ISSN: 3022-5388
JKAIA website: https://accesson.kr/jkaia
DOI: http://doi.org/10.24225/jkaia.2025.3.2.27

A Study on AI(Artifiacial Intelligence) Utilization Cases and Performance Analysis in Domestic Public Institutions

Yushin KIM[1]

Received: December 22, 2025. Revised: December 22, 2025. Accepted: December 28, 2025.

Abstract

Following the Fourth Industrial Revolution and the COVID-19 pandemic, digital transformation in the public sector has become a necessity, not an option. This study systematically analyzes the use of artificial intelligence (AI) in domestic public institutions to identify the outcomes and success factors of AI adoption in public administration. Focusing on public institutions under the Gyeonggi Province government, the study analyzed empirical cases across five key areas—corporate support, administrative innovation, and industrial ecosystem development—and found that AI technology produced both quantitative and qualitative results, including a more than 40% reduction in processing time and a dramatic improvement in citizen service accessibility. This study suggests a phased and strategic approach, active participation from top management, user-centered design, and integration with existing systems as key success factors for public AI adoption, offering practical implications for developing future digital transformation strategies for domestic public institutions.

Keywords: Artificial Intelligence (AI) Policy, AI Governance, AI Regulation, National Security & Technology Policy, US AI Policy

Major Classifications: Artificial Intelligence (AI) Policy

1. Introduction

1.1. Background and Purpose of the Study

The acceleration of the Fourth Industrial Revolution and the COVID-19 pandemic have triggered a global digital transformation in the public sector. The Korean government is actively promoting the use of AI in the public sector through the "Digital Government Innovation Development Plan (2020)" and the "K-Digital Strategy (2020)". In particular, the emergence of generative AI is fundamentally shifting the administrative paradigm.

AI utilization in the public sector can be broadly categorized into four axes: ▲Improving citizen services ▲Policy decision support ▲Work automation ▲Predictive analytics. These changes are no longer a future possibility but a present reality, and examples are emerging that demonstrate the potential of AI innovation beyond the private sector, even in public institutions.

This study systematically analyzes actual AI adoption cases in domestic public institutions. Its purpose is to evaluate the performance of AI in public administration and identify key factors for successful adoption. Through this, it aims to provide a practical benchmarking model for other local governments and public institutions to develop digital transformation strategies.

1.2. Research Scope and Methodology

This study analyzes AI implementation cases implemented since 2020, focusing on public institutions under the Gyeonggi Province. The research method involved a combination of literature review and case studies, and included an in-depth analysis of empirical cases in five key areas: corporate support, administrative innovation,

* This study was supported by the research grant of the KODISA Scholarship Foundation in 2025.
1 First Author. Team Leader, Corporate Ombudsman Team, South Korea. Email: kyslhk@gbsa.or.kr

industrial ecosystem development, public service improvement, and intra-organizational collaboration innovation.

Furthermore, through a comparative analysis with advanced overseas cases from countries such as Singapore, Estonia, and the Netherlands, the direction of domestic public AI adoption and policy implications were identified.

2. Theoretical Background and Previous Research

2.1. Digital Government and the Role of AI

Digital government aims to utilize information and communication technologies to enhance government efficiency and provide better services to citizens (Gil-García et al., 2018). AI is a key technology for implementing digital government, demonstrating exceptional performance in rapidly processing large amounts of data, analyzing patterns, and building predictive models. In particular, the emergence of generative AI (Generative AI) is opening up new possibilities for public administration, such as natural language processing, automated consultation, and personalized service provision (Sun & Medaglia, 2019). Generative AI goes beyond simple data analysis to support creative tasks, enabling qualitative improvements in public services.

2.2. International Trends in AI Adoption in the Public Sector

Singapore has been leading the way in AI-based public services, with continuous investment for over a decade through its "Smart Nation" strategy (2014). Estonia has successfully implemented AI-powered e-government through its "e-Estonia" program, with 99% of public services now provided online.

Conversely, the failure of the Netherlands' AI welfare claim review system highlights the risks of implementing AI without citizen participation. This highlights the essential elements of transparency, participation, accountability, and inclusiveness when implementing public AI.

2.3. Review of Previous Research

Previous research on AI adoption in the domestic public sector has primarily focused on suggesting policy directions (Lee Seok-hee, 2021) or exploring technological feasibility (Kim Seong-tae et al., 2020). In-depth and systematic analyses of actual implementation cases are relatively lacking. This study aims to address this research gap by empirically analyzing the performance and success factors of AI systems in operation.

3. Analysis of AI Utilization Cases in Domestic Public Institutions

3.1. Business Support Area: AI Gyeonggi Business Secretary Platform

3.1.1. Overview

The AI Gyeonggi Business Secretary is a generative AI-based customized business support platform developed by a public institution under the Gyeonggi Province Government. It is the first public AI service introduced nationwide. This platform is designed to enable businesses to quickly access various support policies, including funding, technology, and exports, through AI search, and even enable batch applications.

3.1.2. Core Technology and System Architecture

The AI Gyeonggi Business Secretary is centered around a deep learning-based matching algorithm. By learning policy data and company-owned data, the system automatically recommends optimal support programs for each company. Key features include:

- Customized Support Program Matching for Businesses: Automatic recommendation logic is applied based on company type (startup/manufacturing/export) to derive optimal support programs for each company.
- AI-based Personalized Policy Recommendation: Comprehensively analyzes a company's past consultation history, participating projects, and financial structure to prioritize "projects with high support potential."
- 24-Hour Generative Consultation: Automatically processes civil complaints, business inquiries, and document guidance, and responds to corporate inquiries in real time even outside of business hours.
- One-Click Application for Support Programs: Integrates with internal ERP and corporate support systems to automate the entire process, from consultation to matching and application.

3.1.3. Results and Significance

Quantitative results include a doubling of the processing speed for corporate inquiries, and increased corporate satisfaction, leading to a decrease in civil complaints. Qualitatively, the system demonstrates the feasibility of "personalized policy services" through generative AI in the public sector. This case study is recognized as a pioneering example of an AI-based administrative innovation model

that structures policy and support data. In particular, its ability to provide personalized recommendations by learning support project and corporate information through deep learning serves as a key competitive advantage.

3.2. Administrative Innovation: Paperless Accounting

3.2.1. Overview and Background

A public institution under the Gyeonggi Province government has become the first public institution in Korea to fully digitize its entire accounting process based on electronic documents. This system, the only one implemented among the 25 institutions under the Gyeonggi Province government, is recognized as a leading model of administrative innovation that completely eliminates paper documents throughout the entire accounting process.

3.2.2. System Structure and Key Strategies

Key features of paperless accounting include the following:

- Electronic Approval – Full ERP Integration: By digitizing all approval processes and integrating them in real time with the ERP system, data duplication is eliminated and processing speeds are improved.

- Automatic Tax Invoice and Corporate Card Verification System: Manual verification work is completely eliminated, and an automated data collection and verification system is in place. - Automatic notifications during contract review stages: Automatically tracks contract deadlines and sends notifications to prevent missing work.

- Real-time accounting data verification: Real-time data integrity is checked to preemptively prevent errors.

3.2.3. Performance Analysis

Quantitatively, approval and accounting processing times have been reduced by more than 40%. Tasks that previously required two to three days for expenditure approval can now be completed with a simple search. The speed and transparency of budget execution have been significantly improved, and traceability has been maximized with all processes digitally recorded.

This case study addresses the fundamental problems of paper-based administration (delays, errors, and lack of traceability) and establishes a new standard for public sector administrative innovation by presenting a fully automated accounting model based on AI technology and digital documents.

3.3. Regional and Industrial Innovation: AI Demonstration Support Project

3.3.1. Project Overview

Public institutions under Gyeonggi Province are working with the province to support local AI companies in testing their technologies in real-world environments and enhancing their marketability through the "AI Demonstration Support Project." A total of 26 companies participated in the 2025 project, demonstrating AI technologies in various fields, including manufacturing, robotics, and bio-healthcare.

3.3.2. Key Demonstration Cases

- Habib's 'AI Patent Application Assistant': Supported small and medium-sized enterprises (SMEs) in securing intellectual property rights by shortening the patent preparation process from one month to one day.

- Chung-Ang University Gwangmyeong Hospital's AI endoscopic lesion detection technology: Supported real-time lesion detection, improving the accuracy and speed of medical diagnosis.

- All AI's AI technology in collaboration with Hyundai Engineering & Construction: Applied AI technology for safety management and process optimization at construction sites.

- West Moon's HD Hyundai Samho forklift driving safety AI assistance system: Contributed to the prevention of industrial accidents. 3.3.3 Ecosystem Achievements and Significance

Approximately 100 participants, including venture capitalists and accelerators, attended the "2025 Gyeonggi Province AI Demonstration Support Project Results Presentation" held on November 14, 2024, sharing their achievements. Some companies secured collaboration opportunities with global companies such as Hyundai and NVIDIA.

By establishing a public-private-industrial linkage structure, this project demonstrated that the public sector can serve as a platform to accelerate the commercialization of AI technology. By providing a platform for technology demonstrations, it facilitated the market entry of AI companies and fostered innovation in the local industrial ecosystem.

3.3.3. Ecosystem Achievements and Significance

Approximately 100 participants, including venture capitalists and accelerators, attended the "2025 Gyeonggi Province AI Demonstration Support Project Results Presentation" held on November 14, 2024, sharing their achievements. Some companies secured collaboration opportunities with global companies such as Hyundai and NVIDIA.

This project demonstrated that the public sector can serve as a platform for accelerating the commercialization

of AI technology by establishing a public-private-industry linkage structure. By providing a platform for technology demonstration, it facilitated the market entry of AI companies and fostered innovation in the local industrial ecosystem.

3.4 Public Service Innovation: AI Challenge Program

3.4.1. Program Overview

The AI Challenge Program identifies AI technologies suitable for solving public sector problems and establishes a public AI diffusion model through technology demonstration and case studies. This program connects companies with AI technology capabilities with cities, counties, and public institutions in the province, providing opportunities for field demonstrations.

3.4.2. Key Strategies and Tasks

Public institutions under Gyeonggi Province utilize a proprietary AI-based intelligent matching platform to provide customized technology matching services between demand agencies and suppliers. In 2025, the program conducted two rounds of bidding, with projects selected across three areas: administrative services, safety, and welfare.

The key projects selected are as follows:

- AI-based 119 Call Reception and Situation Analysis: Supports rapid classification and response to emergency reports.
- AI Welfare Call: Automates responses to vulnerable populations, eliminating blind spots in welfare services.
- Generative AI 24-Hour Civil Complaint Chatbot: Improves citizen accessibility and enables 24-hour civil complaint processing.

3.4.3. Significance and Achievements

This program presents a model that reduces the "procedural difficulties and organizational resistance" associated with AI adoption in public services. By establishing a structure that can be readily utilized across a wide range of public sectors (safety, administration, and welfare), it accelerates the application of AI technology to public services. This problem-solving public AI model connects local governments and public institutions with AI companies to demonstrate their solutions. Based on a technology matching platform, it improves the accuracy of matching between suppliers and demanders, thereby supporting efficient AI adoption.

3.5. Innovating Collaboration Within the Organization: NHN Duray Collaboration Tool + NHN Cloud Conversion

3.5.1. Background and Process of Implementation

Gyeonggi Province-affiliated public institutions implemented the NHN Duray collaboration tool company-wide over an eight-month period from October 2023 to June 2024. Currently, over 600 active accounts are in operation, and separate accounts are also maintained for external users, such as companies and project partners.

3.5.2. Core Strategies and System Integration

- Collaboration Tool Integration: Work fragmentation was eliminated by integrating groupware, messengers, and electronic approval.
- System Integration: Electronic approval was completely migrated through ERP (Younglimwon Softlab) integration. This was achieved after a six-month functional improvement process. - Work Automation: Automated contract review notifications were implemented, and deadline tracking was automatically implemented.
- Cloud Migration: Over 20 key information systems, including the main website, were migrated to NHN Cloud in April 2024.

3.5.3. Results and Implications

The introduction of collaboration tools reduced work time, and over 600 active accounts are currently in operation. The cloud migration significantly reduced the rate of service outages and significantly improved system stability and security.

This case study led to fundamental changes in the collaborative culture within public institutions and provided a model for organizational culture transformation, which is crucial in the early stages of digital transformation. Beyond the introduction of technology, it also generated qualitative results, including improved digital literacy among organizational members and fostering a work-oriented, innovative atmosphere.

4. Results Analysis of Public AI Implementation

4.1. Quantitative Results

Table 1 summarizes the quantitative results of the cases analyzed in this study.

Table 1: Quantitative Results of AI Implementation in Public Institutions

Category	Accounting and Approval Processing	Corporate Inquiry Processing	Participation in AI Demonstration	Collaboration Tools
Quantitative Results	More than 40% Reduction	More than Doubled Speed	26 Companies Participated, Patent Processing Time Reduced (From 1 Month to 1 Day)	More than 600 Active Accounts

AI implementation resulted in an average increase of more than 40% in processing speed, and in some areas, a dramatic increase of more than doubled processing speed. In particular, patent application processing was shortened from a month to a day, demonstrating the potential of AI to maximize administrative efficiency.

4.2. Qualitative Results

In addition to quantitative results, the following qualitative changes were observed: - Organizational Culture Innovation: Digital literacy was promoted, and a practice-oriented, innovative atmosphere was strengthened.

- Service Quality Improvement: 24-hour consultations improved accessibility for businesses and citizens, facilitating the exploration of customized policies. - Enhanced Transparency and Reliability: The electronic document-based records system enabled real-time verification, enhancing administrative transparency and reliability.

- Expanded Citizen-Centered Services: Individualized policy recommendations and customized consulting services improved citizen satisfaction.

5. Analysis of Success Factors

5.1. Phased and Strategic Approach

The case of a public institution under Gyeonggi Province demonstrates a phased strategy: introduction of collaboration tools → AI adoption → cloud migration → establishment of a verification ecosystem. This approach minimized organizational resistance and effectively enhanced stage-by-stage maturity.

By introducing technology in stages rather than a radical transition and allowing sufficient time for organizational members to adapt at each stage, sustainable innovation was achieved.

5.2 Active Participation of the CEO and Staff

Training led by the institution head and operating a dedicated onboarding team were key drivers in ensuring the entire organization shared the direction of change and actively participated. The likelihood of successful AI adoption increases when strong commitment from top management is combined with active cooperation from staff.

5.3. User-Centered Service Design

Policy matching based on corporate demand analysis and feedback-driven functional improvements are key to user-centered design. Service design that reflects users' actual needs, rather than focusing solely on technology, is a prerequisite for successful AI adoption.

5.4. Integration with Existing Systems

Full integration with ERP, electronic approval, and tax invoice systems ensures that AI systems do not operate independently but are seamlessly integrated into existing work processes. This enhances user convenience and increases the system's practical usability.

5.5. Collaboration with External Experts

Partnerships with private companies such as NHN and Younglimwon enable public institutions to leverage specialized technologies and experience that may otherwise be difficult to acquire on their own. Public-private collaboration is a crucial strategy for enhancing the efficiency and success of public AI adoption.

6. Future Development Tasks

6.1. Advancing AI for Data-Driven Policy Prediction and Analysis

Current AI utilization is primarily focused on task automation and matching services. Future development requires the development of advanced AI systems that can predict policy effects and analyze optimal policy combinations based on accumulated data.

6.2. Strengthening AI Ethics and Privacy Protection

As AI systems expand, ethical issues and privacy protection become increasingly important. Institutional mechanisms must be strengthened, including ensuring algorithm transparency, preventing bias, and mandating Privacy Impact Assessments (PIAs).

6.3. Expanding Inter-Agency Data-Linked

Services

Currently, AI is primarily utilized by individual agencies, but this should evolve to provide integrated public services by linking data across agencies. To achieve this, data standardization and interoperability are essential.

6.4. Strengthening Employee Digital Capacity

For the successful operation of AI systems, strengthening the digital capacity of public sector employees is essential. Continuous education and training are essential to foster the ability to understand and utilize AI technologies.

7. Policy Implications and Recommendations Based on International Cases

7.1. Adoption of the "AI First" Principle

A key success factor in leading AI-using countries such as Singapore and Estonia is their mandatory prioritization of AI utilization for all new digital government projects. Domestic public institutions should also adopt the "AI First" principle and shift their policy direction to make AI the default.

7.2. Creating a Culture of Tolerance for Failure

As the Dutch case demonstrates, hiding failure leads to greater disaster. Establishing a culture where failure is acceptable for 50% of pilot projects and incorporating learning from failure into evaluations should encourage innovative attempts.

7.3. Mandatory Citizen Participation

A key factor in the failures of Chicago and the Netherlands was citizen exclusion. High-risk AI systems (e.g., welfare eligibility assessments, policing) should undergo mandatory citizen impact assessments to ensure AI functions as a tool for citizens.

7.4. Strengthening International Cooperation

AI is a technology that transcends borders, so an isolated approach is ineffective. International cooperation should be strengthened, including by implementing the OECD AI Principles, adhering to UNESCO's AI ethics recommendations, and regularizing AI policy dialogue with neighboring countries (Japan and Singapore).

7.5. Sustainable Investment

Singapore's Smart Nation initiative, launched in 2014, has achieved results through 10 years of sustained investment. Rather than a one-off project, we must establish a long-term investment plan spanning 10 years or more to build a sustainable AI ecosystem.

8. Risk Factors and Response Strategies

Table 2 summarizes the risks and response strategies that may be encountered when implementing public AI.

Table 2: Risk Factors and Response Strategies for Implementing Public AI

Risk Factor	Likelihood	Impact	Response Strategy
Insufficient Data Quality	High	High	Strengthened Data Governance, Quality Incentives
Public Official Resistance	Very High	High	Change Management Program, Encourage Early Participation
Privacy Infringement	High	Very High	Mandatory Privacy Impact Assessment (PIA)
Algorithm Bias	Medium	High	Fairness Audit, Diverse Development Team
Budget Shortage	Medium	Medium	Phased Investment, Private Sector Collaboration
Technology Dependency	Low	Medium	Prioritize Open Source, Foster Sovereign AI

Public official resistance, in particular, is highly likely and impactful. Therefore, it should be proactively addressed through change management programs and early engagement. Privacy infringement carries a significant impact, so mandatory privacy impact assessments should be implemented to preemptively mitigate risks.

9. Conclusion and Recommendations

9.1. Summary of Research Results

This study systematically analyzed AI use cases in domestic public institutions and drew the following conclusions.

First, it demonstrated that domestic public institutions are capable of AI innovations surpassing those of the private sector. Case studies such as the AI Business Secretary and paperless accounting administration presented a new administrative paradigm: generative AI business support, a 40% reduction in administrative tasks, and 24-hour public consultation.

Second, it confirmed that a phased and strategic approach, active participation of top management, user-centered design, integration with existing systems, and

collaboration with external specialized companies were key success factors for public AI adoption.

Third, the AI Demonstration Support Project and the AI Challenge Program demonstrated that the public sector can serve as a platform for accelerating the commercialization of AI technology by establishing an AI ecosystem that seamlessly integrates AI demonstrations, business incubation, and policy services.

9.2. Theoretical and Practical Implications

This study, an empirical study on AI adoption in public administration, goes beyond existing policy-oriented research and makes theoretical contributions through in-depth analysis of actual operational cases. Furthermore, it has significant practical significance in that it presents a practical benchmarking model that can serve as a reference for other local governments and public institutions adopting AI in the future.

9.3. Policy Recommendations

AI in the public sector is no longer a future possibility; it is a present reality. The cases analyzed in this study demonstrate that AI can make government more efficient, accessible, and responsive.

However, technology itself is not neutral. AI can either strengthen or weaken existing power structures. The key is who designs and operates AI, for what purpose, and how.

Countries that have successfully utilized AI to date have implemented the following four principles:

- Transparency: Disclosure of how algorithms work.
- Participation: Reflecting the voices of affected citizens.
- Accountability: Establishing mechanisms to correct mistakes.
- Inclusiveness: Designing AI to benefit all citizens. By developing public AI under these principles, technology will function as a tool for citizens, and a truly smart government can be realized.

9.4. Limitations of the Study and Future Research Directions

Because this study focused on the case of public institutions under the Gyeonggi Province jurisdiction, generalizing the results to all public institutions is limited. Future research encompassing cases from various public institutions, including the central government and other local governments, is needed.

Furthermore, while this study comprehensively analyzed quantitative and qualitative outcomes, it did not conduct longitudinal studies on long-term impact. Follow-up studies are needed to examine sustainability and long-term effects three and five years after AI implementation.

Finally, in-depth research on qualitative aspects such as AI ethics, algorithmic bias, and citizen participation remains a future task. These topics are key factors in determining the social acceptance and sustainability of public AI, and therefore, further research through an interdisciplinary approach is anticipated.

References

Gyeonggi Province. (2025, July 14). *Gyeonggi Province to promote second public sector competition for AI-based solutions to public social issues* [Press release].

Gyeonggi Province Economic and Science Promotion Agency. (2024). *2024 Gyeonggi Province R&D support project performance analysis report*. Gyeonggi Province Economic and Science Promotion Agency.

Kim, S.-H., & Lee, J.-H. (2024). A study on the application of generative AI to public services. *Korean Journal of Public Management, 38*(2), 45–72.

Lee, S.-J., & Kim, M.-S. (2024). Analysis of barriers to digital transformation in the public sector. *Korean Public Administration Review, 33*(1), 123–150.

Park, H.-J., Kim, M.-S., & Lee, S.-J. (2023). A study on success factors for the introduction of artificial intelligence in public institutions. *Information Society and Media, 24*(3), 89–118.

Brennen, J. S., & Kreiss, D. (2016). Digitization. In K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley, & R. T. Craig (Eds.), *The international encyclopedia of communication theory and philosophy* (pp. 1–11). John Wiley & Sons.

Cordella, A., & Paletti, A. (2019). Government as a platform, orchestration, and public value creation: The Italian case. *Government Information Quarterly, 36*(4), Article 101409. https://doi.org/10.1016/j.giq.2019.101409

Janowski, T. (2015). Digital government evolution: From transformation to contextualization. *Government Information Quarterly, 32*(3), 221–236. https://doi.org/10.1016/j.giq.2015.07.001

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly, 36*(4), Article 101385. https://doi.org/10.1016/j.giq.2019.06.002

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems, 28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003