the public and related departments can trust.

CASE 15 | LEGISLATION

From search to examination: high-speed mode ON

AI Patent Administration Innovation: A New Partner for Examiners

Ministry of Intellectual Property: AI-Based Patent Administration Innovation

AI-Based Patent Administration Innovation is an internal administrative innovation project that brings AI into the entire patent, trademark, and design examination process to enhance search, classification, and summarization functions.

In collaboration with LG AI Research, the Ministry of Intellectual Property (MOIP) built the world's first language model specialized in the patent field. By moving beyond the limits of conventional keyword search to in-depth analysis at the level of sentences and claims, it is dramatically improving the accuracy of examination and administrative efficiency.

AI-Based Patent Administration Innovation – Key Functions

- **Patent-specific language model:** The world's first patent-specialized LLM, built by training on patents, case law, and administrative data
- **AI search:** Precise prior art search that analyzes similarity at the sentence and claim level, going beyond keyword search
- **AI classification:** Recommends Cooperative Patent Classification (CPC) codes and goods codes to classify patents and goods automatically
- **Trademark search:** Stronger detection of similar trademarks by recognizing even the pronunciation of word marks
- **Design search:** Image-based detection of similarity in two-dimensional designs
- **AI summarization:** Summarizes the core technical content of inventions by field, reducing examination time

Background

Surging Patent Applications, Examination at Its Limits

Examiner A: *"Applications keep increasing and documents keep piling up, and it takes far too long to search for and review them."*

Applicant B: *"At this rate, I might miss out on my patent! When will I get a decision?"*

As patent, trademark, and design applications increase every year, the number of documents examiners must review has reached several million. Intensifying global technology competition is driving ever-higher demand among Korean companies to secure intellectual property, but limits on expanding the examination workforce have led to persistent problems of work overload and examination delays.

The conventional keyword-based search method had clear limitations in finding precise prior art within vast amounts of data. As a result, searches returned excessive numbers of similar documents, and screening out the necessary ones took an enormous amount of time, slowing examinations and making quality control difficult.

To achieve fundamental technological innovation beyond existing methods and keep pace with the continuously growing volume of applications and accumulating data, MOIP launched the AI-Based Patent Administration Innovation project in earnest to overcome the limits of examination administration and provide world-class examination services.

Implementation Process and Changes after Adoption

AI Breaks Through the Limits of Keyword Search

AI-Based Patent Administration Innovation is not a short-term achievement but a project that has grown step by step every year since the launch of the AI-Based Patent Administration Innovation research and development (R&D) project in 2023. It took its first step in 2023 by building the world's first patent-specific language model and piloting word mark search. In 2024, it established the foundation for examination by developing patent search (Phase 1), patent and composite trademark classification, and invention summarization functions. In 2025, it advanced patent search (Phase 2) and added trademark and design image search, automatic drafting of office actions, and expanded summarization. In 2026, it aims to advance patent search (Phase 3) and deliver composite trademark classification and conversational AI examination support.

Phased development

Year	Main tasks
2023	Built the patent-specific language model; piloted word mark search
2024	Developed patent search (Phase 1), patent and composite trademark classification, and invention summarization
2025	Advanced patent search (Phase 2); trademark and design image search; automatic drafting of office actions; expanded summarization
2026	Advanced patent search (Phase 3); composite trademark classification; conversational AI examination support

With keyword-based search, examiners spent enormous amounts of time screening hundreds of similar documents one by one, which caused examination delays and lower quality. With AI, however, as search is refined to the sentence and claim level and classification and summarization functions are added, examiners will be able to quickly identify only the documents they need.

Before and after adoption

Category	Details
Before adoption	Keyword-based search; large numbers of similar documents; much time spent on screening
After adoption	Precise search at the sentence and claim level; extraction of necessary documents; AI classification and summarization support → greater accuracy and more efficient examination

Ultimately, AI will convert "time spent screening" into "time spent on judgment and verification," shifting the entire patent administration process into high-speed mode.

Progress

High-Speed Mode: Building a Model Dedicated to Patents

AI-Based Patent Administration Innovation has expanded step by step, going beyond a simple technology experiment to establish legal and institutional grounds and undergo field validation.

In the early stages of the project to build a patent-specific AI language model, there were many difficulties, including the absence of precedents among the IP offices of major countries, technical limitations for application in the public sector, and insufficient computing resources and infrastructure, and private companies showed little interest in participating. However, a strategic partnership was formed with LG AI Research, which shared an appreciation of the importance of the goal of securing AI technology in the patent field and broadening its base.

As a result, the collaboration was solidified through a memorandum of understanding (MOU) with LG AI Research in 2023, and the world's first patent-specific language model was successfully built. Building on this achievement, research and pilot collaboration on patent search and summarization functions began in 2024, continuing the drive for innovation.

Date	Milestone
July 2023	MOU signed between the Korean Intellectual Property Office (now MOIP) and LG AI Research → development of a hyperscale AI-based patent examination system began
December 2023	Joint development of the world's first language model specialized in the patent field completed
August 2024	AI strategy briefing held to share application potential by field and pilot directions
Second half of 2024	Patent search (Phase 1), patent and trademark classification, and invention summarization developed and piloted
August 2025	On-site meeting held with LG AI Research to review progress on joint tasks, including patent search (Phase 2), trademark and design image search, and automatic drafting of office actions

Key Service Functions

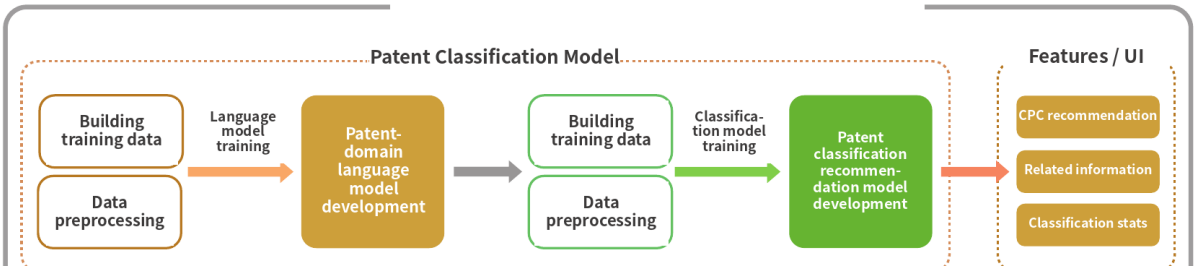
AI Patent and Goods Classification

Patent classification codes and goods classification codes, which used to be assigned manually, can now be recommended and assigned automatically through AI models.

① AI patent classification

Research and piloting of automatic assignment of classification codes to newly filed patent documents using an AI patent classification model, provided as a service to the Korea Patent Classification Agency (KPCA).

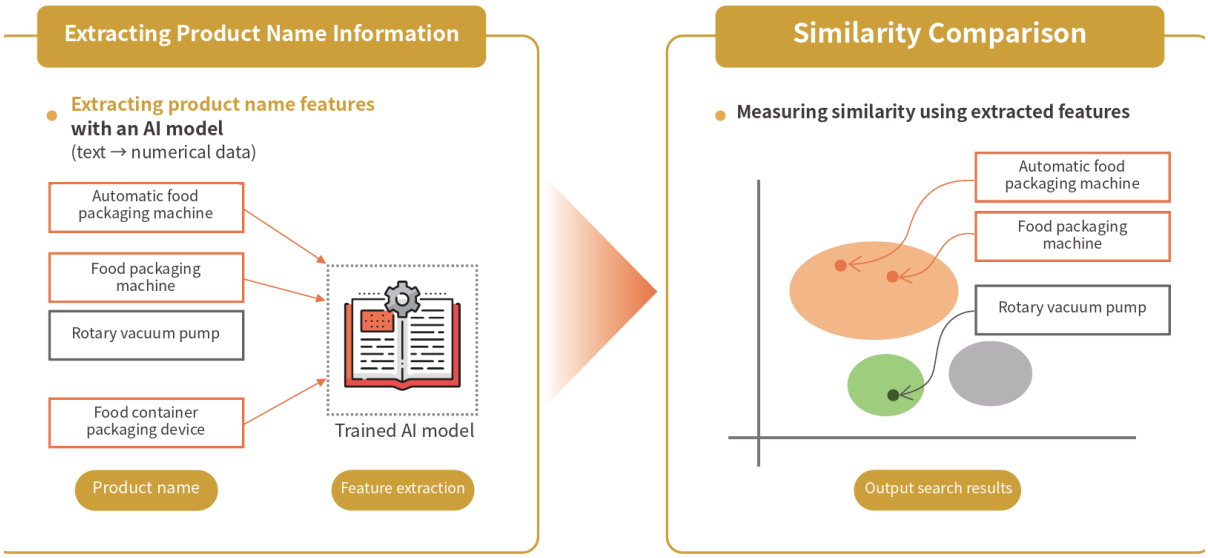
< Intelligent Patent Classification Recommendation System >



② AI goods classification

A research and pilot approach that, when goods designated by an applicant are not included in the officially notified names, automatically recommends the classification code of the most similar goods based on past goods classification cases. This gives trademark examiners consistent classification recommendations and enables them to assess similarity between goods.

< AI Goods Classification Recommendation System >



AI Patent and Word Mark Search

This function was created to complement the conventional keyword-based search systems for similar patents and word marks, as prior patent and trademark searches accounted for the largest share of time in the entire examination process. It searches by considering the context between patent paragraphs and sentences and the pronunciation of word marks.

① AI patent search

The previous patent search system recommended prior art documents similar to the claimed invention based on simple similarity between keywords, but by the nature of keyword-based search, this approach had difficulty reflecting the overall context. To overcome this limitation and improve search accuracy, a sentence-based search system is under research and piloting. By gradually expanding the training data and search scope, the system will help patent examiners search in fine detail at the sentence level.

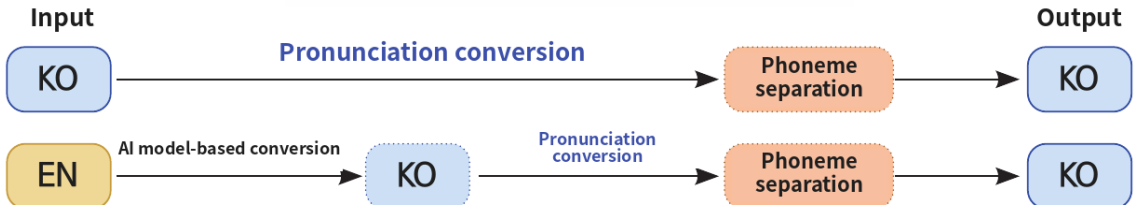
< Goals for Advancing the AI Patent Search System >

Category	Conventional	AI Prior Patent Search
Method	Extracting and comparing keywords from entire documents	Determining sentence similarity for each claim element
Search results	Recommends 200 prior art documents with high similarity	Provides about 5 closest prior art documents

② AI word mark search

The previous word mark search system searched for similar trademarks by mechanically substituting and expanding input words, but this rule-based expansion had limitations such as excessive expansion and slower searches. To address this, word marks are now converted into their pronunciation and ranked by similarity. This allows trademark examiners to review similar trademarks quickly and intuitively.

< Search Process of the AI Word Mark Search System >



AI Patent Summarization

To review many prior inventions within limited time, it is important to grasp the content of inventions quickly. To this end, methods for effectively summarizing the key information in the main fields of an invention are under research and piloting. By gradually expanding the training data and level of summarization, the system will help patent examiners quickly understand the content of inventions.

Models and data used

- **Training models:** Language models include LG AI Research's EXAONE and Google's BERT-family models, and image models use the ViT family
- **Training data:** Key patent data, including training data for natural language processing in the patent field (patent gazettes, patent administrative data, etc.) and decision notices, obtained through KIPRISPlus

Outcomes

Rewriting the Timetable for Patent Examination

AI-Based Patent Administration Innovation has brought clear changes from its early stages, including better examination quality, greater efficiency for examiners, and higher user satisfaction.

Key performance indicators

- **Higher quality:** Fewer omissions and errors and better examination accuracy through AI summarization and classification support

- **Trademark search results:** 80.5% satisfaction and 83.5% reliability achieved in image search for figurative marks
- **Work efficiency:** Less time spent on repetitive document review and organizing materials, allowing examiners to focus on judgment and verification
- **External recognition:** AI-based examination support technology has drawn attention as a flagship public–private collaboration between MOIP and LG AI Research

Future Plans

High-Speed Mode Never Stops

MOIP plans to build a continuously evolving examination system by actively adopting the latest AI technologies, improving data quality, and strengthening examiners' capabilities.

Key plans

- **Data enhancement:** Continuously adding patent documents, administrative data, and case law to training materials to improve quality
- **Model upgrades:** Adopting the latest AI language and image models to refine search, classification, and summarization
- **Broader application:** Extending AI support beyond patents to trademarks and designs, and further to trials and office action work
- **Stronger expertise:** Improving AI skills through training and hands-on practice for examiners
- **Stronger public–private cooperation:** Accelerating technological innovation through expanded collaboration with private AI research institutions such as LG AI Research

Ultimately, MOIP aims to complete "High-Speed Mode ON, from search to examination," creating an environment in which the public and businesses can secure intellectual property rights faster and more accurately.

Organization	Ministry of Intellectual Property
Department	Intellectual Property Information Systems Division
Service Launch	2023 (pilot)
Budget (2024–2026)	KRW 9.2 billion (KRW 1.8 billion in 2023; KRW 1.9 billion in 2024; KRW 1.9 billion in 2025; KRW 3.6 billion in 2026)
Application Area	Internal Administrative Innovation
Service Type	Other (Search, Classification)
Technology Type	Language Intelligence

Key Summary: AI-Based Patent Administration Innovation

Category	Key Details
Public–Private Cooperation and Foundation	• Partners: Laid the foundation for cooperation through an MOU between MOIP and LG AI Research (July 2023) and jointly developed the world's first language model specialized in the patent field
AI Model Selection and System Configuration	• Specialized model: Built and used a patent-specific LLM (LG EXAONE, Google BERT family) trained on patents, case law, and administrative data • Technology application: Uses both language models (LLMs) and image models (ViT family) to implement various functions such as patent search and trademark and design image search
Data Acquisition and Utilization	• Data acquisition: Uses data for natural language processing in the patent field, such as patent gazettes, patent administrative data, and decision notices, obtained through KIPRISPlus • Method of use: AI search functions are designed in fine detail at the sentence and claim level to overcome the limits of keyword-based search
Quality Improvement and Operation/Enhancement Plans	• Phased implementation: A systematic expansion strategy under the "Roadmap for AI-Driven Patent Administration Innovation (2023–2027)," extending functions step by step from patent search to trademark and design search and automatic drafting of office actions • Expanded scope of support: Aims to extend support beyond patents to trademarks and designs, as well as trials and office action work

Appendix 1: Expert Recommendations

Jeong-hee Kang | Attorney, Bae, Kim & Lee LLC

AI-Based Patent Administration Innovation is significant as a pioneering case that opens new horizons for public administrative innovation, having brought AI technology in earnest into intellectual property examination, a field that requires a high level of legal insight and technical expertise.

Above all, by building a patent-specific language model and moving away from simple keyword matching toward a system of precise analysis at the sentence and claim level, it is regarded as having offered the most effective and realistic solution for firmly maintaining the reliability of national patent administration.

The case is particularly highly regarded for its design philosophy, which strengthens the essence of human-centered administration rather than being absorbed by the convenience of technology. The work structure has been redesigned so that AI takes on draining, repetitive tasks such as searching, classifying, and summarizing vast amounts of data, while examiners can fully focus on legal judgment and final verification, which require their unique expertise. This shows a desirable model of collaboration in which AI does not replace people but augments their expertise as a partner.

For the system to take root even more successfully, a transparent operating framework must be in place. AI-supported search and analysis results and the scope of their use should be clearly recorded in examination records so that they can be verified after the fact at any time. With such institutional safeguards, this case will help improve the efficiency of public administration while steadfastly maintaining the accountability and consistency of examination administration.

Kyung-jin Cha | Professor, Hanyang University

I see AI-Based Patent Administration Innovation as a highly insightful AI transformation (AX) case, designed on the clear premise that the essential value of patent examination lies not in the relative strength of “search capability” but in the “quality of judgment,” which requires a high level of expertise.

The examination bottleneck caused by rising patent applications, a problem raised for many years, stemmed more fundamentally from a structural inefficiency in which examiners’ limited cognitive resources were excessively consumed by searching for and screening vast amounts of prior art. By designing the AI system to absorb this simple, repetitive cognitive load, the project succeeded in shifting the center of gravity of examination work back to examiners’ core duties of legal judgment and precise verification.

The patent-specific language model, sentence- and claim-level search, and automatic classification and summarization technologies stand out in that they are not simply about efficiency but constitute cognition-assisting AX tailored to examiners’ thought processes. The shift from mechanical keyword matching to context-aware exploration that grasps context and technical meaning has been a key factor in qualitatively changing examiners’ work experience itself.

As a result, the physical time required for examination has been shortened, and the likelihood of omissions or misjudgments due to human error has decreased significantly. This in turn creates a virtuous cycle of providing applicants with faster, more predictable, high-quality administrative

services. In conclusion, this case is a landmark example demonstrating that even in administrative areas requiring a high level of expertise, the right AX design can raise work quality, speed, and public trust at the same time.

Jung-soo Kang | Director, AI Research Center, BLUEDOT AI

This project is one of the most impactful internal administrative innovation cases. Its approach of using AI to shorten search and classification, the biggest bottleneck in patent examination, and converting that time into examiners' "judgment time" aligns precisely with the project goal of improving examination quality. In particular, building a patent-specific model through public–private cooperation and establishing a phased roadmap (2023–2026) that extends from search to classification, summarization, and drafting office actions is very positive in terms of feasibility.

However, given the legal accountability inherent in patent administration, the success of this project depends not only on the excellence of its functions but on explainability and security controls. I therefore propose two key improvements.

First, ensuring the transparency and verifiability of results. Even if AI recommends documents efficiently, the risk of missed documents remains. To ensure examiners do not blindly trust AI results but make their own judgments, the basis for similarity scores and claim-mapping information should be provided.

Second, because the summarization function can subtly influence legal judgments, the system should indicate the supporting passages in the original text, clearly state that "summaries are for reference only," and establish a feedback process that reflects errors in training when they occur.

In addition, measures for data security and preventing technological dependence are essential. Security boundaries must be clearly defined to block the external transfer of sensitive data such as examination notes and office actions. For long-term operational stability, standard APIs should be applied and a flexible architecture that allows replacement with other models in the future should be secured to prevent technological dependence on a specific vendor.

Overall, this project is highly justified in terms of work productivity. Going beyond simply meeting performance indicators, if it implements the trust and accountability essential to public work at the system level, it will make a major contribution to strengthening national intellectual property competitiveness.

Appendix 2: Interview with the Project Officer

Chang-gyo Lee | Deputy Director, Intellectual Property Information Systems Division, Ministry of Intellectual Property

Q. Were there any difficulties in planning to build the world's first language model specialized in the patent field?

A. When we were planning a large AI language model specialized in the patent field, ChatGPT had not yet fully emerged, so it was difficult to find precedents to refer to, not only among the IP offices of major countries but also in the private sector. In addition, because large AI language models were being developed mainly by a few global big tech companies based on large-scale infrastructure and data, securing the technical capabilities, budget, and computing resources needed to build one was one of our challenges.

Q. We are also curious about how LG AI Research became your partner.

A. Intellectual property data is core information that shapes the technology strategies of industries and companies, and at the same time an important strategic data asset in the age of AI and big data. LG AI Research appears to have placed high value on the public and industrial value of intellectual property data and on the potential for technology development based on it. The partnership was formed because MOIP's need for the technical capabilities to build a large AI language model matched LG AI Research's need for experience in building language models based on public data and for access to intellectual property data.

Q. What are you currently focusing on most to further advance patent administration innovation?

A. We are focusing on three things to further advance intellectual property administration innovation.

First, because AI-Based Patent Administration Innovation is an R&D project, we are confirming its feasibility and providing pilot services for strong results. To provide services on a stable infrastructure, full-scale development is required. MOIP plans to conduct an Information Strategy Planning (ISP) project in 2026 to rebuild its next-generation system, and will then reflect the research and pilot results of the AI R&D project through a preliminary feasibility study and full-scale development.

Second is securing and applying high-quality data. AI can produce good models only when trained on high-quality data. Securing high-quality data is therefore important, and this requires expert-based manual work.

Third, high-performance models and retraining are needed. AI models are advancing rapidly, and AI performance is improving just as quickly, so models must be updated by regularly checking the performance of the latest AI models and retraining. Because operation and maintenance systems for AI systems have not yet been firmly established in the public sector, institutional support is also needed.

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. The way AI is applied to existing work is much the same in most situations. You need to analyze the work in detail through interviews and meetings with the staff responsible and confirm whether

AI can be applied. Patent, trademark, and design examination at MOIP proceeds through complex stages. To determine whether AI can be applied at each stage, we are planning and implementing services through meetings and discussions with examiners, and to expand the areas where AI is applied, we will identify various areas through close discussions with examiners.

Q. What budget and organizational support systems are in place, or needed, for sustainable project advancement?

A. MOIP does not have a dedicated organization for AI projects, but it has hired one Deputy Director dedicated to AI through recruitment of private-sector professionals. A dedicated AI organization, budget, and staff are needed for the systematic implementation of AI projects and system operation.

CASE 16 | LEGISLATION

Curious about the law? No more frustration!

Bringing the Law Closer to the Public: Change Driven by AI

Ministry of Government Legislation: AI Legal Information Search System

The AI Legal Information Search System is an intelligent legal information service designed so that anyone can find laws and regulations quickly and easily. Unlike the previous approach, in which complex provisions and difficult terms made searching hard, AI now aims to understand the meaning of a question and present relevant statutes, court rulings, and interpretation cases together. This allows people to get the answers they need in daily life without being legal experts, making the service an increasingly familiar legal assistant for the public.

AI Legal Information Search System – Key Functions

- **Intelligent search:** Analyzes user questions to identify relevant statutes quickly and accurately
- **FAQ autocomplete:** Automatically suggests frequently asked questions and related items as search terms are entered
- **Broader search scope:** Integrated search covering not only statutes but also administrative rules, forms, interpretation cases, and everyday law information
- **Comprehensive information:** Comprehensive answers that go beyond fragmented search by linking statutes, court rulings, and administrative interpretations
- **Accuracy safeguards:** Continuous checks using RAG technology and evaluation and validation datasets built by legal experts to reduce the risk of generative AI hallucinations

Background

Citizen-Centered Legal Information Made Possible by AI

Citizen A: *"I'm about to sign a jeonse lease, and it's so hard to figure out which laws I should look at to protect my deposit."*

Office Worker B: *"I searched to check the conditions for receiving severance pay, but dozens of documents came up and I can't tell which one is right."*

The National Law Information Center, Korea's leading legal information service with about 800,000 visitors a day on average, has played a role closely tied to people's daily lives. However, it remained limited to keyword-based search, making it difficult to find needed information. This led to calls for an AI-based legal search service so that ordinary citizens who are not legal experts could search laws more easily and use them in daily life. The project supports the national policy task "Realizing the World's Leading AI Government" and is being carried out under the Act on the Management and Provision of Statutory Information, which took effect in December 2020.

By having AI understand the meaning of questions and provide related statutes, court rulings, and administrative interpretations together, a foundation has been laid for anyone to find the legal information they need in daily life more easily.

Key Features

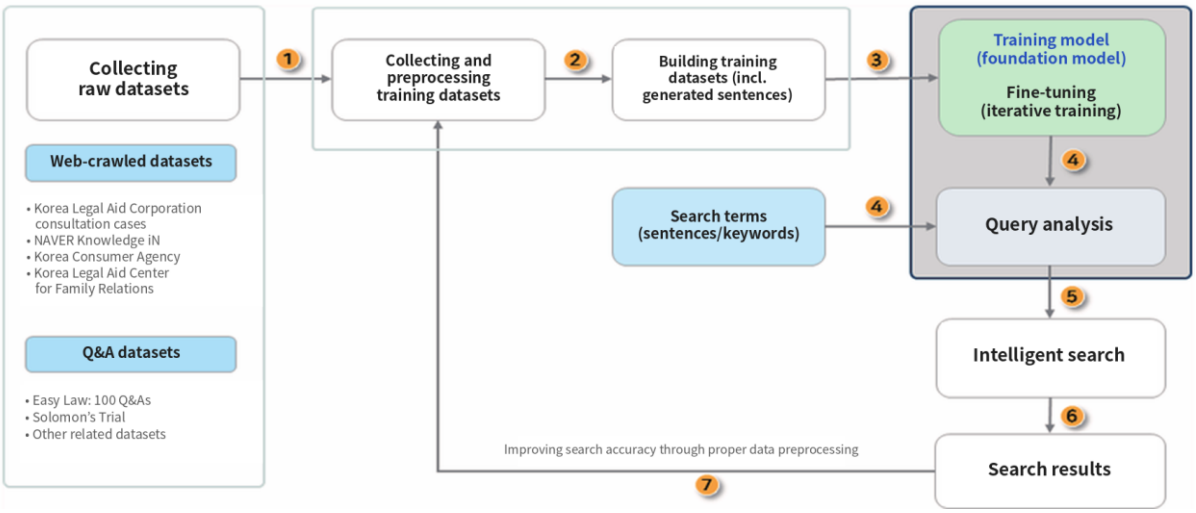
One-Stop Legal Information, Fast and Easy for Everyone

The AI Legal Information Search System is evolving in stages to improve public access to the law. In Phase 1, vector DB–based similarity search of user queries complemented the limitations of conventional keyword-based search. Phase 2 aims to introduce a small language model specialized in law (sLLM) to understand the intent of user questions more accurately and provide comprehensive legal information, including statutes, court rulings, and administrative interpretation cases.

Phase 1: Intelligent Legal Search System

- **AI-based search:** Extracts key keywords from user questions and presents the most similar legal provisions

< (Example) AI Machine Learning Procedure for Intelligent Legal Search >



Source: Ministry of Government Legislation, materials on the Generative AI Legal Information Service for the Public

- **FAQ autocomplete:** Reflects 830 frequently asked questions (FAQs) so that related items are suggested after entering only a few keywords
- **Broader search scope:** Search coverage expanded significantly from statutes (5,200) to administrative rules (20,000) and appended tables and forms (38,000)
- **Public launch (December 2024):** Service opened so that people who are not legal experts can easily search laws using everyday words and sentences

< Intelligent Legal Search System >



Intelligent search main screen



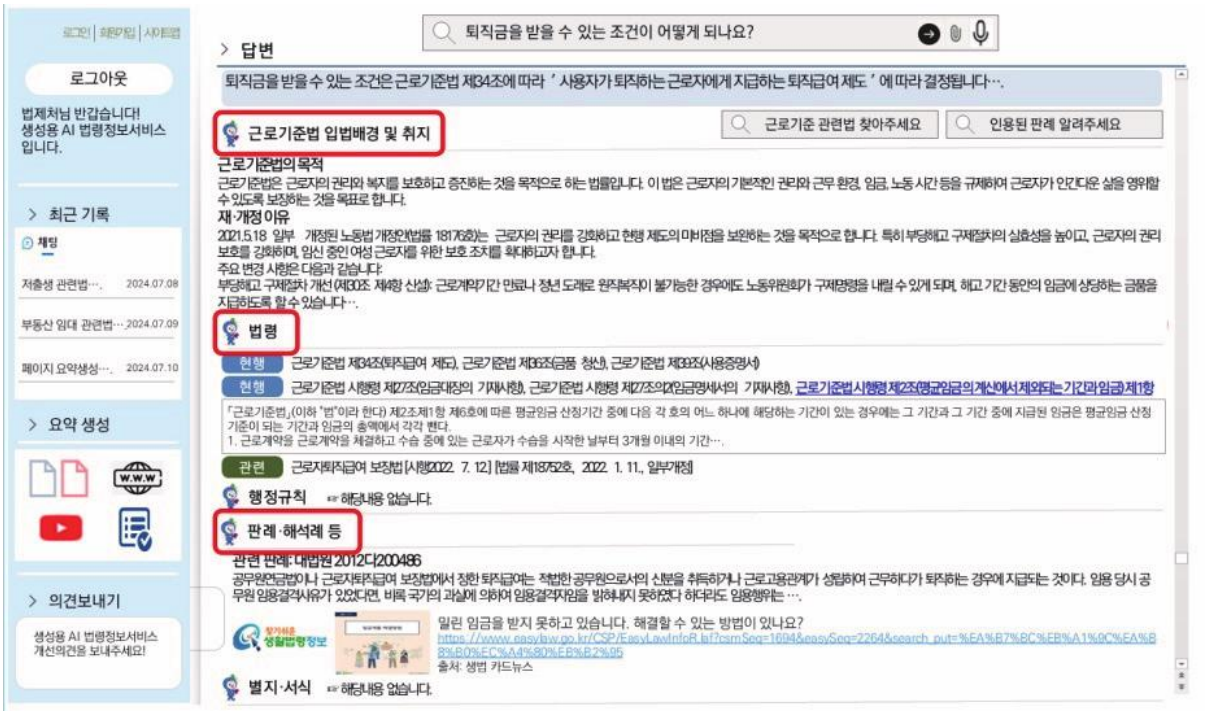
Intelligent search results screen

Source: Ministry of Government Legislation, materials on the Generative AI Legal Information Service for the Public

Phase 2: Generative AI Legal Search Service

- **Multidimensional information:** Provides not only statutory provisions but also legislative background and purpose, court rulings, and administrative interpretation cases together
- **Specialized language model (sLLM):** Improves search accuracy by introducing a language model specialized in law together with RAG technology
- **Service launch roadmap:** 2026 – developing the sLLM and preparing the RAG-based service; 2027 – launching a generative AI public service with functions for summarizing and organizing legal information; 2028 – expanding training data, advancing the language model, and extending the service to a mobile app

< Projected View of the Generative AI Legal Search Service >



Source: Ministry of Government Legislation, main materials on the Generative AI Legal Search Service for the Public

Models and data used

- **Phase 1 data:** About 20,000 datasets collected from external sources (Korea Legal Aid Corporation, Korea Legal Aid Center for Family Relations, private portals) and internal sources (Easy Law (OneClick Statutory Information Service), Solomon's Trial); similarity search based on a vector DB using an in-house embedding model
- **Phase 2 data:** About 7 million items of legal information and a 750,000-entry knowledge base held by the Ministry of Government Legislation (MOLEG) are trained, refined, and used; accuracy and reliability ensured by comparing, selecting, and building a law-specialized language model

Implementation Process

AI Legal Search, Completed through Phased Evolution

The AI Legal Information Search System is progressing from Phase 1 intelligent search to Phase 2 generative AI services. It began with building a knowledge base linking legal terms and everyday terms, which led to pilot system development and public launch, and it is now expanding into a service that provides comprehensive legal information based on generative AI.

Phase	Timeline	Details
Phase 1: Intelligent Legal Search System	2020	Established the ISP for building the next-generation legal information system
	2022–2023	Built 5,424 statutes and a 750,000-entry knowledge base → foundation for intelligent search

Phase	Timeline	Details
	December 2023	Developed a pilot intelligent search system; collected Q&A datasets and conducted iterative AI training
	December 2024	Launched the Intelligent Legal Search System to the public
Phase 2: Generative AI Legal Search Service	2024	Established the ISP for generative AI legal search based on language models and RAG technology
	2026	KRW 3.3 billion included in the government budget; full-scale development of the generative AI–based legal search service begins
	2027 onward	Scheduled launch of a generative AI public service that provides statutes, court rulings, and administrative interpretations together

Outcomes

83.7% Satisfaction: A Change in Legal Search That the Public Can Feel

Through Phase 1 intelligent search, the AI Legal Information Search System has greatly improved public access to the law, and the Phase 2 generative AI service is expected to extend this to accuracy and shared use.

Phase 1 results (intelligent legal search)

- Anyone can now easily find the legal provisions they want using everyday terms and sentences
- In a satisfaction survey conducted in March 2025 (15,222 participants) after the public launch in December 2024, 83.7% responded “satisfied” or higher

※ Satisfaction survey conducted through system pop-ups after the public launch (December 2024): survey period March 17–25, 2025; 15,222 participants; satisfied or higher: 83.7%

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
43.4%	40.3%	14.3%	1.3%	0.7%

※ User feedback: Generally satisfied with the overall screen layout and search results, but more diverse legal information such as court rulings and interpretation cases should be provided through generative AI, and search guides need improvement

Source: Materials on the Generative AI Legal Information Service for the Public

- **User feedback:** Overall satisfaction with search results is high, but users called for more diverse legal information, such as court rulings and administrative interpretations, and better search guides
- **Civil affairs officials:** Can easily search for related statutes and forms even without knowing the exact legal terms or form names, improving the efficiency of handling civil requests

Phase 2 expected effects (generative AI legal search service)

- **Accessibility:** Statutes, court rulings, and interpretation cases are organized and provided for public convenience, so anyone can use AI-based legal information free of charge
- **Shared use:** The legal information AI model is standardized and linked with other ministries' AI systems → spread across government administration
- **Accuracy:** Hallucinations (errors) are minimized by introducing a small language model specialized in law (sLLM) and RAG technology

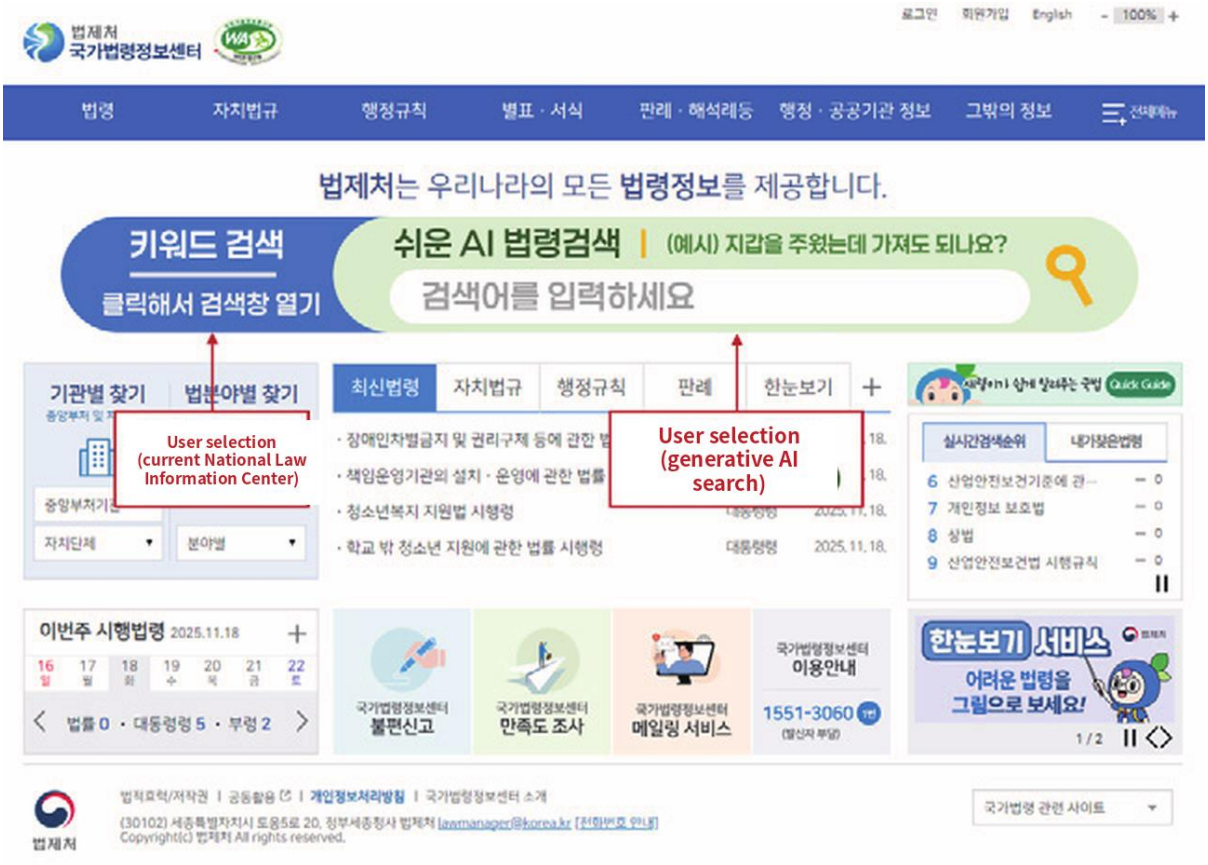
Future Plans

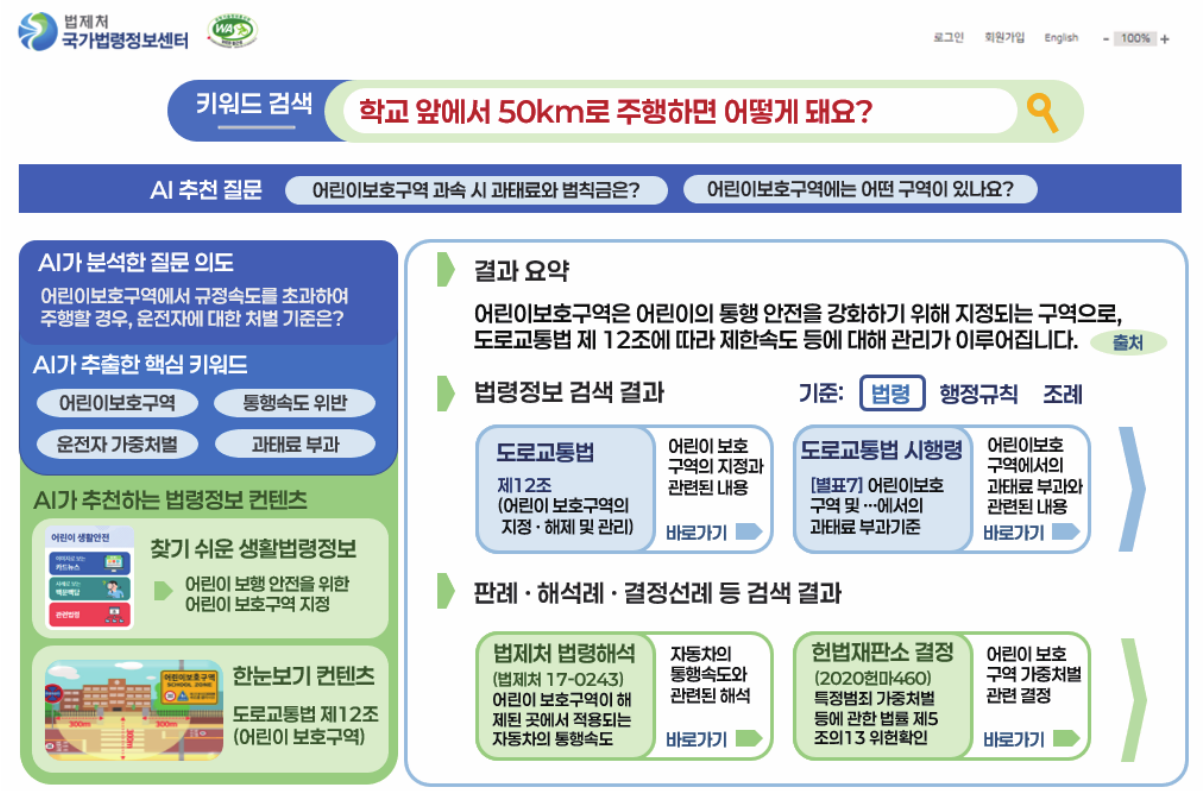
From Intelligent to Generative: The Next Leap in Legal Search

Regarding the AI Legal Information Search System, the public has called for more comprehensive legal information, such as court rulings and administrative interpretation cases, and for better guidance on how to search. In addition, the hallucination risk inherent in generative AI and variations in data quality are recognized as challenges to be addressed going forward.

To overcome these limitations, MOLEG plans to advance the system in the following directions.

< Example Screen of the Generative AI Legal Search Service >





Source: Materials on the Generative AI Legal Search Service for the Public

- **Data enhancement:** Expand citizen-friendly data such as everyday law information and consultation cases, and integrate and refine statutes, court rulings, and administrative interpretation cases to strengthen customized services
- **Accuracy:** Minimize errors by combining a small language model specialized in law (sLLM) with RAG technology
- **User convenience:** Improve search guides and the user interface (UI) to create an environment accessible to everyone
- **Wider shared use:** Build a standardized AI legal information model and link it with other ministries' systems to expand its use across government administration

Under the roadmap, MOLEG will begin building the generative AI–based legal information service in 2026 and launch a public service with summarizing and organizing functions in 2027. In 2028, it plans to develop it into a next-generation public service through which anyone can use legal information more easily and accurately, by expanding training data, advancing the language model, and extending the service to a mobile app.

Organization	Ministry of Government Legislation
Department	National Law Information Center
Service Launch	December 2024 (Phase 1); December 2026 (Phase 2, pilot service)
Budget (2024–2026)	KRW 5.3 billion (KRW 1.5 billion in 2024; KRW 500 million in 2025; KRW 3.3 billion in 2026)

Application Area	Public Services
Service Type	Q&A
Technology Type	Language Intelligence

Key Summary: AI Legal Information Search System

Category	Key Details
AI Model Selection and System Configuration	• Intent-aware search: Built a system that recommends similar statutes based on context rather than simple word matching, by applying an embedding model that identifies the intent of user questions • RAG (planned): To prevent hallucinations in the generative AI to be introduced, retrieval-augmented generation (RAG) technology, which first finds supporting evidence before answering a question, will be applied
Data Acquisition and Utilization	• Diverse data: AI trained on 20,000 Q&A datasets collected from the Korea Legal Aid Corporation, private portals, and other sources • Data integration and shared use: A one-stop information system integrating search coverage of not only statutes but also administrative rules (20,000) and appended tables and forms (38,000)
Quality Improvement and Operation/Enhancement Plans	• User convenience: Creating an environment accessible to everyone by improving search guides and the user interface (UI) • Generative AI: Aiming for hallucination-free answers by introducing a generative AI model and applying a RAG search system

Appendix 1: Expert Recommendations

Hwi-woong Jung | Director, 42Maru

The fundamental challenge facing legal search services is that it is difficult for people to find, on their own, the legal provisions that precisely fit their specific circumstances. Therefore, rather than simply advancing search technology, careful consideration must first be given to how to understand and define the context of the questions people ask, from their perspective.

In actual civil service settings, the boundary between law and administrative programs is often unclear. Many people search with vague hopes of finding help, without being able to tell whether their problem requires a legal judgment or can be resolved through an administrative support program.

Given this reality, a truly meaningful AI legal search system needs to go beyond simply listing the legal information it holds. It requires an approach that identifies not only the surface expressions of the questions people enter but also the real problems and context behind them, and analyzes in depth not “the information the provider can offer” but “the direction for resolution that users actually need.”

Kilkon Ko | Professor, Graduate School of Public Administration, Seoul National University

The effort of the AI Legal Information Search System to improve public access to the law is very positive, but I would like to suggest areas to address in advancing it. The core of a legal information service lies not in simply displaying individual provisions but in analyzing the intricate relationships between laws, such as the hierarchy of higher and lower laws, the relationship between general and special laws, and the principle that newer laws take precedence, and clearly indicating to users which law should apply first.

The RAG (retrieval-augmented generation) technology adopted in the system should be advanced beyond simple information retrieval toward precisely prioritizing information based on this legal logic. Given that commercial private-sector models already provide fairly good answers through web search and source citation, the ability to curate context-appropriate answers by identifying the multidimensional links between laws, rather than simply listing search results, is essential for a public system to demonstrate distinctive usefulness.

In future development, by focusing on qualitative enhancement rather than quantitative expansion of data, and by dramatically improving service quality to the level of identifying the intent of users’ questions and interpreting which laws matter more among vast amounts of legal information, the service will finally be able to establish itself as a next-generation legal service that provides real help to the public.

Yong-min Park | Team Leader, LG AI Research

MOLEG’s Generative AI Legal Search Service is regarded as a meaningful case in that it goes beyond simply improving search technology to redesign access to complex legal information around users. Complementing the limitations of conventional keyword matching and enabling people to grasp the context of laws in everyday language through generative AI represents real progress in the use of public data.

These achievements will become even more valuable when they function not only as a public service but as infrastructure for the industrial ecosystem as a whole. Private generative AI services

currently struggle to generate accurate answers due to the complexity of the legal system and ambiguity in interpretation, which undermines trust in these services. As a result, there are quite a few cases in which the use of generative AI is constrained in highly regulated industries.

With this in mind, if MOLEG considers enabling external generative AI services to reference the legal lookup function of its AI Legal Information Search System, it could help improve the accuracy and reliability of AI services across industries.

Appendix 2: Interview with the Project Officer

Seon-woo Ha | Deputy Director, Statutory Data Innovation Team, Ministry of Government Legislation

Q. Did you face any difficulties or challenges in the service planning stage (project launch and initial adoption)?

A. It is important to clearly set project goals and a service scope suited to the characteristics of each ministry before launching a project. MOLEG set the goal of enabling the public to search for the legal information they need easily and accurately, and defined the project scope so as not to violate Article 109 of the Attorney-at-Law Act (prohibiting non-attorneys from handling legal affairs such as consultations on cases). Accordingly, we designed the service to search for and provide objective legal information, excluding solutions for specific cases.

Q. What budget and organizational support systems are in place, or needed, for sustainable project advancement?

A. To innovate legal search services using AI, we formed a dedicated team (the Statutory Data Innovation Team, February 2022) using MOLEG's total payroll budget, and, reflecting the need for national policy implementation and a permanent operating organization, we also pursued its establishment as a regular organization (the National Law Information Center, scheduled for January 2026). In addition, by actively explaining and consulting with the fiscal authorities from the budget request stage, we were able to secure the budget for the ISP and the main project. I also think that pursuing projects through the Ministry of Science and ICT's public AX project call for proposals could be another option.

Q. What efforts are you making to secure data for building an agency-specific AI service?

A. In addition to the data it holds as the original producer of legal data, MOLEG has collected various consultation cases held by related institutions and used them for training. We also plan to build our own data needed for training in the legal field as we develop the generative AI legal search system.

Q. Were there specific criteria or reasons for selecting the AI model, and were there any related security issues?

A. For the generative AI legal search system, scheduled to begin in 2026, we plan to analyze, compare, and validate various AI models to develop a model optimized for the legal field. We also plan to ensure an appropriate level of security by building information resources in a cloud environment that has completed a security review, and to put in place guardrails to prevent misuse and abuse of the legal AI model.

Q. Please describe any other key considerations during implementation or challenges you overcame.

A. As AI technology develops and changes rapidly, public expectations for it have also risen considerably. Within MOLEG, we are continuously considering how to ensure that the results of projects using generative AI meet these public expectations. To this end, we are reviewing key checkpoints through meetings and networks with academia and private legal tech companies, and we plan to carry out the project to build the generative AI legal search service based on these discussions.

AI in Korean Government : A Casebook of Public-Sector AI Services

NIA Digital & AI Insights Series #5 | Volume.2

Published by | Ministry of the Interior and Safety
National Information Society Agency

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Korean edition | March 25, 2026

English edition | November 11, 2026

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LLM (Large Language Model) technology was partially utilized in the translation process of this report.