



2022 AI Policy Global Update: South Korea



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State of AI in South Korea

The government of Republic of Korea, known as South Korea, realized artificial intelligence (AI) was the future when Korean “Go” Master Lee Sedol faced off against DeepMind’s AlphaGo—and lost.¹ This moonshot moment spurred an initial investment of \$863 million (USD) over the next five years into AI research,² which included the creation of a public-private research center.³ Building upon this momentum with hopes to lead in data, networks, and AI (DNA), South Korea announced plans for its AI Research and Development (R&D) strategy, which focused specifically on investments into AI technology development and talent for the public sector.

Plans for AI R&D were one of the first efforts to support the Presidential Committee on the Fourth Industrial Revolution, which was created in 2017 to provide comprehensive policy and action plans to harness DNA and other technologies in South Korea.⁵ A key aspect of the Committee’s work is to encourage innovation by strengthening public-private partnerships.⁶ Hence, South Korea’s commercial sector is also making rapid leaps in AI, as companies such as Samsung and SK Telecom invest heavily into AI-focused R&D and acquisitions over the next few years.⁷



1 Tony Peng, “South Korea aims high on AI, pumps \$2 billion into R&D,” Medium, May 16, 2018, <https://medium.com/syncedreview/south-korea-aims-high-on-ai-pumps-2-billion-into-r-d-de8e5c0c8ac5>.

2 Tony Peng, “South Korea aims high on AI, pumps \$2 billion into R&D.”

3 “India-South Korea collaboration in AI” government plans,” INDIAai, <https://indiaai.gov.in/country/south-korea>.

4 Troy Stangarone, “COVID-19 Underscores the Benefits of South Korea’s Artificial Intelligence Push,” The Diplomat, December 7, 2020, <https://thediplomat.com/2020/12/covid-19-underscores-the-benefits-of-south-koreas-artificial-intelligence-push/#:~:text=In%202018%2C%20the%20committee%20announced,to%20be%20competitive%20in%20AI>.

5 OECD.AI, “Presidential Committee on the Fourth Industrial Revolution,” <https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policy/initiatives-16688>.

6 The Presidential Committee on the Fourth Industrial Revolution, “Greetings,” <https://www.4th-ir.go.kr/4thir/greetings>.

7 <https://www.intralinkgroup.com/getmedia/7bca58ca-90d0-4c2d-a25f-af23c057b7b3/Korean-Artificial-Intelligence-Final-Report-Innovation-Brochure>

National AI Strategy

South Korea's 2018 AI R&D Strategy was a precursor for the country's comprehensive "National Strategy for AI," which the South Korea's Ministry of Science and ICT released in 2019. This strategy focused on three areas for AI: ecosystem, utilization, and a people-centered approach. Some actions that fall under the National Strategy's nine strategies and 100 tasks by 2030 – which include creating AI ethics and securing infrastructure – are as follows:

- encouraging innovation by creating a favorable regulatory framework, including enabling universities to expand high-tech programs and starting an "AI Olympics" to enhance global cooperation;
- supporting the growth of companies with government funding;
- making AI accessible and usable to everyone; and
- aiming to become an AI-based digital government.⁸

Recognizing how crucial data is for understanding and making business decisions, the South Korean government hopes to make public data accessible across all ministries. There is also a growing focus on easing regulations to "allow first and regulate later."⁹ Creative start-up companies are playing a key role in rapidly expanding AI across South Korea, which the government continues to support. This is evidenced through the country's 2020 "Digital New Deal," which addresses post-COVID economic recovery by investing \$11 billion over the next five years into DNA. That same year, the national budget for AI also increased by 50%.¹⁰

To better compete on the world stage, South Korea designated five universities as AI Engineering institutions in the AI R&D Strategy,¹¹ such as the Korea Advanced Institute of Science and Technology and Pohang University of Science and Technology.¹² This action addresses the shortage of AI talent, which inhibits the development of AI technology. In fact, the high demand for skills related to digital transformation caused the South Korean government to announce plans in 2021 to train 413,000 individuals by 2025—an increase of over 80,000 from the number they originally intended to train.¹³ The Ministry of Science and ICT also announced the launch of new programs to teach enlisted soldiers about AI and software in 2022.

8 The Government of the Republic of Korea, National Strategy for Artificial Intelligence," 2019, https://wp.oecd.ai/app/uploads/2021/12/Korea_National_Strategy_for_Artificial_Intelligence_2019.pdf.

9 "National AI Strategy of South Korea: Purpose and Use Cases," eGovSpace, <https://egovspace.co.in/national-ai-strategy-of-south-korea-purpose-and-use-cases/>.

10 Stangarone, "COVID-19 Underscores the Benefits of South Korea's Artificial Intelligence Push."

11 Peng, "South Korea aims high on AI, pumps \$2 billion into R&D."

12 Shin Chan-ok and Minu Kim, "More Korean schools to open 'AI grad schools under gov't initiative," September 30, 2019, <https://pulsenews.co.kr/view.php?year=2019&no=780548>.

13 Kan Hyeong-woo, "Korea to foster 89,000 more software talents by 2025," The Korea Herald, December 2, 2021, <http://www.koreaherald.com/view.php?ud=2021120200652>.

Military Applications of AI

As the Ministry of National Defense (MND) seeks to increase efficiency within the military, it is turning to AI to drive innovation and modernization. In 2018, the MND announced that it will perform AI-enabled predictive maintenance.¹⁴ In early 2019, the South Korean Army launched an AI R&D Center which, in the short-term, is mapping out the development of future military AI capabilities.¹⁵ South Korea's military efforts align with its vision for a Fourth Industrial Revolution, prioritizing ISR systems and sensors, mobile technology, and most importantly Internet of Things (IoT), big data, and cloud computing.¹⁶ In addition to exploring AI-enabled capabilities for cybersecurity, priority military AI technologies include large-scale unmanned underwater vehicles, AI-based command systems, AI-based aviation training systems, and AI-based object tracking systems.¹⁷ The South Korean government is also looking at AI technologies that acquire and process big data to start enhancing commanders' decision-making, such as identifying the most effective weapons to defeat the enemy.¹⁸ However, aware of the related ethical challenges, the military has stressed that AI-based systems will only play an advising role for commanders.



To further South Korea's vision for AI-based defense capabilities, in January 2022, the state-run Korea Research Institute for Defence Technology and Advancement (KRIT) released a roadmap for AI technologies in future battlefield operations.¹⁹ An assessment of current AI-based capabilities for the defense sector accompanied this document, which revealed that South Korea is now only one year behind the U.S. in its speech, image, and voice recognition technologies.²⁰

14 Felix Kim, "Republic of Korea military upgrades technology for future of defense," Indo-Pacific Defense Forum, September 14, 2018, <https://ipdefenseforum.com/2018/09/republic-of-korea-military-upgrades-technology-for-future-of-defense/>.

15 Yonhap News Agency, "South Korean army to launch AI research center," UPI, December 31, 2018, <https://www.upi.com/Defense-News/2018/12/31/South-Korean-army-to-launch-AI-research-center/4431546269737/>.

16 Hyun Ji Rim, "Emerging Technologies: New threats and growing opportunities for South Korean Indo-Pacific Strategy," Journal of Indo-Pacific Affairs, Air University Press, April 1, 2022, <https://www.airuniversity.af.edu/JIPA/Display/Article/2979680/emerging-technologies-new-threats-and-growing-opportunities-for-south-korean-in/>.

17 Su Fei, "Military developments in artificial intelligence and their impact on the Korean peninsula" from The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk: Volume II East Asian Perspectives, edited by Lora Saalman, "Stockholm International Peace Research Institute, pp. 33-38 (Oct. 2019), <https://www.jstor.org/stable/resrep2453212?seq=2>.

18 Su Fei, Military developments in AI and their impact on the Korean peninsula.

19 https://www.krit.re.kr/krit/bbs/reportsEng_pdf.do?bbsid=reportsEng&article_category=&nttid=4436&page=1&searchCnd=&searchWrd=&startd=&endd=&menu_no=05010000

20 Yonhap, "S. Korea's AI defense technologies catching up with US equivalents: report," The Korea Herald, January 26, 2022, <http://www.koreaherald.com/view.php?ud=20220126000783>.

Commercial applications of AI

Following the AI R&D Strategy, South Korea released two strategies focused on critical manufacturing, with a particular emphasis on AI chip production.²¹ As a result, South Korean big technology companies—such as LG, Hyundai, and Samsung—are beginning to leverage AI. For example, Samsung is the second biggest semiconductor producer globally and is investing in next-generation AI chips. In January 2022, the company announced a successful demonstration of the world’s first in-memory computing—a move Samsung says will realize next-generation low-power AI semiconductor chips.²² Prior to this, Naver, South Korea’s largest search engine and portal site, acquired Xerox AI research center Europe in 2017 and built its own core AI engines for image recognition, machine learning, and test analytics.

The healthcare industry is another sector that is adopting AI. The COVID-19 pandemic inspired South Korean biogenetics firms Theragen Etex and Synteka Bio to use AI for identifying treatments. Lunit, a medical solutions company, developed an AI system that reads chest X-rays to diagnose COVID-19.²³

As of April 2022, South Korea has approximately 548 AI startups.²⁴ Despite this relatively small ecosystem, government funding—including the creation of an AI Innovation Hub—has enabled South Korea to become an “AI R&D powerhouse,” such that the country was elevated to number 20 on Startup Genome’s 2020 ranking list. This is due to an increase in venture investments catalyzed by the creation of the Ministry of SMEs and Startups in 2017. Indeed, funding has grown from \$2 billion to \$6.4 billion between 2017 and 2021.²⁷



21 Stangarone, “COVID-19 Underscores the Benefits of South Korea’s Artificial Intelligence Push.”

22 “Samsung demonstrates the world’s first MRAM based in-memory computing,” Samsung Newsroom, January 13, 2022, <https://news.samsung.com/global/samsung-demonstrates-the-worlds-first-mram-based-in-memory-computing>.

23 Stangarone, “COVID-19 Underscores the Benefits of South Korea’s Artificial Intelligence Push.”

24 “Artificial Intelligence Startups in South Korea,” April 3, 2022, <https://tracxn.com/explore/Artificial-Intelligence-Startups-in-South-Korea>.

25 Ibid.

26 Wataru Suzuki, “Japan and South Korea catching China in startup race: report,” Nikkei Asia, June 25, 2020, <https://asia.nikkei.com/Business/Startups/Japan-and-South-Korea-catching-China-in-startup-race-report>.

27 Saemoon Yoon, “This is how South Korea can become a global innovation hub,” World Economic Forum, January 22, 2022, <https://www.weforum.org/agenda/2022/01/startups-in-south-korea-are-thriving-this-is-why/>.

AI Ethics and Safety

In 2019, the Korea Communications Commission (KCC) and the Korea Information Society Development Institute (KISDI) jointly announced governing principles over the creation and use of AI, with a focus on protecting human dignity.²⁸ The AI Ethics Principles emphasized:



Transparency and explainability

Relevant and clear information must be provided to end users when AI services have a material impact.



Responsibility

All members of the AI community have a joint responsibility to ensure proper functioning of AI services and human-centered value creation.



Safety

The AI community must build safe and reliable AI services. Service providers must operate an autonomous response system to address damages caused by AI services.



Anti-discrimination

AI community must minimize discriminatory elements in the development and use of AI algorithms.



Privacy and data governance

Personal information and privacy of citizens should not be compromised in the entire development and usage of AI services.

Promoting AI ethical principles is important for South Korea given its focus on autonomous devices and robots. For example, South Korea's best-selling turret, the Super aEgis II, was initially designed with an AI-enabled auto-firing system but transitioned to human-approved firing after customers asked for safeguards to prevent accidental firing.²⁹ In 2016, South Korea was the second country to sell the most robots—over 41,000.³⁰ In addition to its internal focus on ethics, South Korea has contributed to the international development of AI principles, such as the OECD AI Principles, to impose social responsibility on AI in 2019. Additionally, South Korea helped create UNESCO's Recommendations on the Ethics of AI that were adopted in late 2021.³¹

28 Sinook Kang and Juneyoung Jang, "Korean government announces guidelines to promote ethical AI development," Lexology, December 3, 2019, <https://www.lexology.com/library/detail.aspx?g=a23170cc-772a-4c1e-a217-9f5bce224c04>.

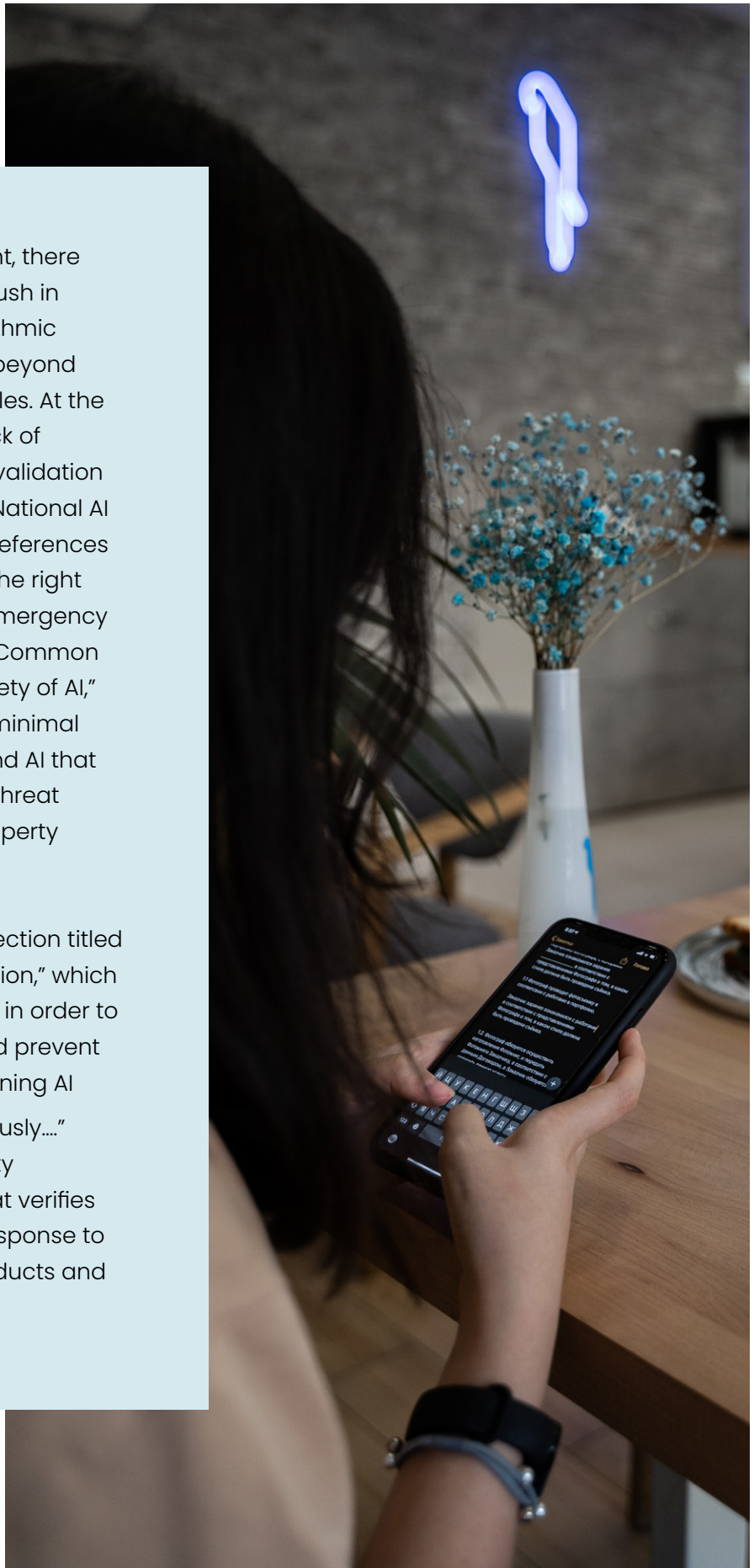
29 Simon Parkin, "Killer robots: the soldiers that never sleep," BBC Future, July 16, 2015, <https://www.bbc.com/future/article/20150715-killer-robots-the-soldiers-that-never-sleep>.

30 "IFR forecast: 1.7 million new robots to transform the world's factories by 2020," International Federation of Robotics, September 27, 2017, <https://ifr.org/ifr-press-releases/news/ifr-forecast-1.7-million-new-robots-to-transform-the-worlds-factories-by-20>.

31 Kyunghye Song, "Korea is leading an exemplary transition. Here's how," OECD.AI, March 10, 2022, <https://oecd.ai/fr/wonk/korea-ai-transition>.

While ethics are important, there has not been a related push in AI safety to ensure algorithmic robustness and security beyond these announced principles. At the same time, despite its lack of reference to testing and validation for achieving safety, the National AI Strategy contains some references that put South Korea on the right track. These include an emergency stop option for AI under “Common legal issues: Securing Safety of AI,” (also referenced under “minimal protection measures”) and AI that enhances cybersecurity threat detection/intellectual property protection.

Most notably, there is a section titled “Prevention of AI Dysfunction,” which calls for “conducting R&D in order to develop new services and prevent dysfunctions from happening AI development simultaneously....” and “establishing a quality management system that verifies reliability and safety in response to the proliferation of AI products and services.”³²



³² The Government of the Republic of South Korea, “National Strategy for Artificial Intelligence,” pp 26.

AI Initiatives and Key Statements

South Korea is focused on collaborating with allies through AI centers and international forums. For example, in December 2020, India established an Indo-Korean Center for Research and Innovation in India through which both countries partner on a range of projects, such as the IKCRI Technology summit.³³ The South Korean government is also advancing the AI-based digital environment by innovating how the government operates with cutting-edge technology and improving important e-government systems.

Some key statements from South Korean leaders include:

- “The advancement of AI will lead humanity into a world never experienced before. AI will not only affect industrial sectors but also solve many issues facing our society.”

South Korean President Moon Jae.³⁴

- “The fourth industrial revolution will be led by companies that collect data, connect to the network, and make decisions with AI.”

Park Young-sun, minister of SMEs and Startups.³⁵



³³ “India-South Korea collaboration in AI” government plans,” INDIAai, <https://indiaai.gov.in/country/south-korea>.

³⁴ “Remarks by President Moon Jae-in at Korean Artificial Intelligence Developers Conference ‘Deview 2019,’” The Republic of Korea website, Oct. 28, 2019, <https://english.president.go.kr/Briefingspeeches/Speeches/682>.

³⁵ Monica Younsoo Chung, “SMEs Minister Park Young-sun sees potential of AI to benefit SMEs,” Korea IT Times, December 6, 2019, <http://www.koreaitimes.com/news/articleView.html?idxno=94476>.

Conclusion

While South Korea lagged considerably behind the U.S. and China in AI technological development a few years ago, since announcing its first wave of AI investment, South Korea has begun rapidly shrinking that gap. This is as long as South Korea succeeds at overcoming its AI talent shortage, which is driven in large part by its shrinking population size.

Additionally, last year, the country joined the first-tier group of countries in the Center for AI and Digital Policy's Artificial Intelligence and Democratic Values Index, which demonstrates its commitment to ethics and safety.³⁶ As it focuses on ethics and accelerating its technology development and adoption, South Korea will need to implement testing and validation practices for its technology that adhere to the international standards of both the country and the globe, particularly as it maintains its "regulate later" approach.



About CalypsoAI

CalypsoAI's mission is to build trust in AI through independent testing and validation. We solve one of the biggest issues facing AI: machine learning models not getting deployed into production. Through CalypsoAI's automated testing and validation solution, decisionmakers gain the performance visibility needed to confidently deploy their models into production. This ensures the success of AI strategy while drastically reducing the amount of risk, time and money spent to manually test and validate models. CalypsoAI was founded in Silicon Valley by DARPA, NASA, and DoD veterans.

For more information visit calypsoai.com

³⁶ Yonhap, "South Korea joins top-tier group in democratic AI Index," The Korea Herald, February 23, 2022, <http://www.koreaherald.com/view.php?ud=20220223000718>.