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11th APPeN – Bhutan

Digital Transformation and Procurement
- Policy Updates and Trends

Innovation and Intelligence

Next-Generation KONEPS

(**K**orea **ON**-line **E**-**P**rocurement **S**ystem)

Bongki SHIN

Deputy Director

International Cooperation Division

Public Procurement Service

ADB

Public Procurement Service

Public Procurement Service



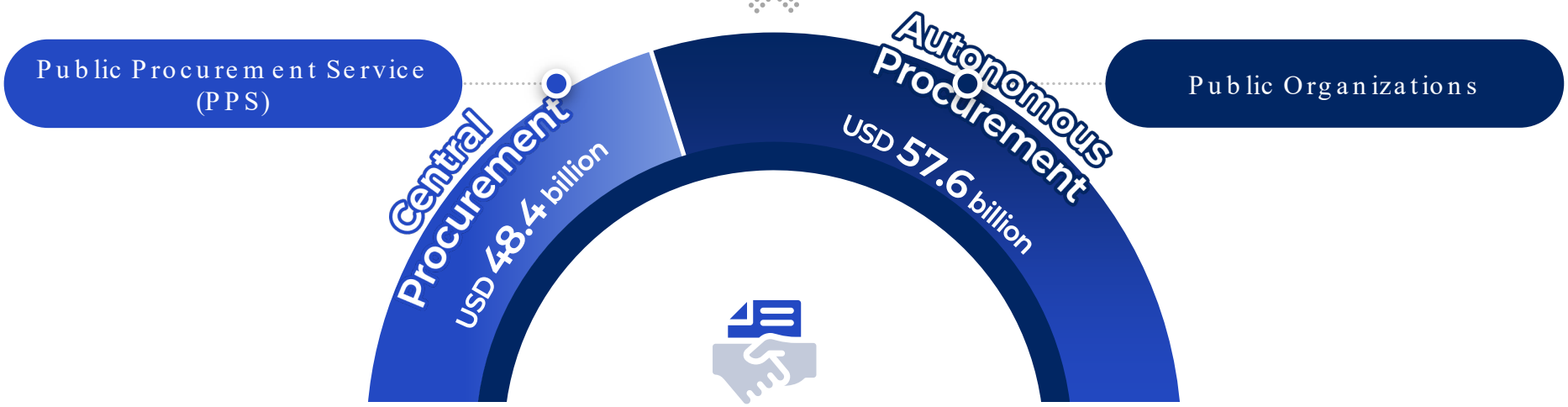
Chapter 1 Overview of KONEPS

KONEPS

Status of KONEPS Utilization (as of 2025)

The total annual volume of public procurement in Korea is approximately USD 174 billion

Of the total public procurement volume (USD 169B), **KONEPS** accounts for USD 106 billion (61%)



Usage Scale

- 75,000 public organizations
- Approximately 634,000 suppliers use the system

Annual Announcement / Bidding Volume

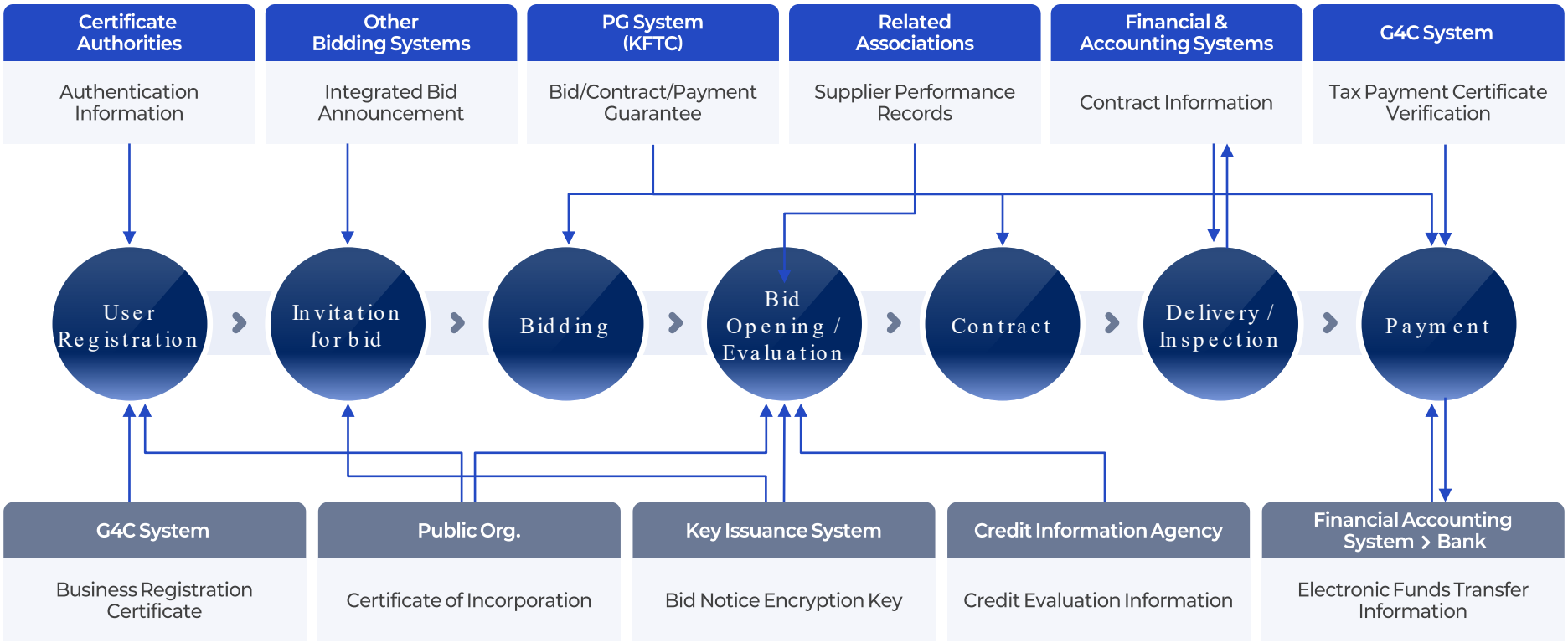
- 460,000 electronic bid notices per year
- **39.37 million bid participation**
- 275,000 electronic bidding processes
- 1.24 million electronic contracts

Scale of System Integration

- Currently integrated with 227 institutions and companies
  - 38 in 2002 → 141 in 2013 → 188 in 2023

KONEPS Integration

One-stop processing through integration with 227 external institutions



- **One-stop procurement services** enabled through integration with 227 external systems including the Ministry of the Interior and Safety, financial institutions, and relevant associations
- Documents repeatedly submitted during bidding and contracting such as business registration certificates, national tax clearance certificates, guarantees, qualification documents, and corporate registration records are **replaced with linked data**

Public Procurement Service

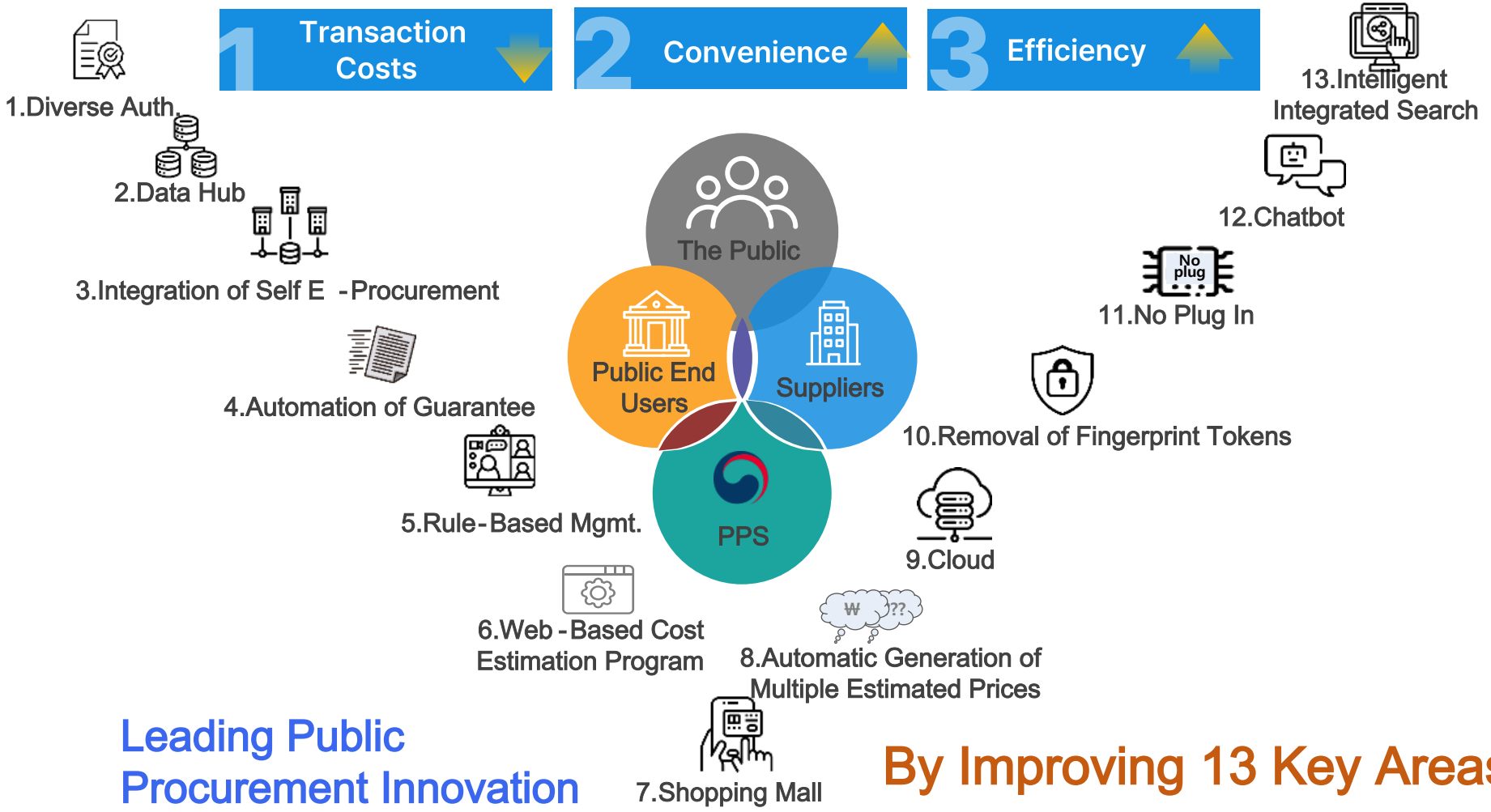


Chapter 2 Key Features of KONEPS

KONEPS

New KONEPS

What Has Been Different?



Leading Public Procurement Innovation

By Improving 13 Key Areas

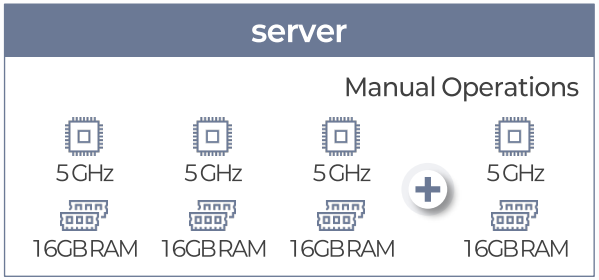
Cloud-Based Standard Platform for Public Procurement

Built on a cloud platform resistant to failures

As-Is

Traditional systems suffer from service delays and outages during usage spikes

1 Previously structured with large-scale physical servers



2 Manual Operations

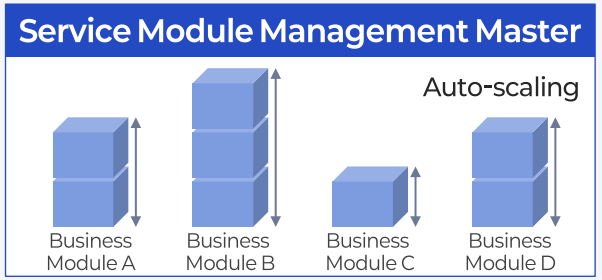
- Resource scaling relied on manual intervention during demand surges
- Unable to allocate or reclaim resources by individual service

- Server-level instance configuration caused service disruptions, as failures required manual handling for each server
- No capacity management by individual service in legacy systems

To-Be

Flexible response to traffic surges without service interruption

1 Configured as small-scale business service units



2 Auto-scaling

- Cloud platform based on modular business services
- Enables fine-grained resource management by individual service

- Modular architecture allows for segmented control at the service level
- Automatic scaling in and out of small-scale business service units
- Maximized resource efficiency through detailed capacity management per service

Resolves overload issues at specific peak times

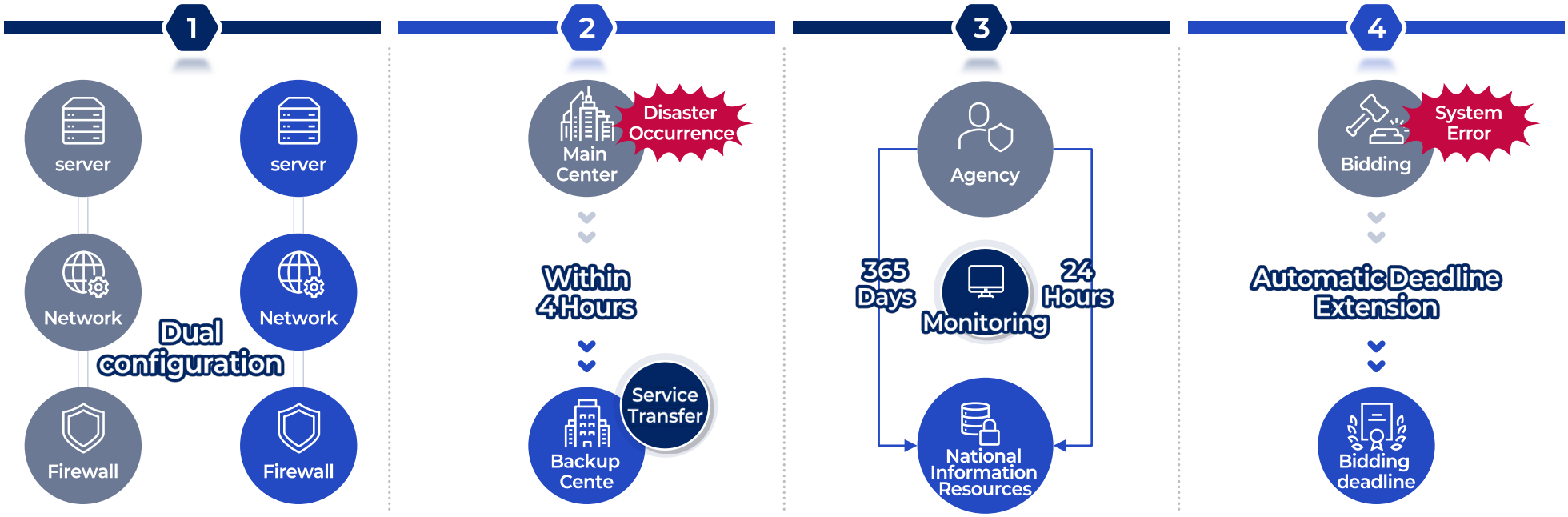
Automatically adjusts server resources in response to traffic surges or anomalies

Future-oriented cloud architecture optimized for KONEPS
(Dynamic resource allocation using Kubernetes containers)

※ Kubernetes: A management system that enables automated deployment, scaling, and operation of containerized applications

Stable Operation Measures for KONEPS

Ensuring service continuity and stability through equipment redundancy and emergency response systems



- Redundant setup for servers, network, and firewall
- Triple to quadruple redundancy for key systems

- In case of disaster at the main center (Daejeon), services are transferred to the backup center (Gwangju) within 4 hours

* Joint annual recovery drills with the National IT Industry Promotion Agency

- National Information Resources Service Monitored 24/7

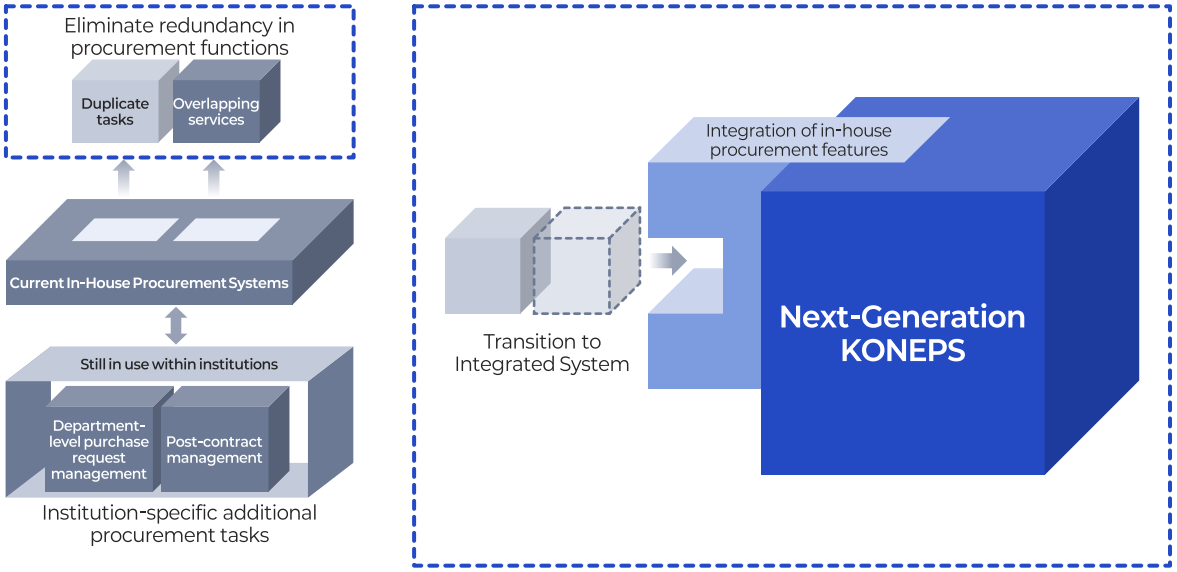
- If a bidding error occurs, the deadline is automatically extended

* Based on the Terms of Use for the National e-Procurement System

Integration of In-House Procurement Systems

Integration and unification into KONEPS

Target Vision



Reference: Planned schedule for institutional transition

Phase 1 (Jan. 2025)	– Kangwon Land, Incheon International Airport Corporation, Korea District Heating Corporation, SR Co., Ltd., Korea Institute of – Science and Technology, NIPA (6 institutions)
Phase 2 (First Half of 2025)	– Korea Railroad Corporation, Korea Minting, Security Printing & ID Card Operating Corporation (2 institutions)
Phase 3 (Second Half of 2025)	– KECO, KISTI, Korea National Oil Corporation, KERI, KEPCO KDN, LX, Korea Racing Authority, LH, K-water (9 institutions)
Phase 4 (From 2026)	– National Railroad Authority, Korea Expressway Corporation, KEPCO, KISA, KOICA, KOGAS (6 institutions)

Key Points

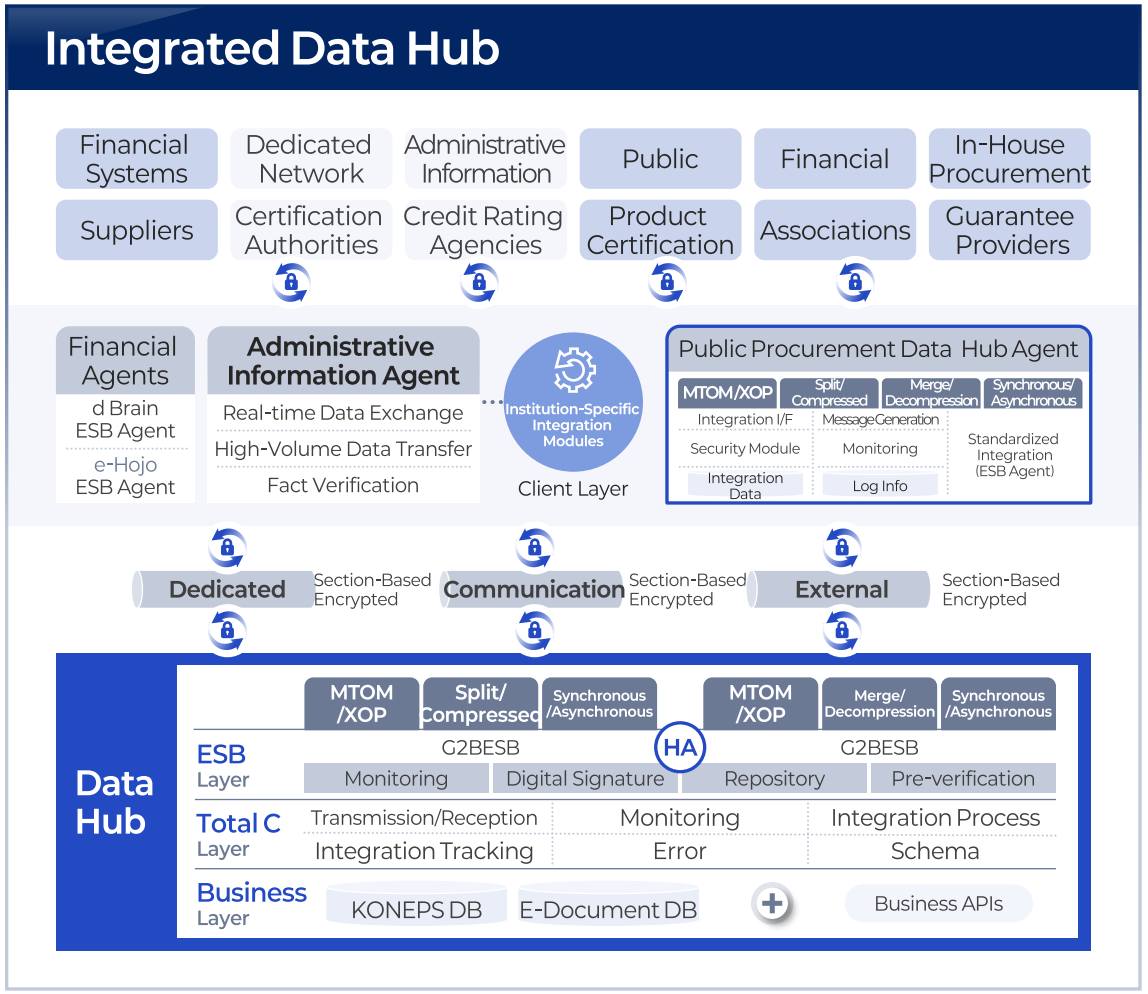
1 Integrated Public Procurement Platform for All

- Streamlined procurement access for improved convenience for suppliers
- Customized integration of overlapping procurement functions reduces system maintenance and operational costs
- Real-time disclosure of procurement information via KONEPS enhances fairness and transparency

2 Phased transition in progress

- Additional functions remain in-house but are linked with KONEPS to ensure business continuity.
- Minimizing trial and error through phased adoption tailored to each institution's needs

A single hub for all public procurement data



A next-generation system built

by integrating existing Open Portals, On-tong Procurement, Big Data, and Data Warehouse systems

1 Integrated Data Management

- Previously separate systems are unified to allow centralized access and utilization of data from various sources

2 User-Centered, Intuitive Interface

- Advanced data search, filtering, and visualization services
- Self-service BI for users to query and analyze unstructured data

3 Enhanced data openness and transparency

- Proactively opening public data for free and open use by all.

4 Data analysis and forecasting

- Insights for strategic decision-making using big data and AI analytics

Public Procurement Service



Chapter 3 AI+Digital Strategy

KONEPS

AI + Digital Strategy

Why Public Procurement Needs AI Transformation Now

Rapid Advances in AI Technology

Breakthroughs in Generative AI
- Improved context awareness, reasoning, and multimodal capabilities

Expansion of AI Agent Technology
- From simple Q&A → task execution and tool use

Growth of the Open-Source AI Ecosystem
- More diverse and capable high-performance models
  → Greater feasibility of in-house AI development

Acceleration of Government AI Policy

AI Basic Act Takes Effect (Jan. 22, 2026)
- Establish a national framework for AI development and use
- Accelerate AI adoption across the public sector

Advancing National AI Capabilities
- Build a government-wide AI common platform
- Develop sovereign AI foundation models

Launch of the National AI Strategy Committee
- Coordinate government-wide AI policies
- Advance the national AI Action Plan

Urgent Need for AI Transformation in Public Procurement

Growing Importance of Public Procurement
- KRW 238 trillion (9% of GDP)
- Up 6% YoY, an all-time high

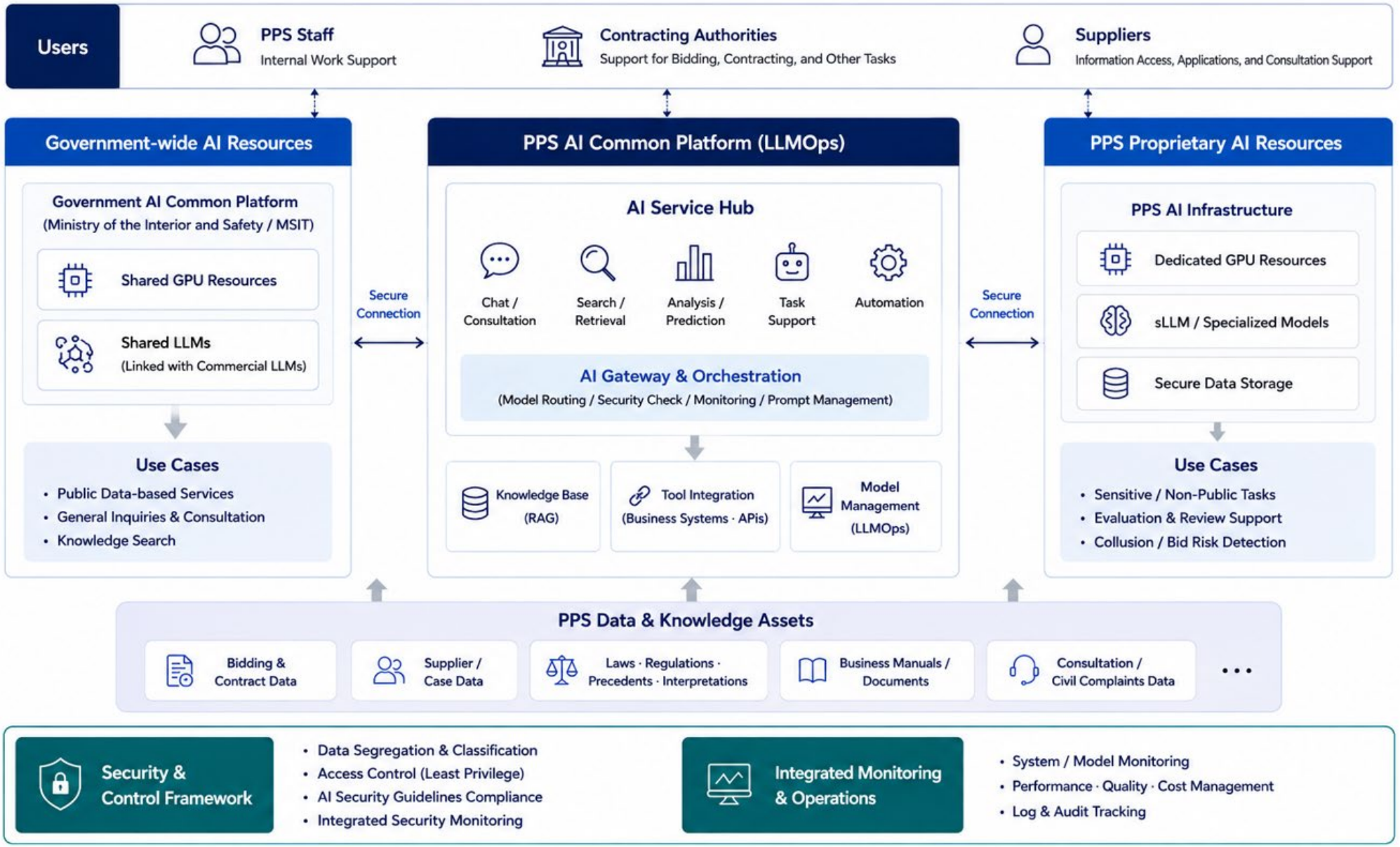
Increasingly Complex and Specialized Procurement Work
- Complex procurement laws and regulations
  → Growing workload for procurement officers

Expansion of AI-Based Public Services
- Growing demand from citizens and businesses for faster, tailored services
  → Need for proactive AI transformation in procurement administration

Redesign the entire public procurement process around AI → Drive AI Transformation (AX) in Procurement Administration

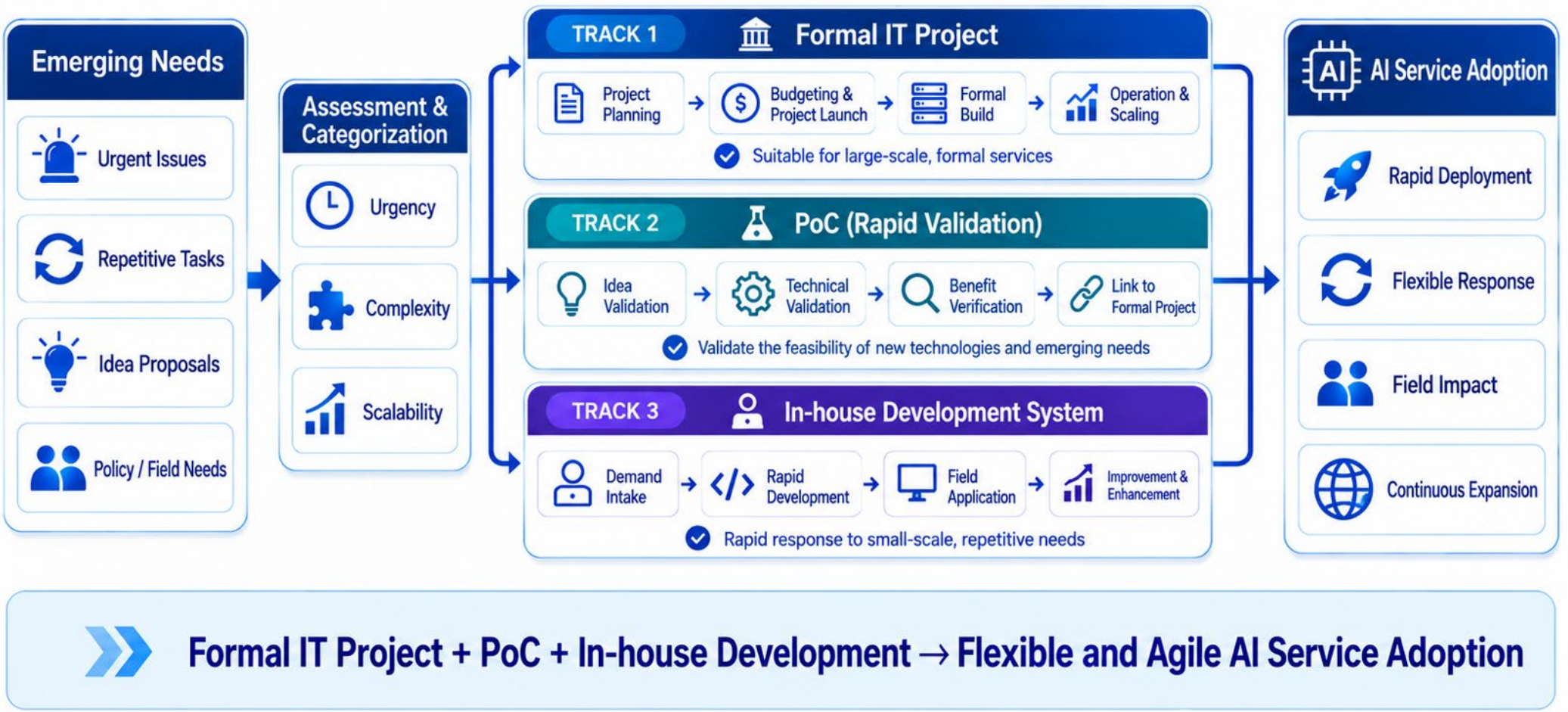
AI Adoption Strategy

PPS: Hybrid AI Architecture



AI Transformation Strategy

A Flexible and Agile Strategy for AI Transformation



Formal IT Project + PoC + In-house Development → Flexible and Agile AI Service Adoption

AI Service Case ① | In Service since March 2026

Procurement Advisory and Tailored Consulting

Current State (AS-IS)

Suppliers and procurement officers must directly search for and inquire about the information they need

Phone / Civil Petition Inquiries

- Make inquiries to project and operations officers by phone or submit civil petitions
- Detailed responses are limited, making it difficult to obtain the desired information

Face-to-face Consulting

- Consulting staff manually search for relevant regulations based on limited information
- Access to tailored consulting is limited, creating time and workload burdens

Future State (TO-BE)

A structure in which AI provides evidence-based consultation and tailored consulting

AI-Based Procurement Advisory

- Provide consultation on procurement systems and contract regulations through AI-based question answering
- Provide answers with supporting sources to improve speed, accuracy, and reliabiliity

AI-Powered Tailored Consulting

- Provide AI consultation based on supplier information, consultation history, and performance records
- Improve the professionalism and speed of consulting through personalized guidance

Provide faster and more accurate procurement services through AI-based procurement advisory and tailored consulting

AI Service Case ② | In Service since May 2026

AI-Based Price Research System

Current State (AS-IS)

When processing a new item notice, staff need to refer to similar past cases

* Comparison and review of dozens of item specifications per notice

- Excessive time and administrative effort
- Limited experience and domain knowledge on the item

Manual search for similar past notices (purchase cases)

Staff manually search previous notices based on the announcement text and review attached files such as specifications.

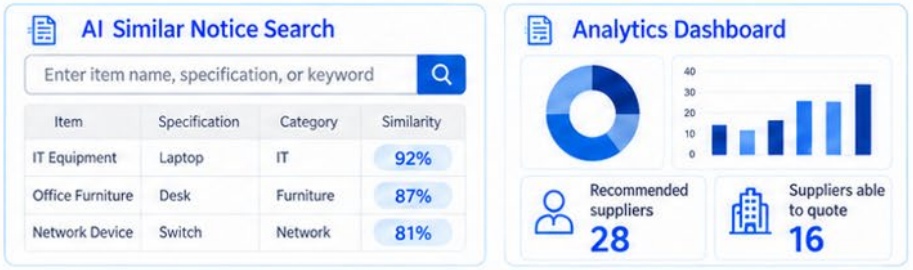
Requesting quotations based on subjective judgment

Staff subjectively determine suppliers' expertise and likelihood of participation before requesting qu tations.

Future State (TO-BE)

Use AI to identify similar purchase cases and recommend relevant suppliers

* Work processing support using LLMs



LLM-based Specification Summary and Notice Search Service

Use LLMs to extract and summarize key information from specifications, and search similar notices based on the summary.

Related Supplier Analysis and Supplier Information Service

Support securing quotations by identifying suppliers likely to participate in bidding.

Introduce an AI-based service for searching similar purchase cases and recommending suppliers for securing quotations.

AI Service Case ③ | In Development

AI-Based KONEPS Bid Notice Monitoring

Annual Target Notices: Total 620,000

Average Daily Monitoring: Approx. 2,300

Monitoring Coverage: Approx. 10% → 100%

Review Time: 50 min/case → within 3 min (about 94% reduction)

Current State (AS-IS)	
Monitoring Coverage	Partial inspections based on random sampling and specific themes due to staff shortages
Analysis & Identification	Staff manually review bid notices and judge possible legal violations based on experience
Timeliness	Manual review requires substantial analysis time, making it difficult to secure the golden time for correction requests before bid closing
Work Efficiency	Excessive administrative effort is spent classifying review targets among an average of 2,300 notices per day
Case Feedback	Correction cases are managed separately by each staff member, limiting data utilization to prevent recurrence of similar violations

Future State (TO-BE)	
Monitoring Coverage	AI-powered screening enables continuous monitoring of all bid notices
Analysis & Identification	An LLM-based model **automatically identifies** potential violations of national/local contract laws and unfair or restrictive clauses
Timeliness	Risk levels are calculated immediately upon notice posting, enabling correction and revision requests to procuring entities **in the shortest time**
Work Efficiency	Staff focus on high-risk notices preselected by AI, maximizing the **effectiveness of monitoring**
Case Feedback	Violation cases are database-driven, automatically reflected in the system, and can be **immediately fed back into training and guidance materials**

Through AI-based full monitoring, proactively detect possible legal violations and build a fair and trusted public procurement system

AI Service Case ④ | In Development

Automatic RFP Draft Generation

Reduced Drafting Time: From days to hours

Improved Document Quality: Consistent & High Quality

Higher Work Efficiency: Streamlined Process

Knowledge Accumulation: Reuse and Learn

Current State (AS-IS)	
Drafting Method	Manual drafting centered on templates and past documents
Drafting Time	Too much time spent reviewing each section, taking days to weeks
Document Quality	Variation in quality by drafter, with omissions and ambiguity
Work Continuity	Work is disrupted when staff changes, and history/comments are not well managed
Evidence & Utilization	Insufficient linkage to supporting evidence and inconvenient file use/conversion

Future State (TO-BE)	
Drafting Method	AI automatically generates first drafts based on templates and RAG, with a logical structure
Drafting Time	Generate first drafts from key inputs only, reducing drafting time from days to hours, and minimizing repetitive work
Document Quality	Apply standardized structure and automatic checks for omitted or ambiguous items, ensuring consistent and high-quality documents
Work Continuity	Integrated management of generation history and review comments, continuous use by successor staff, and accumulation of organizational knowledge
Evidence & Utilization	Link to supporting evidence, automatically flag items requiring review, and support various formats (HWP, DOCX, XLSX, PDF)

AI-powered automatic RFP draft generation enables faster, more consistent, higher-quality, and more efficient RFP drafting support

Lessons Learned: What Makes Intelligence Work

Four Enablers Others Need — intelligence is built on these, not on the model

01 Data Quality First

- Re-map legacy files (70.8% “unclassified”) to a new taxonomy
- AI-ready metadata to the national 29-field standard
- Quality built in at creation: auto-tagging, open formats

02 Governance

- Clear data ownership & accountability
- Make-or-buy by data sensitivity: shared gov’t AI vs. PPS-dedicated AI
- 3-track delivery (IT project · PoC · in-house) to scale what works

03 Security

- Sensitive data (evaluation, collusion risk) stays in-house on dedicated GPUs & sLLMs
- Access control, least privilege & audit logs
- Integrated monitoring under national AI security guidelines

04 Human in the Loop

- AI drafts & recommends — officers review and decide
- Answers cite their sources (RAG): verifiable, explainable
- Risk scores focus human review; feedback improves the AI

How They Advance Core Procurement Values

Transparency

- Bid monitoring ~10% → ~100%
- Source-cited AI answers
- Open data via the Data Hub

Value for Money

- Benchmarks from similar past cases
- RFP drafting: days → hours
- Shared AI infra, no duplication

Fairness

- Restrictive clauses flagged early
- Equal, fast advice for all suppliers
- Consistent quality, any drafter

“Intelligence is only as good as the data and governance beneath it.”

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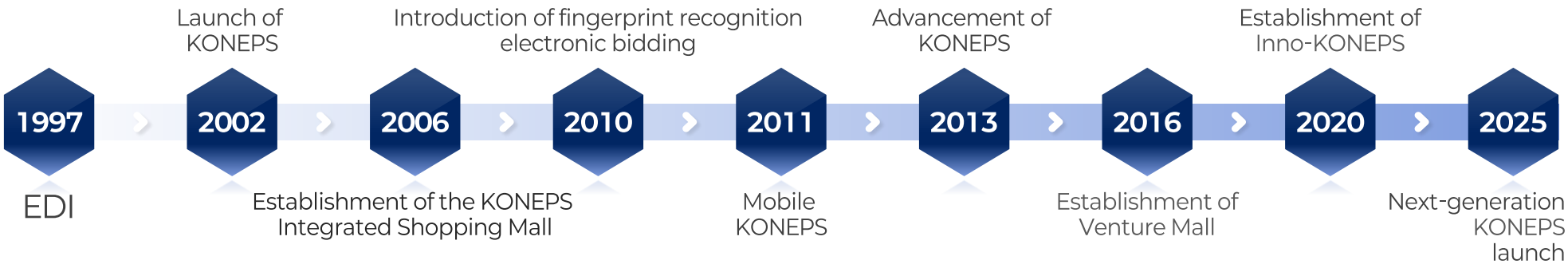
Thank You

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Progress Timeline

Gradual enhancement and expansion of functions since its introduction in 2002



Development of the KONEPS system (2001~2002)

- Based on the internal procurement information system (EDI) used by the Public Procurement Service, a universal e-procurement system for all public institutions was developed.
- All e-procurement tasks are processed electronically through a single online portal

Enhancement and Advancement of the KONEPS System (2003–2013)

- Establishment of the KONEPS Integrated Shopping Mall (2006)
- Introduction of fingerprint recognition electronic bidding (2010)
- Launch of mobile services (2011)
- Adoption of the e-Government Framework, provision of Open APIs, and implementation of the Subcontracting Support System (2013)

Expansion of the KONEPS System (2013–2024)

- Provision of virtualized electronic bidding services (2014)
- Establishment of the Public Procurement Statistics System (2015)
- Establishment of Venture Mall (2016)
- Establishment of Inno-KONEPS (2020)

Development of the Next-Generation KONEPS (2021–2025)

- Analysis · Design (2022)
- Development · Testing (2024)
- Launch · Stabilization (2025)

Changes After Launch (2003 > 2025)

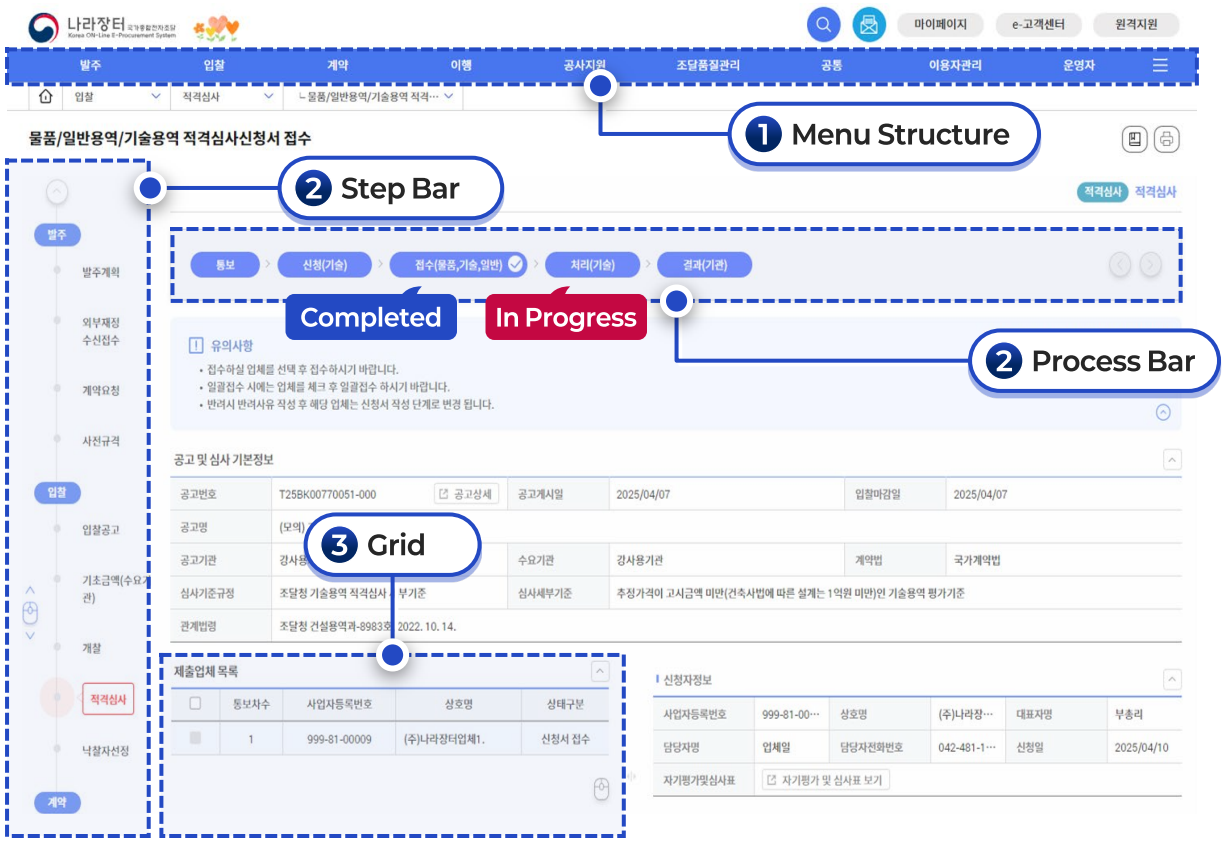
More than fivefold quantitative growth from 2003 to 2025

Changes in KONEPS users over the past 20 years

	Items	2003	2025	Changes
1	Transaction Volume	27.8 Billion $	106 Billion $	3.8 times ▲
2	Users (Public Organizations)	25,000	75,000	3 times ▲
3	Users (Suppliers)	92,000	634,000	6.9 times ▲
4	Linked Systems	38	227	6.0 times ▲

Intuitive UI reflecting workflow logic

Work Screens



Key Details

1 Process-Based Menu Structure

- Menus aligned with task flow for faster, more efficient work

2 Navigation-Style Menu

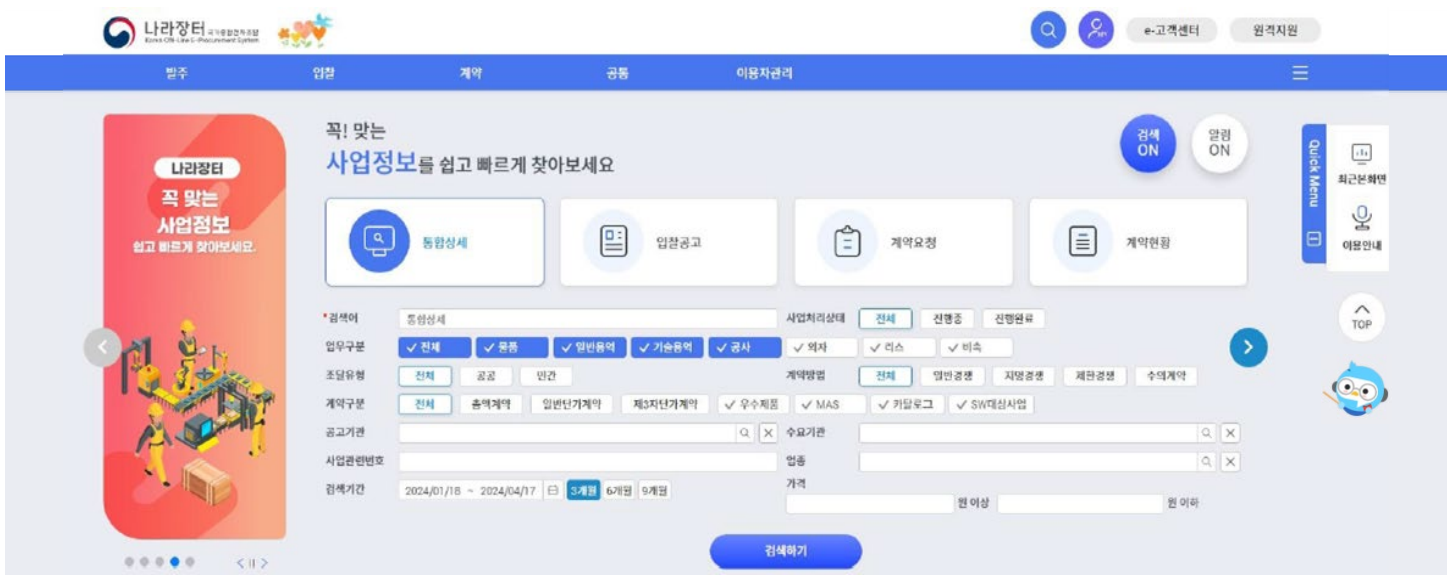
- Step Bar: Easy navigation between stages
- Process Bar (Status Bar): Visual overview of task progress

3 Grid System Design

- Minimizes unnecessary space and displays more information
- Provides various user controls for efficient screen usage (e.g., section collapse/expand, split pane movement)

Fast and accurate access to bidding and contract information

Unified Search





Key Features

1. **Most frequently used search functions placed prominently on the main screen (Search ON)**
   - Easily set various search filters with just a few clicks
2. **Access FAQs, user manuals, and more via chatbot icon on the main screen**

Various recommendation services based on purchase and bidding history

Customized Product Recommendations

Broader purchasing options through tailored product suggestions

1

Purchase history and behavioral data → Big data analysis → Personalized product recommendations → Improved satisfaction through easier product selection

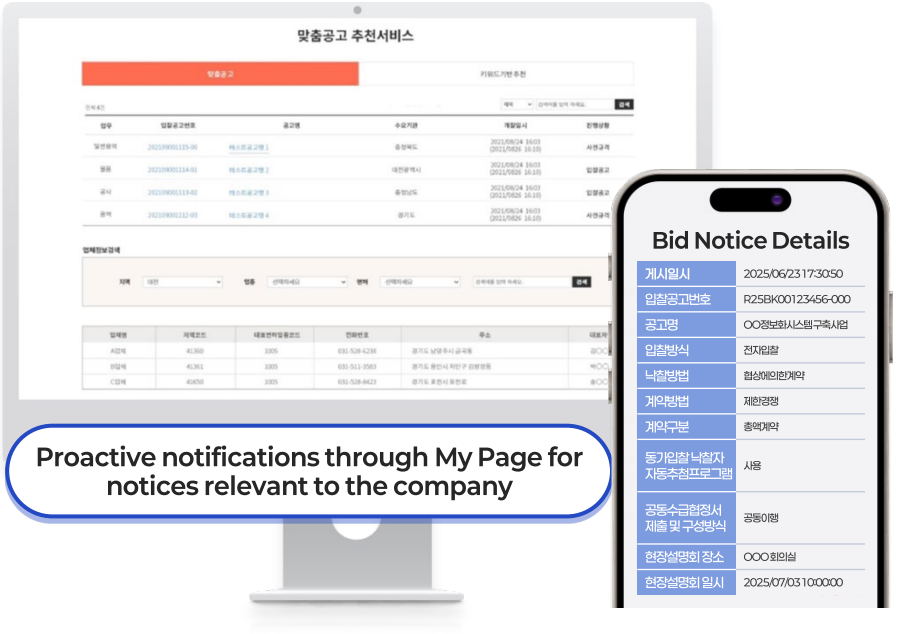
2



→ Enhanced shopping convenience through personalized product recommendations

- Expanded product exposure across main pages, product detail pages, and My Page
- Personalized product recommendations based on purchase and search history expand buyer options and improve shopping convenience.

Customized Notice Recommendation Service



Proactive notifications through My Page for notices relevant to the company

- When new notices are posted, past bidding history is analyzed to send customized recommendations to suppliers with high participation potential
- Increased bidding opportunities for companies with limited monitoring capacity, such as SMEs and startups

E-Ordering through KONEPS Online Shopping Mall



- For frequently purchased goods and services, the Public Procurement Service (PPS) signs unit price contracts, allowing all public institutions to place electronic orders without bidding (e-ordering).
- Dedicated online malls support national policies, including those for companies owned by people with disabilities, women-owned businesses, social enterprises, and eco-friendly products.

* As of 2024: 14,000 companies / over 1 million products registered / Annual transaction volume: KRW 26.4 trillion (approx. USD 19.9 billion)

A system for assigning and managing item catalog information (item name, identification number)

Utilization of item catalog data

National reference data

Government contract eligibility	Public Procurement Portal	Government Accounting	Inventory Management
• Bid qualification criteria (goods)	• Mandatory Requirement for Venture Mall, MAS & Excellent Products Mall Registration	• Reference Data for Goods Acquisition in National, Local, and Educational Finance Systems	• Standard item data from acquisition to disposal, including useful life and quantity

Used across systems to connect all procurement-related processes



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공통속성정보

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세부품명영문명	Notebook computers
단위	개
내용연수	6
상품원산지국가명	베트남(VN)
품목구분	일반용 품목
부품여부	N
품목등록일	2025-04-10

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제조업체명	삼성전자 주식회사
제품설명	삼성전자 갤럭시북4 프로 NT961XGK-KR51G

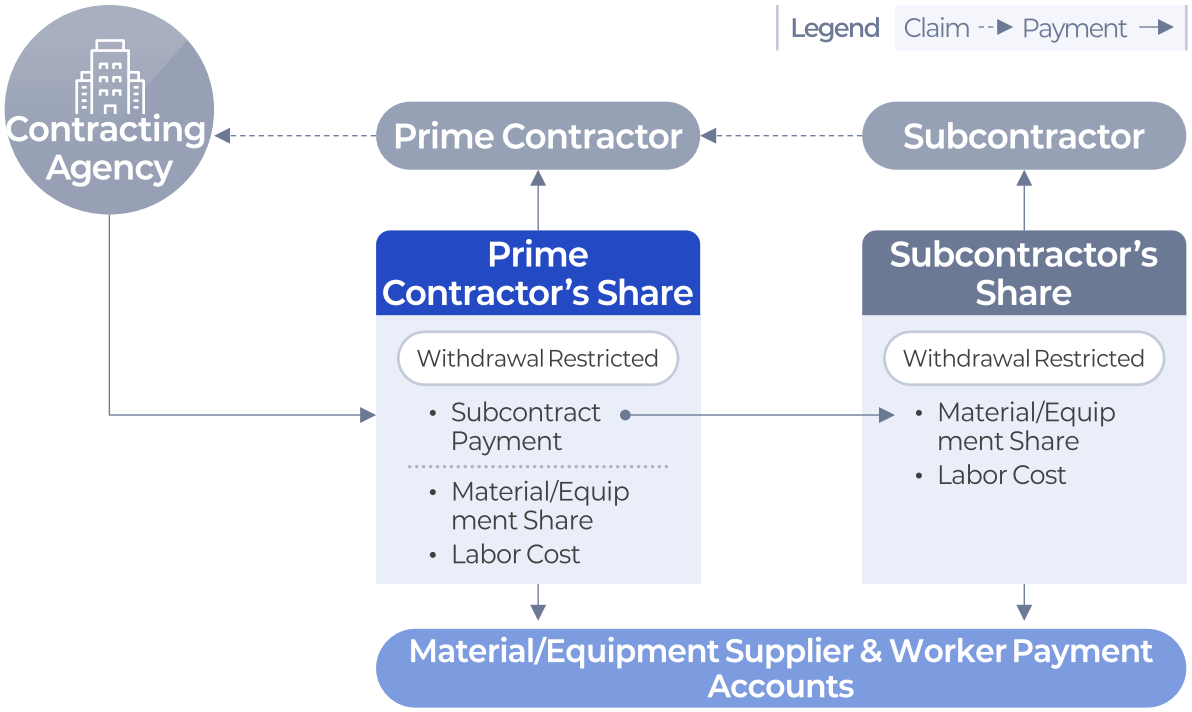
대기전력저감제품 인증정보

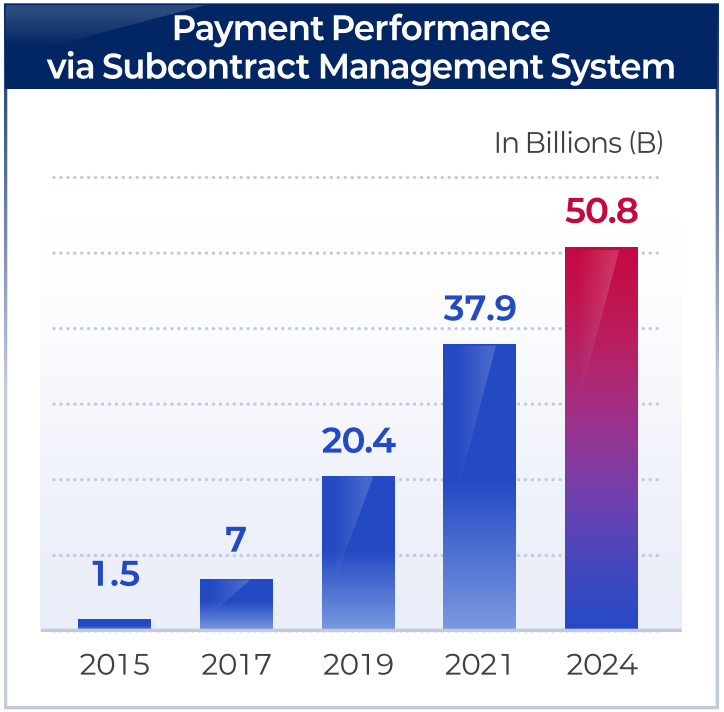
저감기준만족여부	N
인증일자	

- **Items are classified and named uniformly, with unique ID numbers assigned**
- **Catalogs include specs, manufacturer, and certifications**
- **Applied in e-procurement, from bidding to inventory management**

As of 2024: 5,407,389 items registered

Real-time processing of electronic subcontracting and payment verification in public contracts





- **Established in 2013 to improve unfair subcontracting practices, such as delayed or unpaid subcontract payments, in public sector contracts**
- **A system for electronic management and monitoring of payments between agencies, contractors, subcontractors, suppliers, and workers.**
  - Payments usually flow from agency → prime contractor → subcontractor, with direct payment to subcontractors also possible.

Public Procurement Service



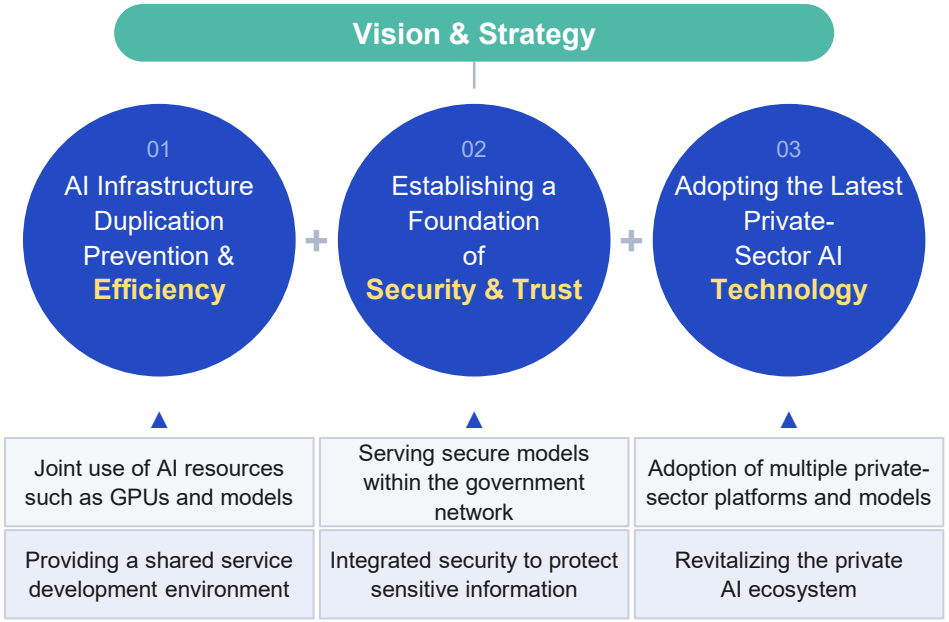
Chapter 4 Data Governance

KONEPS

(MOIS*) Building AI infrastructure and platforms that all ministries can jointly use

* **M**inistry **o**f the **I**nterior and **S**afety

Government-Wide AI Common Infrastructure



Accelerating Government-Wide AI Transformation (AX)

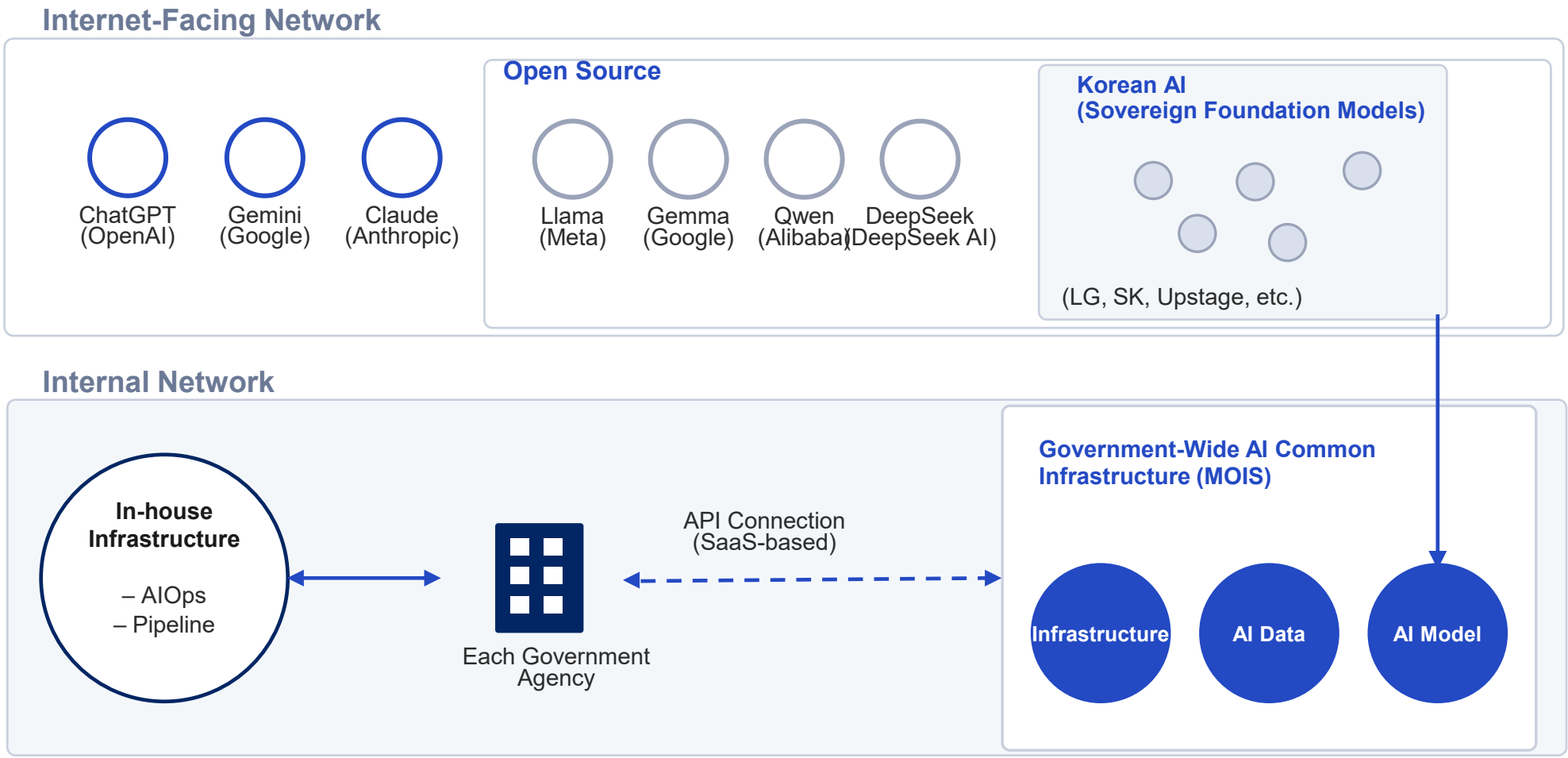
- Hardware and AI model management are “outsourced”
- Focus on domain service capabilities
- Rapid service development without infrastructure investment

Balancing Security and Innovation

- Utilize sensitive administrative data for AI service development within a secure infrastructure governed by security guidelines
- Flexible adoption of the latest AI technologies

Bottom line: Outsource shared AI infrastructure and models to move fast, while keeping sensitive administrative data inside a security-guideline-compliant environment.

Establishing an AI Adoption Strategy Tailored to Each Agency's Situation



- Prioritize developing services that can quickly show results using the **government-wide common infrastructure**, while taking a mid-to-long-term view of **introducing in-house infrastructure** to strengthen the security of core data and advance AI services.

Unstructured Data Status & 3 Key Challenges

Integrated Data Scale ('25 Status)

Generates **~100M files (75 TB)** annually across public procurement operations, but lacks structured taxonomy standards.

Annual Vol.	Annual Files
75 TB	**~100M**

Data Type Distribution Anomaly

70.8% of total unstructured files are dumped under 'Unclassified / Other', rendering search & AI usage ineffective.

Unclassified	Contracts/Specs
70.8%	**14.1%**

Metadata & Format Constraints

Only 3~5 basic fields stored (vs. NIA std 29 fields). **71.5%** are proprietary formats (PDF 42.8%, HWP 28.7%).

DATA INTEGRATION ASSESSMENT

Data Ingestion | **Taxonomy & Metadata** | AI Parsing & Search

ISSUE 01 — Poor Taxonomy System

70.8% 'Unclassified / Other' Category

- **Lack of granular sub-categories:** absence of functional & attribute-based classification.
- **System impact:** critical file omission during AI system setup when key terms (e.g., 'Spec') are absent from filenames.

ISSUE 02 — Insufficient Metadata Storage

Only 3–5 Attributes Tracked

- **Basic attributes only:** system records only primitive attributes (file type, file path).
- **NIA standard deficit:** far below national AI guidelines (11 core + 18 extended fields), creating data gaps for RAG models.

ISSUE 03 — Non-Open Format Dominance

71.5% Proprietary Documents (PDF/HWP)

- **Parsing overhead:** heavy reliance on PDF (42.8%) and HWP (28.7%) inflates parsing time and operational cost.
- **Action plan:** continuous evaluation alongside modern AI layout-parsing advancements is essential.

AX-Based Unstructured Data Management Strategy

Strategic Objective

Clean legacy data backlog and automate quality data generation at creation to directly power AI projects and employee AX.

Expected AX Impact

- **Search Efficiency:** 85%+ improvement in accurate document retrieval.
- **AI Readiness:** complete alignment with National AI Data Standards (NIA).
- **Cost Reduction:** decreased manual document parsing & cleanup overhead.

Execution Roadmap

Phase 1: Taxonomy & Metadata Standardization

Phase 2: Legacy Data Refinement

Phase 3: Auto-Classification Pipeline

Goal: Clean Legacy Data + Automate Real-time Quality Data Generation → Power AX Infrastructure

STRATEGY 01

Establish Taxonomy & Metadata System

- **Granular Taxonomy:** build functional & attribute-based categories tailored for each procurement stage.
- **Core Metadata Framework:** standardize mandatory AI metadata (unique IDs, dataset lineages, access security levels).

"Establishing a robust classification framework is the top priority for AI Transformation." — Prof. Heon-Yeong Kwon

STRATEGY 02

AX-Driven Data Cleanup & Refinement

- **Legacy Data Re-mapping:** systematically reclassify and re-organize historical data (including On-Nara admin records) into the new taxonomy.
- **AI Searchability Enrichment:** refine and map metadata tags to transform stagnant dark data into instantly searchable AI assets.

STRATEGY 03

Automate Quality Control & Open Formats

- **System-Level Automation:** enforce standardized file naming rules to automatically assign taxonomy and metadata upon document creation.
- **Open Format Transition:** transition to structured open formats (JSON/XML) for public data while aligning with national governance guidelines.