Department for International Trade

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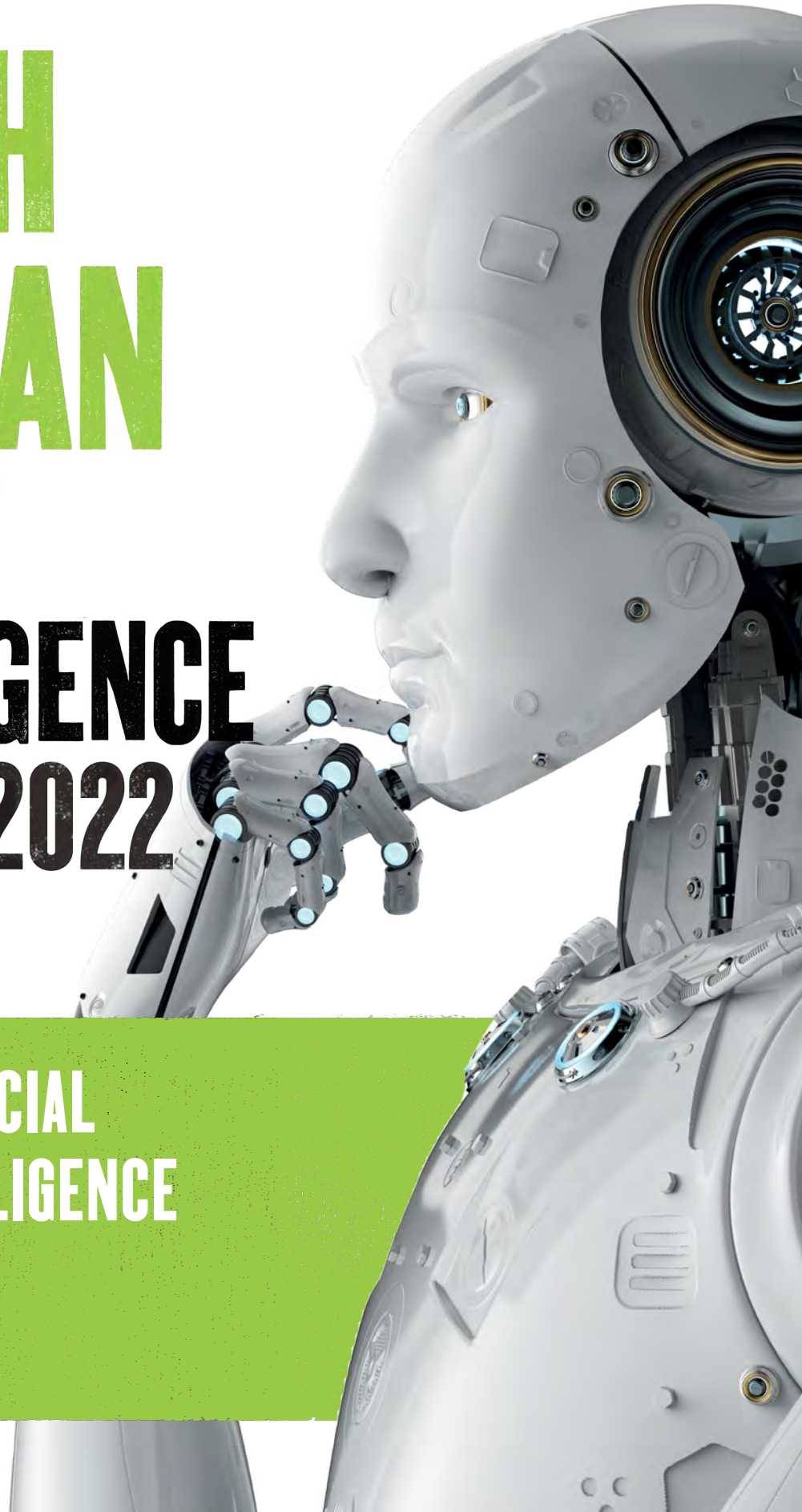
SOUTH KOREAN MARKET INTELLIGENCE REPORT 2022



ARTIFICIAL INTELLIGENCE

Department for International Trade

The UK's Department for International Trade (DIT) helps businesses export, drives inward and outward investment, negotiates market access and trade deals, and champions free trade.

We are an international economic department, responsible for:

- supporting and encouraging UK businesses to drive sustainable international growth
- ensuring the UK remains a leading destination for international investment and maintains its number one position for international investment stock in Europe
- opening markets, building a trade framework with new and existing partners which is free and fair
- using trade and investment to underpin the government's agenda for a Global Britain and its ambitions for prosperity, stability and security worldwide.

About Intralink

This market intelligence report has been developed by Intralink.

Intralink is an international business development and innovation consultancy specialising in East Asia. The company's mission is to make commercial success in new global markets fast, easy and cost effective.

Intralink has 120 multilingual employees, a track record of over 30 years, and offices in South Korea, China, Japan, Taiwan, Singapore, the UK, the United States, Israel, France, Poland and Australia.

The company helps western businesses to expand in East Asia, Asian companies to collaborate with western innovators, and governments from around the world to grow their exports and attract foreign direct investment.

Intralink does not just develop its clients' strategies but plays a hands-on role in building their businesses. Its teams in Asia – immersed in the cultures and business practices of their local markets – identify opportunities, negotiate deals, and generate revenues. And when the client is ready, they will help set up an in-country presence through a local subsidiary or partnership.

Intralink's clients range from technology start-ups and SMEs to multi-national corporations and economic development agencies from Europe, North America and Asia. The company's specialist teams – in sectors such as energy, mobility and healthcare – are working with leading-edge, enabling technologies to help its clients develop and deliver solutions for the big challenges of our time.

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01 INTRODUCTION

South Korea (Korea) has set its sights on becoming one of the top three countries in the world for digital competitiveness by 2030 and sees artificial intelligence (AI) as key to achieving that aim. The country's advanced ICT infrastructure and the increasing digitisation of its commercial, industrial and government processes all combine to ensure that Korea has the foundations to become a global leader in the world of AI. Despite the fact that some firms put off investments due to the pandemic the Korean AI market grew from GBP 642m in 2018 to GBP 1.7bn in 2021. The market is expected to quadruple in size again to reach GBP 6.47bn by 2025, all of which suggests strong opportunities for British firms with competitive AI solutions.

When President Moon Jae-In's administration came to power in 2017 he pledged to increase investment in AI and enact more business-friendly data legislation. His government announed its National Strategy for Artificial Intelligence in 2019, committed itself to spending GBP 110m to bolster the AI industry in the country and placed particular emphasis on rolling out AI in the public domain, such as healthcare, transportation, and security. Further public investment in AI was announced under the Korean New Deal 2.0 programme in the summer of 2021 as part of the government's economic response to the pandemic.

Although an increasing number of AI-powered solutions are being commercialised, Korea is still estimated to be 1-2 years behind other technologically advanced countries in terms of core AI technology, and many large domestic players continue to look for third-party AI technologies that can offer them a competitive edge. To bridge this capability gap, the government and large conglomerates are investing heavily in AI research and the training AI professionals. Naver Labs, for example, has established a Global AI R&D Belt to secure its network across Europe and Southeast Asia by partnering and collaborating with international AI institutions, academic partners, and entrepreneurs.

Korean conglomerates such as Samsung, LG, Naver and Kakao, are all investing heavily in artificial intelligence and machine learning capabilities, and forming partnerships with companies to accelerate the development and commercialisation of their solutions. 42dot, for example, a Korean autonomous transportation-as-a-service (TaaS) startup, has received a total of GBP 95m in Series A and pre-Series A investment from a range of Korean conglomerates such as Hyundai, Kia and LG Electronics and Korean private equity players who are also increasing their investment in this area.

All of this has created fertile ground for artificial intelligence firms. Key opportunity areas for UK AI companies include, but are not limited to, autonomous vehicles (e.g., V2X, ADAS, etc.), digital healthcare (e.g., visual recognition, smart diagnostics, etc.), AI-based financial services (e.g., robo-advisors and fraud detection), smart factory solutions (e.g., production optimisation, energy optimisation and predictive maintenance), cyber security and AI assistants. There is also an awareness that the UK is a leader in the field of AI, so British companies should find a warm reception among potential Korean customers and partners.

02

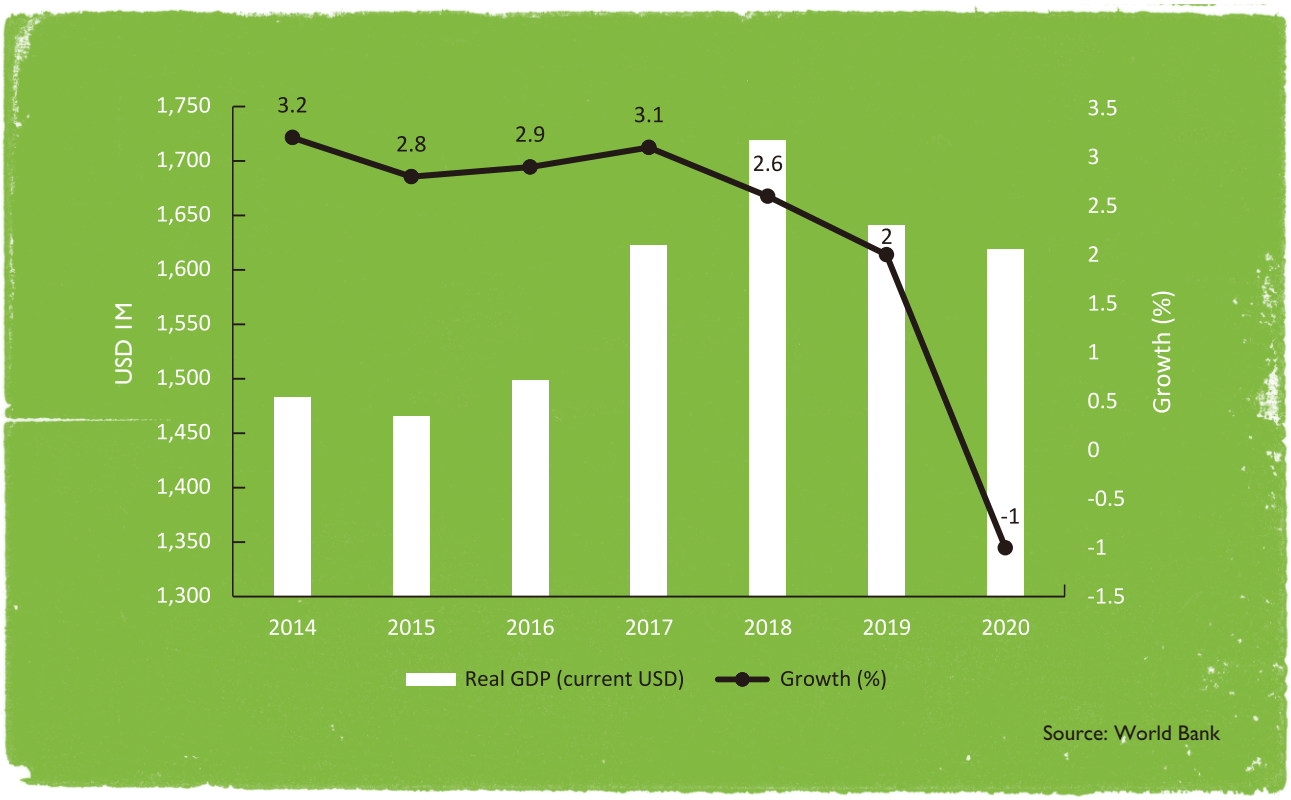
KOREA: AN OVERVIEW

In the space of just 60 years, Korea has transitioned from an agricultural economy to one driven by high value industries such as automotive, shipbuilding and advanced manufacturing. Perhaps most remarkable of all is the country's success in the area of information communications technology where it has become world class in terms of semiconductor, consumer electronics and ICT infrastructure.

With a population of 51 million people, Korea boasts the 10th largest economy in the world, a GDP of GBP 1.21 trillion (USD 1.63 trillion) in 2020 and a per capita GDP of GBP 23,300 (USD 31,500) that same year. Whilst no longer experiencing the dizzying growth rates that characterised its early growth phase in the second half of the twentieth century, Korea has maintained strong growth for a developed economy of close to 3% in the years prior to the outbreak of the COVID-19 pandemic.

Total trade (exports and imports) between the UK and Korea was GBP 13bn in the four quarters to the end of Q2 2021, an increase of 6.1% or GBP 749m over the preceding 12-month period. Of this, UK exports to Korea totalled GBP 7.5bn while its imports from Korea came to GBP 5.5bn. Korea is the UK's 22nd largest trading partner and accounts for 1.1% of total UK trade. The UK and Korea signed a continuity free trade agreement in 2019 which largely replicated the EU-Korea agreement.

Figure 1: GDP and Growth Rates (2014-2020)



03

THE AI INDUSTRY IN KOREA

The AI industry in Korea has been developing at a remarkable pace for the last few years and has become a significant consideration across nearly every high-value industry. The domestic AI market grew by more than 40% from GBP 642m in 2018 to GBP 957m in 2019, and despite the covid pandemic that slowed some investments and delayed the implementation of new solutions since 2020, the market is still expected to reach a size of GBP 6.7bn by 2025.

The largest Korean telecommunication service providers, KT and SK Telecom, as well as IT giants like Naver and Kakao, have been at the forefront of contributing to the growth of the sector. However, despite the rapid increase in the number of AI patents, Korea still falls behind its peers in terms of patent quality. According to a report published by the Korea Advanced Institute of Science and Technology (KAIST) and Clarivate Analytics, the quality of Korean AI patents is regarded as relatively weak due to a low number of forward citations and due to the preponderance of exclusively domestic registrations.

Figure 2: Korea AI Market Size

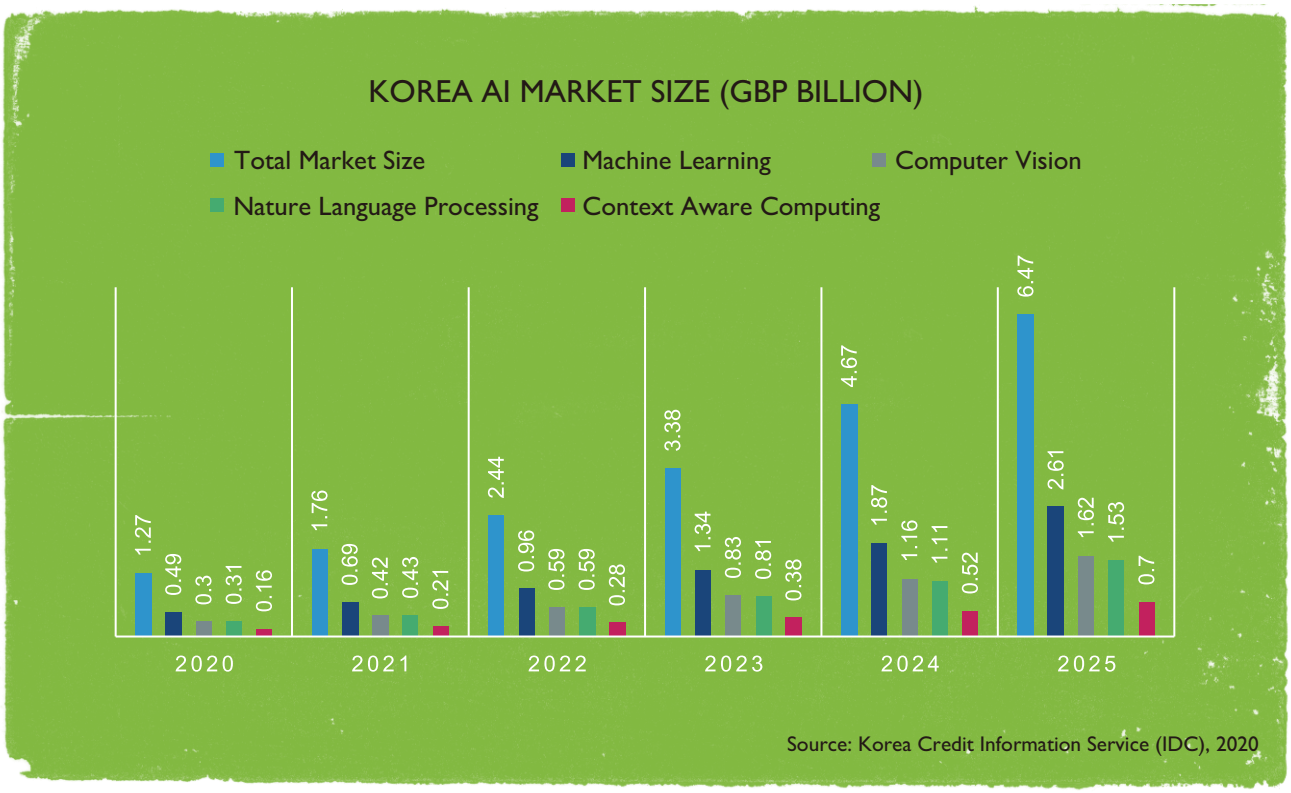


Figure 3: AI Patents (Unit = patents)

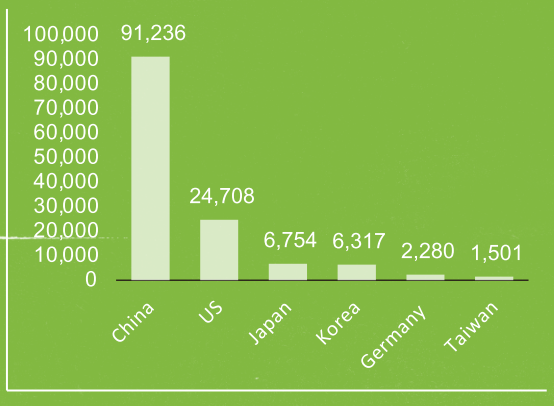
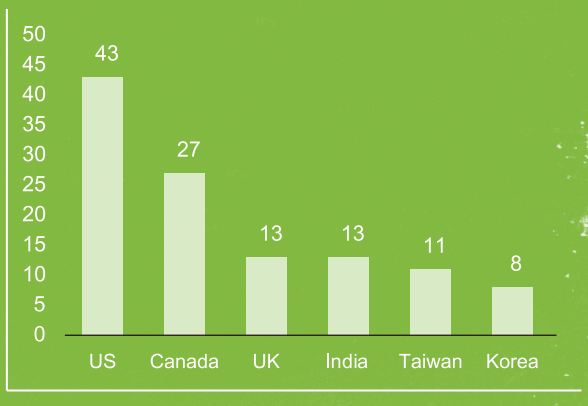


Figure 4: Top Quality Patents (Unit = %)



Source: Korea Advanced Institute of Science and Technology (KAIST), Clarivate Analytics Korea, 2019

Industry Insider's Thoughts

Compared with the US and Japan, Korea is a bit behind in both AI technology and investment levels. There are many reasons, some government-related and some on the private side. Before AlphaGo, any project involving AI was rejected from applications for government funding. Private firms were also not developing AI, except for Samsung and LG but even they had a relatively short-term (3-5 year) approach compared to the 30+ year timeline projects often undertaken in Japan.

Director - The Artificial Intelligence Research Institute (AIRI)

AI ECOSYSTEM AND KEY PLAYERS

The AI ecosystem is made up of universities, government-funded research centres, major conglomerates and SMEs. Most Korean universities offer education programmes based on AI studies in different fields. Although the government plays a relatively active role in shaping the overall direction of AI research efforts, the chaebol – Korean conglomerates often involved in numerous disparate sectors and businesses – are the key players in the field. In recent years, many conglomerates have established AI research centres, either in-house or as separate "lab" structures designed to afford a degree of autonomy away from the day-to-day operations of the company.

Samsung Electronics, the fourth largest investor in start-ups globally, has long recognised the importance of AI. Having invested significantly, the company currently operates a total of seven global AI centres in five countries - Korea, the UK, Canada, US and Russia, which allow the company to accelerate technology releases, as well as to recruit talented professionals in these strategically important markets.

Similarly, Naver, which owns and operates Korea's largest internet search engine, has a separate subsidiary Naver Labs that mainly develops autonomous robots and automotive products, like ADAS, HUD, as well as mapping solutions that are based on ambient intelligence. Naver Labs established a Global AI R&D Belt to secure its AI network and to explore the field across Europe and Southeast Asia by partnering and collaborating with

international AI institutions, academic partners, and entrepreneurs. The company has a multidisciplinary institute in AI in Grenoble and an AI research institute named PRAIRIE in Paris.

A growing number of collaborations between Korean conglomerates and start-ups has been forming to bridge the gap with the more advanced AI nations. In 2019 Hyundai Motor and Kia invested GBP 1.23m and GBP 9.23m respectively in a Korean start-up 42dot, a provider of comprehensive mobility infrastructure platforms. Last year, the start-up was appointed to fully operate Hyundai Motor's newly created autonomous driving business (Transportation-as-a-Service division), which helped 42dot to raise the Series A round up to GBP 61.6m in 2021, attracting big investors like SK Telecom, LG Uplus, Shinhan Bank, Lotte Rental, and more.

The key players have been rearranging their internal organisations, and actively recruiting professional researchers to staff their newly formed AI teams and divisions. However, the market still has a shortage of skilled engineers and AI professionals. To overcome this, companies are implementing a parallel strategy – fostering future AI talent by establishing in-house campuses and education programmes while also acquiring local or international AI firms. LG Group, for example, has formed a group-wide LG AI Research that secures AI original technologies and aims to nurture up to 1,000 AI experts by 2023 in order to massively expand AI expertise across its key sectors, such as home appliances, telecommunications, electronics, and bio.

Industry Insider's Thoughts

Samsung Ventures invests in many AI-related areas – voice interfacing and graphics for photo and face recognition are some key verticals. We're looking at more general AI-platforms, though we're a bit more sceptical about this. We're also looking at AI-accelerator chips and next-gen hardware. Our London office is active in finding investment opportunities in the AI space.

Director - Samsung Ventures

Table 1: Key Players and Reorganisation Plans

Company	Industry	Reorganisation and New Recruitment
Samsung Electronics	Electronics	Launched Samsung Innovation Campus with a focus on AI, IoT, ICT in 28 countries and enrolled over 30,000 students in 2021
Hyundai Motors Group	Automotive	Established the AIRS (AI Research & Service) company in 2019 to develop AI technology in an automotive voice agent, mobility service platform, and smart factory
SK Telecom	Telecom	Established an "AI Tech Centre" under the direct supervision of the CEO
KT	Telecom	Appointed key personnel for "eBrain" from MIT
LG U+	Telecom	Formed a unit of 80 specialists, who applied AI on IPTV search service, which detects users' specific preferences, and thus recommends suitable contents
Naver	IT	Joined hands with KAIST Graduate School of AI and Seoul National University to build AI research centres for further joint research, and to foster more AI specialists
Kakao	IT	Established AI subsidiary "Kakao Brain" and developed an in-house AI assistant Casper, allowing functions like speech-to-text, text-to-speech, machine translation and image recognition

Source: Intralink research

Figure 5: AI Ecosystem

04

GOVERNMENT INITIATIVES

GOVERNMENT POLICIES ON AI

When President Moon Jae-In took office in May 2017, two of his main campaign promises were the creation of jobs and an economic policy based on 'innovative growth'. It became clear that the so-called fourth industrial revolution would play a central role in achieving these two goals when Moon established the Presidential Committee on the Fourth Industrial Revolution and the Ministry of SMEs and Start-ups. This initiative clearly signaled the government's support for DNA (Data, Network, and AI) and led to policies such as Data Industry Activation Strategy, 5G Strategy, AI R&D Strategy, and other AI-related policies (Table 2).

Artificial intelligence has been one of the four concrete goals of the Moon administration's science and technology policy plan for the fourth industrial revolution. The policy directive mentions a strategic expansion of AI's core technology and the creation of a cooperative ecosystem. Vision and voice recognition and natural language processing were explicitly mentioned as a focus for the policy initiative. Another focus has been the creation of supercomputing hardware and software over the past five years.

In March 2022, the new president-elect Yoon Suk Yeol pledged to launch a government platform fully supported by AI technology within the next 3 years. The incoming government has already tasked Ministry of Science and ICT with the upcoming national project to digitise further administrative functions and the civil service, pointing to likely strong support for further incorporation of AI, big data, cloud, and 5G/6G technologies.

Table 2: Major Korean AI-related Policies

Policy	Date	Context
AI R&D Strategy	May 2018	Securing AI technology, securing AI experts, building AI technology infrastructure
Strategic investment direction for innovative growth	May 2018	Strategic investment in the three major areas (data, AI, hydrogen economy) & fostering innovative talent
Data and AI economy revitalization plan	January 2019	Creating a world-class AI innovation ecosystem and promoting convergence between data and AI
Strategies for spreading and accelerating innovative growth	August 2019	Accelerating innovation across platforms (data, network, AI) and leading businesses
AI National Strategy as part of Digital New Deal	December 2019	Presenting visions and tasks for leaping into a global AI leader

Source: Korea Institute for Industrial Economics and Trade (KIET), 2021

In December 2019, the government announced its National Strategy for Artificial Intelligence under the Digital New Deal initiative with the aim of creating a cooperative ecosystem and ensuring AI played a core role in the nation's key infrastructure, namely defence, security, healthcare and industry. The government aims to bring the public and private sectors together to secure a world-class digital competitiveness and turn Korea into a global AI powerhouse by 2030.

The government has also stressed the importance of AI across numerous ministries' portfolios. In 2021, the Ministry of Science and ICT (MSIT) hosted the first AI Strategy Summit where public and private sector professionals gathered to explore opportunities for cooperation to lead the AI and data economy. The Ministry intends to hold the AI Summit every six months to cover topics such as AI semiconductors, cloud development, public-private collaboration in fostering AI talent, digital healthcare, and AI robot services.

The Ministry of Trade, Industry and Energy (MOTIE) has been focusing on AI with respect to digital health (e.g., precision medicine), autonomous vehicles (e.g., machine and deep learning algorithms), and energy (accurate estimates of renewable energy generation) and provides specific support to relevant SMEs and R&D centres. The Ministry of Land, Infrastructure and Transport (MOLIT)'s plans focus on developing AI to facilitate the development of autonomous vehicles, drones, and smart cities.

GOVERNMENT INVESTMENT PLANS

As AI continues to become a more important component of the government's overall industrial policy, the amount of investment is increasing, and the focus of investments is changing. Under the National Strategy for AI, the government confirmed an investment of GBP 110m across Nine Strategies and 100 tasks across three areas: AI Ecosystem, AI Utilisation, and People-centred AI, which are the main pillars of this initiative.

One of the key tasks under the National Strategy for AI was to create an AI Investment Fund. Another essential investment the government allocated under the strategy is the opening of Korea's first ever National AI Industrial Complex, AI Hub Centre in Gwangju, which aims to create a supportive ecosystem for the startups and in which the government has invested approximately GBP 243m. The facility supports fundraising through the Korea IT Fund, Future Technology Development Fund and aims to bring in matching funds related to DNA (Data, Network, and AI).

In July 2021, the government announced a revised investment plan under Korea New Deal 2.0 that covers three verticals - Digital New Deal, Green New Deal, and Human New Deal. This revision came about largely with the realisation that the pandemic demonstrated the urgency of accelerating the transition to the digital economy and fostering an 'untact' (non-contact) infrastructure. According to the Korean New Deal 2.0, a total of GBP 30.3m will be invested between 2021 and 2025 to strengthen the digitisation

ecosystem and to activate the use of AI technology across all three deals (Table 3).

Moreover, in November 2021 the Ministry of Science and ICT announced its plans to invest GBP 251.2m into developing technologies related to process-in-memory (PIM) chips, a must for AI that requires fast processing of vast amounts of data. Unlike conventional memory chips, PIM can help increase processing speed and improve power efficiency. The funds will be spent between 2022 and 2028.

Exobrain

Exobrain is the Korean equivalent of IBM Watson, with the goal to develop AI software for natural language processing that enables human-machine communication. The Electronics and Telecommunications Research Institute (ETRI), a non-profit government-funded research organisation, is in charge of developing the AI. The government plans to invest approximately up to GBP 74m and by 2023 hopes to develop the Exobrain technology so that it is capable of performing tasks such as responding to requests at call centres, working as an advanced computer and assisting drivers with navigation. The project has already resulted in technology that is capable of understanding natural language and providing correct answers on a contextual basis.

Deep View

Deep View is a computer vision project that started in 2014 and is due to be completed in 2024 at a total cost of GBP 74m. Led by ETRI and supported by university research centres, the goal of the project is to analyse large-scale data from both still images and video footage to understand multi-dimensional and time series changes in urban scale. Once fully developed, Deep View will be able to replace humans in a variety of applications, such as industrial quality inspection, medical diagnosis, intelligent CCTV, online video platforms, autonomous vehicles as well as intelligent robots.

Table 3: Korean New Deal 2.0 – Revised Investment Plan (GBP million)

Deal	2022	2021-2025	Total (since 2020)
Digital New Deal	5.56	30.3	41.4
Green New Deal	7.85	37.7	60
Human New Deal	7.05	30.9	34.6
Total	20.46	98.9	136.1

Source: Ministry of Economy and Finance (2021)

Table 4: Application and Commercialisation of AI in Government Demonstration Projects

Field	Sector	Content
AI Area of Demand	Machinery	Three projects including 1) smart construction 2) autonomous agricultural equipment and 3) artificial in-line injection moulding systems that can operate alongside workers
	Robots	Robot with social intelligence characteristics that can use autonomous judgment in unstructured situations, to be applied for efficient execution of existing repetitive tasks in logistics and manufacturing
	Shipbuilding	Development of augmented reality based remote control systems capable of recognising and responding to maritime environment – for use in large merchant ships
	Drones	Development of an unmanned aerial vehicle system capable of automatic return and self-diagnosis in case of wireless disconnection through image recognition and obstacle avoidance systems
	Medical devices	AI-based decision support systems using digestive and cardiovascular images; Development of diagnostic assistive systems using bi-directional capsule endoscope
	Security systems	Development of a security system that uses mobile robots, drones and image recognition etc
	Smart factories	Utilising Big Data and Deep Learning to accurately diagnose the health of production facilities and to develop productivity-enhancing management solutions
Base Technology	Semiconductors	Development of AI Systems-on-chip (SoC) semiconductors for server systems that can process learning and judgment at high speed in real time
	Cyber security	Deep learning-based cyber security technology with self-learning function to protect smart factories and service robots by detecting malicious software and hacking attempts

Source: Ministry of Trade, Industry and Energy, "Artificial Intelligence, Big Data Industrial Intelligence Forum", 2020

RELEVANT LEGISLATION

Korea is currently in the early stages of developing legislation relating to AI. In December 2020, the country took its initial steps by presenting the ethical standards for AI with the theme of "AI for humanity". The standards depict the three pillars for the ethical use of AI as being human dignity, public benefit, and the right purpose of technology. These pillars stand on ten essential elements: human rights, privacy, diversity, infringement, pursuit of greater good, solidarity, data management, responsibility, safety, and transparency. The ethical standards do not impose legal obligations, but the Ministry of Science and ICT (MSIT) stated its intention to promote these standards by providing checklists and educating innovators and users.

In the same month the MSIT also presented its 'Roadmap for Legal, Institutional and Regulatory Maintenance' for AI and announced that it had formed a task force team to establish a legal foundation for AI. The government has recently drafted the Framework Act on Promotion of Data Industry and the Promotion of Use (Framework Act on Data), a new law with the intention of establishing clear regulations for data collectors, aggregators and resellers, among other entities. The Law is to be enacted in April 2022.

Among Korea's existing legislation, data protection laws have a large influence on the roll-out and use of AI. Korea has long been one of the toughest jurisdictions in data protection with the Personal Information Protection Act (PIPA) at the core of all related laws. PIPA requires personal information to be collected exclusively for specific and lawful purposes and requires businesses to appoint personal information managers who ensure that all information is accurate and held securely, disclose companies' privacy policy and anonymise information wherever necessary. PIPA also contains separate rules for the initial collection and use of personal information and for any subsequent different use or transfers to third parties.

Since the arrival of the Moon administration in 2017 the government has been seeking to strike a balance between ensuring adequate consumer protection and providing businesses the necessary freedom to innovate. The government started an initiative in 2018 by installing a regulatory sandbox for new innovative industries including AI and fintech, exempting participating companies from certain regulatory requirements.

Korea has been passing major amendments to PIPA since 2020. The main goals have been to facilitate cross-border data flow and to establish an updated legal infrastructure to accommodate the country's rapid digital transformation. The former objective was partially achieved in December 2021 when Korea was declared to have an adequate level of personal data protection by the EU's General Data Protection Regulation (GDPR). The approval permits data from the EU to flow into Korea without additional safeguards.

Closer Look

In 2016, a prominent Korean NGO sued Google over a case of non-identifiable personal information that had been revealed by WikiLeaks. A local court ruled partially in favour of the plaintiff and requested that Google and Google Korea reveal what users' personal information had been passed on to third parties, such as the CIA in the US. Foreign companies were surprised by this ruling as it set a precedent that even local branch offices of foreign companies can be held accountable for actions that occurred entirely outside of Korea.

The government takes an active role in leading the growth of AI-related businesses and services in Korea. Paying close attention to government plans is a useful way to understand market trends in Korea, and companies can get updates on government contracts, projects and policies from the following websites:

- Korea On-Line E-Procurement System: The Korean government uploads its projects to seek competitive bidding from interested parties. www.g2b.go.kr (Only available in Korean)
- A matching service system, operated by PPS (central procurement agency in Korea), on behalf of foreign buyers and Korean firms. www.globalkoreamarket.go.kr (Available in English)
- National Strategy for Artificial Intelligence www.english.msit.go.kr/eng/ (Available in English)

05

KEY APPLICATION AREAS

This section identifies five opportunity areas for British companies in the AI sector: autonomous vehicles, digital health, virtual assistants, AI-based financial services, and smart manufacturing, as these areas have relatively large market size. Autonomous vehicles and digital health, for instance, represent good opportunities due to their high CAGR (41.1% and 15.4% respectively as of 2021) and their specific inclusion in government development plans.

British companies can seek strategic partnerships that go beyond selling their solutions in the Korean market and increasingly foreign venture-backed companies are looking to Korea as a source of investment, both strategic and purely financial. Samsung Electronics is pursuing investment in foreign AI technology companies and the same increasingly applies to Korea's internet giants, Naver and Kakao. SKT and KT, Korea's two top telecommunication companies, are also looking to invest and form partnerships with foreign AI firms, especially in natural language processing.

Industry Insider's Thoughts

We think the UK, Germany and the US are the three most attractive countries for AI. We have announced that we will integrate AI technology into our existing network across the following 5 platforms: media, smart energy, financial transactions, disaster safety, and enterprise public value.

Team Leader of AI Tech Centre & Service – KT

AUTONOMOUS VEHICLES

Korea ranked 7th on KPMG's 2020 autonomous vehicle (AV) readiness index, ranking well in infrastructure (2nd) and technology (9th), but slightly less so in consumer acceptance (10th) and policy and legislation (16th). Nonetheless, having legally allowed carmakers to sell a Level 3 autonomous cars from July 2020, the Korean government is keen to facilitate growth in the sector. Level 3 uses various AI-based technologies to allow drivers to take their hands and eyes off the road in certain situations. In November 2021, the government started construction of a testbed area in Gunsan city, which will be used for the research and development of high-speed autonomous driving technologies. The test road will be 21 kilometres-long, with vehicles allowed to reach speeds of up to 80 km/h.

Hyundai Motors is planning on commercialising Level 3 autonomous vehicles – starting with Genesis G90 in the second half of 2022 – and on launching Level 4 vehicles in 2027. In 2021, Kakao Mobility launched the Autonomous-Driving Alliance Program that was joined by Kakao's domestic partners, such as Autonomous A2Z, SWM, Thor Drive, Mars Auto, Edison Motors, and Stryx. Alliance members will be allowed to test AI technologies on Kakao T – Korea's biggest taxi hailing app with more than 29 million users. The initiative will provide a chance for companies to receive real-world feedback on their latest products, while users get to experience the newest services related to self-driving cars.

As the autonomous vehicle market continues to grow in both size and importance, and AI semiconductors play a crucial role in the development of autonomous vehicles, both government and private organisations are investing significant amounts into AI chips and related technologies. AI Chip and IP start-up Openedge secured strategic investment of GBP 1.8m from Hyundai Motor to create AI chips for autonomous vehicles. Currently, the company is creating and optimising IP chip for Neural Processing Units (NPU) and memory system enhancement, which will reduce power consumption by half while increasing processing efficiency by over 30%. The Ministry of Science and ICT also committed to spend around GBP 24m from 2022 to 2025 to support the development of AI chips related to autonomous driving.

Industry Insider's Thoughts

At Naver, we are focused on "ambient intelligence". By this, we mean being able to provide relevant services and information even before a user becomes accustomed to the environment. Cars are just the tools that help us move from point A to point B. We don't want to focus so much on the tools, but rather on in-vehicle information (IVI) systems that provide real-time information to make the passenger's journey more comfortable and meaningful.

Team Leader of AI Tech Centre & Service – KT

Case Studies

Hyundai Motor Group	
Website	www.tech.hyundaimotorgroup.com
Problem	Launch Ride Pooling Service 'Shucle'
Key Technology	Real time optimal route creation technology (Dynamic Routing Engine)
Outcome	Korea's first on-demand ride pooling service for area residents
Developed by	Hyundai Motor Group
Overview	Shucle service is based on real-time route creation technology and determines the optimal route for a journey. The key benefit it provides to passengers is cost and time efficiency. The system uses AI vision systems inside vehicles to identify seats available for passengers in real-time. Users can call a vehicle within a radius of 2 km, and one van can pick up and drop off up to 11 passengers at their desired locations. The service launched in April 2021, and is available in three cities – Eunpyoung, Sejong, and Paju.

RideFlux	
Website	www.rideflux.com
Problem	Develop a software for Level 4 autonomous driving by 2024
Key Technology	End-to-end AI-based full stack software solution
Outcome	Self-driving shuttle service from Jeju airport to SOCAR station
Developed by	RideFlux
Overview	RideFlux launched a real-time demand response self-driving shuttle service in Jeju and in 2021 the company started the self-driving paid transportation service that connects Jeju Airport and Jungmun Tourist Complex, the longest self-driving distance in Korea (76km round trip). RideFlux raised Series A investment of GBP 10.1m. The company's goal is to provide autonomous driving services that anyone can use in major cities across the country by 2024.

DIGITAL HEALTHCARE

One industry that has seen great leaps in terms of artificial intelligence in recent years is digital healthcare. According to market research firm Markets and Markets, Korea's AI healthcare market was estimated to be worth GBP 47m in 2020 and is expected to grow to GBP 152m by 2023. As of September 2021, there are a total of 85 AI-based medical devices approved by the MFDS in Korea, a sharp increase since 2018 when there were only 4 approved devices.

Since May 2018, a consortium sponsored by the Korean government has been developing an AI-based medical solution called "Dr. Answer", Korea's version of IBM Watson. Led by Seoul's Asan Medical Centre and involving 25 local hospitals and medical institutions as well as 21 AI software developers, including DEEP Bio, JLK Inspection and Kakao Brain, the state-sponsored medical AI initiative set out to develop a platform that analyses patients' medical data to offer personalised diagnostics and treatment plans for major diseases.

The current iteration of the platform solution, called Dr. Answer 2.0, is comprised of 24 software programmes, and can help diagnose 12 diseases including cancers, cardiac disorders and Alzheimer's. The unique selling points of these platforms are that the main database reflects Korean data and the platforms become eligible for reimbursement once approved by the MFDS. Clinical trials are underway at 26 hospitals in Korea, as well as Saudi Arabia and several countries in Africa.

Korea has a large quantity of medical data as almost its entire population is covered by the country's national health insurance system, but it has faced challenges using this data due to strict regulations. Nonetheless, there is a growing demand for AI and big data-related technologies, spurred by bio database projects and precision medicine hospital information systems.

Industry Insider's Thoughts

Korean companies' weakness is managing innovation – they won't finance projects unless they are ready for the market. Between "innovation" and "advanced development", creativity is important.

- CEO of Neurocontrols

Table 5: Current AI Developments in Hospitals

Hospital Name	Current Status of Development in AI Technology
Seoul National University	Plans to develop a new hospital information system
Yonsei University	Plans to develop disease prediction service based on big data
Seoul Asan Hospital	Plans to open business group focused on analysing medical images
St. Mary's Hospital	Developing radiation cancer treatment technology with Stanford University
Ajou University Hospital	Developing solutions to predict the number of emergency patients in ICU

Source: Intralink Research

Both the British and Korean governments are supporting initiatives raising awareness around the clinical benefits of precision medicine programmes and resolving issues regarding data usage. As both countries work towards achieving the same goals, this will result in significant opportunities in Korea for British companies with strengths in precision medicine platforms, data analytics and data interpretation, as well as applying analytics to develop AI/big data-based medical diagnostic and treatment devices, which are all necessary to boost the adoption rates of AI/big data solutions.

Industry Insider's Thoughts

Implementing AI in the health care industry, especially in Korea, would be very useful, where the after-care service for patients is weak. Since it is expensive to monitor all patients after medical treatment, managing records of diagnosis and medicines through AI would help in tracking patients' health.

CEO of Healthcare Chatbot Inc.

Case Studies

Samsung Medison	
Website	www.samsungmedison.co.kr
Key Technology	Diagnostic imaging solutions in ultrasound, digital radiography, and mobile computed tomography
Outcome	New AI-based features 'NerveTrack' and 'UterineAssist' for ultrasound solution
Developed by	NeuroLogica and Samsung Medison
Overview	Samsung Medison has leveraged AI technology to advance its diagnostic ultrasound solution, and deployed AI functions on each product in 2021: • 'NerveTrack' – provides real-time nerve location information to anaesthesiologists and expert practitioners • 'UterineAssist' – detects tissue changes and assists doctors with a faster workflow support

Lunit	
Website	www.lunit.io
Key Technology	AI-powered diagnostic tools for detecting cancer
Outcome	Accurately analyses mammography images to detect lesions indicative of cancer
Developed by	Lunit
Overview	Lunit has developed data-driven imaging biomarker (DIB) technology that is derived from large-scale medical image data which defines important diagnostic features without guidance from previously established medical criteria. In 2021 Lunit raised GBP 44.8m in its pre-IPO fundraising round, led by major international healthcare investors. Lunit's key products are: • Lunit INSIGHT CXR Triage – AI Powered chest x-ray • Lunit INSIGHT MMG – AI solution for breast cancer detection

AI-BASED FINANCIAL SERVICES

Fintech was another area that witnessed rapid growth since 2017 with the Korean cryptocurrency craze generating global headlines. One of the AI-based fintech technologies that is gaining popularity in Korea is the robo-advisor, a technology that is mainly used as a wealth management tool. Despite the market uncertainties caused by the pandemic, investments into the nation's three robo-advisor platforms – Fount, Aim and Fint – amounted to GBP 795m in 2020, five times higher than GBP 156.2m in 2019, according to the Korea Financial Investment Association.

Although Korean financial service institutions have a reputation for being conservative, they cannot escape the impact of AI and are now building their own AI-based ecosystems. Customer-facing AI-based solutions have been implemented actively across the banking, securities, credit card and insurance industries to provide customer consultation services for their products. AI integration is now an essential factor in finance to enable a smoother and faster workflow.

According to the head of the Korean Advanced Institute of Science and Technology (KAIST) Centre for Wealth Management Technologies, as the market for retirement pensions expands due to an aging society, more people are becoming interested in receiving AI-powered financial advisory services. In addition, due to historically low interest rates, more investors want access to alternative asset management services and so-called "robo-advisors," which use AI and big data to provide financial suggestions and solutions for users.

According to KOSCOM, between 2018 and 2020, AI-driven financial advisor products saw a huge spike in demand with more than 150,000 users subscribing to these services and the number is continuing to grow. The ecosystem and regulations have been adapting to keep pace with the rapidly expanding market. As of 2021, there were four brokerage houses that had launched their in-house developed robo-advisor platforms: NH Investment & Securities, Daishin Securities, Mirae Asset Daewoo, and Kiwoom Securities.

Industry Insider's Thoughts

Until recently people were not that interested in data. However, this changed suddenly and there has been a massive focus on the collection of data in recent years. This data enables us to predict users' financial behaviour. By using the data, we are able to produce prediction functions and models which provide insights into the future. Better prediction equals less risk.

Co-founder - Solidware

Considering the growing consumer and financial sector acceptance of AI-based financial solutions, UK businesses active in the sector could enjoy considerable opportunities in Korea. Particularly wealth management solutions regarding personal finances, stocks, and savings are expected to burgeon from a low base. Another opportunity area is fraud detection, undeveloped in Korea compared to its global peers.

Case Studies

Qara	
Website	www.qara.ai
Problem	Reduce investment losses and expand investment opportunities for users
Key Technology	AI deep-learning robo-advisor products that provide investment analysis to both individual investors and asset management firms
Outcome	Qara's deep learning technology was recorded at 83.1% of S&P Accuracy Rate
Developed by	Qara
Overview	Qara, established in 2014, has developed a machine learning technology that analyses and forecasts trends in financial markets and takes account of a customer's financial goals and risk tolerance to build an optimised investment strategy. Qara aims to expand its footprint globally and has secured GBP 2.2m worth of Series A investments from Korean and UK based venture capital firms

Shinhan AI	
Website	www.shinhanai.com
Problem	Improve risk management and prediction for stock related indexes, as well as the yield on 10-year US and Korean government bonds
Key Technology	The technology relies on Shinhan Group's 430,000 structured and 18 million non-structured data that has been collected over the past 30 years
Outcome	NEO platform – AI tool used by all risk managers of Shinhan Financial Group
Developed by	Shinhan Bank and Shinhan Data System
Overview	Formed in 2019, Shinhan AI aims to provide investment advisory services for asset allocation and funds analysis by applying its AI technology. The NEO platform relies on six hundred risk variables such as exchange rates, long and short-term interest rate differentials and bond yields, to improve risk prediction and deliver more accurate risk management services to its clients

SMART FACTORIES

Increasing industrial productivity has always been an essential element to the Korea's economy. The integration of AI to transform existing production methods and increase efficiency has risen up the agenda of Korea's manufacturing sector in recent years. Some of the applications that have started to be rolled out with AI and machine learning technologies include product simulation, remote analysis of equipment, digital twins, and facility predictive maintenance.

The Ministry of Science and ICT is actively pushing for smart manufacturing innovation technology development and has committed to GBP 217m of investment by 2025. The government aims to have 2,000 AI-based smart factories by 2030, implementing the 'Industry AI Project' across six of Korea's key manufacturing sectors.

The core of any AI technology is well labelled data and so the government is keen to build an industrial big data platform which will be open to SMEs in the manufacturing sector. Since 2020, the government has also been working to establish a cloud-based platform connecting industry with the government's AI manufacturing platform (Korea AI Manufacturing Platform) and to launch a "solution app store" that will support the development and distribution of AI solutions to SMEs.

Top local system integrators such as LG CNS, Hanwha Systems, CJ OliveNetworks and Samsung SDS have already developed in-house smart factory solutions that are being deployed across their subsidiaries' plants. Major Korean conglomerates, specifically Samsung and LG, have demonstrated a strong commitment to accelerating manufacturing automation and digitising more or their processes.

Big telecom companies have also taken advantage of the trend. KT, for example, has invested over GBP 31.7m in Hyundai Robotics to advance the development of 5G-connected industrial robots that offer remote maintenance, production control, predicting the equipment's life cycle and performance. LG Uplus also shifted its business towards smart factory, providing 5G and LTE-based wireless communication technologies for smart factory platforms that often operate in real-time.

One of the key challenges to the roll-out of smart factories in Korea, however, is the slow migration of industrial data from on-site to private cloud infrastructure, and although this is slowly improving the reluctance to move to the cloud for fear of data leakage is still a feature of the Korean manufacturing sector. That said, demand for AI-based platforms and solutions among industrial companies continues to accelerate, and UK companies that offer production optimisation, energy optimisation or predictive maintenance solutions for smart factories would do well to take advantage of the trend.

Case Studies

SK Gas	
Website	www.skgas.co.kr
Problem	Achieve energy savings and energy optimisation using AI technology
Key Technology	Energy Efficiency Solution Powered by Metron
Outcome	Energy Analytics Solution
Developed by	Metron
Overview	SK Gas is the biggest supplier of LPG, LNG, and gas chemicals on the domestic market, and recently the company has expanded its business scope to eco-friendly energy services, which aim to help customers use their energy more efficiently. In 2020 SK Gas entered strategic partnership with a French company Metron, a start-up whose solution recommends in real-time equipment operation measures that optimise a factory's energy usage.

POSCO	
Website	www.posco.com
Problem	Improve production efficiency using AI technology
Key Technology	Through AI integration, POSCO has improved productivity by 25%, reducing carbon emissions and energy input by 2%, which saves GBP 616k per year
Outcome	POSCO AI-based Blast Furnace
Developed by	POSCO and POSCO ICT
Overview	POSCO is the world's 4th largest steelmaker headquartered in Pohang. The company operates the first ever AI-based blast furnace that is considered a super-gigantic furnace. POSCO integrated the machine learning with the collected data, using sensors that measure temperature and other essential variables of the furnace. The AI technology stabilised steel works operation process while reducing carbon emissions and energy costs.

AI ASSISTANTS

According to data released by Counterpoint Technology Market Research, the global AI speaker market will continue to grow at a CAGR of 21% from 2020 to 2025 due to increased consumer awareness, expanded choice and technological advancements. Besides Google's Alexa, there is a total of six AI assistants developed by local major players such as Samsung Electronics (Bixby), LG Electronics (Think Q), Kakao (Kakao i), Naver (Clova), KT (Genie) and SK Telecom (Nugu).

Korean messaging services including KakaoTalk from Kakao Corp and Line from Naver incorporated AI technology into their existing messaging services, as well as several smart devices including speakers and smart lamps. In 2021, Naver launched Clova Lamp based on machine reading comprehension and natural language understanding technologies, which can interact with children by reading books in both Korean and English and translate words at a child's request. Korean companies enjoy an advantage in chat and voice bots for the domestic market as such services are dependent on language-specific insights and technology.

Industry Insider's Thoughts

Nugu is the first Korean-language voice assistant in the world – and its quality is on par with Alexa and Google Assistant. In Korea, SKT has a dominant "mindshare" – by mindshare, I mean that SKT is able to strongly influence the types of services that its subscribers use.

Director - SK Telecom

Case Studies

Naver Corp	
Website	clova.ai
Problem	Cultivate healthy reading habits for children
Key Technology	Smart reading lamp, powered by AI and computer vision technology
Outcome	Clova Lamp – a desk light that can convert text and images from a book into speech. The assistant can explain a word's meaning and answer questions
Developed by	Naver Corp
Overview	Naver was founded in 1999 and has focused mainly on online services, as well as operating its messenger Line – which has more than 200 million users around the world. In recent years, Naver started investing largely into AI, and actively integrates its smart assistant solutions across several devices, where Clova Lamp, launched in 2021, was the first ever smart lamp that uses machine vision and AI technology to interact with children, by reading and translating books in both Korean and English.

KT	
Website	www.enterprise.kt.com
Problem	Improve customer service calls with the AICC (AI Contact Centre) tool for B2B
Key Technology	AICC tool was built relying on Giga Genie, KT's voice command AI assistant technology. The AICC tool can correspond with customers, by asking questions and understanding complex context in Korean
Outcome	KT runs the AI-assisted services in its customer call centres nationwide
Developed by	KT
Overview	KT has been investing heavily in the development of media, e-commerce, and AI technologies. The AICC tool KT is offering is an intelligent contact centre that responds to questions and requests using AI and machine learning technologies. The company aims to lead the AI Contact Centre market, which has grown by 8.25% year on year since 2010

06

MARKET ENTRY STRATEGIES

Korea has a highly developed ICT infrastructure which creates the solid foundation for foreign businesses to test and introduce their AI technologies and solutions. UK businesses looking to introduce their technology or product to Korea should consider both business-related and cultural factors before setting out. UK businesses can approach the Korean market either through direct sales from the UK, by appointing a partner, or by setting up an office in Korea.

Direct Sales From the UK

The simplest market entry option is for UK companies to sell or license a particular AI technology directly to Korean end-users. The main downside of a direct sales approach is the lack of local language and time-zone support as Korean companies tend to be particularly demanding of their partners. This can be mitigated by using a contract-based local liaison capable of bridging time-zone, language and cultural gaps without the long-term commitment of local incorporation and hiring. Market specific factors to consider include:

- Do we have a strong differentiator – something that sets us apart from our competitors in the market?
- Do we have a strong track record in other major markets? Korean companies are not easily convinced to use a new, disruptive technology as a first-mover without case studies
- Are we willing to localise the product for the market and/or for local regulations, if necessary?
- Are we ready to provide a Proof of Concept (PoC) at little or no cost to the customer? Korean companies will look to drive the price down and will not commit before proving the value through testing
- How do we provide after-sales support? Korean customers expect high-quality, local-language support

Appointing a partner

Perhaps a more common way to approach the market is to seek a partnership with an established local company that complements your product, has experience in the target sector and can help navigate the legal environment. A local channel partner, perhaps a systems integrator (SI), can provide services such as pre-sales, sales, consulting, installation, technical training, service maintenance, technical support and system integration in the Korean market. Even large multinationals usually take this route in the early stages of market entry. Market specific factors to consider when seeking a partner include:

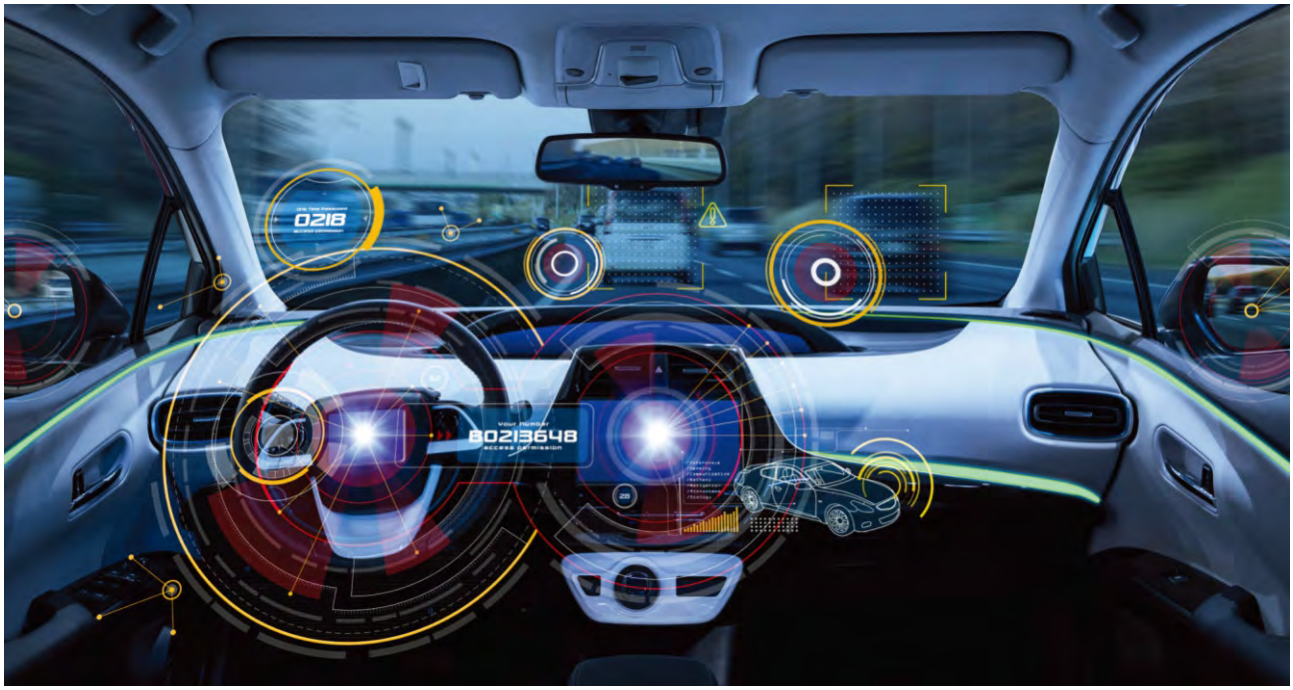
- Does the partner already serve the type of customer that we do?
- Does the partner have a good understanding of the market in general and my application?
- Does the partner already offer solutions similar or synergistic to our offering?
- Is the partner focused on short-term wins or will they be able to drive our business in the long run?
- Does the partner have specific experience with public sector projects?
- Are we comfortable communicating with the local partner and are they transparent with us?

Establishing a Local Presence

There are broadly three ways of establishing a local presence: (1) a liaison office, (2) a branch office or (3) a local corporation through foreign direct investment (FDI). Setting up a liaison office is a simple process, but a liaison office can only perform non-profit generating activities in Korea such as market surveys, research and development and quality assurance. Setting up a branch office can be a complicated process that requires specific documentation to be translated but it allows for sales activities and the exchange of revenues with the head office.

The most common process for an overseas company to open a branch office in Korea is through FDI where an initial investment is made by the head office which in return owns stock in the branch. The local corporation leads independent activities and is authorised to perform direct transactions. Market specific factors to consider when establishing a local presence in Korea include:

- Is our business generating enough revenue in Korea to consider a local presence? Businesses usually consider establishing a local presence after several years of sales (either direct or through a partner)
- Do we need to engage in profit generating activities, or not?
- Will we transfer staff from our head office or hire local staff? Both options have legal implications that need to be considered
- What location shall we pick for our local presence? Scouting, negotiating, and conclusion of contracts are very time-intensive processes that often are hard to conclude without local support



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