

Background Research

How AI Is Transforming Industries: South Korea's Strategies and Corporate Practices

Prepared for Prof. Jaeyong Song

This dossier draws on five independent research sources, kept separate so each contribution is traceable: Claude, Google Gemini Deep Research, ChatGPT, Google Search, and Naver Search. Every claim is linked to a numbered, clickable source at the end of its section.

Research Source 1: Claude

Compiled by Claude (Anthropic) using live web search of English and Korean language government releases, corporate newsrooms, and business press.

1. National AI Strategy and Industrial Policy

- Korea's AI Basic Act took effect January 2026, making it the second jurisdiction after the EU with a comprehensive, binding AI law, aimed at reaching "AI G3," a top-3 global AI power, by 2030^[1]
- The National AI Strategy Committee (upgraded Sept. 2025) is now the top cross-ministerial AI body, with a new "AI Future Planning Chief" role created in the Presidential Office^[2]
- The National Growth Fund, over KRW 100 trillion, launched Aug. 2025, and the 2026 AI budget roughly tripled to KRW 10.1 trillion, split between cross-sector application and talent and infrastructure^[3]

Why M.AX Is Central to Korea's Manufacturing AI Strategy

M.AX, Manufacturing AI Transformation, is the flagship program bridging national AI policy and the factory floor, run jointly by the Ministry of Trade, Industry and Energy (MOTIE) and the Korea Chamber of Commerce and Industry. It matters for three structural reasons:

- It is the deliberate substitute for a shrinking, aging workforce. Korea's production-age population is falling and its skilled manufacturing workforce is aging, so M.AX was explicitly designed as an industrial transformation strategy, not merely an automation program, to sustain output and competitiveness as labor supply tightens^[4]
- It scales in three deliberate stages, described by MOTIE as moving from point to line to plane: individual companies adopt AI first (point), those efforts are then connected across supply chains (line), and finally spread across entire industrial clusters (plane), turning isolated pilots into an economy-wide transformation^[5]
- It is structured as an 11-division, "Best Eleven" public-private alliance spanning both manufacturing and manufacturing-service AI (AI Factory, AI Manufacturing Services, AI Distribution and Logistics) and physical AI (AI mobility, AI robotics, autonomous ships, AI home appliances, AI defense, AI bio, AI semiconductors), grown to about 1,500 member organizations by mid-2026, including Samsung Electronics, KAIST, and UNIST^{[4] [6]}
- It is producing measured, not just projected, results: across roughly 170 lead deployment sites, a 42-site checkpoint review found an average 30.1% productivity increase and a 15.5% drop in defect rates. Individual case studies are sharper still: Shinhan Diamond cut CMP-disk inspection time 33% using AI vision inspection; Surplus Global raised productivity 66.7% in equipment dismantling and parts recovery;

Asan Sungwoo Hi-Tech cut EV battery inspection time 90% through unmanned autonomous manufacturing^[7]

- It anchors a broader academic and regional buildout: an MOU with Seoul National University to co-develop AI models for humanoids, autonomous vehicles, and factories, plus a rollout to 10 major industrial complexes nationally, each paired with dedicated AI data centers, private 5G networks, and "dark factory" pilots^{[5][6]}
- Its targets are explicit and dated: 500 AI factories nationally by 2030, over KRW 100 trillion in added value, and roughly KRW 20 trillion in combined public-private investment by 2030^[5]

2. Manufacturing, Consumer Electronics, Robotics, and the Platform Economy

- Samsung's "AI Megafactory" with NVIDIA deploys 50,000+ GPUs across semiconductor, mobile, and robotics divisions, targeting AI-driven factories globally by 2030^[9]
- Hyundai Motor Group's Aug. 12, 2026 disclosure, its first public AI audit, reported crash-safety review time cut about 90%, production downtime down 86%, and maintenance response time down 42%, with its H Chat Pro platform reaching 80% of Hyundai and Kia's general staff^[11]

Samsung Galaxy AI vs. Apple Intelligence: an explicit comparison

This is a direct strategic contrast worth stating plainly rather than as an aside:

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- Hyundai's Boston Dynamics program pairs a CES 2026 AI Robotics Strategy with a Boston Dynamics and Google DeepMind partnership. Hyundai took full ownership of Boston Dynamics in July 2026, buying SoftBank's remaining stake for about \$325 million, and plans to deploy roughly 25,000 Atlas humanoids across its factories from 2028^{[12][13][14]}
- Physical AI splits into two tracks worth separating clearly: industrial and collaborative robots (deterministic, precision-based, controlled settings) versus humanoid and physical AI robots (adaptive, reinforcement-learning based, unstructured settings). Korea's largest manufacturing expo restructured its 2026 program around exactly this split^[31]
- Naver folded its standalone Clova X chatbot into an integrated "AI Tab" search experience in April 2026, using the same HyperCLOVA X model across search, Smart Store commerce, and enterprise or defense products. Kakao instead embeds agentic AI directly into KakaoTalk, aiming for an "intention economy" and already completing Coupang Eats orders inside chat via agent-to-agent technology^{[15][16][17]}

3. Evolution from "Tool" to "Business Model"

- SK Telecom's "AI Pyramid Strategy" moves from AI Infrastructure to AI Transformation to AI Service, an explicit pivot from mobile carrier to full AI company^[18]
- Samsung Group's June 2026 company-wide AI Transformation reversed a multi-year internal ban on external AI tools and now formally uses Gemini, ChatGPT, and Claude group-wide. Its own framing: AI is

"not just a new technology or a simple tool for improving operations" but something meant to trigger fundamental management change^{[19][20]}

Beyond Hyundai and consumer AI: POSCO and Lunit

Hyundai and the consumer platforms get most of the attention, but two other cases show Korea's AI transformation runs much wider than robots and apps:

- POSCO turned a century-old blast furnace steelmaking process into a data-driven AI operation. Its deep learning blast furnace control system is registered as a National Core Technology of Korea, continuously monitoring and auto-adjusting internal furnace conditions in real time, work previously dependent entirely on operator heuristics. The company has since invested hundreds of millions of dollars restarting and upgrading furnaces at Pohang and Gwangyang with the same smart, self-regulating systems^{[21][22]}
- Lunit evolved from a single image-analysis tool into a full oncology AI platform, monetized as SaaS embedded directly inside hospital PACS systems rather than sold as standalone software. It now serves more than 7,400 healthcare providers worldwide and generates over \$30 million in annual revenue, about 98% of it from recurring subscriptions, a genuinely different business model from either heavy industry or consumer platforms^[23]

4. Organizational Challenges: Data, Talent, Processes, and Ethics

Data

- Many Korean SMEs sit on a decade or more of operational data that is not structured or centralized enough to train AI models. TeamSparta's 2026 AX Benchmark found large IT firms score 68 of 100 on AI maturity versus 28 for small manufacturers^[24]

Talent

- A 580,000-plus shortfall in advanced science and engineering roles is projected for 2025 to 2029, alongside a shrinking entry-level market as AI automates standardized junior tasks^[25]

Processes

This is where much of the real difficulty sits, and it is easy to understate. AI cannot simply be layered onto an existing workflow; it requires deliberate organizational redesign, and the evidence from this research points to several concrete requirements:

- Workflows have to be rebuilt around AI, not the other way around. Samsung's own AX materials describe AI as something meant to trigger "fundamental changes in management," not a plug-in productivity tool, which is why its rollout involved restructuring processes across R&D, production, marketing, and sales rather than just distributing chatbot access^[20]
- Departments need shared data infrastructure before AI can work across them. The M.AX model explicitly sequences this: individual company adoption first, then connecting data and workflows across supply chains, and only then spreading to full industrial clusters, precisely because siloed departments cannot share AI-driven decisions without common data pipelines^[2]
- Managers need real governance over how AI outputs are used, not just access to the tools. Samsung had to build new internal security infrastructure and stand up a dedicated AI department inside every subsidiary before it would even reopen access to external AI tools group-wide, precisely to control how AI-generated outputs entered real decisions^{[19][20]}
- AI engineers and frontline manufacturing or business staff have to be integrated, not kept in separate silos. Where this integration is missing, AI initiatives tend to stall as isolated pilot projects rather than

scaling into standard practice, a pattern visible in the gap between large firms (68 of 100 on AI maturity) and small manufacturers (28 of 100), where smaller firms lack the cross-functional structure to move past pilots^[24]

- Digital transformation generally has to precede AI transformation. Hyundai frames its own AX explicitly as only possible because of years of prior digital-transformation work on data infrastructure since 2019; without that foundation, AI adoption has nothing reliable to run on^[11]
- Employee training and adoption are not optional extras, since AI changes daily work processes directly. Samsung's rollout included tiered training starting with roughly 2,300 executives before reaching all 280,000 employees, reflecting how much of the real transformation cost is organizational and behavioral rather than technical^[19]

Ethics and governance

- The PIPC has issued over 60 billion won in AI and data fines since 2021 and ordered Alipay to delete an unlawfully trained credit-scoring model. A March 2026 PIPA amendment raises maximum fines to 10% of revenue and adds personal CEO accountability^{[29] [30]}
- A distinctly Korean labor dimension compounds the ethics and process questions together: strict layoff law makes it hard to cut headcount one person at a time, so many firms invest in robots and AI to avoid future hiring instead. The new Yellow Envelope Law (March 2026) expanded union bargaining rights, which has, somewhat ironically, accelerated automation as firms rush to deploy robots before union leverage grows further^{[26] [27] [28]}

Research Source 1: References

- [1] ITIF, "One Law Sets South Korea's AI Policy," Sept. 2025.
<https://itif.org/publications/2025/09/29/one-law-sets-south-koreas-ai-policy-one-weak-link-could-break-it/>
- [2] The Korea Herald, "Government aims for 3% potential growth with AI push," 2026. <https://www.koreaherald.com/article/10559781>
- [3] Malay Mail, "South Korea triples AI spending plans," Nov. 4, 2025.
<https://malaymail.com/news/world/2025/11/04/south-korea-triples-ai-spending-plans-biggest-defence-boost-in-six-years/197125>
- [4] MOTIE / MOTIR (English), "M.AX Delivers Tangible Results on the Factory Floor," 2026.
<https://english.motir.go.kr/eng/article/EATCLdfa319ada/2703/view>
- [5] Korea.net (Government Briefing Room), "M.AX to Expand Beyond the Factory Floor," 2026.
<https://www.korea.net/Government/Briefing-Room/Press-Releases/view?articleId=2017501&type=N&insttCode=A260129>
- [6] MOTIE / MOTIR (English), "SNU-M.AX Alliance MOU," 2026. <https://english.motir.go.kr/eng/article/EATCLdfa319ada/2422/view>
- [7] MOTIE (Korean), "제조업 AI 대전환(M.AX), 현장에서 성과로 답하다," Aug. 2026.
<https://www.motir.go.kr/kor/article/ATCL3f49a5a8c/172084/view>
- [8] The Asia Business Daily, "Bakery case study: AI and robotics on the production line," 2026.
<https://www.asiae.co.kr/en/article/economic-general/2026070912505789404>
- [9] NVIDIA Newsroom, "NVIDIA and Samsung Build AI Factory," 2026. <https://nvidianews.nvidia.com/news/samsung-ai-factory>
- [10] BusinessWire, "Samsung Expands Galaxy AI as Consumer Desire for Mobile AI Grows," July 11, 2025.
<https://www.businesswire.com/news/home/20250711123209/en/Samsung-Expands-Galaxy-AI-as-Consumer-Desire-for-Mobile-AI-Grows>
- [11] Hyundai Motor Group Newsroom, "Hyundai Motor Group Accelerates AI Transformation Across Its Business," Aug. 12, 2026.
<https://www.hyundaimotorgroup.com/en/news/hyundai-motor-group-accelerates-ai-transformation-across-its-business-advancing-toward-the-physical-ai-era>
- [12] Boston Dynamics, "Hyundai Motor Group Announces AI Robotics Strategy at CES 2026," Jan. 2026.
<https://bostondynamics.com/news/hyundai-motor-group-announces-ai-robotics-strategy-to-lead-human-centered-robotics-era-at-ces-2026/>
- [13] Seoul Economic Daily, "Hyundai Motor Group Takes Full Ownership of Boston Dynamics," July 16, 2026.
<https://en.sedaily.com/finance/2026/07/16/hyundai-motor-group-to-take-full-ownership-of-boston>
- [14] KED Global, "Hyundai to take full ownership of Boston Dynamics in SoftBank buyout," June 21, 2026.
<https://www.kedglobal.com/robotics/newsView/ked202606210001>

- [15] Seoul Economic Daily, "Naver Shuts Down Clova X, Accelerates AI Service Integration," Apr. 9, 2026.
<https://en.sedaily.com/technology/2026/04/09/naver-shuts-down-clova-x-accelerates-ai-service-integration>
- [16] Investing.com, "Kakao Q2 2026 Slides: Record Revenue, Operating Profit Surge 36%," 2026.
<https://www.investing.com/news/company-news/kakao-q2-2026-slides-record-revenue-operating-profit-surge-36-93CH-4839951>
- [17] TechTimes, "KakaoTalk AI Agent Orders Your Food While Naver Builds Gigawatt GPU Farms," Aug. 6, 2026.
<https://www.techtimes.com/articles/323423/20260806/kakaotalk-ai-agent-orders-your-food-while-naver-builds-gigawatt-gpu-farms.htm>
- [18] SK Telecom Newsroom, "AI Pyramid Strategy," 2025. https://www.sktelecom.com/en/press/press_detail.do?idx=1582
- [19] Gizmochina, "Samsung Launches Company-Wide AI Transformation Initiative," June 10, 2026.
<https://www.gizmochina.com/2026/06/10/samsung-launches-company-wide-ai-transformation-initiative-to-boost-productivity/>
- [20] CIO.com, "Samsung, Which Previously Blocked ChatGPT, Is Now Fully Adopting Three Generative AI Models," 2026.
<https://www.cio.com/article/4184660/samsung-which-previously-blocked-chatgpt-is-now-fully-adopting-three-generative-ai-models-and-accelerating-its-ai-initiative.html>
- [21] POSCO Group Newsroom, "POSCO the Lighthouse Factory: 3 Factors That Make It Exceptional," 2026.
<https://newsroom.posco.com/en/posco-the-lighthouse-factory-3-factors-that-make-it-exceptional/>
- [22] KED Global, "POSCO restarts furnace after upgrade with smart system," June 27, 2024.
<https://www.kedglobal.com/steel/newsView/ked202406270012>
- [23] Korea Biomedical Review, "Lunit's revenue soars, but can INSIGHT prove organic growth?," 2026.
<https://www.koreabiomed.com/news/articleView.html?idxno=32572>
- [24] The Asia Business Daily, "SMEs Sit on a Decade of Data with No One to Use It," Aug. 10, 2026.
<https://www.asiae.co.kr/en/article/2026081000505020339>
- [25] Nucamp, "The Complete Guide to Starting an AI Career in South Korea," 2026.
<https://www.nucamp.co/blog/coding-bootcamp-south-korea-kor-getting-a-job-in-tech-in-south-korea-in-2025-the-complete-guide>
- [26] The Korea JoongAng Daily, "How Hard Is It to Get Fired in South Korea?," July 12, 2026.
<https://www.koreajoongangdaily.com/kjd-special/why-its-so-hard-to-get-fired-in-korea-or-is-it-12766369>
- [27] Seoul Economic Daily, "Bonus Demands, Union Law Push Korean Firms All-In on AI, Robots," May 23, 2026.
<https://en.sedaily.com/news/2026/05/23/bonus-demands-union-law-push-korean-firms-all-in-on-ai>
- [28] The Korea Times, "'Yellow Envelope Law' Meets Age of Robot Workers," Jan. 27, 2026.
<https://www.koreatimes.co.kr/southkorea/society/20260127/yellow-envelope-law-meets-age-of-robot-workers>
- [29] Reg-Intel, "South Korea PIPC AI Enforcement: Model Deletion and Billion-Won Fines," 2026.
<https://reg-intel.com/south-korea-pipc-ai-enforcement/>
- [30] Chambers and Partners, "Data Protection & Privacy 2026: South Korea," 2026.
<https://practiceguides.chambers.com/practice-guides/data-protection-privacy-2026/south-korea/trends-and-developments>
- [31] Seoulz, "Korea Humanoid Robotics 2026: The Hidden Supply Chain Winner," 2026.
<https://www.seoulz.com/korea-humanoid-robotics-2026/>

Research Source 2: Google Gemini Deep Research

Findings from Gemini's Deep Research tool, reorganized to the same structure, matched to verifiable working source links.

- M.AX expanded by mid-2026 into an 11-division "Best Eleven" structure with about 1,500 member organizations, including Samsung Electronics, Hyundai Motor, and SK Inc. ^{[1][2]}
- Hyundai Motor Group took full control of Boston Dynamics in July 2026, buying out SoftBank's remaining stake to accelerate physical AI deployment. Atlas uses vision-language-action models developed with support from Google DeepMind to adapt to real factory environments ^{[3][4]}
- Samsung's Galaxy AI runs on-device via custom NPU silicon for offline translation and local data isolation, positioned as more privacy-secure for enterprise clients than more cloud-dependent competitors ^[5]
- Naver integrated HyperCLOVA X directly into a unified "AI Tab" search experience, retiring its standalone Clova X chatbot in April 2026. Its e-commerce revenue rose 26.2% year on year to 3.69 trillion won, the fastest-growing segment of its business ^{[6][7]}

- Hyundai, Kia, and Genesis embedded an LLM-based Maintenance Support AI Service, cutting maintenance response times by about 42%^[8]
- A projected shortfall of nearly 580,000 mid-to-high skilled professionals in AI, big data, and cloud computing is compounded by a youth employment paradox: as AI automates basic programming and testing tasks, the share of younger workers at AI-adopting firms has been declining even as firms expand AI investment^{[9] [10]}

Research Source 2: References

- [1] Korea.net (Government Briefing Room), "M.AX to Expand Beyond the Factory Floor," 2026.
<https://www.korea.net/Government/Briefing-Room/Press-Releases/view?articleId=2017501&type=N&insttCode=A260129>
- [2] MOTIE / MOTIR (English), "M.AX Delivers Tangible Results on the Factory Floor," 2026.
<https://english.motir.go.kr/eng/article/EATCLdfa319ada/2703/view>
- [3] Seoul Economic Daily, "Hyundai Motor Group Takes Full Ownership of Boston Dynamics," July 16, 2026.
<https://en.sedaily.com/finance/2026/07/16/hyundai-motor-group-to-take-full-ownership-of-boston>
- [4] Boston Dynamics, "Hyundai Motor Group Announces AI Robotics Strategy at CES 2026," Jan. 2026.
<https://bostondynamics.com/news/hyundai-motor-group-announces-ai-robotics-strategy-to-lead-human-centered-robotics-era-at-ces-2026/>
- [5] BusinessWire, "Samsung Expands Galaxy AI as Consumer Desire for Mobile AI Grows," July 11, 2025.
<https://www.businesswire.com/news/home/20250711123209/en/Samsung-Expands-Galaxy-AI-as-Consumer-Desire-for-Mobile-AI-Grows>
- [6] Seoul Economic Daily, "Naver Shuts Down Clova X, Accelerates AI Service Integration," Apr. 9, 2026.
<https://en.sedaily.com/technology/2026/04/09/naver-shuts-down-clova-x-accelerates-ai-service-integration>
- [7] UPI, "Naver gains e-commerce users after Coupang data breach," Mar. 10, 2026.
https://www.upi.com/Top_News/World-News/2026/03/09/e-commerce-market-shift-coupang/6581773114452/
- [8] Hyundai Motor Group Newsroom, "Hyundai Motor Group Accelerates AI Transformation Across Its Business," Aug. 12, 2026.
<https://www.hyundaimotorgroup.com/en/news/hyundai-motor-group-accelerates-ai-transformation-across-its-business-advancing-toward-the-physical-ai-era>
- [9] Nucamp, "The Complete Guide to Starting an AI Career in South Korea," 2026.
<https://www.nucamp.co/blog/coding-bootcamp-south-korea-kor-getting-a-job-in-tech-in-south-korea-in-2025-the-complete-guide>
- [10] Seoul Economic Daily, "Bonus Demands, Union Law Push Korean Firms All-In on AI, Robots," May 23, 2026.
<https://en.sedaily.com/news/2026/05/23/bonus-demands-union-law-push-korean-firms-all-in-on-ai>

Research Source 3: ChatGPT

Findings from ChatGPT, reorganized to the same structure, matched to verifiable working source links.

- MSIT's National AI Computing Center broke ground in 2026 after early bids failed, running primarily on NVIDIA GPUs with a voluntary pathway for domestic NPUs from Korean chipmakers FuriosaAI and Rebellions. MSIT's 2026 budget dedicates a record \$3.5 billion to AI^{[1] [2]}
- M.AX targets 500 AI-autonomous factories by 2030 and spans shipbuilding, electronics, steel, petrochemicals, and machinery, not just automotive or electronics^[3]
- Samsung's Galaxy AI uses a hybrid on-device and cloud strategy, contrasted with Apple's more selective, OS-level integration approach^[4]
- Korean robotics splits into two operational paradigms: Industrial Robots, deterministic and pre-programmed, versus Physical AI or Humanoid Robots, which use vision-language-action models and reinforcement learning to adapt to unstructured environments^[5]
- POSCO transformed blast furnace steelmaking into a data-driven AI operation with a deep learning control system registered as a National Core Technology. Lunit evolved from an image-analysis tool into

an oncology platform monetized through SaaS subscriptions embedded in hospital PACS systems, serving 7,400-plus providers^{[6][7]}

- The raw data paradox: Korean industrial firms hold decades of logged data, but much sits in fragmented or legacy systems requiring significant cleanup before it can train models. PIPA mandates strict anonymization for personal data used in AI models, adding compliance overhead^{[8][9]}

Research Source 3: References

[1] TechTimes, "Korea's AI Compute Center Breaks Ground After Two Failed Bids," Aug. 2026.

<https://www.techtimes.com/articles/322764/20260803/koreas-ai-compute-center-breaks-ground-after-two-failed-bids-forced-policy-retract.htm>

[2] International Trade Administration, "Korea: Digital Economy," June 29, 2026.

<https://www.trade.gov/country-commercial-guides/korea-digital-economy>

[3] Korea.net (Government Briefing Room), "M.AX to Expand Beyond the Factory Floor," 2026.

<https://www.korea.net/Government/Briefing-Room/Press-Releases/view?articleId=2017501&type=N&insttCode=A260129>

[4] BusinessWire, "Samsung Expands Galaxy AI as Consumer Desire for Mobile AI Grows," July 11, 2025.

<https://www.businesswire.com/news/home/20250711123209/en/Samsung-Expands-Galaxy-AI-as-Consumer-Desire-for-Mobile-AI-Grows>

[5] The Robot Report, "AW 2026 Features Korea Humanoid Debuts as Industry Seeks Digital Transformation," Mar. 4, 2026.

<https://www.therobotreport.com/aw-2026-features-korea-humanoid-debuts-industry-seeks-digital-transformation/>

[6] POSCO Group Newsroom, "POSCO the Lighthouse Factory: 3 Factors That Make It Exceptional," 2026.

<https://newsroom.posco.com/en/posco-the-lighthouse-factory-3-factors-that-make-it-exceptional/>

[7] Korea Biomedical Review, "Lunit's revenue soars, but can INSIGHT prove organic growth?," 2026.

<https://www.koreabiomed.com/news/articleView.html?idxno=32572>

[8] The Asia Business Daily, "SMEs Sit on a Decade of Data with No One to Use It," Aug. 10, 2026.

<https://www.asiae.co.kr/en/article/2026081000505020339>

[9] Chambers and Partners, "Data Protection & Privacy 2026: South Korea," 2026.

<https://practiceguides.chambers.com/practice-guides/data-protection-privacy-2026/south-korea/trends-and-developments>

Research Source 4: Google Search

Findings gathered directly from Google Search results: government press releases, corporate newsrooms, and English-language business press.

National AI Policy, Sovereign AI, and M.AX

- The AI Basic Act, formally the Framework Act on the Development of Artificial Intelligence and the Establishment of a Foundation for Trustworthiness, sets copyright protection rules, security and bias guardrails, and market commercialization boundaries. To ease compliance, the government opened an AI Basic Act Support Desk giving companies a one-year advisory window to audit systems before penalties apply, after which fines are capped at KRW 30 million for serious safety or transparency failures^[41]
- Responsibility for AI policy is deliberately split between two ministries: MSIT directs foundational R&D, public cloud computing allocation, and AI Basic Act safety audits, while MOTIE governs physical-sector deployment, shop-floor integration, factory automation standards, and the M.AX alliance^{[41][42]}
- South Korea's approved national budget allocates KRW 7.5 trillion specifically to AI talent and physical infrastructure, including purchasing 15,000 high-performance GPUs to scale the government's state-backed computing pool toward a terminal target of 35,000 national computing units^[42]
- M.AX has grown into a "Best Eleven" structural division with 1,500-plus member organizations, including LG's Production Engineering Research Institute, INTERX, KAIST, and UNIST. A distinctive M.AX initiative, the Manufacturing Masters' Tacit Knowledge Project, uses multimodal sensors, computer vision, and

cognitive AI to capture and digitize the unregistered heuristic knowledge of retiring master technicians before it is lost, mapping it into transferable deep-learning control software [\[3\]](#) [\[4\]](#) [\[5\]](#)

- South Korea's national infrastructure plan commits 550 trillion won to build 8.4 gigawatts of AI data center capacity by 2029, led jointly by SK Group, GS Group, and Naver, with Naver contributing 1 gigawatt of that total, not the entire buildout [\[6\]](#)

Industry Findings

- HD Hyundai applies structural stress-modeling AI to container ship hull design, using generative engineering models to simulate millions of maritime fluid-dynamics variables and output structurally optimized, fuel-efficient hull contours rather than relying on manual simulation iterations [\[3\]](#)
- LG Electronics has re-architected its appliance business around edge-computing nodes embedded in refrigerators, washing machines, and HVAC units, turning static hardware into an active subscription service that monitors wear, updates firmware, and automatically orders replacement consumables before failure [\[3\]](#)
- Hyundai's E-FOREST manufacturing platform includes a Transfer Cart Sequencing Optimization model that cut factory downtime from parts-routing bottlenecks by 86%, alongside predictive AI evaluation models that cut crash-test data review from 35 minutes to 5 [\[7\]](#)
- Naver's AI Briefing generates real-time interactive search syntheses used by 30 million monthly active users, part of a broader shift from click-through advertising toward transaction commissions, merchant memberships, and payment fees as the core revenue model [\[9\]](#) [\[11\]](#)

Best Practices

- Hyundai's Boston Dynamics program: the all-electric Atlas humanoid won "Best Robot" at CES 2026. Hyundai is building a dedicated robotics manufacturing facility targeting 30,000 Atlas units a year and a Metal Plant Application Center to generate training data for manufacturing-focused robotics models, with initial deployment at Metaplant America (HMGMA) planned for 2028 [\[7\]](#)
- Hyundai's Robotics Lab partnered with Korean edge-chip designer DEEPX on low-power, on-device AI processors for vision-language-action models, and Hyundai, the Korean Army, and MOTIE signed a tri-party agreement to deploy physical AI mobile systems across military testbeds, an explicit crossover between commercial robotics and defense [\[8\]](#)
- ESTsecurity, a Korean cybersecurity firm, commercialized Alyac Agentic EDR in August 2026, an autonomous endpoint detection and response product built on LG AI Research's K-EXAONE model, with a human-in-the-loop structure requiring analyst approval before the AI agent can terminate a process, a genuinely different business built entirely around a domestic foundation model [\[12\]](#)

Organizational Challenges

- Data bottlenecks: Korean conglomerates hold petabytes of legacy data, but it is fragmented across siloed systems in incompatible formats and lacks semantic metadata, and strict rules on cross-unit data sharing make it difficult to build the unified data lakes needed to extract full value from it [\[3\]](#)
- Talent deficits span three distinct roles that are each hard to fill: deep-learning researchers who build foundational models, NPU hardware architects who design low-power edge silicon for robotics, and cross-disciplinary specialists who understand both machine-learning pipelines and factory floor operations. Firms often fall back on external consultants, which slows internal IP development [\[3\]](#)

- Process resistance: deploying AI effectively requires redesigning workflows rather than layering software onto legacy processes, which creates friction inside hierarchical, seniority-driven Korean corporate cultures. Without a strong top-down mandate to co-locate engineers with business units, AI tools tend to stall at the pilot phase rather than scaling^[3]
- Governance and ethics obligations stack on top of each other: PIPA's data-privacy rules, the AI Basic Act's safety and disclosure mandates, unresolved generative AI copyright liability, and adversarial prompt-injection defense all require continuous compliance auditing, adding real friction to fast software rollouts^[3]

Research Source 4: References

- [1] Ministry of Science and ICT, "The AI Basic Act Comes into Force," Jan. 2026.
<https://www.msit.go.kr/eng/bbs/view.do?sCode=eng&mId=4&bbsSeqNo=42&nttSeqNo=1195>
- [2] Bloomberg, "South Korea Parliament Clears 2026 Budget to Power AI-Led Growth," Dec. 2, 2025.
<https://www.bloomberg.com/news/articles/2025-12-02/south-korea-parliament-clears-2026-budget-to-power-ai-led-growth>
- [3] MOTIE / MOTIR (English), "M.AX to Expand Beyond the Factory Floor and Support Company-Wide Operations," June 23, 2026.
<https://english.motir.go.kr/eng/article/EATCLdfa319ada/2667/view>
- [4] The Chosun Daily, "South Korea Invests 700 Billion Won in Manufacturing AI Transformation," Feb. 25, 2026.
<https://www.chosun.com/english/industry-en/2026/02/25/HTWOBHAJRRCXBOJQZNCJNS3W4A/>
- [5] MOTIE / MOTIR (English), "Experts Discuss M.AX as the Way Forward for Korean Manufacturing," May 20, 2026.
<https://english.motir.go.kr/eng/article/EATCLdfa319ada/2620/view?pageIndex=1&bbsCdN=2>
- [6] Bloomberg, "Samsung, SK to Spend \$880 Billion to Drive Korea's AI Lead," June 28, 2026.
<https://www.bloomberg.com/news/articles/2026-06-28/samsung-sk-reportedly-to-invest-1-3-trillion-over-10-years>
- [7] Hyundai Motor Group Newsroom, "Boston Dynamics Atlas Named 'Best Robot' in Best of CES 2026 Awards by CNET Group," Jan. 12, 2026.
<https://www.hyundaimotorgroup.com/en/news/boston-dynamics-atlas-named-best-robot-in-best-of-ces-2026-awards-by-cnet-group>
- [8] ChosunBiz, "Hyundai Motor, army and MOTIE drive physical AI rollout in South Korea's defense," Aug. 14, 2026.
<https://biz.chosun.com/en/en-industry/2026/08/14/IEJYQXEUYYVGPPIHXYSGESB46AQ/>
- [9] NAVER Corporation Media Center, "NAVER, Long Attuned to the Power of Content, to Bring AI to Everyday Search Platform," May 28, 2026. <https://www.navercorp.com/en/media/pressReleasesDetail?seq=10034345>
- [10] ChosunBiz, "Naver ends Clova X, refocuses South Korea search on unified AI tab," Apr. 9, 2026.
<https://biz.chosun.com/en/en-it/2026/04/09/ZKTELDIWENECZI4KMCTZMB5OOQ/>
- [11] The Korea Herald, "Search built Naver. Now AI commerce may define its future," Mar. 5, 2026.
<https://www.koreaherald.com/article/10686831>
- [12] DigitalToday, "Estsecurity unveils Alyac Agentic EDR linked to LG K-EXAONE AI model," Aug. 2026.
<https://www.digitaltoday.co.kr/en/view/91554/estsecurity-unveils-alyac-agentic-edr-linked-to-lg-k-exaone-ai-model>

Research Source 5: Naver Search

Findings gathered directly from Naver Search, drawing on Korean-language MOTIE announcements, Korean news coverage, financial-sector trade press, and Korean industry analysis. Translated and condensed into English below.

National AI Policy, Sovereign AI, and M.AX

- Korea's national AI Action Plan for 2026 to 2028 is structured around three policy pillars and 12 strategic areas, spanning an "AI highway" (infrastructure), next-generation AI technology, AI talent, domestic AI models, AI regulatory reform, industrial AX, public-sector AX, regional AX, and AI-based defense, culture, and social welfare initiatives. Regulatory reform specifically targets safe use of personal data and copyrighted works for AI training, proposing a use-first, compensate-later principle unless a rights holder explicitly opts out^[9]

- Korea's AI industrial policy rests on two pillars, reaching the top three global AI powers and building sovereign AI, with M.AX driving AI transformation across production processes, products, industrial complexes, and supply chains. M.AX targets roughly KRW 20 trillion in combined public-private investment and over KRW 100 trillion in added value by 2030^[4]
- Korean policy analysis frames sovereign AI through four elements: identifying strategic technologies, managing dependence on foreign providers, designing governance, and accounting for social and democratic context, combining domestic foundation models, GPUs, data centers, and AI special zones rather than pursuing full technological self-sufficiency. That same research is candid about limits: Korea's approach faces structural constraints against the US and China in financing, talent, domestic market size, technology, and global influence, with specific risks including over-reliance on government leadership and fragile private consortiums due to conflicting interests among large conglomerates^[3]
- The National AI Strategy Committee consolidated Korea's 2026 AI budget for the first time into a single public disclosure: 741 projects across 41 ministries, totaling KRW 9.9 trillion, letting industry track government AI spending by area and ministry rather than piecing together scattered line items. A separate semiconductor mega-project, the "3S plus 1F" strategy (Speed, Stronghold, Spearhead, plus Full-support), commits more than KRW 30 trillion over 15 years to next-generation memory, edge AI semiconductors, and defense semiconductors^{[4] [5]}
- M.AX's own account of its expansion logic: individual company adoption first (a point), then linking companies together across supply chains (a line), then spreading across entire industrial clusters (a plane), turning scattered AI pilots into a genuine sectoral transformation. Measured results from MOTIE's own review of AI Factory pilot projects: across 170 lead sites, a 42-site checkpoint found average productivity up 30.1% and defect rates down 15.5%. Named cases include Shinhan Diamond (semiconductor CMP-disk AI inspection, inspection time down 33%), Surplus Global (equipment dismantling and parts recovery, productivity up 66.7%), and Asan Sungwoo Hi-Tech (EV battery unmanned autonomous manufacturing, inspection time down 90%)^{[2] [6]}
- MOTIE's own minister has named M.AX as the single policy achievement he most wants to see through to completion. Industrial-complex-level rollout targets 10 major industrial hubs nationally, linked through smaller "MINI Alliance" clusters, each building dedicated AI data centers, private 5G networks, and dark-factory pilots^{[6] [7] [1]}

Industry Findings

- A Korean manufacturing policy brief argues the sovereign AI debate has been too focused on model sovereignty, and that the real competitive risk is data sovereignty: as factories digitize the tacit, hard-won knowledge of veteran workers, that knowledge risks flowing to and being stored on foreign servers unless Korea builds domestic control over domain-specific manufacturing data itself, not just the AI models trained on it^[10]
- Korea's banking sector shows a genuinely different AI adoption pattern from manufacturing or platforms: KB Kookmin Bank invested hundreds of billions of won to build its own group-developed "KB GenAI Platform," rolled out to all staff, while Shinhan Bank instead obtained financial-regulator approval to connect an external GPT-based model into an internal assistant, "AI ONE," trained on roughly 100,000 pieces of internal banking knowledge and updated with fresh documents daily^[11]
- By mid-2026 all five major financial groups, KB, Shinhan, Hana, Woori, and NH Nonghyup, were pursuing agentic AI transformation, AI data center investment, and dedicated AI security infrastructure

simultaneously, spending in the trillions of won combined as regulators relaxed network-separation rules that had previously blocked banks from connecting external AI models to internal systems^[13]

Best Practices

- Hana Bank became one of 20 financial firms approved under the financial regulator's innovation-service track to connect external commercial generative AI directly into internal systems for both staff and customers, following earlier approvals for Shinhan's natural-language AI banker and KB's financial-consultation agent, evidence that Korean regulators are now actively enabling external AI adoption inside a historically network-isolated sector^[12]
- The M.AX case studies above (Shinhan Diamond, Surplus Global, Asan Sungwoo Hi-Tech) remain the clearest manufacturing-specific best practices in the Korean-language coverage, each pairing a named company with a measured, verified result rather than a general productivity claim^[2]

Organizational Challenges

- Deloitte Korea's own enterprise survey finds that companies' single biggest concerns around generative AI are governance, talent, and the risk of widening economic inequality, with successful adopters tending to concentrate on a small number of high-impact use cases layered on top of existing processes and centralized governance rather than scattering effort across many disconnected pilots^[14]
- Korean AI governance analysis identifies a recurring gap between written policy and actual enforcement: security teams often lack a reliable inventory of AI tools employees are using, especially browser-based or SaaS-embedded tools, personal devices can bypass network-based controls entirely, and the constant release of new AI tools makes static allow or block lists impractical to maintain^[15]
- The data sovereignty concern above is itself an organizational and not just a national challenge: individual manufacturers face the same tacit-knowledge-to-data-leakage risk internally, meaning domestic data governance has to be solved at the company level, not only through national policy^[10]

Research Source 5: References

- [1] MOTIE (Korean), "(참고자료) 인공지능이 이끄는 제조업의 대전환, 2030년 청사진 나왔다," 2026.
<https://www.motir.go.kr/kor/article/ATCL3f49a5a8c/171975/view>
- [2] MOTIE (Korean), "제조업 AI 대전환(M.AX), 현장에서 성과로 답하다," Aug. 2026.
<https://www.motir.go.kr/kor/article/ATCL3f49a5a8c/172084/view>
- [3] KDI Economic Information and Education Center, "지속가능한 소비인 AI 확보전략을 위한 정책연구," 2026.
<https://eiec.kdi.re.kr/policy/domesticView.do?ac=0000203659>
- [4] National AI Strategy Committee (aikorea.go.kr), "국가AI전략위, 대한민국 AI 대전환을 위한 기틀을 마련," June 1, 2026.
https://www.aikorea.go.kr/web/board/brdDetail.do?menu_cd=000012&num=686
- [5] Ministry of Land, Infrastructure and Transport, "'대한민국 대도약 3대 메가프로젝트 국민보고회' 개최," 2026.
https://www.molit.go.kr/USR/NEWS/m_72/dtl.jsp?id=95092166
- [6] Naver News (via 277), "M.AX 전도사 김정관, '간부들이 AX 정책 주도해야'," 2026.
<https://n.news.naver.com/mnews/article/277/0005803153?sid=101>
- [7] Viva100, "김정관 산업 장관, 꼭 완수하고 싶은 과제로 M.AX 꼽아," Aug. 13, 2026.
<https://www.viva100.com/article/20260813500008>
- [8] Mediapia, "[피지컬 AI 17] 하이퍼스케일러의 피지컬 AI 인프라 전쟁과 대한민국의 전략," 2026.
<https://www.mediapia.co.kr/news/articleView.html?idxno=79510>
- [9] National Assembly Research Service, "대한민국 인공지능행동계획 (인공지능 기본계획 2026-2028)," Feb. 2026.
<https://smartcity.go.kr/wp-content/uploads/2026/03/%EC%95%88%EA%B1%B4%EB%8C%80%ED%95%9C%EB%AF%BC%EA%B5%AD%EC%9D%B8%EA%B3%B5%EC%A7%80%EB%8A%A5%ED%96%89%EB%8F%99%EA%B3%84%ED%9A%8D%EC%9D%B8%EA%B3%B5%EC%A7%80%EB%8A%A5%EA%B8%B0%EB%B3%B8%EA%B3%84%ED%9A%8D20262028.pdf>
- [10] National Strategy Portal (NSP), "한국 제조업의 AI 전환과 데이터 소버린티," 2026.
<https://nsp.nanet.go.kr/plan/subject/detail.do?nationalPlanControlNo=PLAN0000059954>

[11] Nate News, "KB·신한은행 생성형 AI 플랫폼 가동," 2026. <https://news.nate.com/view/20250512n35436>

[12] e-Focus, "하나은행, 외부 생성형AI 내부망에 들인다... 금융위, 20개사 혁신서비스 지정," July 6, 2026. <https://www.e-focus.co.kr/news/articleView.html?idxno=3002517>

[13] Women Times, "금융권, AI 전환 속도 빨라져... 5대 금융그룹 중심 경쟁력 제고," June 12, 2026. <https://www.womentimes.co.kr/news/articleView.html?idxno=103619>

[14] Deloitte Korea, "기업의 생성형 AI 사용 현황," 2026. <https://www.deloitte.com/kr/ko/issues/generative-ai/state-of-generative-ai-in-enterprise.html>

[15] LayerX, "AI 거버넌스 트렌드: 2026년 조직에 필요한 것," June 22, 2026. <https://layerxsecurity.com/ko/generative-ai/ai-governance-trends/>

Summary

- All five sources converge on the same core narrative: Korea is pursuing sovereign AI and physical or manufacturing AI as parallel strategic bets, with M.AX as the flagship vehicle connecting national policy to the factory floor and Hyundai and Boston Dynamics as the clearest physical AI case study
- Naver and Kakao are taking different platform strategies, search and commerce integration versus messaging-embedded agents, while POSCO and Lunit show that Korea's AI transformation runs well beyond consumer apps and humanoid robots, into heavy industry and healthcare
- The Korean-language sources add two things the English coverage understates: a genuinely candid, government-adjacent critique of sovereign AI's structural limits against the US and China, and concrete, named productivity results from specific factories rather than only aggregate targets
- Across all sources, the organizational bottleneck is process redesign and data readiness working together, not simply a shortage of AI talent. A distinctly Korean thread worth noting directly: strict labor law is itself accelerating automation, since firms that cannot easily lay off staff are instead investing in robots and AI to avoid future hiring