Innovative Korea: Deep tech ecosystem growth for building an innovation-driven, resilient economy in a new global era

Reddal – Korea deep tech report

June 2025

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Forewords

When we at Reddal first visited Seoul in 2011, South Korea stood with a track record bar none. It had performed a miraculous transformation from a war-ridden country to a modern developed nation and had a stellar growth record. No surprise then that we decided to open our Seoul office the following year, in 2012.

However, the second decade of the new millennium brought new challenges to South Korea. Growth was slowing down, the challenge from China was felt increasingly in many industries, and the era of industrial policies set by the government seemed to grind to a halt. Presidential commitments to first green technology and then creative economy did not really change the trajectory. Increasingly Korea was facing challenges that are common of developed nations – demographics and aging, growing inequality, and increasingly cautious corporations focusing more on stability than aggressive growth. And as in the past, SMEs and startups continued to remain marginalized.

These challenges reminded me very much of my home country, Finland. In Finland, the collapse of Nokia brought a massive change to the business ecosystem and helped to build a new and active startup ecosystem that became internationally recognized. Could the same happen in South Korea?

It was with these thoughts we at Reddal decided the launch the "Korea Deep Tech" project. We wanted to gauge the state of Korean "bleeding edge" innovation and how well the nation's ecosystem supports creating new global leaders. We hope this report provides some insights to this.

Per Stenius

South Korea's rapid economic growth, fueled by strong public-private alignment and conglomerates in strategic sectors like automotive and semiconductors, has been cited as a model of national development. Yet, this success has come at a cost. The broader industrial ecosystem, including SMEs, has faced mounting pressures: weakened productivity, limited global exposure, and startup communities overly focused on domestic conglomerates as exit channels.

As global innovation accelerates, particularly in frontier fields like AI, Korea risks falling behind, having missed early opportunities in several emerging domains. This has raised doubts about whether the country can maintain its economic momentum.

To chart a new course, Korea must cultivate a more decentralized and inclusive tech ecosystem. Deep tech, spanning university labs, SMEs, and public-private research efforts, will play a central role in shaping the next wave of global economic growth. But for this to happen, technical and commercial expectations must be high from the outset. Korean deep tech ventures must aim to set global benchmarks, not follow them. Doing so will be essential to building a vibrant hub that attracts top talent, forward-looking customers, and committed investors from around the world.

We hope this report offers a starting point for dialogue and collaboration among global stakeholders eager to engage with and contribute to Korea's deep tech evolution.

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Korean deep tech ecosystem is showing early success, yet building sustained momentum will depend on global reach, broader exit options, and active conversion of basic science research

Executive summary

In this report

Reddal's deep tech list introduced

432 companies

Insights from

9 investors

8 startups

1 foreign expert

Growth perspectives

10 sectors including AI, robotics, quantum and nuclear

Early wins, global limits, and structural hurdles

- Korea's deep tech ecosystem has achieved early successes but faces significant challenges
- Many startups remain centered on domestic use cases, limiting their global impact
- Limited foreign capital availability significantly hinders the globalization of domestic deep tech companies
- The broader startup landscape and domestic IPO system have confined investors to safer bets
- Startup formation remains sluggish, and R&D outputs lag behind leading economies despite high investment levels and a strong researcher pool

Limited global reach and commercial innovation

- Attraction of foreign investors and customers is critical for global competitiveness
- Korea should focus on creating value at a global scale and establish a platform for transforming high-impact ideas into market-ready products
- A healthy deep tech ecosystem requires continuous translation of basic science research into private-sector commercialization
- Ecosystem development should not be solely government-driven but foster symbiotic relationships among innovators, end users, and funding providers

Growth via targeted stakeholder action

- A focus on global value creation through multi-stakeholder collaboration and a systematic approach is critical for success
- Rather than forcing innovation through artificial structures, the right conditions for natural innovation should be created
- Startups should target global challenges with strong commercialization strategies
- Domestic investors should hone their deep tech expertise, diversify the LP base, and enable high-impact, long-term returns
- The government should reduce regulatory barriers and cultivate a global testbed environment for breakthrough technologies

Global leadership: fast-follower to first-mover

- Starting point – actively engage with global talent, startup and venture capital community
- Over the next 3–4 years, startups and investors should build strong deep tech cases focused on globally impactful products, backed by consistently supportive regulatory environment
- For long-term growth (5+ years), diversification into emerging fields like quantum and nuclear will be key to achieving global leadership
- Moving beyond fast-follower strategies common in AI and robotics, startups should shift to first-mover approaches to drive differentiation

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Korea's large volume of deep tech companies can be attributed to its historically strong biotech industry; however, focus areas are rapidly shifting, driven by the influence of the global AI boom

Deep tech definition, segments and technologies

Our definition of deep tech

Reddal's deep tech list includes 432 firms that are manually selected based on the following criteria

- Possession of foundational technologies that solve complex engineering challenges
- Currently existing SMEs and startups that have raised at least a single round of investment from established investors like VCs and accelerators
- Aligns with Korean government's selected deep segments and technologies*

Firms with AI-based core offerings

Biotechnology — AI 26%
215 companies
AI diagnostics | Cancer treatment | Antibody

Robotics — AI 72%
29 companies
Industrial robots | Robot surgery | AI robotics

AI and big data — AI 100%
78 companies
AI cores | AI engine | Generative AI | LLM

Aerospace — AI 48%
23 companies
Satellite | Drones | Aerial vehicle systems

Cloud and network — AI 100%
21 companies
Cyber security | MSP | Cloud computing

Mobility — AI 77%
22 companies
Autonomous driving | Battery materials

System semiconductor — AI 86%
14 companies
Microchip design | AI chips | NPU | Fabless

Quantum technology — AI 50%
4 companies
Quantum computing | Quantum engineering

Sustainability — AI 15%
26 companies
Bioenergy | Hydrogen | Recycling | CCUS

Next generation nuclear
None detected
Small modular reactor

*10 pre-defined categories are biotechnology, AI and big data, sustainability, cloud and network, robotics, system semiconductor, aerospace, mobility, quantum technology, and next generation nuclear.

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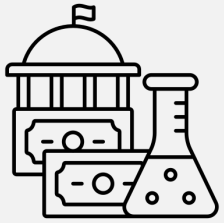
Deep tech represents a transitional phase shaped by both basic science research and commercial interests, with many emerging technologies still in the pre-commercial stage

Technology development phases

Phase 1: Research

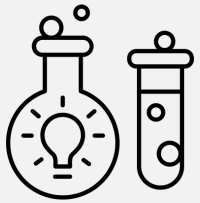
- Basic science research
- High-risk and high-cost R&D



- Government research institutes
- University labs

Phase 2: Lab-to-market

- Applied technologies
- Customers defined
- Public funding and grants



- Early-stage university startups and small government-funded startups
- Corporate spin-offs

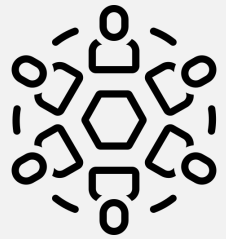
Phase 3: Scaling

- Revenue generation
- Product-market fit tested
- Private investors

- Private fund-backed startups
- Larger startups with focused product and customer portfolio

Phase 4: Maturity

- Mass commercialization



- Scaled companies with more mature and diversified product/customer portfolio
- Technology by conglomerates

Potential deep-tech

Deep-tech

Ex-deep-tech

Other segments with a longer history of established deep tech cases

Quantum technology
Next-generation nuclear

Source: The Seoul Institute (2022), Hankyung (2021), Reddal analysis.

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Currently, the growth of Korea's deep tech ecosystem is primarily driven by institutional initiatives and global technological trends, despite facing country-level challenges

Overview of deep tech growth drivers and inhibitors

Key growth drivers

General

Government subsidies and directives for deep tech vitalization

Sector-specific

AI boom

- Driven by the introduction of ChatGPT in 2022
- Advancements in AI technologies, including semiconductors, cloud computing, AI models, and AI services
- Notable AI semiconductor startups include Rebellions and Furiosa AI

Rising biotech interests

- Global breakthroughs such as CRISPR-Cas9 (gene editing) and mRNA technology are driving interest
- Domestically, AI-based cancer diagnostic startups like Lunit and Deep Bio are gaining traction

Climate change and global sustainability mandates

- Focus on waste processing, biomaterials, and decarbonization software solutions
- Largely driven by Korean conglomerates' needs to meet global customer demands

Key growth inhibitors

Country-wide

Talent drain to bigger markets

- In 2023, Korea recorded a net outflow of 0.3 AI experts per 100,000 (population)
- 5,600+ Koreans received EB-1/2 visas in the US (2023), a category often granted to experienced engineers; on a per-capita basis, this was the highest globally

Macroeconomic factors

- High interest rates increase financing costs for startups
- Early-stage investments in H1 2024 declined by 29% YoY, while later-stage deals increased by 9.5% during the same period, indicating reduced risk appetite

Limited groundbreaking solutions

- Technology trade remained in deficit, reaching 4.4BUSD in 2022
- Electronics segment was the most foreign-dependent, with a 4.2BUSD deficit

Slow startup scene at universities

- Seoul National University (77th), is the only Korean college in the global top 100
- Between 2013 and 2024, it produced 251 startup founders, while the top-ranked UC Berkeley produced 1,811

Certain segments like quantum computing and next-generation nuclear missing clear commercialization opportunities

- Quantum computing startups received approximately 0.4% of deep tech investments in H1 2024
- Technologies such as small modular reactors (SMRs) face regulatory delays, pushing commercialization timelines

Source: Expert interviews, Korea Fair Trade Commission (2024), The Chosun (2024), Business Korea (2024), Maeil Economy (2024), Hankyung 1 2, Newsis (2024), Pitchbook (2024), Reddal analysis.

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Among various stakeholders, several investor types are observed, while the government aims to steer GPs toward deep tech through accelerator programs and fund-of-funds schemes

Overview of the Korean deep tech stakeholders

Investor landscape and dynamics

VCs

Provides funding and strategic guidance to deep tech startups, typically investing larger amounts at Series A and beyond. Many are based in foreign countries like the US, UK, and Singapore. Active involvement expected.

KIP Korea Investment Partners · SoftBank Ventures Asia · INTERVEST · Atinum · IMM · AJU IB INVESTMENT · KB Investment · Shinhan Venture Investment

Corporations (CVC)

Strategically invests in companies aligned with the parent company's long-term business goals. Often integrates startups into their supply chains or ecosystems.

SAMSUNG VENTURE INVESTMENT · LG Technology Ventures · LOTTE VENTURES · posco INVESTMENT · Hanwha Investment&Securities

Angels and accelerators

Often focuses on early-stage startups, such as pre-revenue of in idea/prototype phase. Small-scale investments and training/networking provided.

future play · bluepoint · Primer · MASHUP VENTURES

Fragmented government presence

Central government

Ministry of SMEs and Startups

Key entity operating programs to support deep tech startup R&D and commercial development, including:

- Global Super Gap 1000+ Project (commercial deployment-focused; 2023**)
- Global Fund (foreign VC funding; 2023**)
- Deep Tech TIPS (R&D-focused; 2024**)
- Deep Tech Value-up (domestic conglomerate partnerships; 2024**)

Local government

창조경제혁신센터 Center for Creative Economy and Innovation (CCEI).

19 Centers across the country operate to support deep tech companies, jointly funded by the local and central governments. They locally support central government's deep tech initiatives with individual projects and data sharing.

Deep tech startup categories and investment volume, 2024*

Biotechnology	1 214.0BKRW
AI and big data	969.4BKRW
Cloud and network	692.7BKRW
System semiconductor	644.1BKRW
Sustainability	445.9BKRW
Robotics	303.1BKRW
Aerospace	230.5BKRW
Mobility	170.8BKRW
Quantum technology	11.8BKRW
Next generation nuclear	13.5BKRW

*The sector categorization follows Korean government's methodology and publication. Investment volumes were double-counted across sectors. **Established years.
Source: KVIC, Ministry of SMEs and Startups 1 2 3 4, Startup Alliance (2023), ET News (2024).

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The government's role spans from providing de-risking measures for investors through fund-of-funds to offering R&D subsidies and commercialization support for startups

Government's role in the deep tech ecosystem

Overarching government directives

Main role

Policy driver – Set and develop the overarching national policies and strategies of deep tech industry

PACST 국가과학기술자문회의 Presidential Advisory Council on S&T · Ministry of Science and ICT · Ministry of SMEs and Startups · Ministry of Trade, Industry and Energy

Role #1

Funding driver – provide direct or indirect financial resources to foster deep tech startups and research

KVIC Korea Venture Investment Corp. · K-Growth Korea Growth Investment Corp. · KDB Bank

A fund-of-funds (FoF) management entity that invests in VC and PE funds primarily as a LP.

Role # 2

R&D driver – 23 government-funded research Institutes conduct R&D, including AI, biotech, and robotics, testing and evaluation, and technical support

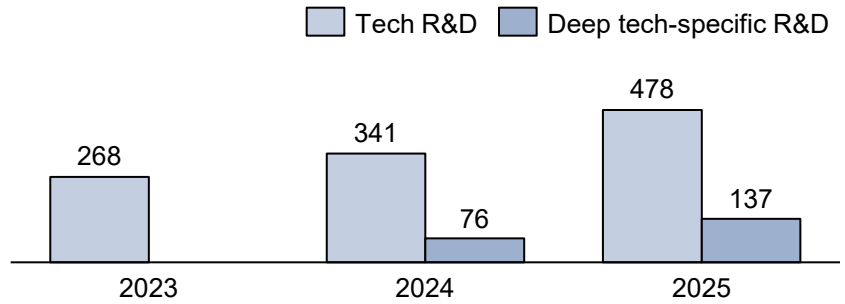
KIST Korea Institute of Science and Technology · KISTI Korea Institute of Science and Technology Information · ETRI Electronics and Telecommunications Research Institute · KRIBB Korea Research Institute of Bioscience & Biotechnology · KFE Korea Institute of Fusion Energy · KRISS Korea Research Institute of Standards and Science · KARI 한국항공우주연구원 Korea Aerospace Research Institute

Role #3

Operational driver – provide operational support, mentoring, networking and commercialization resources

K-STARTUP Korea Tech Incubator Program for Startup · KST 한국과학기술지주 · KISED Korea Startup · INNOPOLIS Korea Innovation Foundation · Center for Creative Economy and Innovation

Annual R&D budget for the government's Tech Incubator Program for Startups (TIPS), BKRW, 2023-2025



Highlights

- The South Korean government allocates large-scale budgets and sets strategic policies to develop national core technologies, such as AI, biotechnology, and systemic semiconductors, prioritizing global competitiveness
- To offset potentially insufficient private investment, the government leverages a fund-of-funds (FoF) model operated by KVIC, providing capital and mitigating risks by acting as a limited partner (LP) while selecting private VCs as general partners (GPs)
- Recently, the government has diversified its funding strategy by establishing a global FoF to attract international venture capital firms to invest in Korean deep tech startups

NOTE: Analysis includes both government entities and public enterprises.
Source: Government and company reports, Ministry of SMEs and Startups (2024), Chang-Kyu Lee et al., (2024), Policy Briefing (2024).

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Investors' varying risk appetites and focus areas create different archetypes; CVCs and accelerators often have vastly different interests from traditional VCs

Investor landscape in deep tech

(NN) Number of corresponding deep tech firms on Reddal list

Biotechnology (215)	AI and big data (78)	Cloud and network (21)	System semiconductor (14)	Mobility (22)	Robotics (29)	Sustainability (26)	Aerospace (23)	Quantum tech (4)
								Next-gen nuclear (0)

Archetype 1. Generalist VCs: Invest across most deep tech verticals and maintain a balanced portfolio but difference exist in the concentration

KIP Korea Investment Partners · IMM Investment, Corp. · Atinum Investment · Stonebridge Ventures · KB · AJU IB Investment · Mirae Asset Global Investments · Woori Venture Partners · SoftBank Ventures Asia · NH Investment & Securities · Shinhan Venture Investment · SV Investment · HB Investment · LB Investment · DSC Investment · Company K partners · Altos Ventures

Foreign VC participation in Korea's early-stage deep tech sector remains limited, compared to domestic VCs.

Archetype 2. Focused VCs: Invest across deep tech verticals but historically focus on biotechnology and/or IT sectors

DAYLI Partners · INTERVEST · Smilegate Investment

Archetype 3. Conglomerate CVCs: Backed by large conglomerates, investing in areas tied to their core businesses, such as semiconductor, advanced manufacturing and mobility; some are seen expanding into robotics or sustainability to strengthen current operations and establish expertise in emerging technologies

LG Technology Ventures · Samsung Venture Investment · Lotte Ventures · Hyundai Cradle · POSCO Investment · Hanwha Investment & Securities

Archetype 4. IT CVCs: Corporate venture arms of major IT players and investing in related digital technologies; demonstrates interest in startups that can complement their parent company's platform or service offerings

Naver D²SF · kakaoinvestment · kakaoventures · NCSOFT

Archetype 5. Accelerators: Support early-stage deep tech startups broadly, without strict sector preferences

future play · bluepoint · Primer · Mashup Ventures · SparkLabs · KAIST 청년창업투자지주㈜ · 서울창업허브 · PLUG AND PLAY

Some foreign accelerators operate in Korea, supporting domestic startups to enter foreign markets.

Missing Gap

Comparatively small number of startups and investments are detected here.

Public research institutions and universities are driving innovations, despite low private sector activities.

Source: Company websites and reports, Pitchbook, Ministry of SMEs and Startups (2024), Reddal analysis.

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Historically, Korean VC ecosystem has evolved rapidly, experiencing several boom-and-bust cycles; push for deep tech investments faces challenges amid a declining market

Korean venture investment – historical overview

1986

Early venture ecosystem development
- First VC (Small Business Investment Co) established in 1986
- KAIST alumni led fostering the foundation of tech venture entrepreneurs

1997

1st venture boom (1997-2000s)
- The Special Measure Act for the Promotion of Venture Business was enacted to promote venture business during the IMF crisis
- Many tech startups emerged particularly in IT and telecommunications sectors

2000

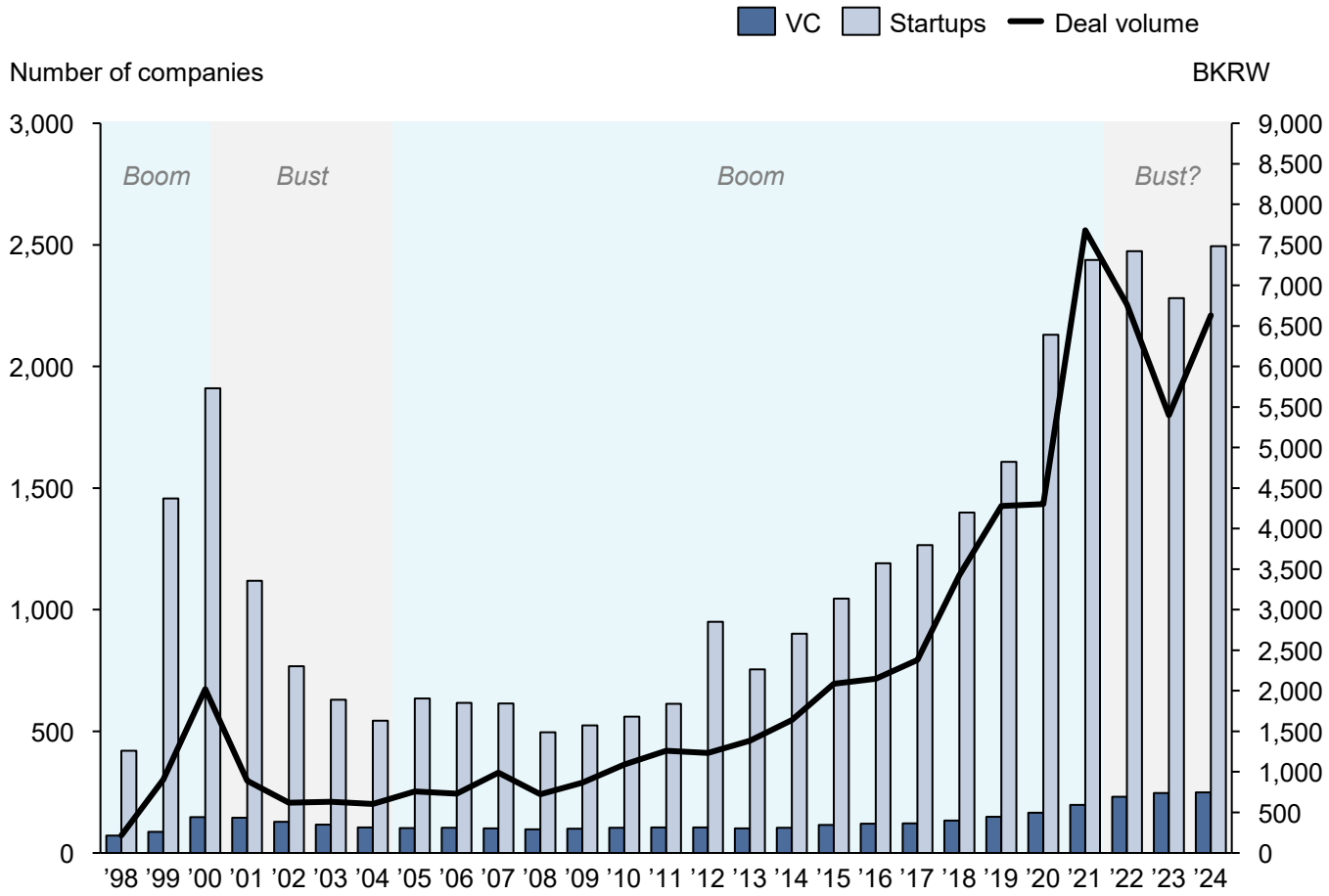
The dot-com bubble (2000-2002)
- South Korea's tech sector experienced a dramatic boom as Investors rushed into internet and IT companies since 1999
- The crisis forced many KOSDAQ-listed IT companies into bankruptcy

2005

2nd venture boom (2005-2018)
- In 2005, KVIC and Korea Fund of Funds were established
- Introduction of smartphone catalyzed a new wave of venture growth, particularly in platform businesses, with unicorns like Kakao (communication) and Coupang (e-commerce)

2019

Supply chain domestication, AI and deep tech (2019-present)
- Trade dispute with Japan (2019 – 2023) motivated government to support domestication of high-tech industry supply chains
- Deep tech is gaining momentum, driven by the AI boom and strategic government support



Source: Asia-Pacific Journal of Business Venturing and Entrepreneurship (2013), Korea Daily (2019), Government Index Portal, KVIC, KVCA.

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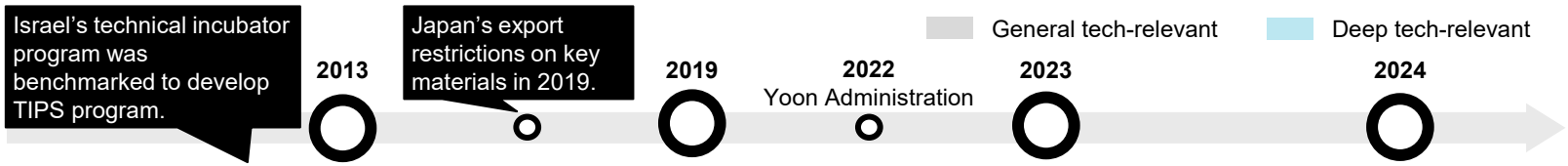
Several new fund-of-funds are being launched, but strong government influence and shifting policies tied to administrative changes and hype sectors can pose risks

Past and current key public initiatives



	Technical Incubator Program for Startups initiative (TIPS)	Materials, Parts, and Equipment Industry Support Policy	Global Super Gap 1000+ Project	Deep Tech Scale-Up Valley
Main Objectives	• To foster a tech start-up investment at early stages by connecting innovative startups with private investors, offering R&D grants and commercialization support	• To reduce reliance on foreign suppliers in materials, parts, and equipment by investing in R&D, infrastructure, and startup support	• To develop global unicorns by co-funding over 1,000 deep tech startups to scale up across 10 key sectors, providing 1.1–1.7 BKRW per company for R&D and commercialization with support of universities and research centers for 3 years	• To develop deep tech clusters, the government unified R&D institutes, universities, startups, large corporations, and investors, selecting AI semiconductors (Gwangju) and quantum computing (Daejeon) as focus areas
Implications	• The program has been a key pillar in providing startups with vital resources to scale • The program is extended to offer financial support for deep tech startups since 2023 under Global Super Gap 1000+ initiative	• By 2023, many South Korean companies were able to diversify supply chains and reduced dependence in semiconductors, display, and secondary cell industries	• Deep tech startups gained access to substantial capital for R&D and commercialization, boosting market survival	• In addition to financial support, promising startups gain from systemic collaboration with academia, investors, and large corporations, boosting global competitiveness
Budget	• 2.3TKRW (2013-2024) • 587BKRW (2024)	• 11.5TKRW (2020-2024)	• 344BKRW (2024-2026) • 103BKRW (2024)	• 42BKRW (2024-2027)

Example public funding for deep tech startups

Fund of funds	Key objectives	Example GPs
Startup Korea Fund Total 838BKRW State capital 231BKRW	Jointly created by corporates, SMEs, financial institutions, and government to fund deep tech startups expanding globally	IBK Industrial Bank of Korea, Shinhan Venture Investment, Samsung Venture Investment, SBI Investment, Hyosung Ventures, KDB Investment
Growth Ladder Fund 2 Total 350BKRW State capital 200BKRW	Supports growth-stage startups to scale and expand internationally, focusing on emerging tech sectors	Wonik Investment Partners, Posco Investment, IVP Inter Value Partners
Global fund Total 1.2TKRW State capital 150BKRW	Promotes Korean startup's global expansion through co-investment with international VCs	Third Prime, Amadeus, ACVC Partners, Global Brain, CICC 中金公司, IMM Investment Corp., Shinhan Venture Investment

Additionally, K-VCC (variable capital company) is expected to launch in Singapore, targeting foreign VCs with an initial 200MUSD by 2027.

Funds launched in seven countries; co-GP funds with domestic VCs in three.

Source: KVIC, Ministry of SMEs and Startups (2024), National Assembly Budget office (2024), Chang-Kyu Lee et al., (2024), Se-hoon Kwon et al., (2023), ETNEWS (2024), Bizinfo (2024), Korea Policy Briefing (2024).

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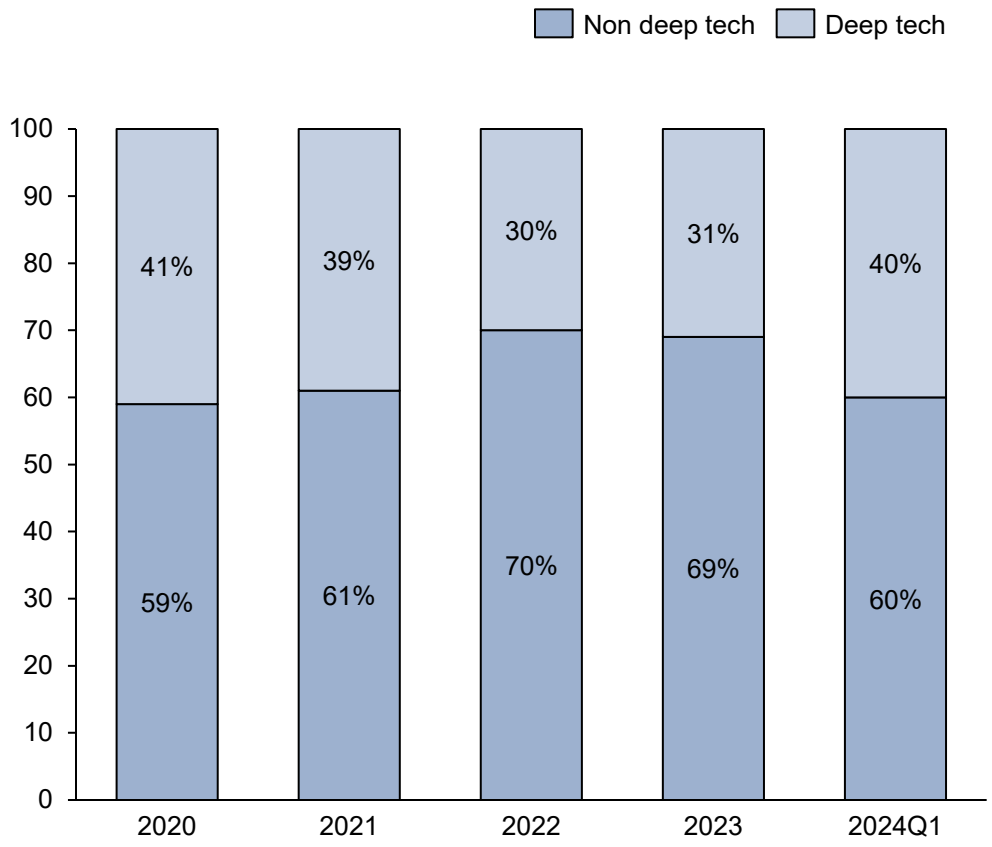
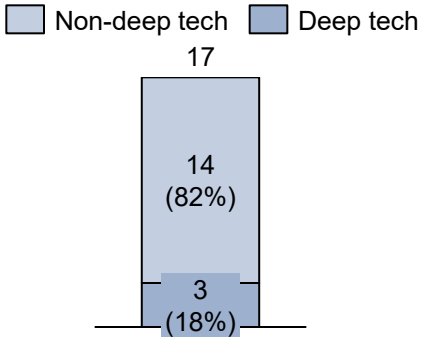
Investors may also hesitate to pursue aggressive deep tech investments, as historically only few success stories with strong returns have been seen, posing significant risks

Deep tech investment and unicorn composition

Estimated proportion of deep tech investments in South Korea

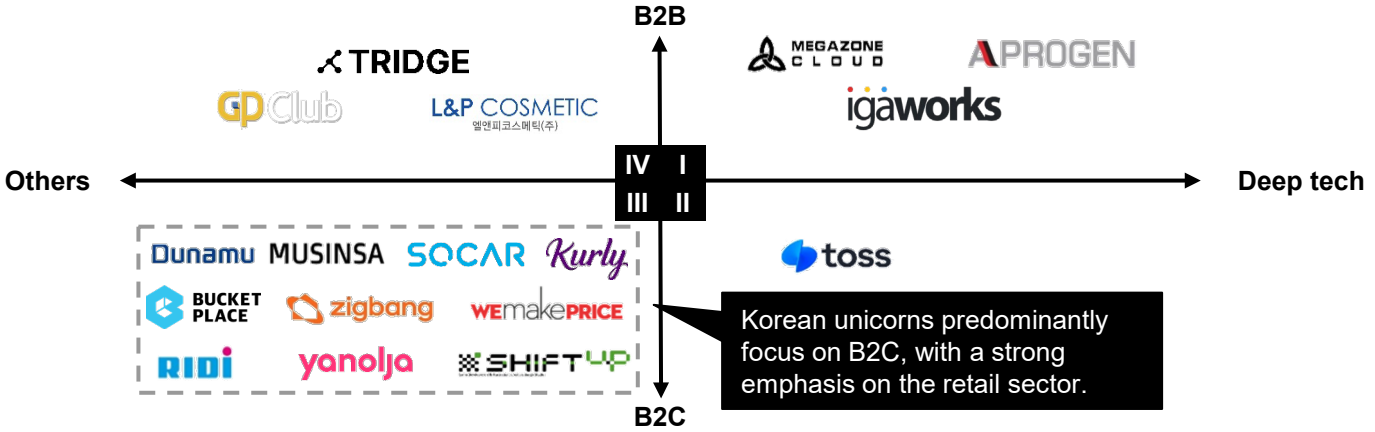


South Korean unicorns as of May 2024



Deep tech unicorns	Founded	Revenue (2023)	Sector
MEGAZONE CLOUD	1998	1.51TKRW	• Cloud • AI services
APROGEN	2000	150.6BKRW	• Biotechnology • CDMO
igaworks	2006	153.2BKRW	• AI and big data • Data management

Korean Unicorns' market landscape



Source: Reddal analysis, Statistics Korea (2023), Ministry of SMEs and Startups (2024), CBINSIGHTS, WOWTALE (2024), Money Today (2024).

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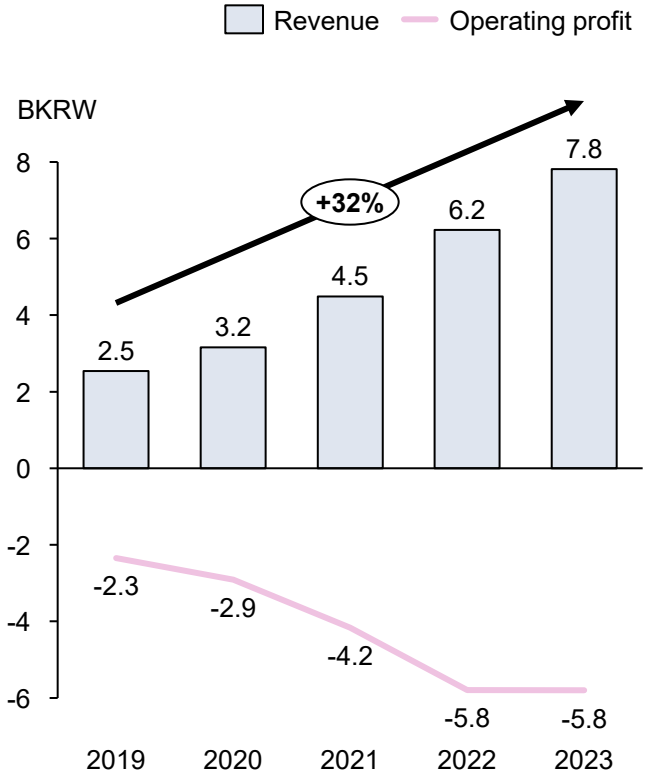
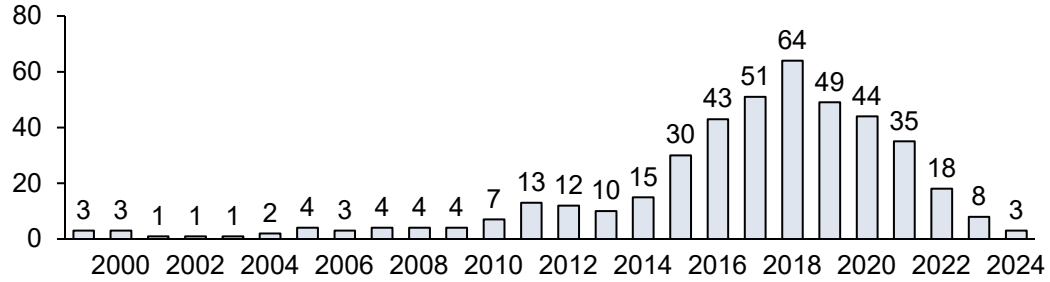
While surviving deep tech firms show revenue growth, the downward trend in new firm formation raises concerns for future ecosystem growth

Reddal's deep tech list in numbers – basic company profiles

Average deep tech revenue and operating profit



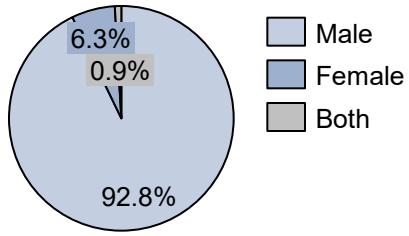
Foundation across years

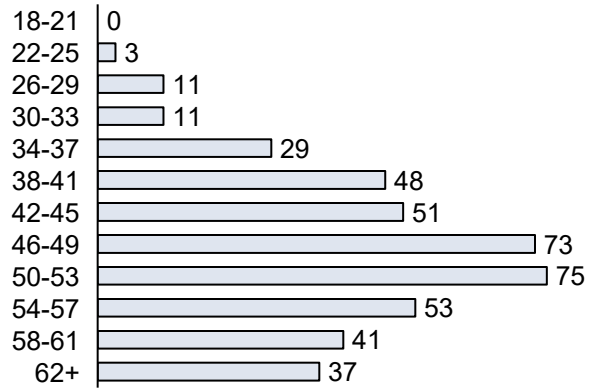


CEO profiles

48.7 years

Average CEO age*





Remarks

Surviving deep tech firms show rising revenue

- The average revenue of Reddal-selected deep tech startups continues on an upward trajectory
- The analysis excludes companies that are no longer active, which may introduce survivorship bias

Deep tech formation is trending downward

- After peaking in 2018, new formation activities have slowed significantly
- Recent stealth-mode startups may not appear in the data, but macroeconomic challenges since 2022 coincide with lower activity

CEO profiles remain largely male

- Leveraging more female talent in tech and business could further strengthen the ecosystem

NOTE: Data pertain to 432 deep tech firms in Reddal's deep tech list. Financial and demographics data are as of Q1 2025.
Source: Reddal analysis.

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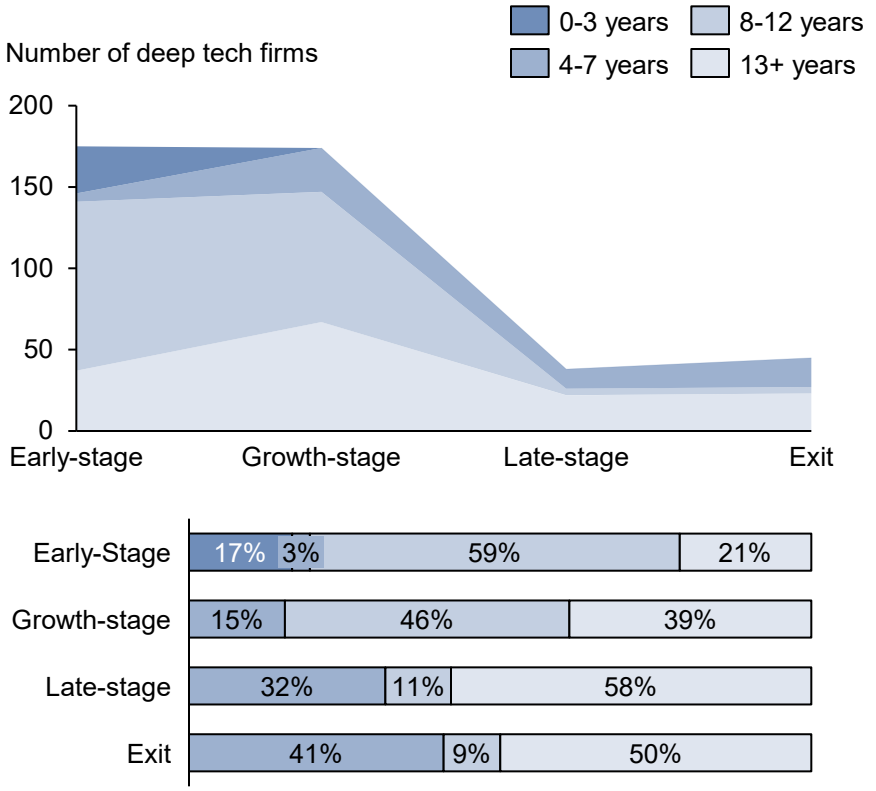
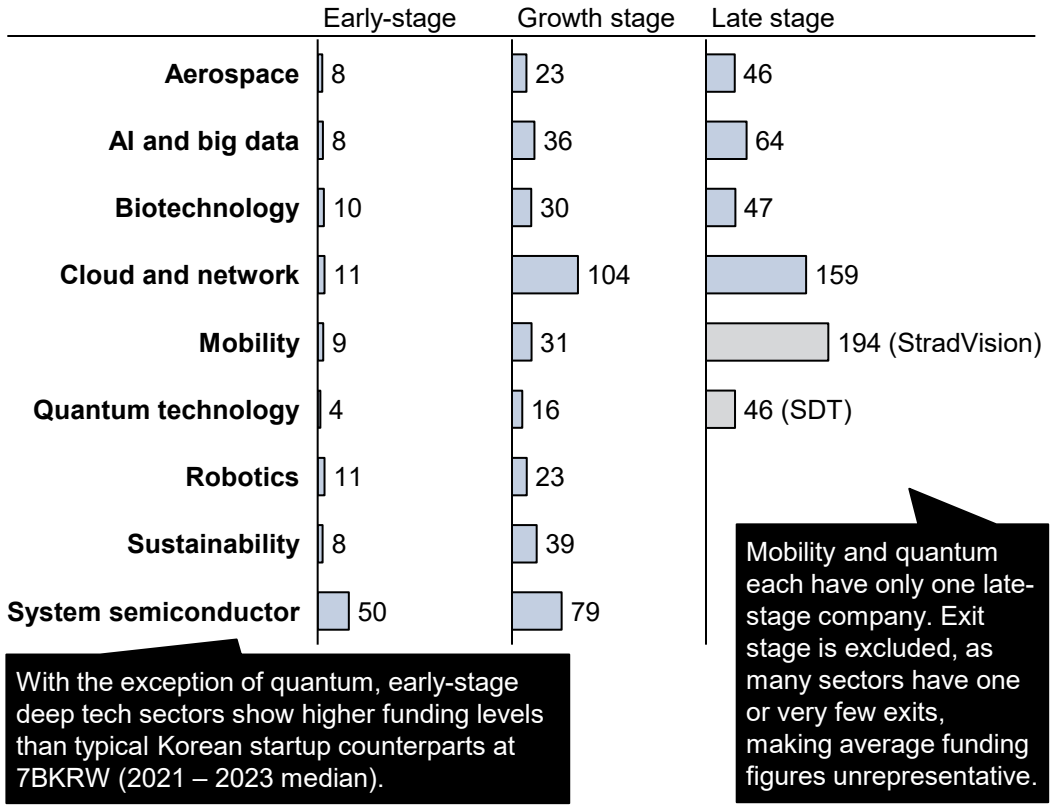
One challenge is long development cycles; investors should ramp up early-stage funding to build a sustainable pipeline of future opportunities

Reddal's deep tech list in numbers – company stage

Korean deep tech startup investment stage by company age, 2025



Average total funding of deep tech companies by segment and stage, BKRW



Remarks

- Korean deep tech startups often accumulate funding slowly, with most companies staying in early or growth stages for 8+ years, reinforcing the long timelines needed to build and validate frontier technologies
- Deep tech companies receive uneven funding across different sectors
- System semiconductor is the only segment with high average funding across early and growth-stage companies, suggesting a clearer pathway and investor confidence
- Cloud and network shows a rise in funding at the growth stage, indicating strong scalability potential once early traction is proven

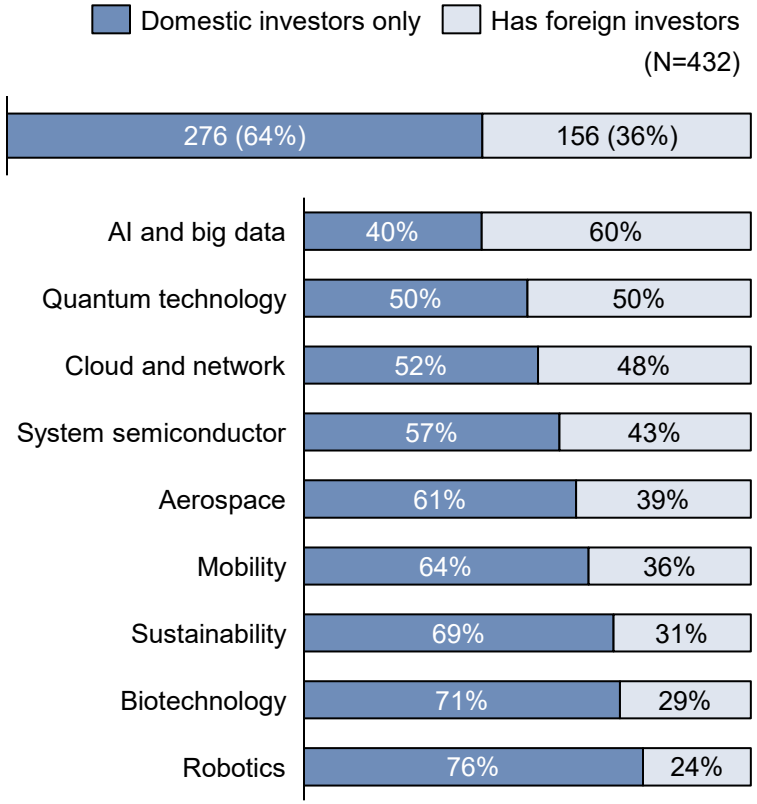
NOTE: Investment stages are categorized by latest funding round.
"Early stage" includes Seed, Pre-A, and Series A rounds; "Growth stage" includes Series B and Series C; "Late stage" includes Series D and Pre-IPO; and "Exit" includes IPO, Post-IPO, and M&A.
Source: Startup Genome, Reddal analysis.

REDDAL

Availability of foreign capital also varies significantly by segment, and not all have succeeded in attracting global investor interest

Inbound foreign investment statistics

Foreign funding recipients in Reddal's deep tech list



*Includes Hong Kong Special Administrative Region.
Source: Reddal analysis.

Top 5 foreign investor origins

Fund domicile	Count of deep tech firms	Investor makeup	Notable investors	Example portfolio companies
US	99	• Diverse spread of investors	Google for Startups Accelerator	• Medipixel – Ai healthcare startup • Funded by Johnson and Johnson, Microsoft, Medtech, and Matter
Japan	23	• Comprised with many CVCs • Many roots from Japanese banks	SBI Investment	• Rowan – AI healthcare startup, targeting dementia prevention • Funded by both SBI and Colopl Next
China*	19	• Well-rounded VCs	君联资本 LEGEND CAPITAL	• Stradvision – autonomous driving • Funded by IDG capital, specializing in tech startups
Singapore	12	• Diverse spread of investors	JAFCO ASIA	• Quad Miners – AI and cybersecurity • Funded by NUS Incubator, a Singaporean University
UK	10	• Diverse spread of investors • Also includes UK government offices	AstraZeneca	• Sky Labs– AI health data startup • Funded by UK Department for International Trade

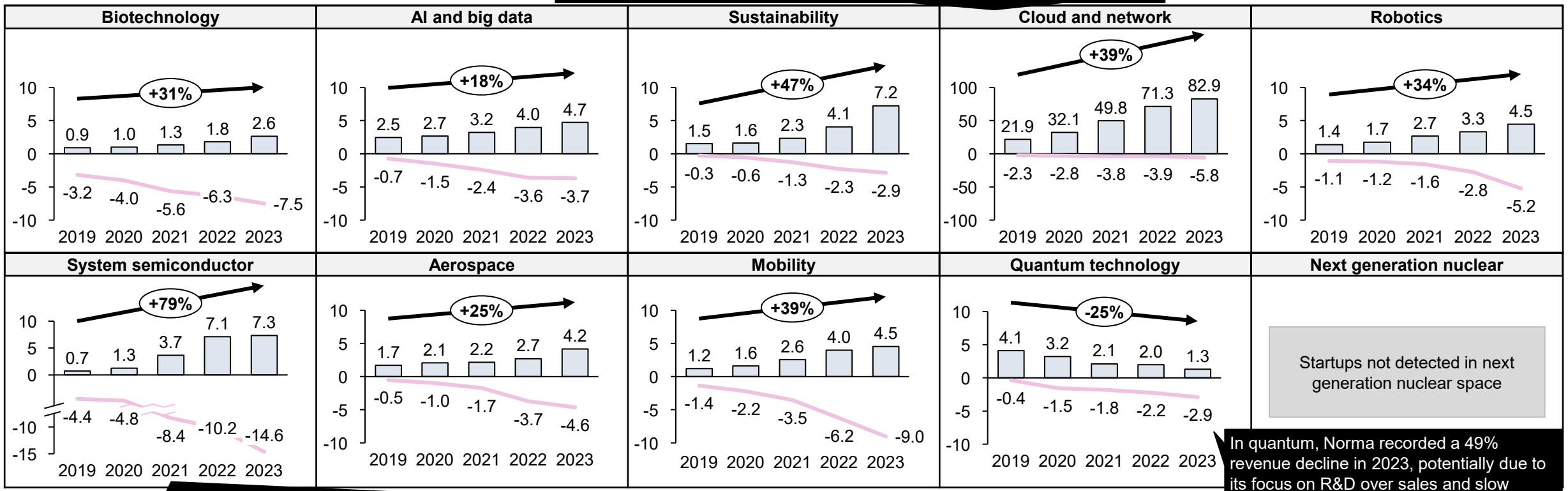
REDDAL

Despite challenges, surviving deep tech firms are seeing rising sales across most segments except quantum, though negative profitability is also increasing

Deep tech startup development – revenue and profitability (2019 – 2023)

In cloud, major players such as Megazone Cloud and Bespin Global are driving average revenue to levels nearly 10 times higher than those in other sectors

Revenue Operating profit Unit: BKRW



In system semiconductor, outliers like FADU and Openedges Technology led steep revenue growth during the reported period.

In quantum, Norma recorded a 49% revenue decline in 2023, potentially due to its focus on R&D over sales and slow market adoption.

***Disclaimer**: the chart presents average sales performance by sector to illustrate sector-specific trends; these figures should not be interpreted as representative of individual company performance, as the number of companies and the presence of outliers vary across deep tech sectors.

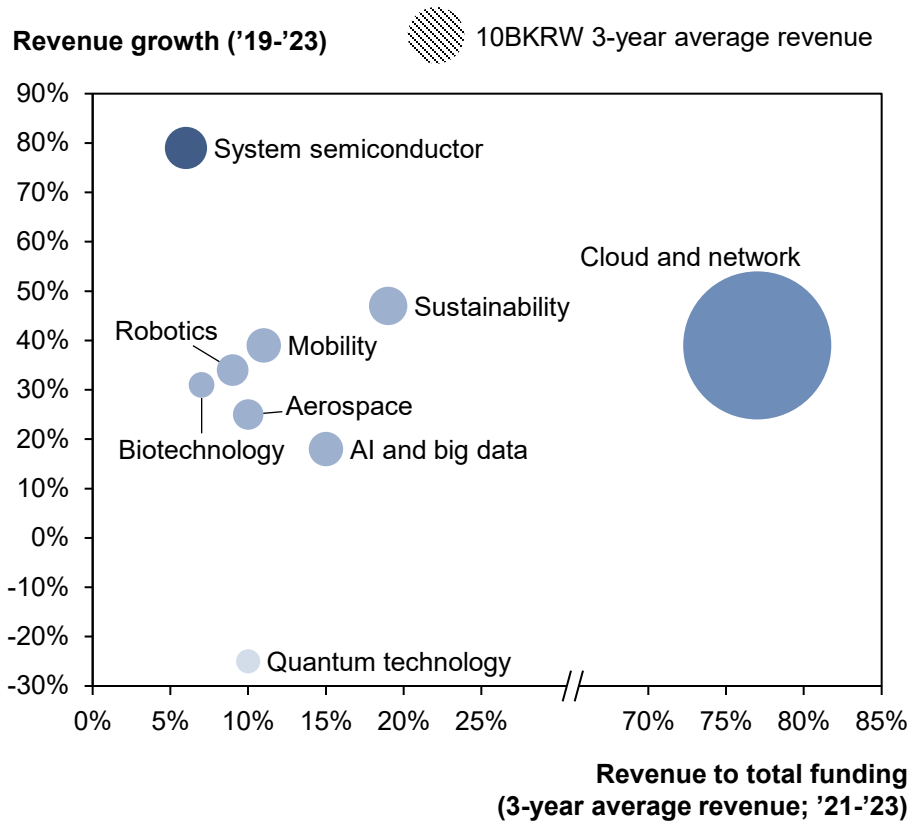
Source: Reddal analysis.

REDDAL

Growth and revenue vary by segment; cloud is more mature with strong revenue, while others remain investment-heavy for growth, with system semiconductors expanding the fastest

Korean deep tech segments' growth and revenue-to-investment efficiency

Segment-specific financial performance



Key observed profiles

Over 40% of firms have foreign investments

Sectors	Remarks
Capital intensive growers System semiconductor	• Very high revenue growth and moderate revenue scale, despite lower capital efficiency • Requires substantial upfront investment and long development cycles • Exhibits strong commercialization momentum once past initial phases
Efficient scalers Cloud and network	• Strong revenue-to-funding efficiency and highest average revenue scale • Mature, scalable models with rapid go-to-market capabilities and solid market traction • Market maturity attracts investors focused on profitability and sustainable growth
Steady builders AI and big data, Aerospace, Biotechnology, Robotics, Sustainability, Mobility	• Mid-range performance in both revenue growth and funding efficiency • Early commercial activity with small-to-mid revenue scale, but yet to achieve breakout • Reflects ongoing development and diverse commercialization timelines • Requires continued development and ecosystem support to reach full potential
Long-horizon bets Quantum technology, Next generation nuclear*	• Low funding efficiency, limited or negative revenue growth, and lowest revenue scale • Predominantly in early-stage R&D or pre-commercial phases • Requires long-term policy support and patient capital due to uncertain near-term returns

*Next-generation nuclear likely fits the long-horizon bets category due to its high technical and commercial uncertainty. However, it is not shown on the chart, as no relevant Korean startup was identified in the dataset.
Source: Reddal analysis.

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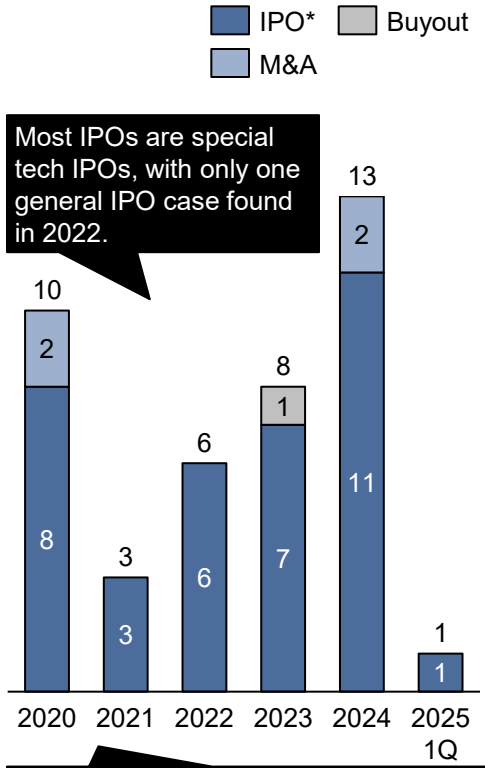
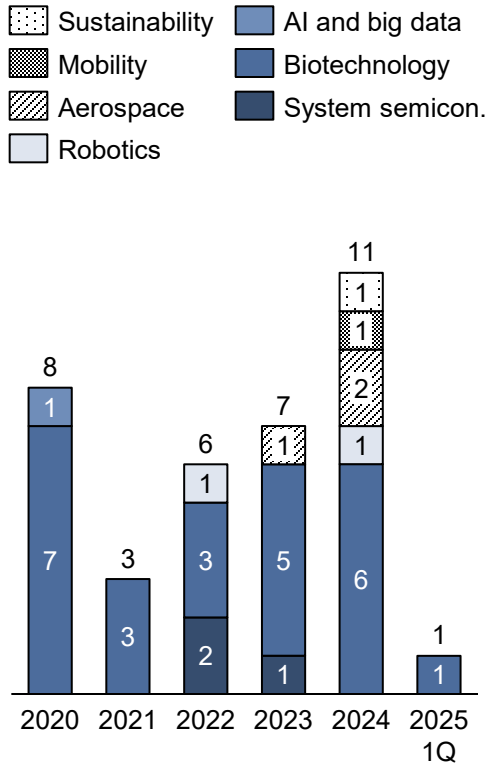
Korean deep tech firms' preference for domestic IPOs, with the special tech track, contrasts sharply with foreign peers listing on US markets; this can limit foreign interest and globalization

Overview of exit cases

Deep tech exit cases by exit types

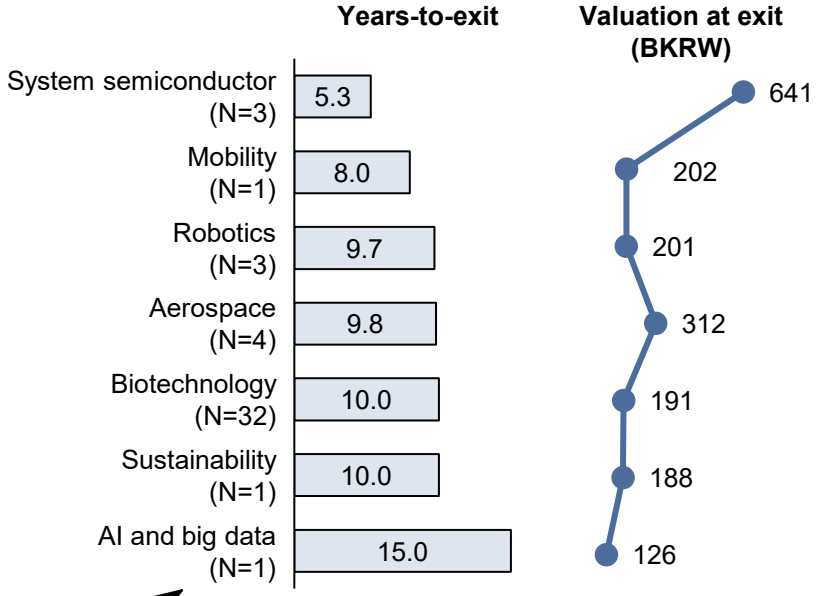


Deep tech IPO cases by sectors



Average statistics of each sector

An analysis of 45 deep tech company exits shows an average exit time of 9.7 years and an average valuation of 266BKRW.



Sampled firm in AI and big data sector was founded in 1979 and changed core business to AI in 2005.

One company (FADU) was valued at over 1.49TKRW in system semiconductor sector, contributing to the large average value.

Remarks

Dominance of IPO
- Domestic IPO accounts for 87.8% of deep tech startup exits, aligning with the overall trend of startup exits in Korea
- This stands in contrast to leading deep tech hubs such as Israel and the Nordics, where many public exits occur through listings on US or UK markets
- M&A is less commonly considered as an exit strategy for deep tech companies

Leveraging special tech IPO initiative
- The number of deep tech startup IPOs has steadily increased since 2022
- This coincides with the increase of special tech IPOs during the fluctuations in the overall IPO volume, indicating that deep tech startups are actively leveraging the initiative

Diversification into non-biotechnology sectors
- A continuous diversification into non-biotechnology sectors is observed in deep tech IPOs, reflecting the efforts of startups to expand beyond Korea's traditional stronghold

*KOSDAQ only; no NASDAQ IPO case was observed in Reddal's deep tech list; SPAC included.
Source: KIND, BLOTER, DBR, KDI, The VC, Reddal analysis.

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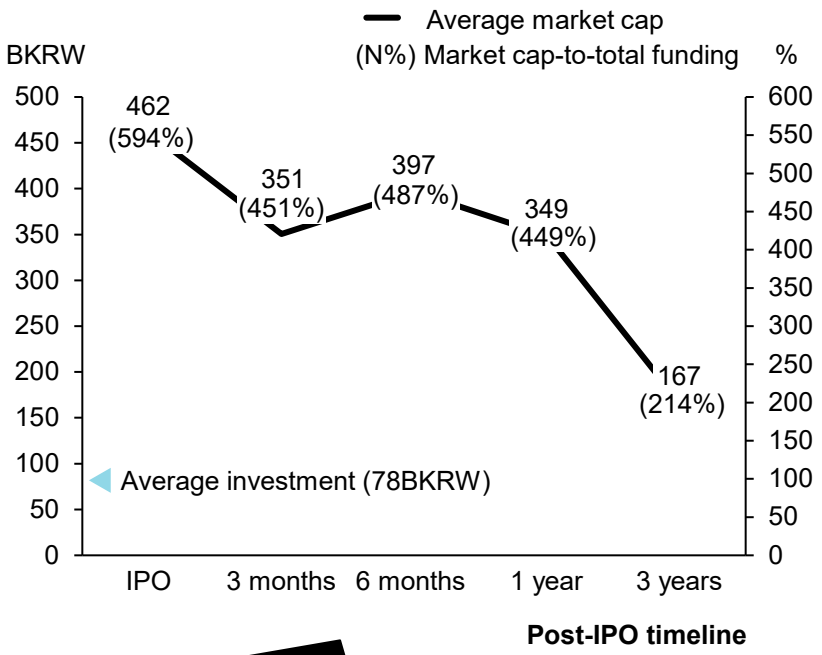
Post-IPO performance in Korea has been weak, though recent valuation haircuts have helped stabilize expectations; diversified exit routes should be considered for post-exit growth

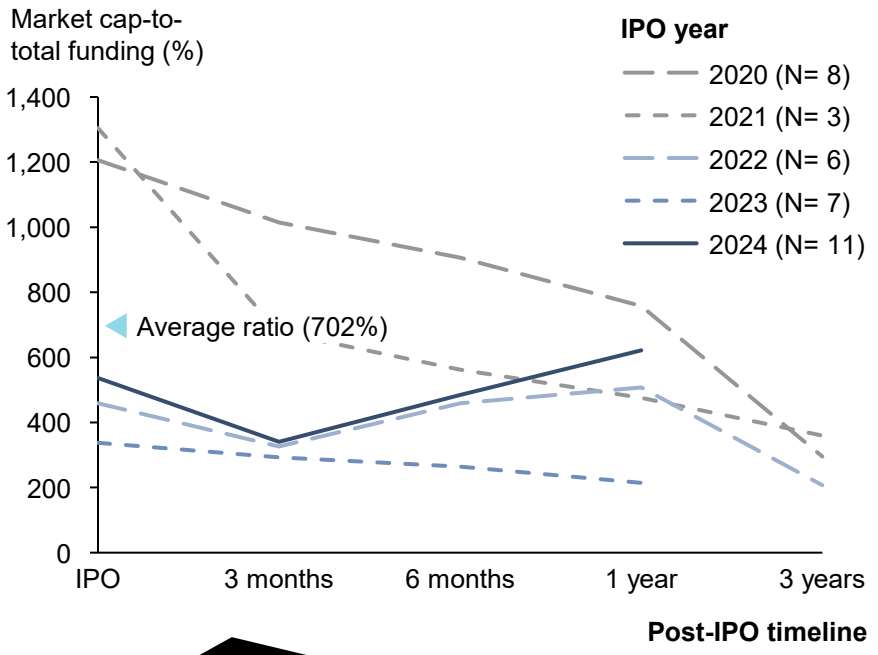
Post-IPO performance

Average market cap of deep tech companies after tech IPO[1]



31% of companies listed for over three years conducted paid-in capital increases within the first three years following their IPO. These moves can significantly dilute existing shareholders and may indicate limited cash reserves.

Annual IPO cohorts and financial performance[2]



Distinct valuation haircuts have been observed following IPOs since 2021. While stock price performance has remained relatively steady in recent years, longer-term challenges within the ecosystem and broader macroeconomic factors may pose risks to this stability.

Key observations

IPO valuation settling down to realistic level

- Public market investors in the 2020–2021 IPO cohorts absorbed losses due to inflated valuations driven by pandemic-era hype
- The average market capitalization at IPO was nearly six times higher than the average pre-IPO funding, reflecting aggressive pricing expectations
- Since 2022, significant IPO valuation haircuts have been observed, indicating a broader market correction toward more sustainable levels

Implications

Opportunity for more sustainable investment

- A “quick win” mentality not only undermines market trust but also damages company reputation when results fall short of expectations
- The cooling of market sentiment opens the door for value-driven investments grounded in clear financial outcomes
- This shift is expected to foster a longer-term investment perspective, rather than focusing solely on short-term post-IPO gains
- If high-performing companies deliver reasonable returns, it can strengthen the credibility of the IPO market and encourage broader investor participation

[1]36 companies monitored during 2020-2025, KOSDAQ. [2]35 companies during 2020-2024, excluding 2025 data due to limited forward-looking visibility.
Source: Korea Exchange (2025), Mirakle AI (2023), Newsis (2024), Hankyung (2024), Reddal analysis.

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Successful ramp-up into a deep tech hub requires several prerequisites; most notably global startup engagement, strong innovation output, and consistent long-term government strategy

Overview of success factors and gaps

Global leading deep tech hub

Pillar #1

Global talent availability coupled with strong domestic pipeline

- Highly skilled workforce rooted in strong STEM education, hands-on research culture, and entrepreneurial mindset
- Targeted visa and recruitment programs to attract experienced foreign scientists and tech entrepreneurs
- Ongoing upskilling initiatives to meet the evolving demands of cutting-edge fields

Pillar #2

Robust supporting infrastructure

- Strong research partnerships uniting academia, industry, and government labs
- Diverse funding channels (venture capital, corporate sponsorships, public grants, foreign capital) that reduce reliance on any single source
- Diversity of LP composition in VC funds that enable balanced risk-sharing and deeper commitments to funding deep tech
- Specialized facilities and testbeds open to multiple stakeholders

Pillar #3

Progressive policies and limited government oversight

- Streamlined and simplified regulations, matching international standards
- Clearly defined, long-term national strategies with sustained R&D budgets
- Targeted subsidies, grants, and tax incentives to encourage high-risk, high-impact innovations
- Effective IP and data-sharing policies that protect inventors and foster collaboration

Collaborative ecosystem for government, startups, and investors

Key identified gaps for South Korea

Global reach of the startups

- Korean deep tech startups show limited linkage to both foreign markets and foreign capital
- Founding teams and executive leadership remain predominantly domestic, with limited participation from foreign executives or engineers

Innovation output in private sector

- Limited conversion of basic science into scalable commercial technologies
- Early-stage funding lacks follow-through toward private-sector adoption

Consistency of government strategy

- Frequent shifts in startup funding priorities and FoF contribution criteria
- Lack of stable, long-term strategy for sector-specific deep tech growth

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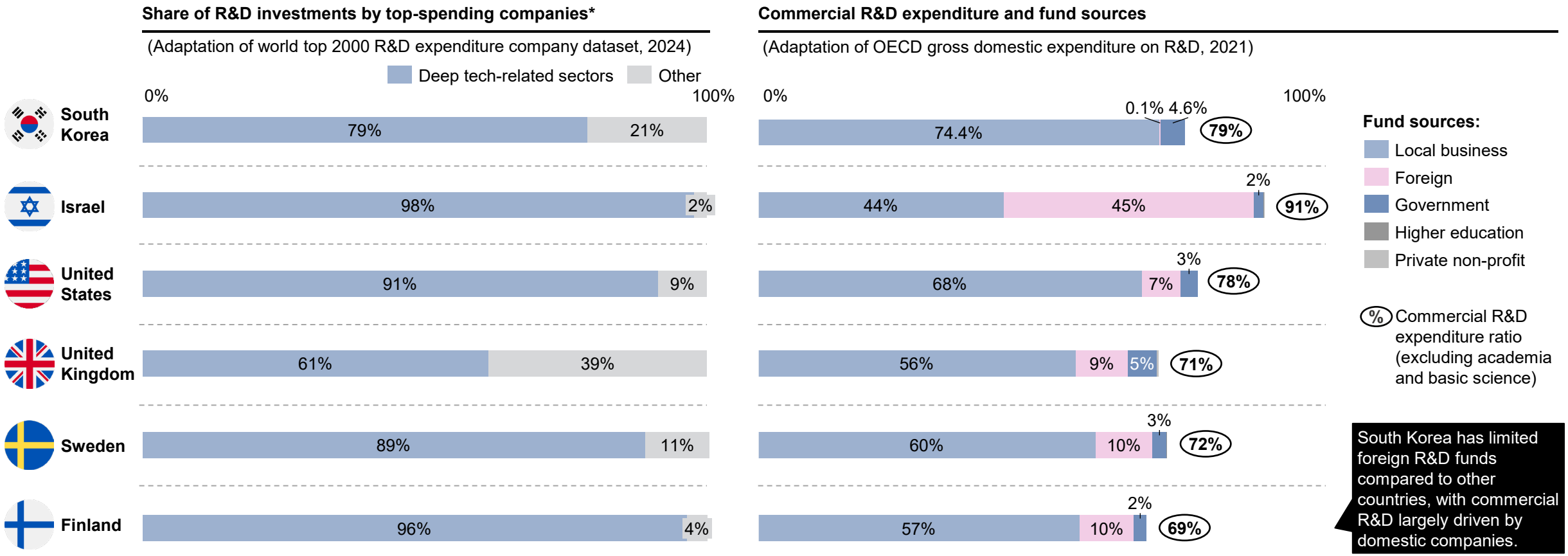
Korea's R&D spending is less concentrated in deep tech and draws limited foreign funding compared to peers; more investment in frontier technologies is needed to attract global capital

Deep tech ecosystem driver country comparison



*Deep tech related sectors are defined based on the scope of this report, including pharmaceuticals and biotechnology, aerospace and defense, automobiles and parts, health care equipment and services, technology hardware and equipment, software and computer services, electronic and electrical equipment, industrial engineering and alternative energy.

Source: Damodaran, European Commission (2024), OECD Data Explorer.

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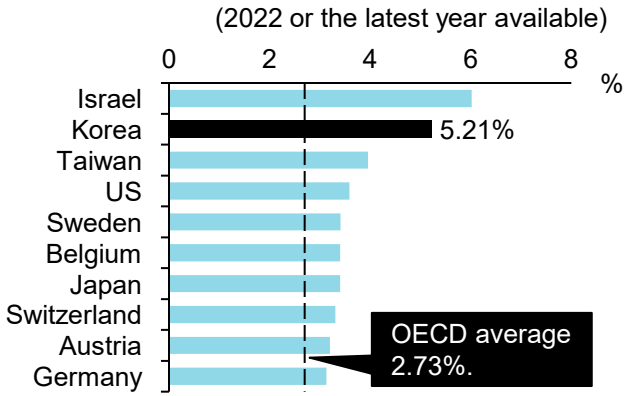
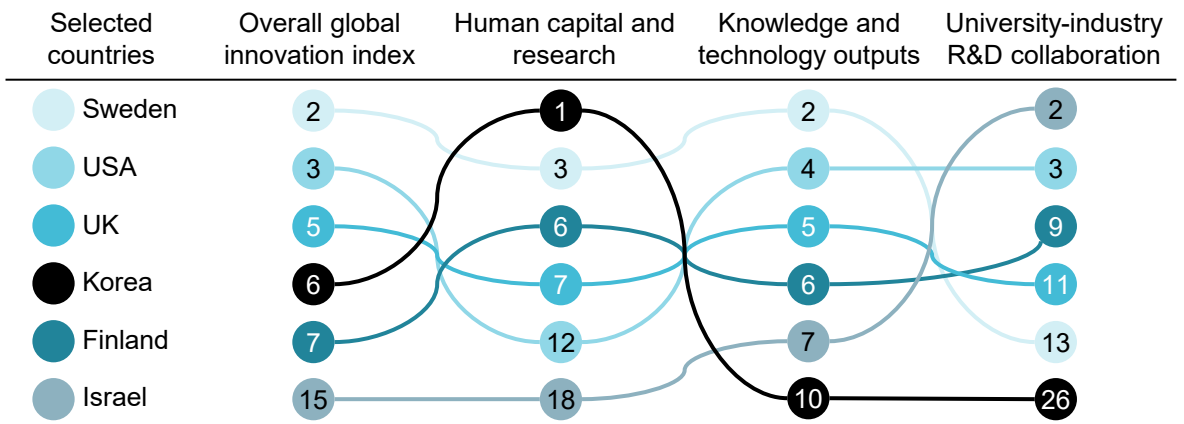
Limited private sector innovation output seems to stem from low commercialization rates and weak academia-industry collaboration despite a highly skilled talent pool

Korea's R&D paradox and impact on deep tech startup formation

R&D expenditure as a percentage of GDP, top 10



Global innovation index position, global ranking 2024

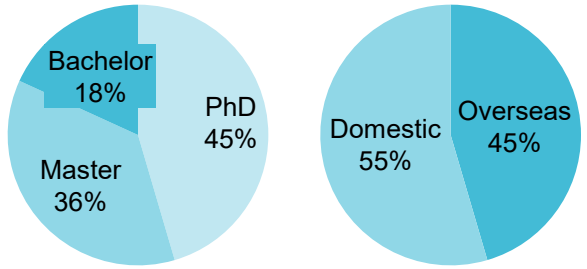


Remarks

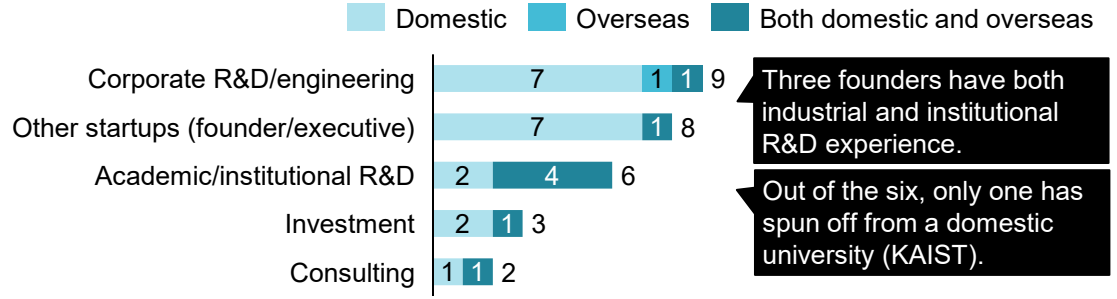
- Korea invests significantly in R&D but faces challenges in translating it into a robust deep tech ecosystem
- Despite strong human capital and research capacity, Korea does not rank as high in knowledge and technology output, pointing to potential inefficiencies in commercialization
- University-industry R&D collaboration remains underdeveloped compared to global peers
- The high quality of talent is evident, with many deep tech founders holding PhDs and having international educational backgrounds
- Domestic academia plays a limited role in deep tech startup formation, with fewer university spinoffs and weaker founder pipelines than seen in other ecosystems
- Instead, successful startups more often stem from domestic corporate R&D or engineering backgrounds and prior startup experience

Founder background profiles of the 2 most funded companies in each of 9 deep tech sectors (N=24, including co-founders)

Founder highest education



Founder past work experiences



Source: OECD, WIPO, Reddal analysis.

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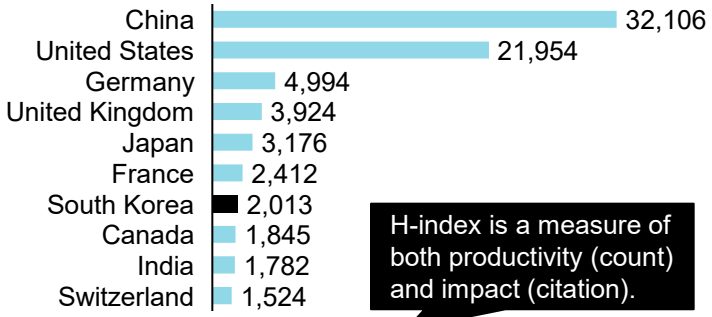
Conversion of basic science research into commercial domain remains limited; fully leveraging competencies through industry – academia partnerships should be prioritized

Science and engineering research performance and commercialization

Number of high-quality scientific publications, Nature Index, top 10, 2024[1]



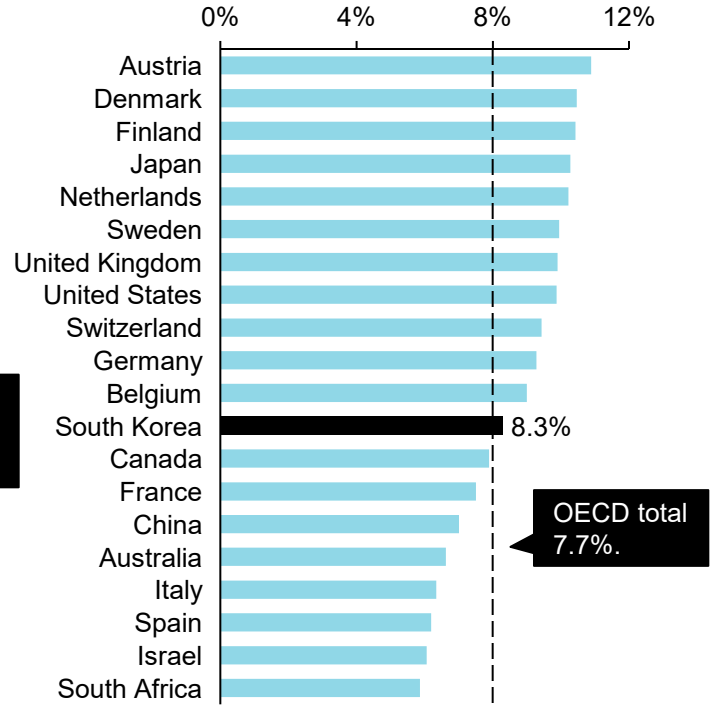
Korea's global ranking by H-index in deep tech subjects, 2024

Subject	H-index global ranking
Overall (all subjects)	16
Materials science	7
Engineering	9
Environmental science	11
Energy	12
Computer science	15
Biochemistry	16

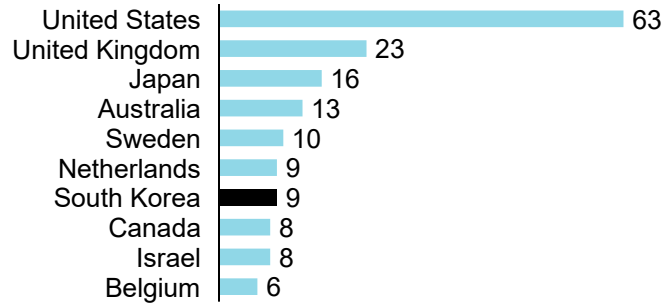
Korea ranks 16th overall while perform better in multiple deep tech related sectors.

Percentage of science and engineering publications coauthored with industrial partners, top 20, 2019-2022

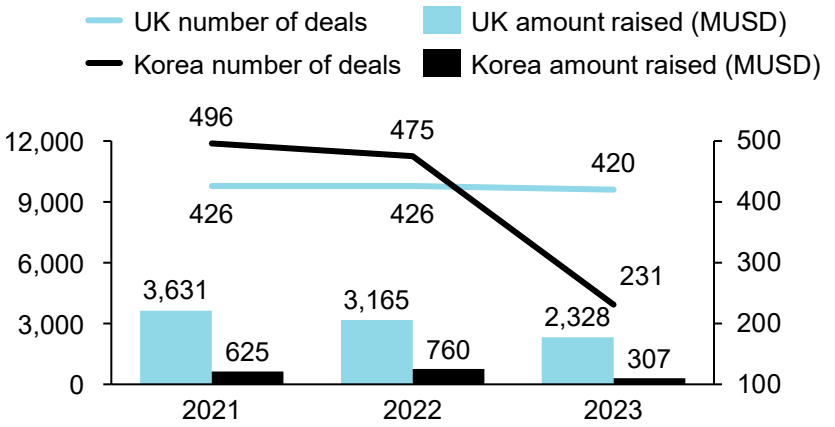
(Adapted from CWTS Leiden Ranking 2024 dataset; countries with <0.1% of global publications omitted)



Number of university venture funds by country, top 10



Investment in university spinoffs, Korea vs. UK, 2021-2023



*Based on Nature Index Share (Jan 2024-Dec 2024), which reflects a country's actual contribution to research articles published in high-quality natural and health-science journals, with credit divided among co-authoring institutions.
Source: Nature Index, STIP compass, Clarivate, Leiden Ranking, Global venturing, Parkwalk advisor, COMPA.

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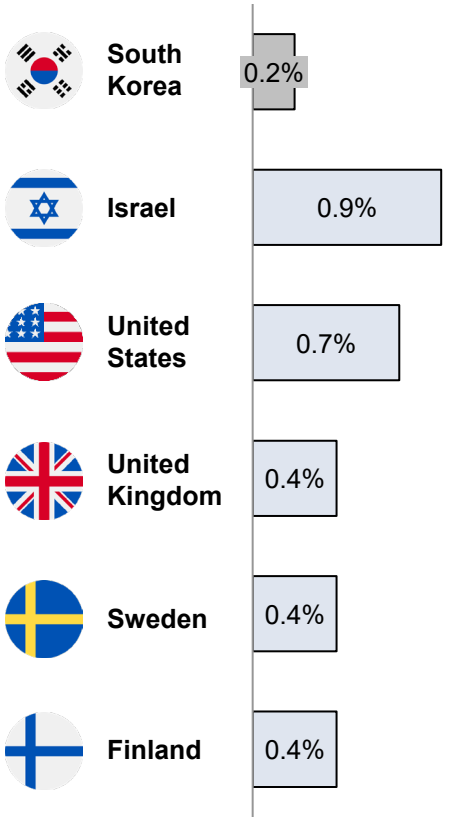
Additionally, alignment with global regulatory standards and clear, consistent government support can reduce barriers and further incentivize private sector investment

Country-specific VC investment volume and key drivers for growth

VC investments by GDP, 2023



Key investment enablers and examples from selected regions

Co-investment	Sharing risk and access larger deals, making investment more attractive for VCs	**Yozma (Israel)** • Privatized Israeli fund that co-invests with VCs • Backed by public insurance and private money matched with government funding • Funded Mobileye, an autonomous driving startup
Loans and guarantees	Leverage public capital to reduce risk and structure funds in ways that attract a broader set of LPs	**European Investment Fund (EU)** • Makes loans and guarantees readily available for VCs to invest in deep tech • Funded Graphcore, an AI semiconductor company via Amadeus Capital Partners
Tax benefits	Enhancing after-tax returns, incentivizing greater allocation to investments	**Qualified Small Business Stock (United States)** • Allows venture capitals in the US to be exempt up to 100% of capital gains tax • Founders Fund actively utilized QSBS to fund Palantir, an AI startup based in the United States
Ecosystem	Fostering innovation, talent, and deal flow, increasing the quality and volume	**Y Combinator (United States)** • Private accelerator that helps startups and connects to VCs • Connected Rigettit, a quantum computing startup with Lux Capital, a VC based in the US

Potential catalysts for success in Korea

Structured co-investments
Create public-private co-investment vehicles where government capital matches private VC funding

De-risking mechanisms
Expand access to public guarantees and first-loss capital to encourage VC participation in high-risk sectors

Outcome-linked tax incentives
Design tax exemptions or reductions linked to investment outcomes like job creation, follow-on funding, export growth

Private sector accelerators
Creating a more effective platform led by private sector funds to screen startups based on their investment preferences

Source: WIPO, Yozma, Ontario Teacher's Pension Plan, IRS, Y Combinator.

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Sustainable growth of the Korean deep tech ecosystem requires key stakeholders to collaborate effectively and systematically, tackling the most difficult challenges head-on

Summary of recommendations

		Recommendations	From	To
Startups: broaden ambition and commercialize globally	1.1	**Tackle globally challenging problems**	Regional application and tweaks of globally popular and trendy technologies	Focus on innovation to develop groundbreaking technologies and secure core intellectual property
	1.2	**Develop robust commercialization strategies and test them globally**	Core company functions focus on R&D while searching for domestic conglomerate partnerships	Recruit experienced commercial officers to design and implement go-to-market strategies at the top level Actively engage with global customers and differentiate from competitors by leveraging unique features and value propositions
	1.3	**Reduce dependence on government subsidies**	Reliance on government subsidies for operational expenses	Proactively engage private sector investors and strategic partners to support commercialization and sales strategies Focus on a limited number of government programs while ensuring adequate resources for independent business development
Investors: move beyond generalist VC habits to back real deep tech	2.1	**Increase internal deep tech competence to better distinguish and support startups**	Funding decisions follow traditional VC investment principles instead of specialized deep tech expertise, often focusing on AI or robotics without fully understanding underlying technologies	Build internal expertise in evaluating deep tech startups, focusing on technical potential and scalability Use tailored valuation models that account for technical competencies rather than relying solely on early financial data
	2.2	**Diversify LP composition**	Traditional VC LPs include government funds, financial institutions, and top conglomerates	Expand to include more diverse funding sources to boost funding for innovation-driven ventures
Government: enable innovation through deregulation and smart capital deployment	3.1	**Deregulate – investment restrictions and portfolio management**	Deep tech funds limited by rigid portfolio criteria (for example, company age, region, or application)	Grant greater freedom to GPs to select and fund startups based on return potential, promoting a diverse and innovative portfolio
	3.2	**Deregulate – testing environment for upcoming technologies**	Testing of new technologies hindered by laws requiring infrastructure-specific regulations	Establish flexible testbeds for emerging technologies, enabling rapid trials and scalable data collection without frequent regulatory changes

Source: Expert interviews, Reddal analysis.

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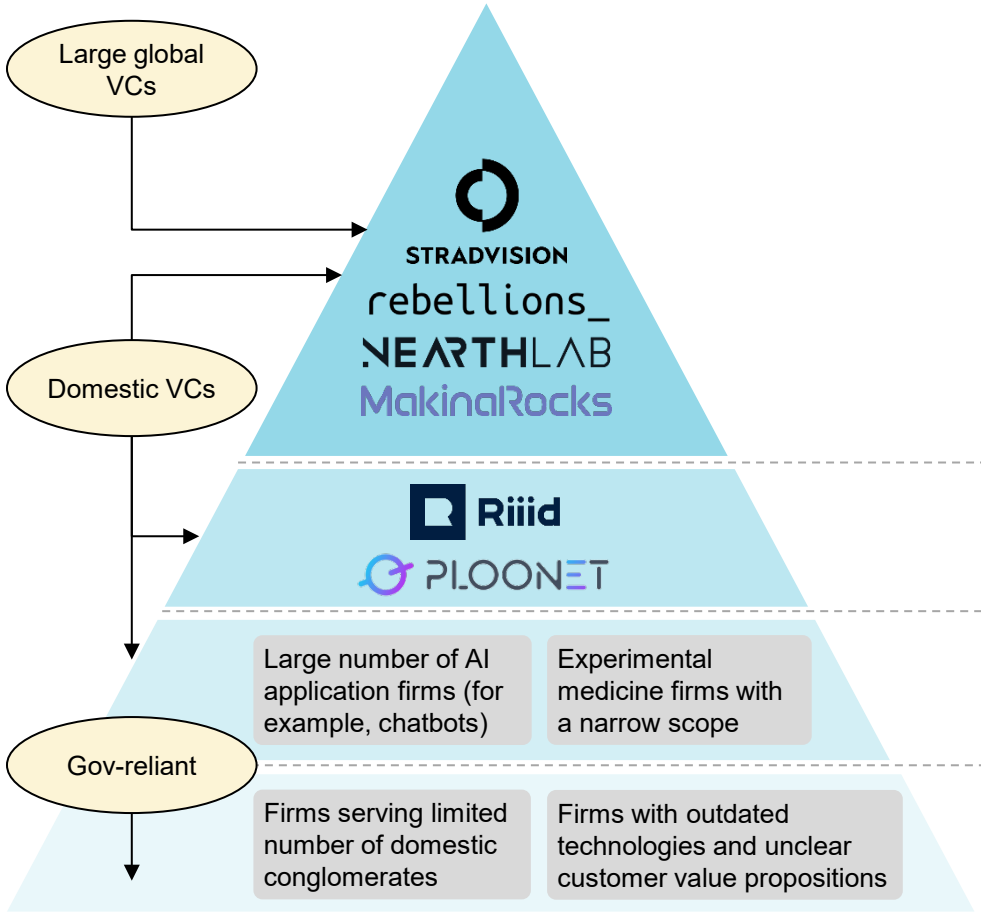
For startups, tackling globally challenging problems and developing robust commercialization plans can pay off – the goal should be to reach tier 1 status

Deep tech tiers – targeting for the top



Tier 1 deep tech 2-3%

Global leaders developing proprietary core technologies that are difficult or impossible for competitors to replicate, driving sustained market dominance

Tier 2 deep tech 5-10%

Regional leaders offering specialized products targeted at niche customer segments, leveraging strong domain expertise

Tier 3 deep tech 30-50%

Companies applying globally popular technologies to serve local markets, focusing on broad yet localized applications

Tier 4 deep tech The rest

Companies with limited market traction and weak R&D capabilities, struggling to differentiate through innovation

Key traits of Tier 1 deep tech

Non-replicable core technologies

- Possession of IP deeply rooted in advanced technical capabilities
- Ability to turn expertise into viable products and services

Global presence/leadership in the domain

- Significant portion of revenue coming from international sales
- Technological partnerships or direct competition with major global players

Attracts foreign investments

- Funding received from major foreign VCs
- Board members and/or executives from global investors, enabling global strategy support and access to foreign customers

Scalability

- Compelling financial implications based on strong product-market-fit
- Validated with strong sales records
- Larger supply deals spotted

Source: Expert interviews, Reddal analysis.

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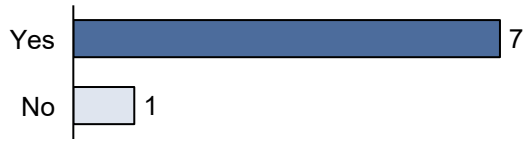
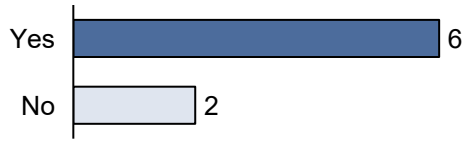
Many deep tech firms pursue foreign market and capital, but successful early global expansions remain rare in Korea; the strong preference for domestic IPOs makes the situation worse

Start-up interview results

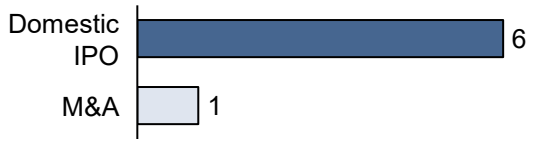
Actively looking for foreign market sales (N = 8)



Looking for foreign investment (N = 8)



Exit method preferences (N = 7)



Selected quotes from tech firms

> There are some cases where Korean deep tech startups focus on proving their success in the domestic market before planning foreign market entry.

> Expanding into foreign markets requires tailored strategies that account for local dynamics. Relying on domestic success before entering global markets can be risky, as each region demands unique approaches to commercialization.

> Foreign investors approach Korean deep tech startups, particularly in sectors like biotechnology and AI. However, differences in local investment practices, regulatory frameworks, and language barriers often create significant challenges, limiting their motivation to invest.

> Attracting foreign investment requires more than just technology—it demands trust in scalability and a proactive approach to building networks abroad.

> Preference for IPOs reflects the underdeveloped M&A market in Korea, where founders prioritize valuation growth and decision-making autonomy over acquisition deals.

> IPO is the dream exit for most Korean deep tech startups, offering visibility and independence. M&A is often seen as a fallback option for companies unable to sustain growth or seeking synergies with larger conglomerates.

Remarks

Different foreign market entry plan across sectors

- Deep tech startups generally follow two distinct approaches to entering foreign markets:
  - Domestic proof-of-concept: Some startups focus on validating their business model in the domestic market before expanding abroad, often targeting international markets in later stages
  - Early global expansion: Others, particularly those in sectors with limited domestic demand, pursue international markets from the outset
- Retrofitting strategies designed for the domestic market can create challenges abroad due to differing market environments and sales dynamics
- More targeted and market-specific early-stage international expansion may lead to better outcomes

Foreign investment appetite varies by sector

- Deep tech startups targeting international markets often seek foreign investors for both financial backing and business development support
- In contrast, startups in sectors that attract strong domestic investor interest tend to focus less on foreign funding as part of their investment strategy

Strong preferences for IPOs

- Korean deep tech founders tend to favor IPOs
- M&A market remains underdeveloped, with few successful reference cases, making it a less attractive exit option

Source: Harvard Business Review (2024), Reddal analysis.

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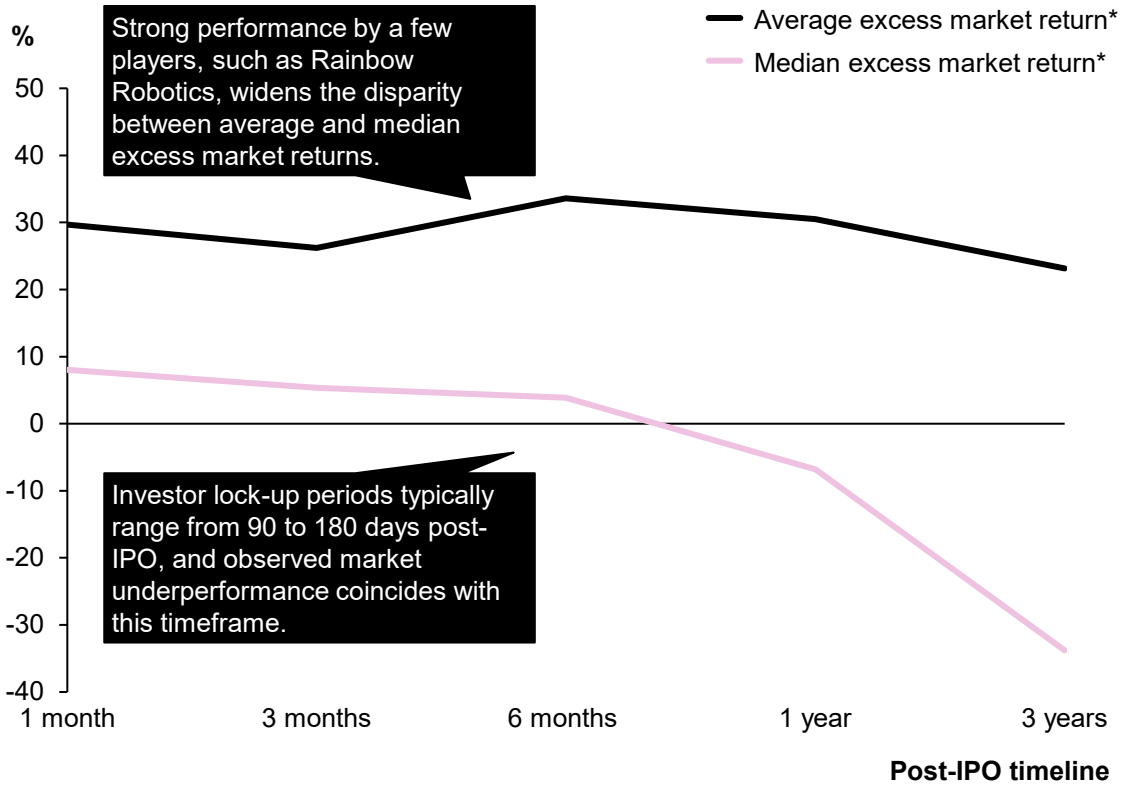
Preventing premature exits and prioritizing globally oriented growth plans should be prioritized to boost creation of tier 1 level global startups

Overview of IPO-based exits and implications

Stock performance after special tech IPOs (153 companies during 2020-2025, KOSDAQ)



*Excess market return = [Return on stock relative to IPO price – KOSDAQ index return over the same period].
Source: Korea Exchange (2025), Reddal analysis.

Key findings and tech firm strategy implications

Stock market underperformance of special tech IPO companies after 6 months

Evaluate whether domestic IPO is the right path

Weigh regulatory burdens, market scrutiny, and long-term capital requirements before committing to a public listing.

Exercise patience to avoid premature exits

Recognize that deep tech innovations often need longer timelines to prove commercial viability, and rushing an exit can diminish potential returns.

Consider a broader mix of exit strategies

Evaluate M&A, buyout, or private secondary transactions as alternative options to avoid over-reliance on volatile public markets.

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Understanding different investor types and their associated risks will help identify the right funding mix aligned with their specific needs

Key public and private funding options and considerations

Indirect | Direct

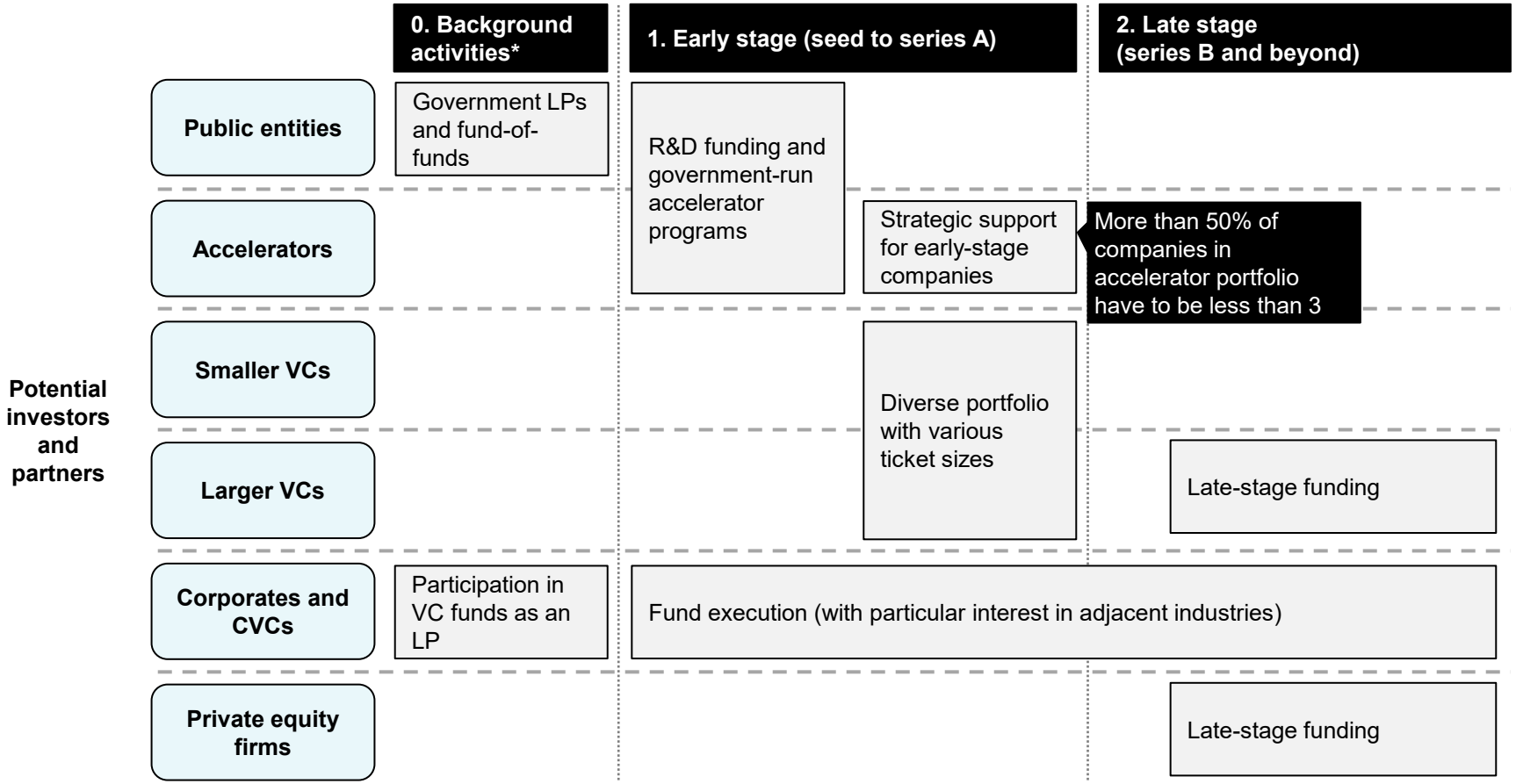
Funding type	Key funding options	Features	Risks and mitigation measures
Public funding	**Fund of Funds (FoFs)**: Government participation in VC funds as an LP **Public-private matching grants**: Private co-investment through public programs such as TIPS **Direct allocation**: Government provides R&D funds directly to startups	• Korean government-led FoFs and its public-private matching grant are considered an effective mechanism to boost early-stage investment ecosystem • Public fundings have allocated most resources to early-stage startups to develop ecosystems	• Capital allocation has focused on quantity over quality, suggesting the need for more selective, performance-based funding • Each ministry used to manage its R&D budget separately, often leading to overlapping investments, highlighting the need for coordinated budgeting
Domestic private funding	**Direct investment:** VCs, corporates, or accelerators invest in startups **VC's deep-tech funds**: Traditional VC funds target tech across sectors **CVC's sector-specific funds:** CVCs invest in sector-aligned startups **Private equity funds:** PEs invest in late-stage firms for profitable exits	• Domestic VCs are structurally anchored to public capital sources such as FoFs, following policy shifts • Korean VC funds averaged 28BKRW (24MUSD) in 2022, significantly below the U.S. VC median of 40MUSD, highlighting limited follow-on funding capacity	• Domestic funds often concentrate in trending sectors, posing risks of overheating and underfunding in emerging deep-tech fields • CVCs account for a small share of deals (10%) – far below the U.S. average of over 20% – highlighting the need for incentives that expand their strategic participation • Domestic VCs rely heavily on government capital, revealing the need to diversify LP sources
Foreign funding	**Indirect investment:** Foreign investors commit via Korean fund managers **Direct investment:** Foreign investors directly invest in startups **Foreign funds:** Foreign VCs deploy capital independently **Fund partnership:** Foreign investors joint funds with foreign investors and Korean VCs	• Only a small portion of total investment activity in deep tech startups (10%) come from foreign investors • Foreign investment tends to be selective, focusing on startups with global scalability or proven track records • Fund partnerships between Korean and foreign investors exist, but are not yet widespread	• Regulatory barriers, such as investor pre-consent rights, limit foreign investor participation, requiring improved transparency and streamlined approval processes • Exit options are limited for foreign capital, suggesting the need to expand cross-border M&A or dual-listing pathways • Language barriers and lack of English materials make it hard for foreign investors to assess startups, highlighting the need for bilingual communication support

Source: Ministry of SMEs and Startups (2024), KOVA (2023), Korea Development Institute (2023), Asia Economy (2025), Yonhap Infomax (2025), Business Korea (2024), Foundernest (2025), Reddal analysis.

REDDAL

As firms mature, transitioning from government funding to attracting additional capital – preferably with global participation – through proven commercial viability becomes essential

Startup funding timeline and considerations for Korea deep tech



Early-stage funding strategy

- Leverage public accelerator programs and government R&D grants but balance with private funding to avoid overreliance on public resources
- Focus on early commercial validation and attract private investors for investor balance
- Prioritize investors who bring more than capital; look for domain expertise, sales support, and long-term commitment
- For example, early engagement with global capital can bring market insights, network, and talent access

Late-stage funding strategy

- Retain sufficient ownership and decision-making power; structure funding rounds to prevent excessive dilution and maintain strategic control
- Look for large-scale expansion support including capital, operational expertise, and global networks to accelerate global growth
- Consider private equity or CVCs for strategic synergies to unlock access to adjacent industries and reduce time-to-market

*Startups do not directly interact with investors in this phase.
Source: Reddal analysis.

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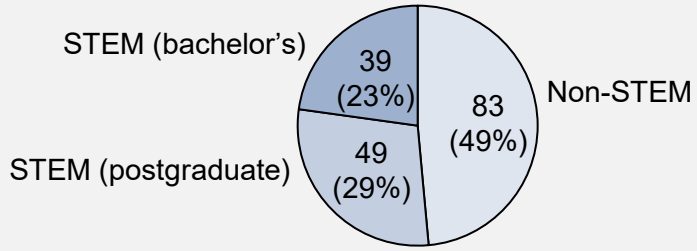
Investors' STEM backgrounds do not always lead to successful deep tech-focused portfolios; deeper technical expertise may be needed for prudent investment decisions

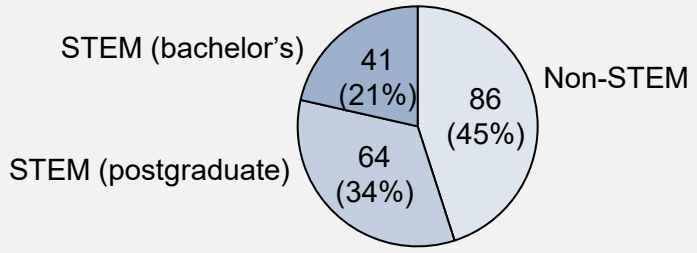
Deep tech investor technical background and development needs

Senior VC staff's academic background[1]

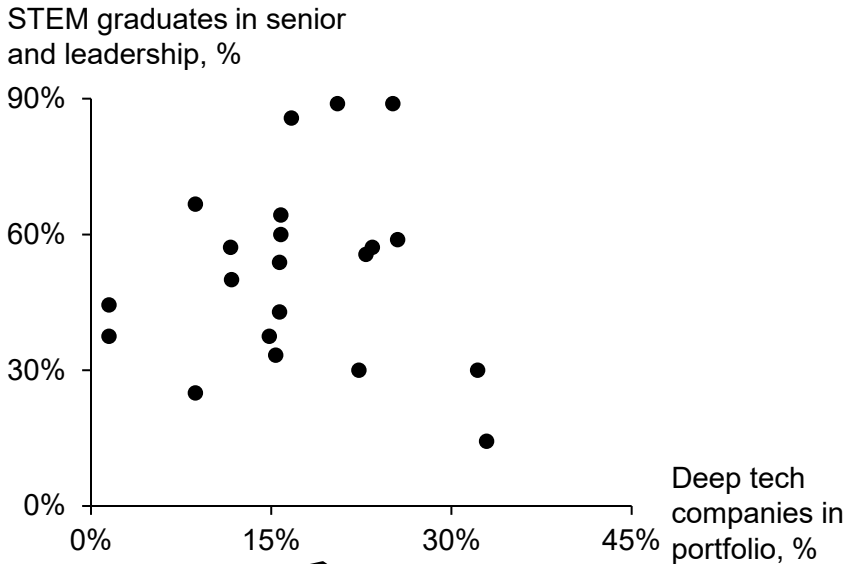
171 investors from top 18 VCs by AUM[2]



191 investors from top 22 VCs by deep tech investment counts[3]



STEM graduates vs deep tech investment in top Korean VCs



Tech proficiency itself may not drive deep tech investment, as there is no clear correlation between the share of STEM-trained leadership and deep tech investments.

Considerations

- Over half of senior team members at leading Korean VCs and active deep tech investors have STEM degrees, suggesting a strong technical foundation across the sector
- It remains uncertain whether this academic background translates into more active or informed deep tech investments
- Interviews with startup executives and investment professionals highlight the need for capability development among investors to assess complex technologies and their commercial potential
- Many deep tech fields demand expertise beyond general scientific literacy, calling for more rigorous and specialized evaluation competencies

[1] "Senior" includes director or equivalent level and above; non-investment roles excluded.
[2] Based on 18 out of Korea's top 30 VCs by AUM, selected based on available team data and deep tech investment activity.
[3] Based on the top 22 VCs with the highest deep tech investment counts; two excluded due to missing team data.
Source: Company websites, DART, expert interviews, Reddal analysis.

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Diversifying investor LP base and leveraging external partnerships to access larger global capital pools and specialized domain expertise can enhance their chances of success

LP composition and strategic benefits of external partnerships

LP composition in VC funds

LP type	Korea	United States	United Kingdom
Financial institutions	High	High	Low
Government agencies	High	Low	Medium
Corporates	Medium	Medium	Medium
Family offices and private individuals	Medium	High	Medium
Pension funds	Low	High	Medium
Universities and academic institutions	Negligible	Low	Low
Sovereign wealth funds	Negligible	Low	Low

Key identified gaps

- LPs in VC funds are mainly government and financial institutions, with limited participation from pension funds, sovereign wealth funds, and academic institutions
- By diversifying LP compositions, Korean VCs can leverage strategic benefits such as greater fund stability and broader industry connections

Strategic value proposition of various LP categories

LP type	Strategic benefit	Example case (country)
Financial institutions	• Access to global capital markets • Structured finance and risk expertise	**KfW Bank (Germany) –** KfW invested in a fund focusing on climate insurance in emerging market, managed by BlueOrchard, supporting mobilization of 80MUSD from public and private investors globally **Mitsubishi UFJ Financial Group Bank (MUFG, Japan**) – MUFG, an investor in ANV Management's life-science fund, empowers VCs by streamlining investment structures and financing
Government agencies	• Large capital • Support for networking and commercialization	**Tibi Initiative (France) –** Tibi facilitates LPs to invest in late-stage tech companies, and has mobilized 30BEUR into French tech ecosystem since its launch in 2019 **Finnish Industry Investment Ltd (Tesi, Finland) –** Tesi accelerates the commercialization and scaling of startups; example deep tech startups include ICEYE, Bluefors, and IQM
Corporates	• Exit opportunities • Commercialization • Industry connection	**Intel Capital (US) –** Intel acquired Mobileye in 2017, integrating its technology to enhance autonomous vehicle capabilities **Cisco (US) –** Cisco, as an LP in VC fund, used its position to access startups like NGINX, showing how corporates can scout future acquisition targets through external funds
Family offices and private individuals	• Long-term capital • Industry connection • Sector expertise	**Sandaire (UK) –** Sandaire runs long-term investment, which often run to 10 or 20 years, aligning with the maturity profile of private equity opportunities **Horizons Ventures (Hong Kong) –** Horizons Ventures, Li Ka-shing's family office, invested early in DeepMind, which later grew into a leading AI company and was acquired by Google in 2014
Pension funds	• Long-term capital • Large capital • Credibility signaling	**California Public Employees' Retirement System (CalPERS, US)** – CalPERS invested 1.1BUSD in VCs in 2022, including Lightspeed (invested in Anthropic) and Sequoia Capital (invested in WhatsApp) **Government Pension Investment Fund (GPIF, Japan) –** GPIF announced in to invest tens of millions of USD in a startup fund run by Globis Capital Partners in 2022
Universities and academic institutions	• Access to research networks • Early discovery of university spin-offs	**University of California (US)** – UC's investment in and partnership with Bow Capital enables the firm to support portfolio companies by connecting them with 2.6 million researchers from the UC ecosystem **Harvard University and MIT (US)** – Harvard and MIT jointly invest in The Engine Ventures with capital, infrastructure, and collaboration programs, supporting advanced tech spin-offs such as Mantel and Atlantic Quantum
Sovereign wealth funds	• Global diversification • Key driver of facilitating sustainable investment	**Public Investment Fund (PIF, Saudi Arabia) –** Saudi's PIF invested in Lucid Motors, an electric car maker to push into clean transportation **Temasek (Singapore) –** Temasek champions sustainable growth in technology and climate-friendly ventures

*Financial institutions include six categories: banks, non-bank depository institutions, financial investment business entities, insurance companies, other financial institutions, and financial auxiliary institutions.
Source: Ministry of SMEs and Startups, BVCA, KIC, Maeil, Forbes, The Economist, Tesi, Reuters, Nikkei Asia, Reddal analysis.

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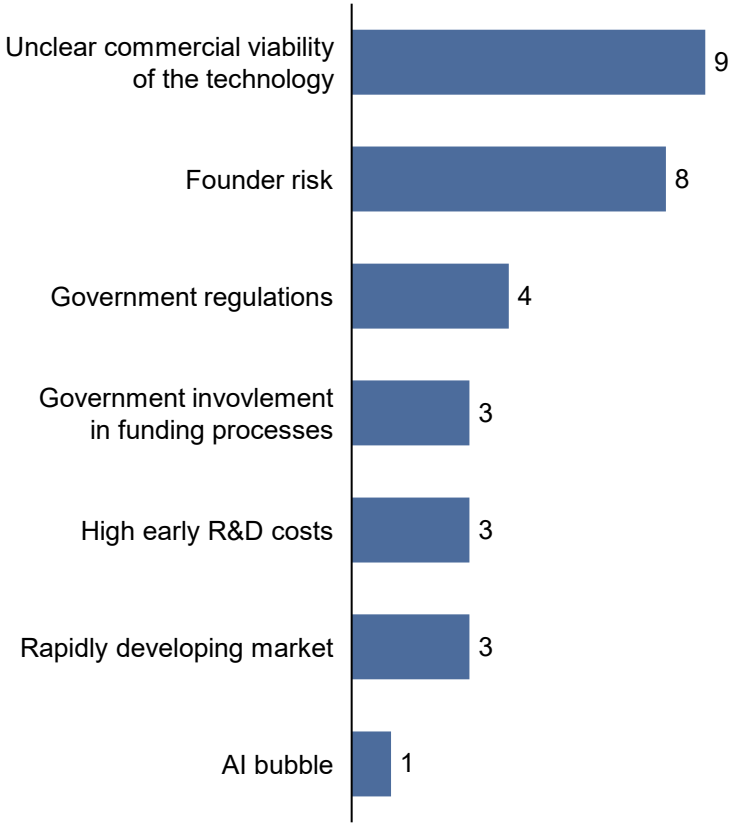
Investors should address risks by improving the ability to identify truly promising deep tech firms, especially considering high market uncertainty

Investor interview results

Identified risks in deep tech investment (N = 9)



Selected quotes from investors

> Key risks in deep tech investments include low commercial viability of many technologies, immature markets, founder risk, and the rapid pace of technological development, which can be difficult to keep up with.

> Founder risk is the primary challenge in deep tech investments; CEOs must combine market acumen with resilience to navigate the complex growth journey. Other risks tend to be localized and segment-specific.

> While many startups have strong technologies, they often lack clear strategies for identifying target markets and achieving commercial success. Korean deep tech startups tend to act as followers, adapting US technologies and business models for the local market.

> To foster ecosystem growth, startups must reduce reliance on government funding, test real market demand domestically and internationally, and avoid surviving on subsidies alone.

> Regulations on investors need to be further relaxed. For example, in the case of accelerators, there are rules such as requiring 50% of funds to be invested in companies within their first three years. While this helps stimulate early-stage industries, companies beyond their third year are often overlooked for investment.

Remarks

Balancing technical and commercial capabilities

- Many technologies are not fully market-tested, which increases investor risk
- Product-market fit should be carefully monitored and evaluated
- Having commercially savvy leaders in startups can significantly boost their chances of success

Navigating government relationships

- While governments offer subsidies and systematic support, this may hinder the natural selection process for weaker startups
- Regulations tied to VC funds receiving public money may limit their flexibility, especially deterring foreign VC interest

Managing market uncertainties

- Global market volatility and rapid technological advancements pose risks, potentially making a startup's technology obsolete
- External factors must be closely monitored to anticipate and align with potential demand for the technology

Source: Investor interviews.

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Several strategic approaches can be designed to align with the unique lifecycle stages and support needs of deep tech ventures

Investor strategy across lifecycle

Investor steps		Deep tech firm life stage	Investor strategy - value optimization and risk mitigation options
Deep tech fund formation/ capital raising	Develop investment strategy – technology domains and ROI targets Recruit LPs – government and private Define governance and fund structure	Define R&D and commercial objectives Prove early commercial validity	• Portfolio construction: diversify across multiple technology verticals and stagger investments by maturity stage, so the portfolio has both early bets and near-exit candidates • Risk-sharing and syndication: collaboration with like-minded investors and spread financial and technical risks; seek co-investors that also bring technical domain expertise
Investment	Opportunity identification Technical and commercial due diligence Investment decision and deal closing Post-investment engagement Valuation and portfolio optimization	Commercialization and scaling	• Active value creation: offer hands-on support to strengthen portfolio companies' business models, IP strategies, and go-to-market capabilities • Milestone-based funding: disburse follow-up capital based on achievements, such as product development goals, securing key partnerships or collaboration, or reaching revenue targets
Exit	Develop exit roadmap Exit execution	Evolve into a mature company	• Exit orchestration: work with potential acquirer or plan for an IPO path; use sector-level insights to time exits

Process can be much longer, and capital intensive for deep tech startups compared to other startups as completion of key R&D objectives and commercial scaling can be challenging.

Milestone-based funding can offer a collaborative approach for investors and deep tech startups to establish a realistic roadmap and ensure measurable growth aligned with capital input. For deep tech, it serves as a risk mitigation measure, as high R&D expenditures may be required without clear objectives from the investor's perspective.

Source: Reddal analysis.

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Korean government's key roles should include providing more flexibility in investment execution and portfolio management as well as easing testing restrictions for emerging technologies

Government's support areas

Support areas	Challenges	Proposed solutions	Foreign examples
Investment and portfolio management	**Investment execution requirements** • Mandates requiring 60%-70% investment in Korean companies in designated sectors can limit diversification, strain deal sourcing, and reduce returns	**Increase flexibility in domestic investment allocation**	**Yozma Program (Israel)** • Yozma allowed co-investments with foreign VCs without strict domestic allocation rules, helping diversify fund portfolios and attract global capital to Israel's startup ecosystem
	Portfolio investment restrictions • Public FoFs such as TIPS, K-Growth Fund require funds to deploy capital into early startups (usually <7 years old) in policy-prioritized sectors, limiting flexibility for GPs	**Enable broader portfolio investment strategies**	**Venture Capital Catalyst Initiative (VCCI, Canada)** • Canada's VCCI supports both generalist and sector-specific VC funds across various stages • This allows flexible portfolio construction that meets evolving market needs rather than enforcing narrow age or sector mandates
	Restrictive investment deployment timelines • Government-backed funds in South Korea typically require GPs to deploy a significant portion of the fund within a limited timeframe about 3-5 years	**Extend investment horizons**	**European Innovation Council (EIC) Fund (EU)** • EIC provides patient capital with up to a maximum of 15-year horizons, supporting deep-tech startups through long R&D cycles and reducing pressure for early exits
Testing environment for emerging technologies	**Rigid regulations and infrastructure-specific testing limitations** • South Korea maintains a positive list approach (what is allowed must be pre-approved), leading to delays in field-testing for sectors such as robotics, biotech and AI • Sandbox coverage remains limited in deep tech areas such as AI and quantum technologies, contributing to regulatory uncertainty and a lack of clear guidelines	**Expand a negative list approach**	**Negative list for autonomous vehicle testing (United States)** • Texas and Arizona adopted a negative list model for autonomous vehicle testing, allowing companies to operate by default • This lowers regulatory barriers, enabling faster pilot projects and shortening time-to-market for emerging deep-tech solutions without waiting for pre-approvals
		Regulatory harmonization across jurisdictions for emerging technologies	**Cross-border harmonization for emerging tech (EU)** • EU provides unified AI and drone regulations (AI Act, U-space), allowing companies to scale more easily across 27 countries by reducing regulatory barriers and speeding up cross-border market entry

Source: KVIC 1 2 (2025), K-Growth (2024), Business Korea (2025), SBIC (2025), KVCA, Ministry of Government Legislation (2022), BVCA, betakit (2023), ITA, Norton Rose Fulbright (2022), Money Today (2024).

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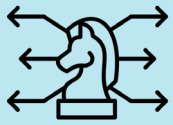
A phased approach will effectively support ecosystem development, with policy, talent, and infrastructure serving as critical enablers for becoming a global innovation hub

Suggested ecosystem development roadmap

	Phase I: Nurture future global deep tech champions	Phase II: Ecosystem expansion	Phase III: Global positioning
	2025 - 2027	**2028 - 2029**	**2030 - onwards**
Key initiatives	**Policy and regulatory support** • Establish regulatory sandboxes to fast-track testing for globally scalable technologies • Provide targeted early-stage tax incentives and capital support for tech with export potential **Focused global talent development** • Launch elite fellowship and leadership programs tailored for top-tier deep tech firms • Develop partnerships between universities and industry to co-develop frontier technologies • Establish dedicated scholarships and subsidies for future talent aligned with global commercialization	**Funding and investment mechanisms** • Introduce venture matching funds or seed grants for promising research spin-offs • Incentivize private investors through co-investment and targeted capital gains exemptions • Attract global VC by showcasing early pilots and robust public-private partnerships **Infrastructure scaling** • Create shared testbeds to foster collaboration and lower entry barriers for startups • Upgrade country's digital backbone for scalable experimentation and deployment of new tech	**Collaborative ecosystem** • Form regional and global alliances with leading innovation hubs for R&D partnerships • Attract foreign experts and entrepreneurs in critical deep tech fields with targeted support • Organize flagship events or summits to attract global attention and strengthen partnerships **Commercialization and market development** • Pursue high-impact demonstration projects with leading international partners in Korea • Target global markets through trade missions, bilaterial agreements, and export strategies
Targets / milestones	 **Deployment of testbeds to validate early breakthroughs**  **Dedicated funding for export-ready technologies**	 **Major success cases with global traction and sales**  **Attraction of global talent and larger investment**	 **Diversification into emerging fields like quantum and nuclear**  **Established global deep tech hub**

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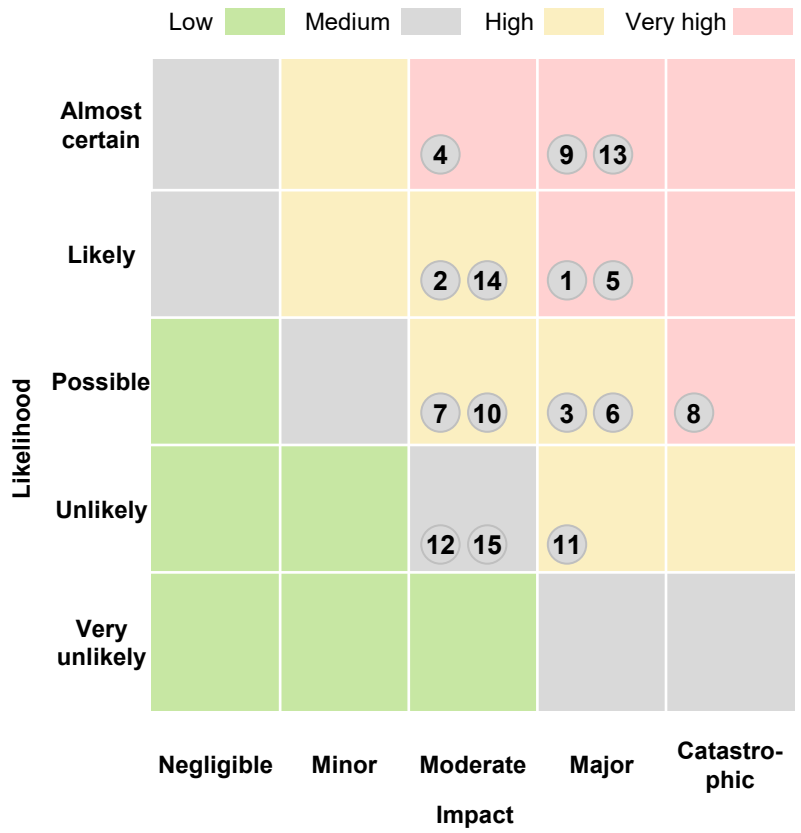
Key risks to be mitigated – startups, investors, and government should collectively address them in a systematic manner

Overview of main risks and mitigation measures

	Risks	Mitigation measures
Technology	1. Talent scarcity in frontier disciplines	• Global talent attraction programs with relocation/immigration support • Research partnerships with global institutions for co-mentorship
	2. Technological failure and scientific uncertainty	• Milestone-based R&D grants tied to technical validation • Training of deep tech-specialized investment associates
	3. Inadequate infrastructure for validation and prototyping	• Shared access to pilot facilities and framework • Subsidized use of university of public infrastructure
Business development	4. Founder skill gaps in go-to-market execution	• Public vouchers for hiring CXOs or commercialization consultants • Growth of deep tech-specific accelerators with business coaching
	5. Difficulty in global scaling	• Expand global soft-landing programs • Incentivize foreign executive hiring or co-founding
	6. Weak access to early adopter and pilot customers	• Mandate government procurement quotes for startup pilot projects • Offer tax credits to conglomerates and SMEs to serve as early testers
	7. Low tolerance for failure among customers and partners	• Develop a deep tech rating system (such as TRL) to set realistic expectations for adoption stages
Funding	8. Funding gap (“valley of death”)	• Introduce bridging grants and convertible notes for post-seed R&D • Use government-backed guarantees to de-risk VC participation
	9. Low-levels of foreign investor participation	• Establish a dedicated global co-investment platform with local syndicates • Host deep tech-related events abroad, featuring Korean companies and market briefings
	10. Risk-averse LP base	• Offer loss relief tax incentives to institutional LPs (example – UK’s EIS)
	11. Exit pathway constraints	• Enable cross-border IPOs through regulatory harmonization • Build domestic M&A capacity via incentives for larger corporations in acquisition
	12. Short fund lifecycles	• Create evergreen fund structures with public anchor capital
Policy and regulation	13. Positive list regulatory framework	• Shift toward a negative list system (permit unless prohibited) for emerging tech • Expand regulatory sandboxes to cover deep tech sectors with faster cycles
	14. Fragmented policy coordination	• Create a consolidated authority for policy development and budget allocation • Consolidate overlapping programs under a single strategic governance framework
	15. Innovation – policy cycle mismatch	• Introduce adaptive policy pilots that update based on tech performance • Allocate flexible funds that operate independently from annual budgeting cycles



Source: United Kingdom Government, Reddal analysis.

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Investor perspectives

Quotes

Gunno Park, Ph.D.

Director, Shinhan Venture Investment

My primary focus is on identifying deep tech companies in Korea that have the potential to create a global impact, similar to OpenAI and Anthropic. Sectors such as AI, blockchain, mobility, aerospace, and quantum technology are particularly promising in this regard.

To foster a thriving deep tech ecosystem, it is crucial for the VC industry to attract more talent with technical backgrounds, enabling promising startups to secure investments while receiving adequate support for business development.

In addition, government support for the deep tech ecosystem is valuable, and continued comprehensive backing for the startup ecosystem is essential to bring more groundbreaking technologies to market.

HoChan Lee

Managing Director, ACVC Partners

The Korean deep tech ecosystem is significantly driven by the AI boom, fueling investments across diverse segments due to its wide-ranging applications and transformative impact.

Even though each AI subsegment may appear to have established players, deeper analysis reveals many opportunities for new entrants. It is crucial for deep tech firms to solve large-scale challenges, and a strong academic and basic science foundation can bolster relevant R&D.

Current government funding and policies, which allow investors to operate and support companies based on their own philosophies, are appreciated. The government should continue to support ecosystem growth with broader objectives and guidelines.

Investor perspectives

Quotes

KyungJin Hyung

CEO, BlissVine Ventures Inc.

BLISSVINE VENTURES

The Korean government has a strong track record of systematically driving investments in emerging technologies, as demonstrated in display, defense, and semiconductors. Likewise, the deep tech ecosystem stands to benefit significantly from government support in R&D and commercialization, particularly in areas like new materials, renewable energy and AI.

Deregulation to facilitate testing of future technologies could accelerate technological advancement and enhance global competitiveness.

Additionally, fostering more proactive entrepreneurship within the basic science research community and academia can strengthen the overall ecosystem. Securing the right commercialization talent is crucial to transforming high-TRL technologies into scalable solutions that generate real market value.

Ki Eom

Managing Partner, Q.E.D. EQUITY

Q.E.D. EQUITY

In the semiconductor industry, government-driven policies on materials, components, and equipment have spurred the growth of domestic companies producing advanced materials, helping to establish a strong foundation for the deep tech ecosystem.

Currently, many VC funds operate with government support and guidance, primarily focusing on early-stage deep tech investments. As the ecosystem matures, major deep-tech investments—particularly in late-stage companies (Series C-D)—increasingly require Private Equity (PE) involvement. Developing a more structured private financing landscape, along with continued government support for PE, could expand opportunities for deep tech startups to scale as their technologies and commercial strategies evolve.

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Investor perspectives

Quotes

Seokwoo Jun

Senior Manager,
KB Card (investments)

KB Kookmin Card

Significant investment opportunities are emerging in biotechnology, semiconductors, and batteries in South Korea, driven by a concentration of top talent and established peer groups. However, concerns remain regarding the talent supply in fields such as AI. Strategically expanding this pool is essential to ensure a diverse and sustainable innovation ecosystem.

As deep tech startups scale, transitioning from founder-led commercial operations to a structure that includes commercial executives is important for effective commercialization and global expansion. This shift can help mitigate management fatigue and improve operational efficiency.

For CVCs, investment timelines are often less defined compared to traditional VCs. Establishing clear exit plans could enhance accountability and drive more proactive investment management.

Rancho Lee

Co-founder and
General Partner,
Simsan Ventures

Sim San ventures

Korea's industrial foundation has long been rooted in high-tech industries driven by science and technology, leading VCs to invest in deep tech for many years. Public investments play a significant role in shaping the domestic ecosystem, as it constitutes a major share of deep tech investments.

VCs are drawn to deep tech sectors due to their higher margins compared to retail industries and strong future growth potential, typically within 3–7-year exit timelines. Biotech and AI are particularly attractive due to active M&A and IPO markets, while high-tech sectors such as quantum computing face challenges due to longer exit periods and a limited pool of expert reviewers.

In sustainability, quantitative growth is already underway. Achieving qualitative growth, such as global market expansion, could further improve the sector’s attractiveness over the next 5–7 years.

REDDAL

Investor perspectives

Quotes

Sun Choi

Founding Partner,
2080 Ventures

While there may be an AI bubble, strong companies with important technologies will endure and become key value creators for VCs.

Additionally, biotech will remain highly relevant due to its direct connection to human life and the growing focus on addressing longevity challenges. Sustainability-related segments in Korea will likely offer promising opportunities. However, they must deliver tangible value rather than relying solely on mandates or social values.

To foster ecosystem growth, startups should adopt a targeted approach that validates genuine market demand both domestically and internationally. They should also reduce dependence on government funding and avoid surviving solely on subsidies. This mindset will help them build a more resilient foundation and thrive in competitive markets.

Tech firm perspectives

Quotes

Seungjin Han

CGO/EVP,
NEARTHLAB Inc.

Deep tech startups in Korea face growing pressures to balance technological innovation with commercial viability, particularly as they prepare for IPOs under investor scrutiny. While this process often refines internal operations and strengthens business models, it also highlights the tension between profitability demands and long-term R&D investments. For the ecosystem to thrive, startups must address globally relevant challenges and adopt international expansion strategies from the outset rather than relying solely on domestic market success.

Investors play a critical role in supporting commercialization efforts by offering strategic guidance, building networks, and fostering partnerships with global players. Meanwhile, the government should focus on creating a supportive environment through early-stage funding programs like TIPS while allowing the private sector to lead later-stage investments.

Jeeyun Ahn

Chief Strategy Officer,
RLWRLD

In Korea, many deep tech investment and R&D activities are closely aligned with global trends, particularly the AI boom. Many corporations are actively investing in AI-related technologies to maintain global relevance in the coming years.

Beyond AI, other key drivers include biotech innovation, such as gene editing and mRNA advancements, which have generated significant demand and excitement for new solutions. Sustainability is also a major driver, driven by urgent global challenges and increasing pressure from rapidly developing aerospace markets in other countries, which impact the domestic market.

For deep tech startups, the most critical success factor is ensuring that executives possess strong market acumen and business development capabilities, with a clear focus on technology commercialization.

REDDAL

Tech firm perspectives

Quotes

Robin Jo

Director, Pozalabs America Inc.

In Korea's AI sector, commercial applications are increasingly prioritized over proprietary technology development, reflecting a shift toward market-driven innovation. For companies specializing in AI-generated music, challenges revolve around building robust data infrastructure, aligning technology with market needs, and overcoming domain-specific hurdles such as proving the ability to replace traditional music composers.

To strengthen the ecosystem, long-term R&D support and practical commercialization assistance from the government are essential. Investors need to adopt patient funding strategies and provide business support, such as connections with conglomerates and global networks. Additionally, startups should consider tailored approaches for international expansion rather than relying solely on domestic stability before entering foreign markets.

Joon-Ha Kim

CEO, DIDEN Robotics

Korea's robotics sector is entering a vibrant growth phase, with many startups emerging from leading research labs to address labor-intensive industries like shipbuilding through deep tech automation.

Government programs such as Deep Tech TIPS provide meaningful early-stage funding, and strong academic credentials often help attract investment; however, limited specialized talent and comparatively smaller funding sizes remain hurdles to scaling.

As deep tech ventures navigate high-risk development cycles, commercialization support, global market visibility and diversified exit pathways (including IPO and M&A) will be key to sustaining long-term growth.

Strengthening collaboration among founders, investors, and corporate partners can accelerate transition from research excellence to globally competitive deep tech enterprises.

REDDAL

Tech firm perspectives

Quotes

Yeonjoo La

South Korea Startup Lead, The Good Food Institute

The Korean deep tech ecosystem is advancing rapidly, and cultivated meat is one sector where technological innovation has positioned companies as potential global leaders. However, challenges persist, including stringent regulatory requirements that delay market entry and increase costs. Funding remains critical, as investors often prioritize proven technologies with shorter commercialization timelines.

Fostering a robust deep tech ecosystem will require collaborative efforts from governments, investors, and tech firms. Streamlining regulatory processes and focusing government support on impactful programs can empower startups to scale effectively. Additionally, addressing language barriers and aligning regulatory standards internationally could unlock foreign investment opportunities and drive global partnerships.

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Biotech and AI lead deep tech investments, while investors continue to seek truly groundbreaking solutions in the domestic market

Funding cases (1/5)

Biotechnology

Rznomics

- Anticancer biologics leveraging RNA replacement technology
- Latest funding: Pre-IPO (2024, 20.3BKRW)
- Total raised: 80BKRW
- Key investors

PARTNERS INVESTMENT · SYNERGY IB INVESTMENT · SBI Investment

NOVELTY NOBILITY

- Targeted therapy for lung cancer leveraging c-Kit-targeting ADC
- Latest funding: Series C (2024, 23.3BKRW)
- Total raised: 75.4BKRW
- Key investors

Medytox · 신한벤처투자 · KB Investment

AIRS MEDICAL

- ML-based solution reducing MRI scan time to less than a quarter
- Latest funding: Series C (2024, 27BKRW)
- Total raised: 573BKRW
- Key investors

Klim ventures · SPRING CAMP · TIPS KOREA

Key takeaways

- Technological advancements in biochemistry and medicine are driven by AI and big data, further fueling investor interests
- Investors target both early-stage startups with novel technologies and late-stage startups with notable breakthroughs in existing focus areas such as cancer and dementia treatment

AI and big data

MakinaRocks

- MLOps for AI model development, deployment and management
- Latest funding: Series C (2024, 19BKRW)
- Total raised: 52.9BKRW
- Key investors

APPLIED MATERIALS · HYUNDAI · 대성창업투자(주)

upstage

- Business LLMs and document processing engines
- Latest funding: Series B (2024, 55BKRW)
- Total raised: 131.6BKRW
- Key investors

Company K partners · SBVA · Premier Partners

Nota AI

- On-device AI solution utilizing lightweight deep learning model
- Latest funding: Series C (2024, 30BKRW)
- Total raised: 57BKRW
- Key investors

STONEBRIDGE Stonebridge Ventures · INTERVEST

Key takeaways

- AI adoption is expanding across multiple fields, attracting investor interest in startups offering a range of AI solutions
- Only a limited number of core AI technologies, such as advanced AI models, are available, while many application-type software solutions depend on global players' APIs
- Investors are actively seeking groundbreaking technologies that can fill the gap in the domestic AI market with more advanced use cases

Source: Company websites, The VC, Reddal analysis.

REDDAL

Recent sustainability deals represent diversified technological advancements; cloud market matures, and investors look for startups with well-defined commercial potential

Funding cases (2/5)

Sustainability

STANDARD ENERGY

- Large-scale vanadium-ion batteries for ESS (energy storage systems)
- Latest funding: Series C (2024, 25BKRW)
- Total raised: 122.5BKRW
- Key investors

LB Investment, 하나증권, 미래과학기술지주(주)

GRINERGY

- Advanced lithium-ion rechargeable batteries
- Latest funding: Series C (2024, 40BKRW)
- Total raised: 66.4BKRW
- Key investors

Coolidge Corner, KVCA 한국벤처캐피탈협회

HENERGY

- Solar power plant investment and management platform
- Latest funding: Series C (2024, 39BKRW)
- Total raised: 48.1BKRW
- Key investors

KB Investment, POSTECH HOLDINGS

Key takeaways

- Large deals are made across various investment rounds and industries, reflecting broad interest in applications
- Investors are looking for companies that play in areas with large-scale demand, and have the technological capabilities to respond to the demand

Cloud and network

MEGAZONE CLOUD

- Managed Service Provider (MSP) simplifying AWS deployment
- Latest funding: Series C (2022, 450BKRW)
- Total raised: 818BKRW
- Key investors

NAU, KDB, KB Investment

Cloocus

- MSP simplifying MS Azure solution deployment
- Latest funding: Series B (2024, 20BKRW)
- Total raised: 53.5BKRW
- Key investors

STONEBRIDGE, SK

SECURITY PLATFORM

- Security solutions for IoT devices and services
- Latest funding: Series B (2024, 6BKRW)
- Total raised: 9BKRW
- Key investors

SBVA, Premier Partners

Key takeaways

- Large later-stage funding rounds suggest a growing investor preference for mature solutions with a stable customer base
- As cloud migration and digital transformation accelerate, cloud MSPs capable of meeting diverse demands are well-positioned to attract investment
- Diversification is underway, with security solutions gaining momentum
- With rising costs, a focus on profitability improvement may be key to attracting investors

Source: Company websites, The VC, Reddal analysis.

Robotics is widely considered as the next big item with potential for cross-industry applications; system semiconductor demands are driven by growing AI use cases

Funding cases (3/5)

Robotics

Polaris3D

- Autonomous server robots for restaurants
- Latest funding: Series B (2024, 15BKRW)
- Total raised: 21.3BKRW
- Key investors

Holiday Robotics

- Humanoid robots for part assembly in manufacturing
- Latest funding: Seed (2024, 17.5BKRW)
- Total raised: 17.5BKRW
- Key investors

LN ROBOTICS

- Collaborative robots for cardiovascular surgeries
- Latest funding: Series B (2024, 20BKRW)
- Total raised: 28BKRW
- Key investors

Key takeaways

- Active investments in both early-stage and later-stage startups reflect growing interest in the sector
- As the technology is more function-specific than industry-specific, successful commercialization depends on applying the right level of automation in target industries to attract investment

System semiconductor

DEEPX

- System semiconductor for on-device AI
- Latest funding: Series C (2024, 110BKRW)
- Total raised: 136.1BKRW
- Key investors

FURIOSA

- AI accelerators for data centers
- Latest funding: Series D (2025, 2BKRW)
- Total raised: 163BKRW
- Key investors

rebellions_

- AI accelerators for various applications
- Latest funding: Series B (2024, 20BKRW)
- Total raised: 297BKRW
- Key investors

Key takeaways

- Growth of AI and cloud computing sectors drive demand for domain-specific system semiconductors
- Passing performance test of major customers is critical for commercial success
- Rebellions recently reached unicorn status, gaining expectations for greater synergy with a semiconductor giant after its merger with SK Group's Sapeon

Source: Company websites, The VC, Reddal analysis.

Aerospace investments in drones and satellites remain while mobility sector presents longer-term potential as regulatory challenges continue with autonomous driving

Funding cases (4/5)

Aerospace

NARA SPACE

- CubeSats and small space systems
- Latest funding: Pre-IPO (2024, 20BKRW)
- Total raised: 33.5BKRW
- Key investors

iM Investment Partners, POSCO INVESTMENT, BNK

PERIGEE

- Sustainable and economical small satellite launch vehicles (SSLVs)
- Latest funding: Pre-IPO (2024, 14BKRW)
- Total raised: 70.78BKRW
- Key investors

MIRAE ASSET Venture Investments, KOREA IP, INNOPOLIS PARTNERS

NEARTHLAB

- Industrial drone solutions including both hardware and software
- Latest funding: Series C (2022, 20BKRW)
- Total raised: 30.3BKRW
- Key investors

Company K partners, future play, MIRAE ASSET Venture Investments

Key takeaways

- Significant funding is directed toward satellite-related hardware, including low Earth orbit (LEO) satellites and launch vehicles
- Drones gain attention for their diverse applications, spanning public sectors like defense and private sectors such as industrial safety

Mobility

STRADVISION

- Vision AI-based autonomous driving solution
- Latest funding: Series D (2024, 42BKRW)
- Total raised: 193.8BKRW
- Key investors

LSS PRIVATE EQUITY, TIMEFOLIO Asset Management, APTIV

bitsensing

- Radar-based autonomous driving and smart city solutions
- Latest funding: Series B (2024, 25BKRW)
- Total raised: 63BKRW
- Key investors

HL Mando, future play, SJ Investment Partners

RideFlux

- Autonomous driving SW utilizing 3D LiDAR, radar and camera
- Latest funding: Series B (2024, 26BKRW)
- Total raised: 55.2BKRW
- Key investors

SOCAR, SEOUL IP, 현대투자파트너스

Key takeaways

- Regulatory constraints and infrastructure limitations make this sector more suitable for investors with long-term perspectives
- Autonomous driving solutions pursuing full automation through technological differentiation are attracting investor interest
- Early investments are expanding into diverse applications, including batteries, ship navigation, and logistics robots, highlighting expectations for broad use cases

Source: Company websites, The VC, Reddal analysis.

REDDAL

Quantum and nuclear technologies are deeply rooted in basic science research, with the growth of startups and private investor sentiment yet to be determined

Funding cases (5/5)

Quantum technology

- Quantum computing solutions including cloud and encryption
- Latest funding: Pre-IPO (2024; 20BKRW)
- Total raised: 46BKRW
- Key investors

- Graphical software simulator for quantum communication
- Latest funding: Series A (2023; 3BKRW)
- Total raised: 33BKRW
- Key investors

- Quantum computing solutions for materials and drug discovery
- Latest funding: Pre-A (2023; 5BKRW)
- Total raised: 5BKRW
- Key investors

Key takeaways

- The total investment size is small, but holds significant expansion potential as an emerging sector
- Investors are making bold investments in companies with diverse applications
- Companies must identify use cases for commercialization and advance technology for tangible growth

Next generation nuclear

Startups not detected in next generation nuclear space

Key takeaways

- Selected markets, including the US, Germany, and China, are seeing the early success of nuclear startups (both fission and fusion reactor designs) driven by strong foundational science research
- Strong customer demand, both domestic and global, combined with systematic government support to de-risk private investment, can accelerate industry growth

Source: Company websites, The VC, Reddal analysis.

Exit cases indicate that IPOs are the primary choice for both startups and investors, offering IPO-specific returns and risks, while M&A and buyouts remain rare

Exit cases

IPO

GI Innovation

- Biotechnology
- Immune therapies and new drug development leveraging dual-fusion protein technology
- Timing and valuation: 2023; 26BKRW
- Exited VCs: VCs have not exited yet

INNOSPACE

- Aerospace
- Small satellite launch vehicles utilizing hybrid engine
- Timing and valuation: 2024; 57.6BKRW
- Exited VCs: d·camp 알바트로스인베스트먼트㈜

FADU

- System semiconductor
- Fabless focusing on memory and storage solution
- Timing and valuation: 2023;193.8BKRW
- Exited VCs: Samho 삼호그랜인베스트먼트, FOREST PARTNERS

neuromeka

- Robotics
- Industrial collaborative robots
- Timing and valuation: 2022; 25.3BKRW
- Exited VCs: true friend

Key takeaways

- A high-valuation IPO is the most common exit strategy and is widely observed across various sectors
- Some investors have not yet recouped their investments, as stock prices have dropped significantly after IPO

M&A

InSpace (Intelligence in Space)

- Aerospace
- Satellite ground station construction and operation, AI-based satellite image analysis, and drone software
- Acquired by Hancom Group
- Timing and valuation: 2020; valuation not disclosed

HANCOM

AtoGen (Gene to Life)

- Biotechnology
- Probiotics based on human microbiome
- Acquired by Tonymoly
- Timing and valuation: 2018; 3BKRW

TONYMOLY

Key takeaways

- A limited number of M&A cases before IPO have been observed, suggesting little interest in M&A from both early-stage startups and large companies

Buyout

EXOCOBIO

- Biotechnology
- An atopic skincare product utilizing exosome for intercellular signaling
- Acquired by K2 Investment Partners
- Timing and valuation: 74BKRW (30% stake)
- Multiple: not disclosed

K2 Investment Partners LLC 케이투인베스트먼트파트너스(유)

Key takeaways

- The investor's roadmap and capability to scale up the company through acquiring relevant companies and expanding globally played a major role

Source: AI Times, News1, Seoul Economy, BLOTER, FN Times, Yonhap Infomax, TopDaily, Company websites, The VC, Reddal analysis.

REDDAL

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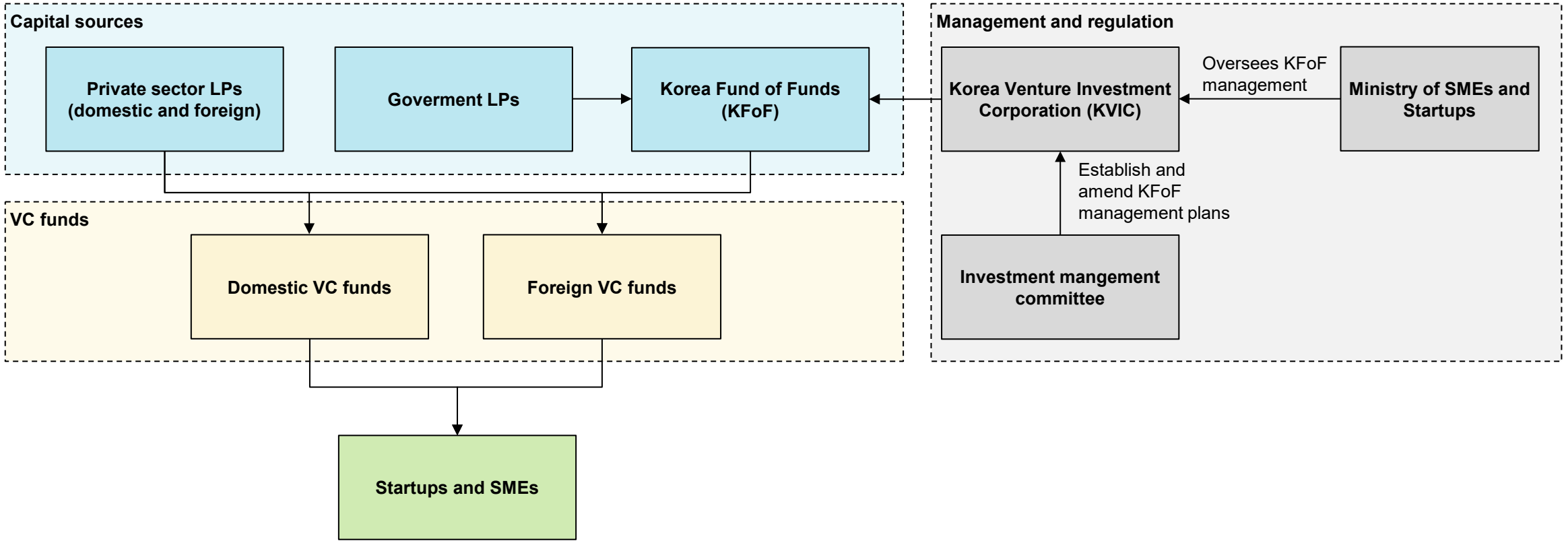
REDDAL

Both domestic and foreign VC funds can receive government funding although many larger VCs opt for private sector LPs as government mandates may hinder independent decision-making

Overview of capital flow in the Korean venture landscape



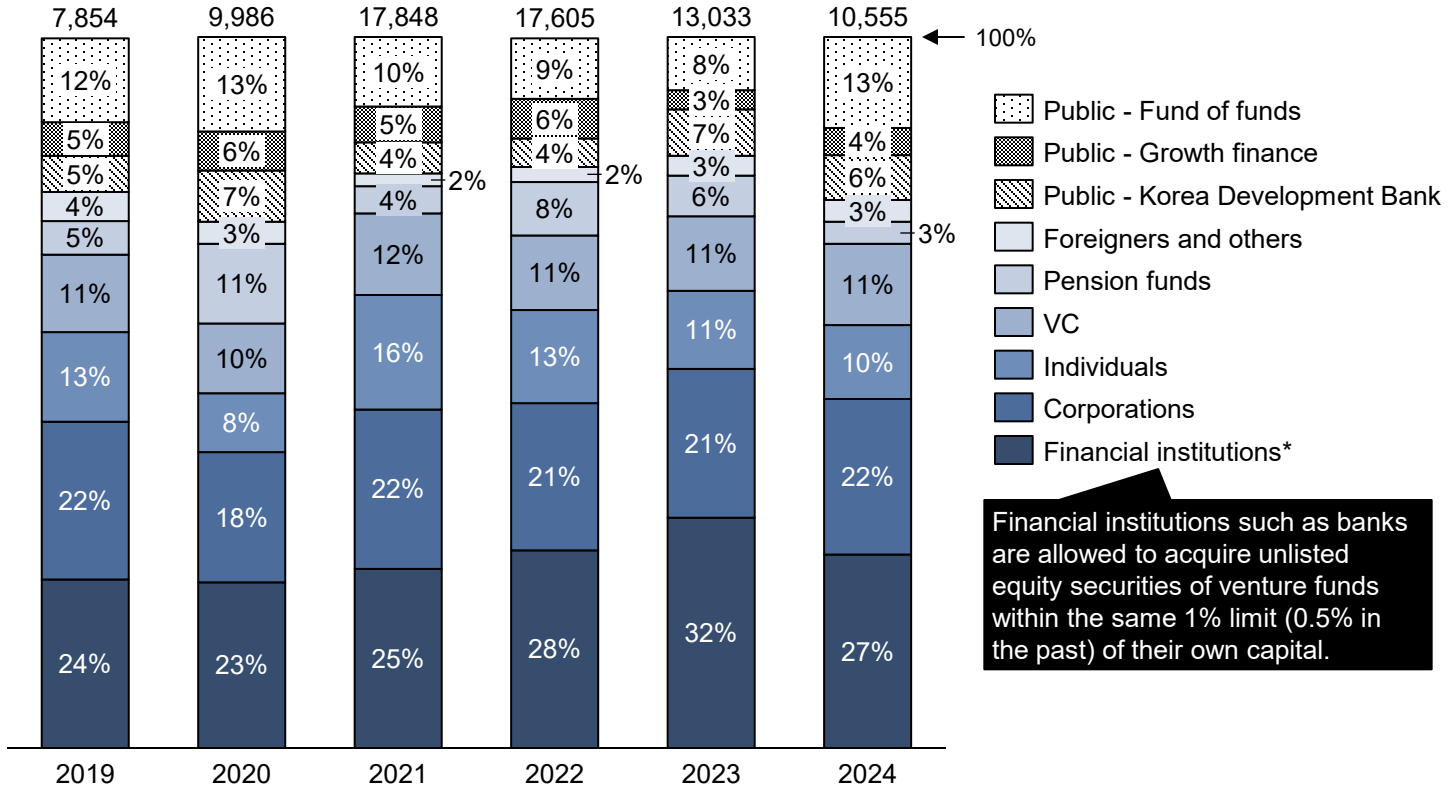
Source: KVIC 1 2, Korea Capital Market Institute (2022).

REDDAL

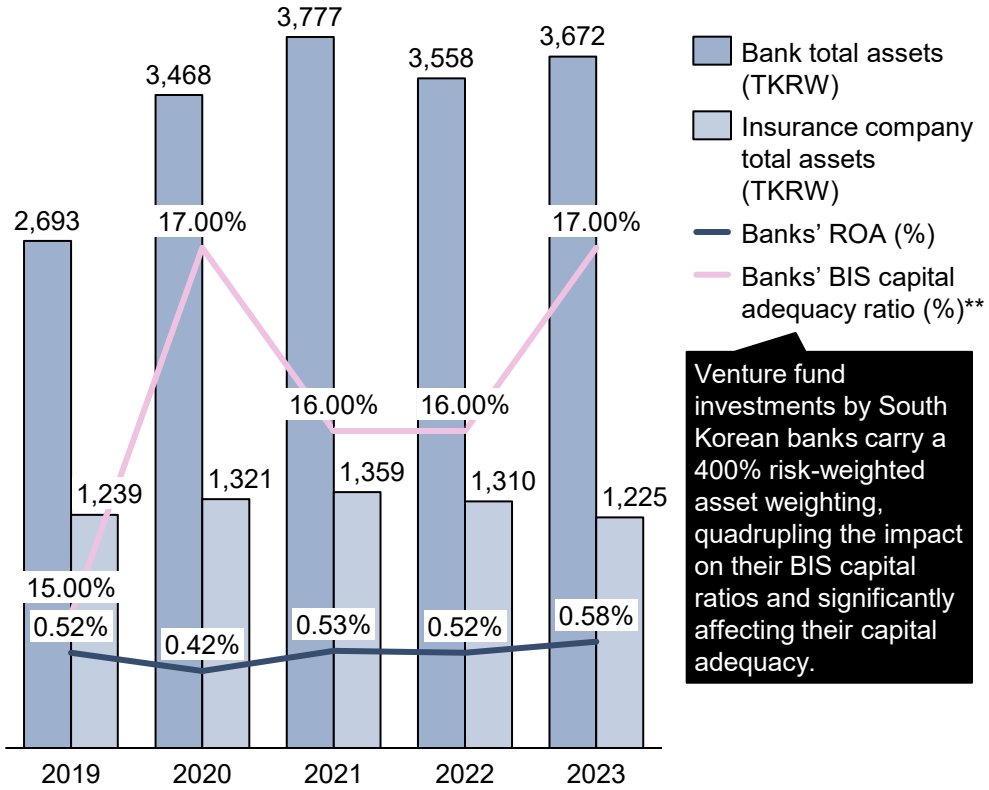
Financial institutions' increasing capital availability has positioned them as the most prominent LP, while seemingly limited government influence continues to promote private investments

Venture fund investor trend

Recent changes in venture fund investment volume by source, in BKRW and %



Banks and insurance companies' total assets



*Financial institutions include six categories: banks, non-bank depository institutions, financial investment business entities, insurance companies, other financial institutions, and financial auxiliary institutions.
**Capital adequacy ratio is defined as capital divided by risk-weighted assets.
Source: Ministry of SMEs and Startups 1, KOSIS, Trading Economics, Bank of Korea, Government Index 1 2, KDI (2023).

REDDAL

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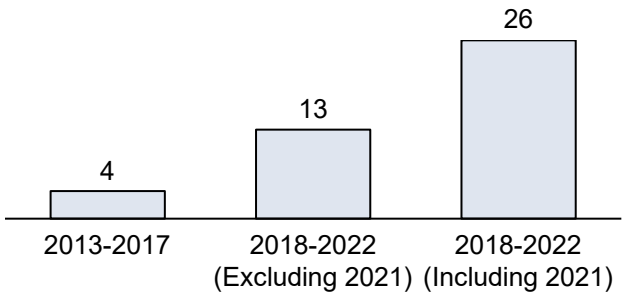
REDDAL

Representing 49% of the global deep tech investment volume, US market is largely driven by active private sector investments and leverages strong basic science research

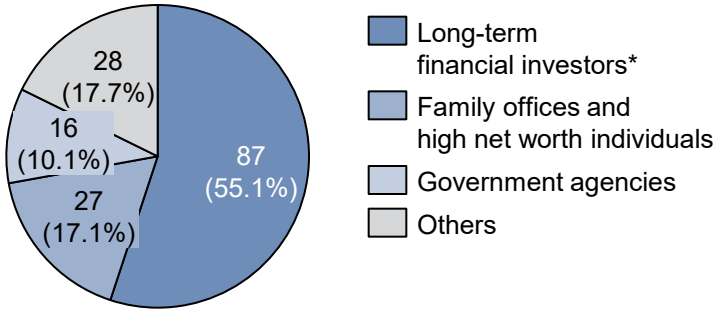
United States

Average deep tech unicorn exits (1BUSD+) per year



Adopted from Tech Crunch (2023). 2021 was an outlier as exits peaked with many SPAC deals.

LP composition in US VC funds in BUSD (2012-2016)



R&D expenditure by sector

Private R&D – business and nonprofit

Total R&D spending: 720.0BUSD (2023)

- Smaller businesses had greater R&D intensity, with microbusinesses (1-9 staff) allocating 62.8% of their workforce to R&D, compared to 5.6% in large companies (25,000+ staff)

Research Universities

Total R&D spending: 108.8BUSD (2023)

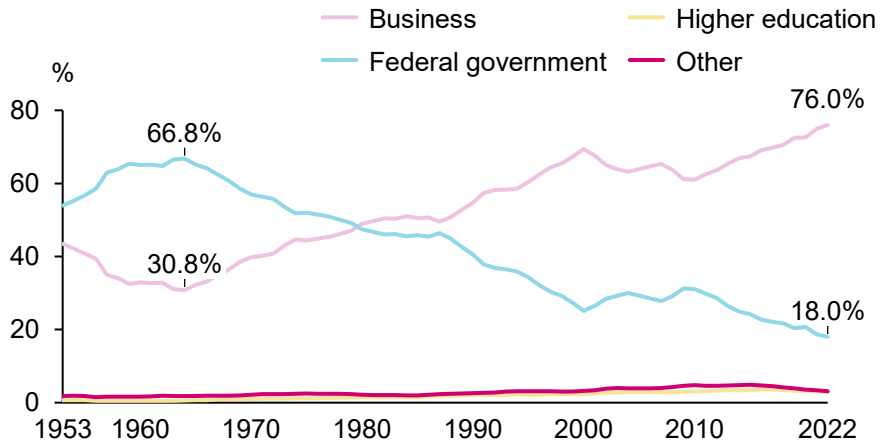
- 146 institutions classified as "R1: Doctoral Universities – Very high research activity“
- 133 institutions classified as "R2: Doctoral Universities – High research activity"

Federal R&D organizations

Total R&D spending: 73.3BUSD (2022)

- 17 National Labs (Department of Energy)
- 5 independent agencies (for example, NSF, NASA, and EPA)
- 40+ other department-supported agencies

R&D expenditure, share by funding sector



Public investments

Direct R&D funding

- Defense Advanced Research Projects Agency (DARPA)
- Advanced Research Projects Agency – Energy (ARPA-E)
- National Science Foundation (NSF)
- Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR)

Hybrid models with fund-of-fund-type investments

- In-Q-Tel (CIA-owned VC)
- Massachusetts Clean Energy Center (MassCEC)
- Maryland Venture Funds
- Indiana Next Level Fund
- New York State Innovation Venture Capital Fund

Federal-level funding primarily targets direct R&D investments, with few instances of fund-of-fund type investment activities. However, some state-level fund management has been observed, particularly in connection with deep tech investments.

*Long-term financial investors include pension funds, academic institutions, endowments, banks, insurance companies and sovereign wealth funds.

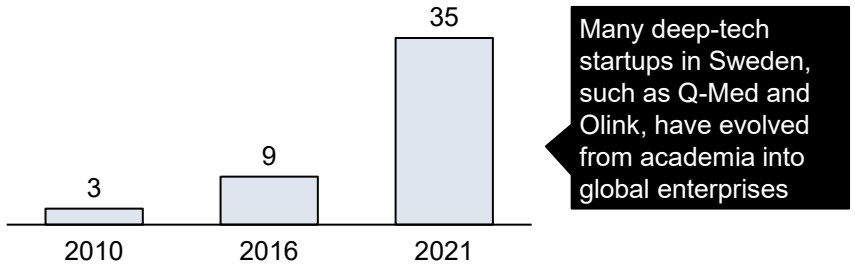
Source: Company and government websites, NVCA (2024), Tech Crunch (2023), BVP (2023), NSF 1 2 3, Axon Partners Group (2023), C&EN (2024) Reddal analysis.

REDDAL

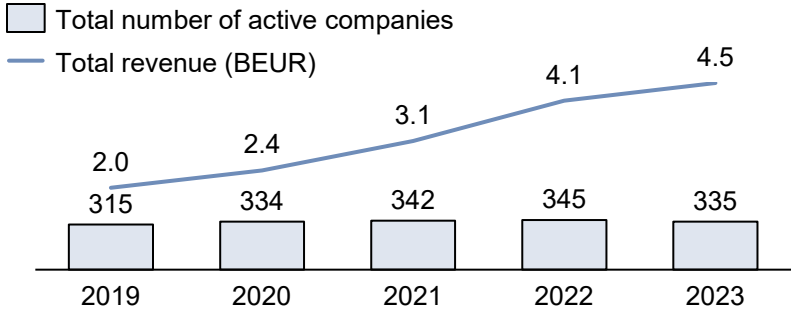
Swedish VC and deep tech ecosystem's success, particularly in manufacturing and automotive, is driven by strong local private and international funding especially in early-stage rounds

Sweden

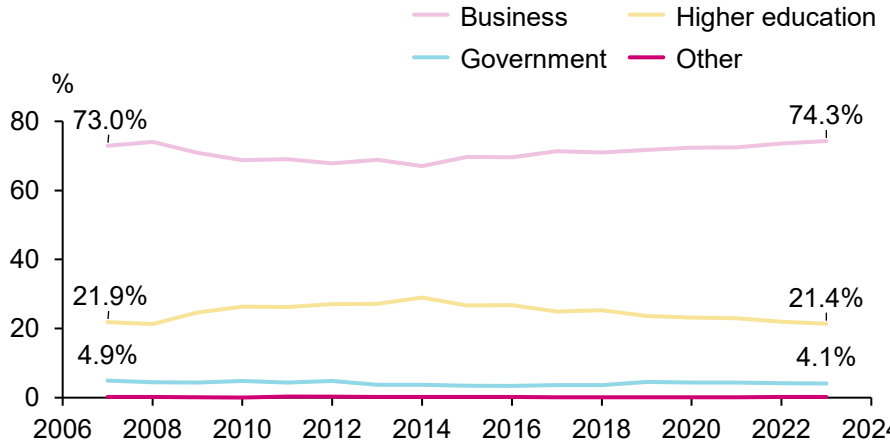
Number of tech unicorns (1BEUR+) in Sweden per year



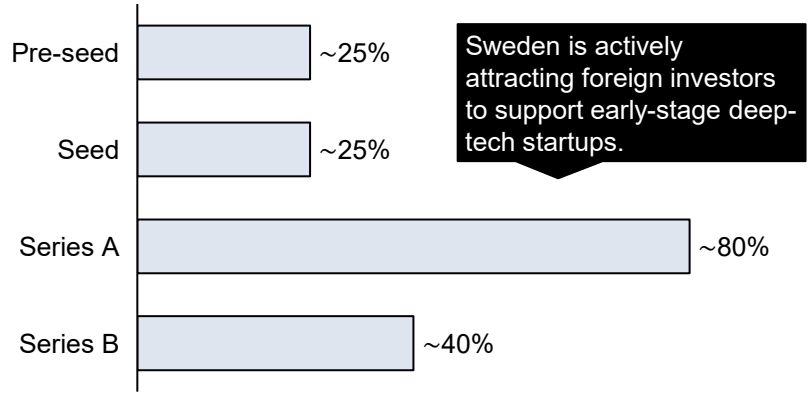
Number of deep tech companies and their revenue*, BEUR



R&D expenditure, share by funding sector



Rounds with non-Nordic investors, 2024



R&D expenditure by sector

In 2023, Sweden's total R&D expenditure amounted to 19.5BEUR, which corresponds to approximately 3.6% of the country's GDP

Private sector

- Manufacturing sector, particularly automotive industry (environment, shared mobility, connectivity, and safety), shows the highest propensity for R&D investment contributing around 25% of Sweden's private R&D expenditure
- Gothenburg region accounts for 35% of Sweden's private R&D expenditure, since it is home to major global corporations like Volvo Group, SKF, and Saab

Higher education institutions

- Higher education R&D in Sweden is primarily funded by the public sector (around 2.6BEUR), private non-profit sector (around 0.5BEUR), and funds from abroad (around 0.3BEUR)

Government

- Swedish Research Council (~0.7BEUR annually)
- VINNOVA (~0.2BEUR)
- Clusters of Excellence (planning to invest 0.1BEUR annually in groundbreaking tech by 2028)

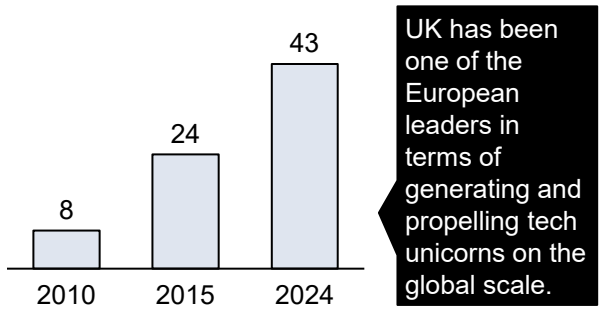
*Due to the limited data availability, it is believed that actual figures are higher, and that the Swedish deep tech ecosystem may be stronger than what is shown here.
Source: Company and government websites, Tillväxtanalys, Industrifonden (2024), Dealroom 1 2, Vetenskapsrådet 1 2, SCB 1 2, Swedish Research Council, Swedish Manufacturing R&D Clusters (2023), Reddal analysis.

REDDAL

UK's VC and deep tech ecosystems owe their success, particularly in biotech, to active private sector investments, a strong diversity of LPs, and strong generation of spinouts by universities

UK

Number of tech unicorns (1BUSD+) in UK



LP composition in UK VC funds (2019-2023)

R&D expenditure by sectors

In 2022, UK's total R&D expenditure amounted to 88BUSD, which corresponds to approximately 2.8% of the country's GDP

Private sector

- Amounted to 62.3BUSD (71% of total)
- A couple of sectors dominate R&D activity with pharmaceuticals (11.2BUSD), software (8BUSD), and automotive (4.7BUSD) among top spenders

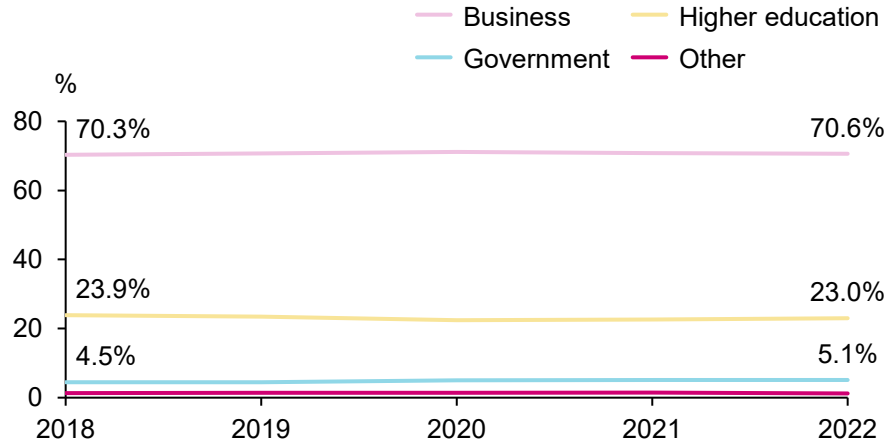
Higher education institutions

- Amounted to 20.3BUSD (23% of total)
- UK Research Councils' key investments (2021–2022):
  - Medical Research Council: 0.9BUSD
  - Engineering and Physical Sciences: 1.2BUSD
  - Biotech and Biological Sciences: 0.5BUSD

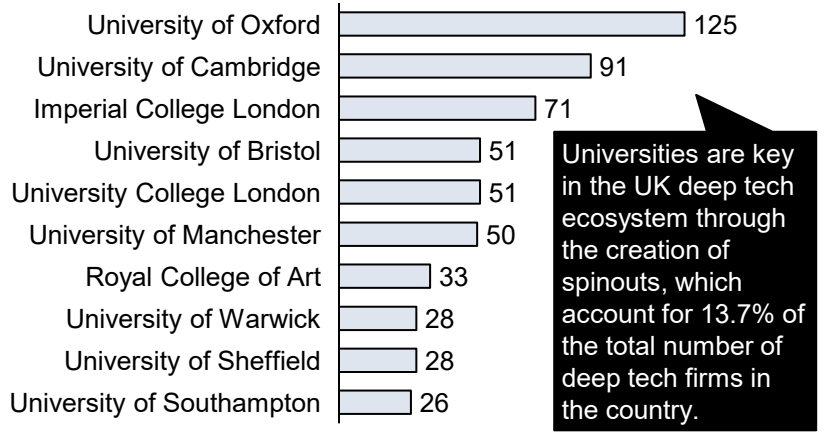
Government

- Amounted to 4.5BUSD (5% of total)
- 58% of government-performed R&D was on defense topics, whereas the remaining 42% went to civil R&D with key focus areas, such as public health research, environment, and nuclear energy

R&D expenditure, share by funding sector



Top origin institutions by number of deep tech spinouts, 2024



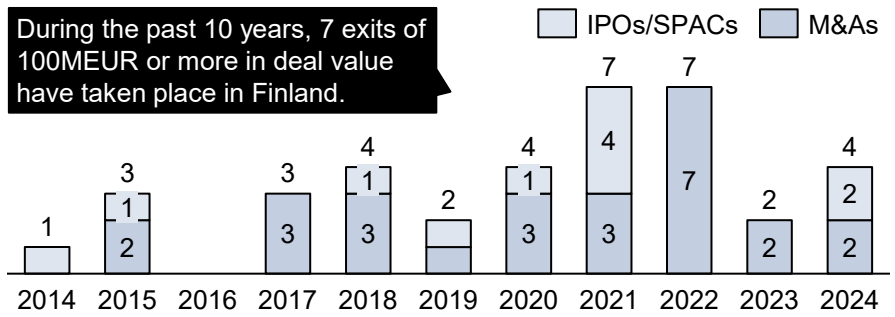
*Long-term financial investors include pension funds, academic institutions, endowments, banks, insurance companies and sovereign wealth funds.
Source: Company and government websites, Startups Magazine, Growth Business, Intel Ignite (2024), Royal Academy of Engineering (2024), BVCA (2024), Reddal analysis.

REDDAL

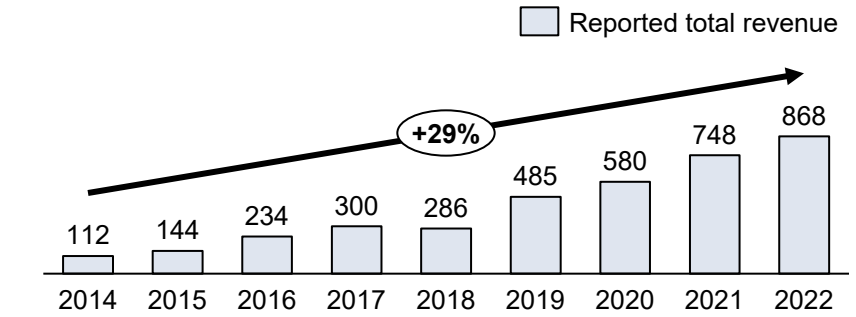
Finnish deep tech ecosystem's success is driven by a balanced investment of both private and public sectors in R&D, as well as active spinoffs from universities and research institutes

Finland

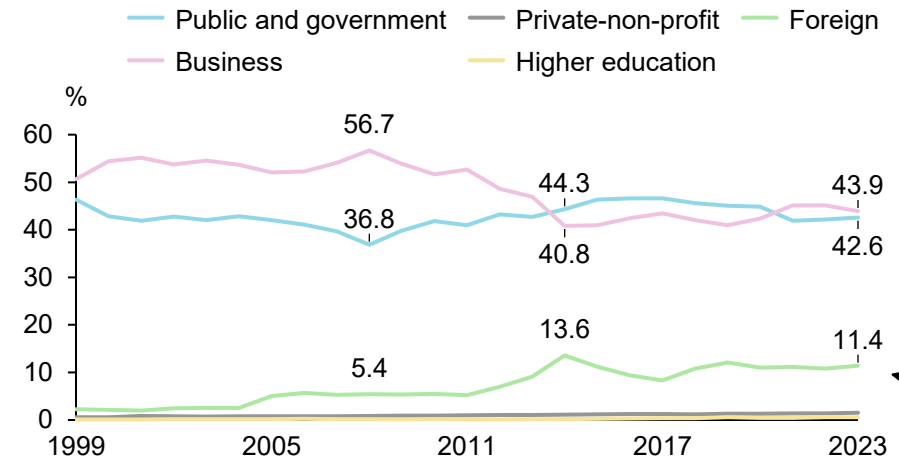
Number of deep tech exits in Finland per year



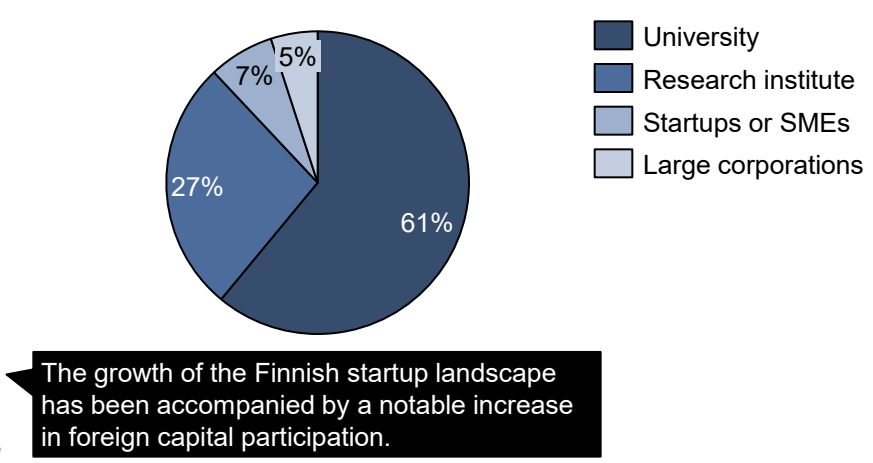
Total revenue of deep tech companies in Finland, MEUR



R&D expenditure, share by funding source



Origins of deep tech spinoffs in Finland, 2024



R&D expenditure by sector

In 2023, Finland spent 8.4BEUR on R&D, which represented 3.1% of its GDP

Private sector

- In 2023, Finland's private sector spent 5.6BEUR on R&D, accounting for 67% of the country's total R&D expenditure
- The ICT equipment (27.7%), the information and communication services (17%) and the electrical equipment and machinery (16.4%) sectors account for the lion's share of business R&D expenditures in the country

Higher education institutions

- In 2023, the higher education sector accounted for only around 0.5%, as a source of Finnish R&D funds; however, the sector is performing a large part of the R&D (around 24% of total expenditures)

Government

- In 2023, government sector R&D expenditure grew by 5.1% in real terms, higher than the higher education (+3.2%) and private (+1.7%) sectors
- Business Finland particularly channels funds to enterprises and SMEs, focusing on sectors with traditionally low R&D activity

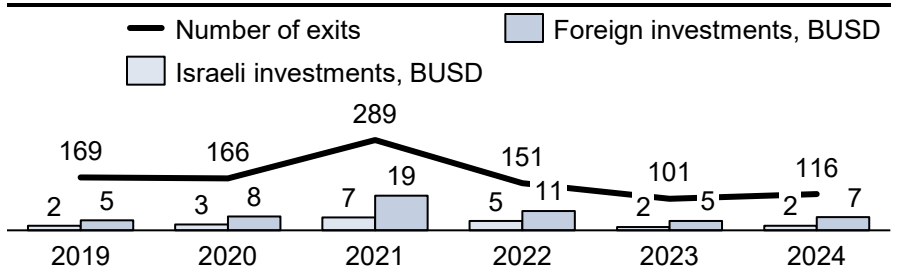
Source: Company and government websites, Tesi (2024), OECD (2021), Business Finland (2024), Reddal analysis.

REDDAL

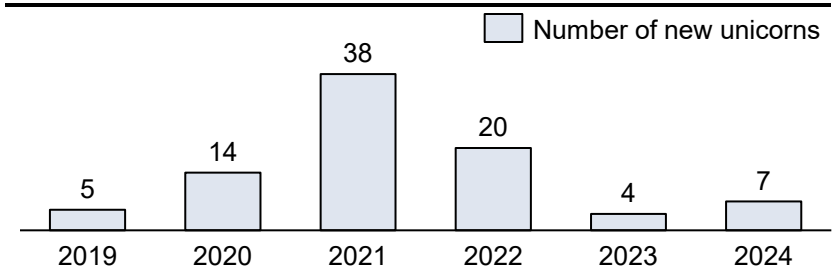
Israel's deep tech ecosystem, with a leading IT and software segment, is largely driven by foreign investments and multinational corporations

Israel

High-tech investment volume and exits, 2019-2024



Number of new Israeli unicorns by valuation data, 2019-2024



R&D expenditure by sector

In 2021, Israel's total R&D expenditure amounted to 25BUSD, which corresponds to approximately 5.8% of the country's GDP;

Private sector

- In 2021, 92% (23BUSD) of Israel's R&D expenditure went into the business enterprises
- The information and communication services sector accounted for half of the total (12BUSD)
- Foreign investments and multinationals are crucial to Israel's R&D, with 46% of R&D funding coming from foreign sources in 2021

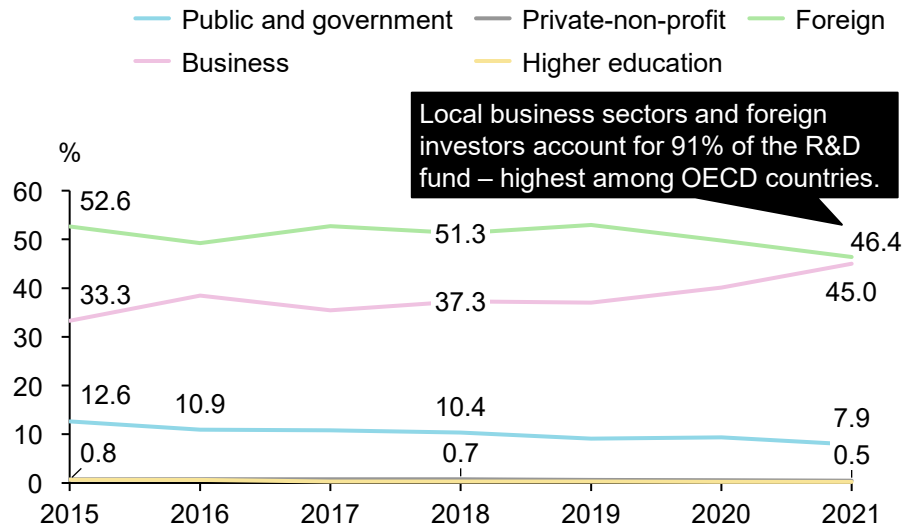
Government

- Government-funded R&D accounted for 8% in 2021
- The Innovation Authority drives government-led tech innovation, receiving 0.49% of the total state budget in 2024, a significant decrease from 0.9% in the 2000s

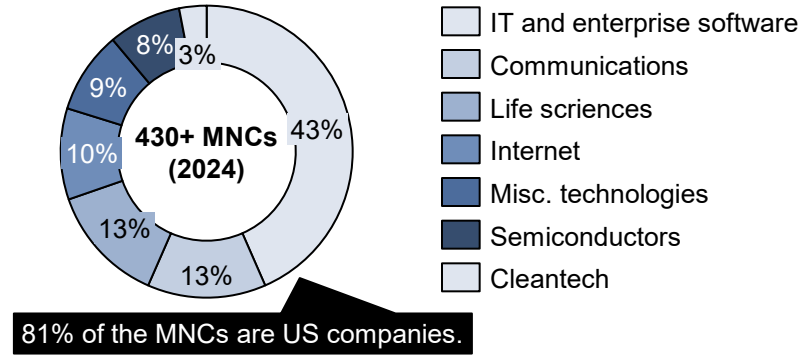
Higher-education

- Although not a major R&D funding source, Israeli universities actively contribute to tech innovation and the startup ecosystem through 18 technology transfer offices (TTOs)
- Tel Aviv University is one of the major hubs that has produced over 300 tech startups

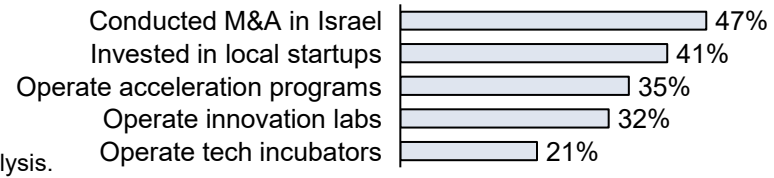
R&D expenditure, share by funding source, 2015-2021



Multinational corporations (MNC) as innovation vehicles in Israel



Most MNCs engage in innovation activities in Israel:



Source: OECD, IVC (2024), Startup Nation Central (2025), IATI (2024), Tracxn, Reddal analysis.

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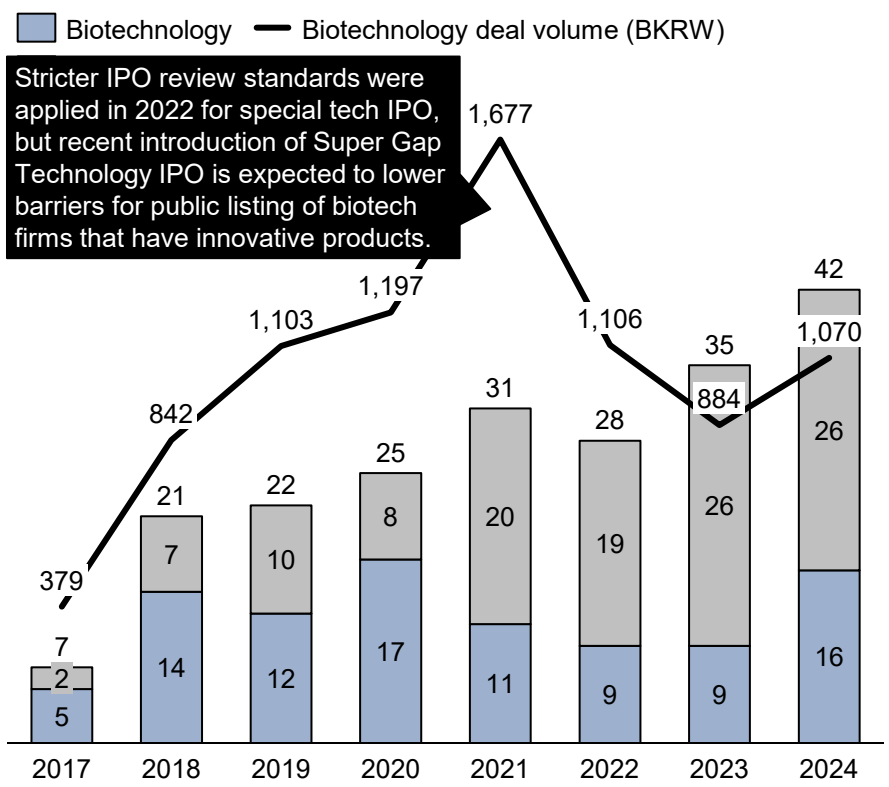
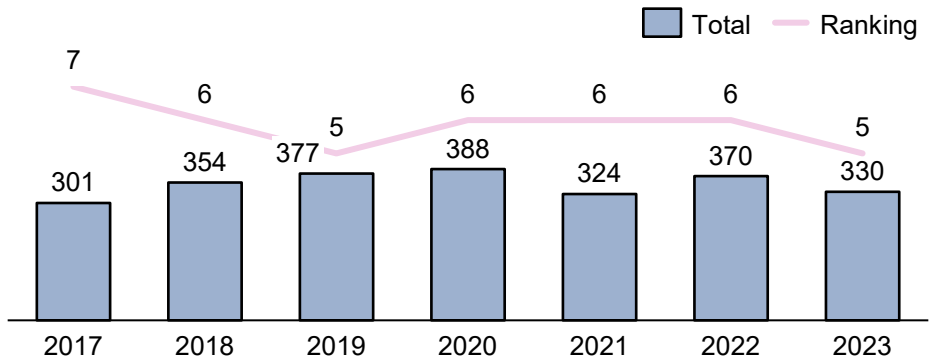
Despite recent decline in biotechnology deal volume, new special tech IPO process and diversified R&D focus areas are attracting investor attention

Investments and growth perspectives – Biotechnology

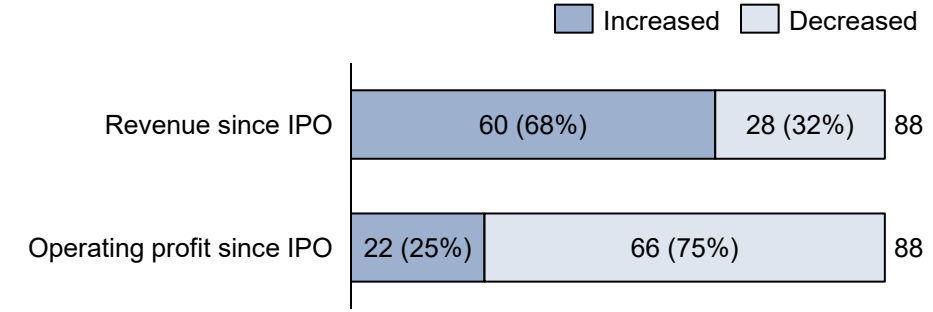
Share of biotechnology firms in special tech IPO* cases, 2017-2022



US patents by Korean biotech companies



Sales/profitability of biotech firms with special tech IPO case**



Internal factors

- New trends driving R&D, particularly cell therapy, gene analysis and biochips
- Generally low profitability due to high R&D costs and investment needs
- Decreasing domestic VC investments in the sector and limited track record of foreign VC investments and success

External factors

- Global geopolitics checking Chinese competition (for example, US Biosecure Act)
- Super Gap Technology IPO process established in 2023, lowering the barrier for biotech firms going public

Future perspectives

- Despite declining deal volume, new R&D activities are attracting investor interest, presenting a growth potential
- Diversified exit routes (beyond domestic IPOs) and relaxed regulations on shareholder requirements may further drive investment inflows

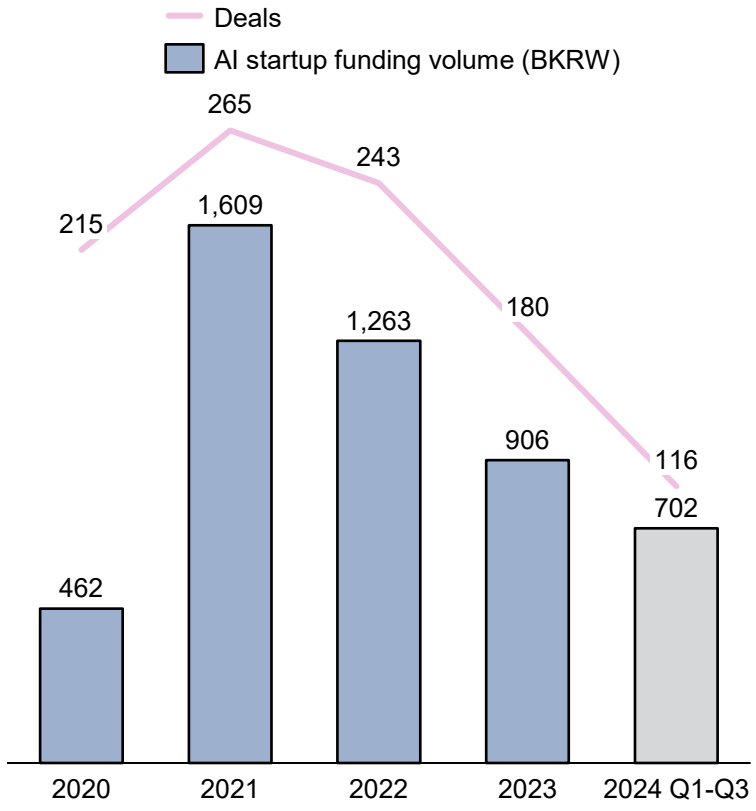
*Special Tech IPO allows companies with recognized innovation capabilities to be listed on KOSDAQ or KONEX, regardless of their current profitability.
**Based on 2023 year-end data. Records include 88 biotech firms that went public during 2014-2023.
Source: Daily Pharm 1 2 3, Hit News 1 2, BioIn (2023), KVIC, Yonhap News (2023), News 1 (2024), Healthcare N (2025).

REDDAL

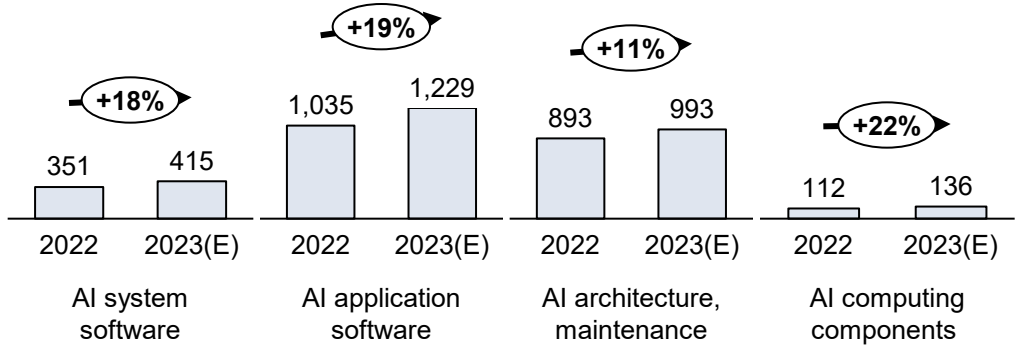
AI investment in South Korea lacks focus on core technologies and most startups are at early-funding stages with limited successful exit cases, needing for further ecosystem development

Investments and growth perspectives – AI and big data

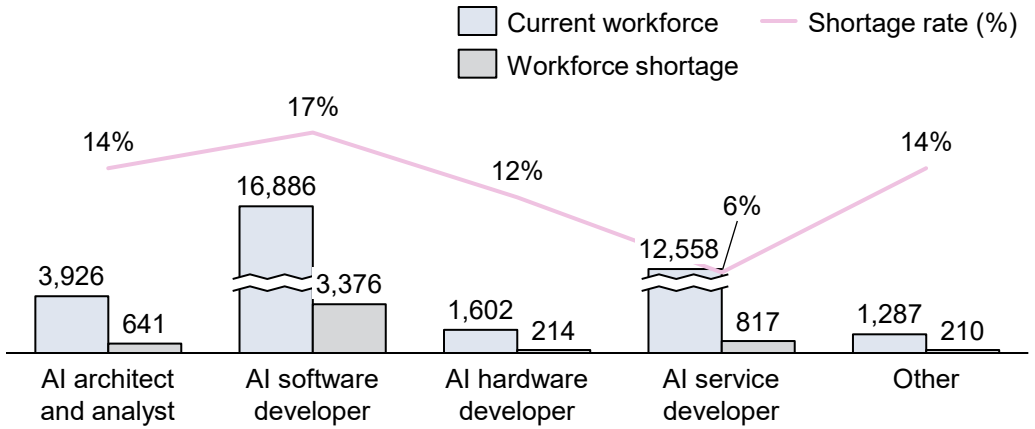
AI startup investment in South Korea, BKRW, 2020-2023



AI category-specific sales performance, MKRW per company*



AI engineer shortage in the market*



Internal factors

- Increasing number of AI products
- Advanced ICT infrastructure, incl. 5G
- Decreasing deals and low sales performance (albeit growth) of startups
- Limited core technologies (such as AI model) and talent drain

External factors

- High demand for AI across industries
- National initiatives such as “AI National Strategy” with large-scale subsidies
- Lack of successful exit cases

Future perspectives

- Continued investor interest in Korean AI startups is expected, fueled by global trends and demand for AI applications
- Risks include a relatively small number of core technologies, talent drain to larger markets, and a limited global track record

*Including non-startups.

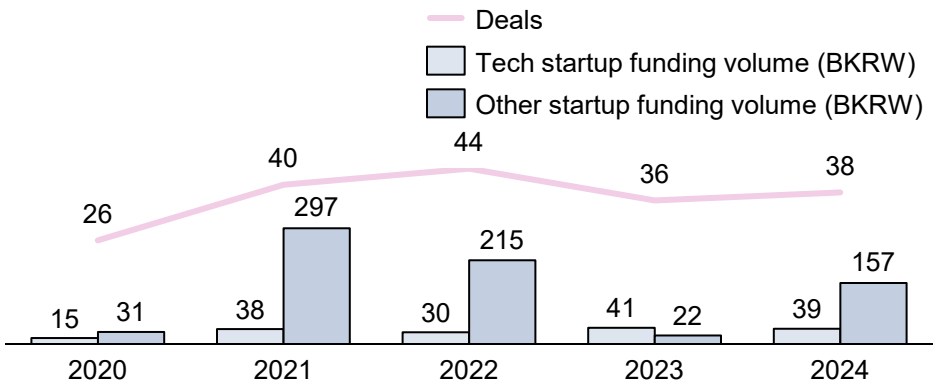
Source: Korean government, Software Policy and Research Institute 1 2 3, Aju News (2024), ET News (2024), Financial News (2025), Reddal analysis.

REDDAL

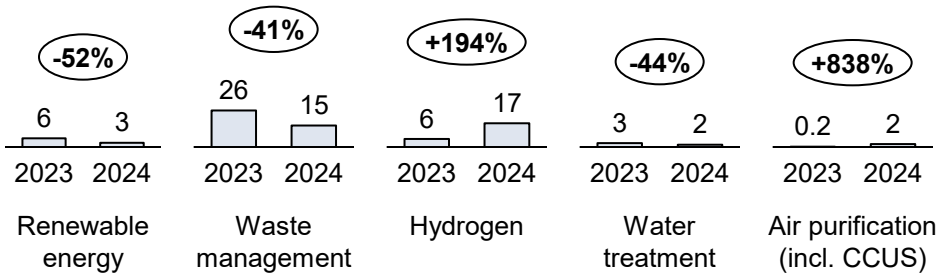
In cleantech, despite a decline in investments across most applications except hydrogen and CCUS, government subsidies and global mandates remain active

Investments and growth perspectives – Sustainability

Green startup investment in South Korea, BKRW, 2020-2024[1]



Investment in clean tech startups by sub-sectors, BKRW, 2023-2024[2]



Government ambition and initiatives for green startup growth

2024 Ministry of Environment Major Policy Implementation Plan

	Current	2027 ambition
Green startups	385 (2022)	1 000
Prospective green unicorn (valuation>100BKRW)	2 (2023)	10
Green investment	1.8TKRW	30TKRW

Future Environmental Industry Investment Fund (FoF)

Fund size	90.6 BKRW (63.25BKRW from the government, the rest from private)
Investment targets	Businesses for carbon neutrality, circular economy, clean water and air, biomaterials
Standard rate of return	At least 3%

Low SRR indicates early growth, high risk, limited profitability, relying on government support to attract private investment.

Internal factors

- Domestic conglomerates driving infrastructure development and actively seeking technologies from startups
- Current reliance on public initiatives
- High number of imported technologies
- Commercialization and scaling challenges

External factors

- Rising demand from domestic and global green mandates
- High capital intensity of clean tech
- Long-term agenda and investment uncertainty from political shifts

Future perspectives

- Green mandates and conglomerates' green transformation offer opportunities
- Ecosystem challenges require robust and consistent government agendas
- Competition from foreign tech leaders in both domestic and global markets highlights the need for breakthrough R&D capabilities

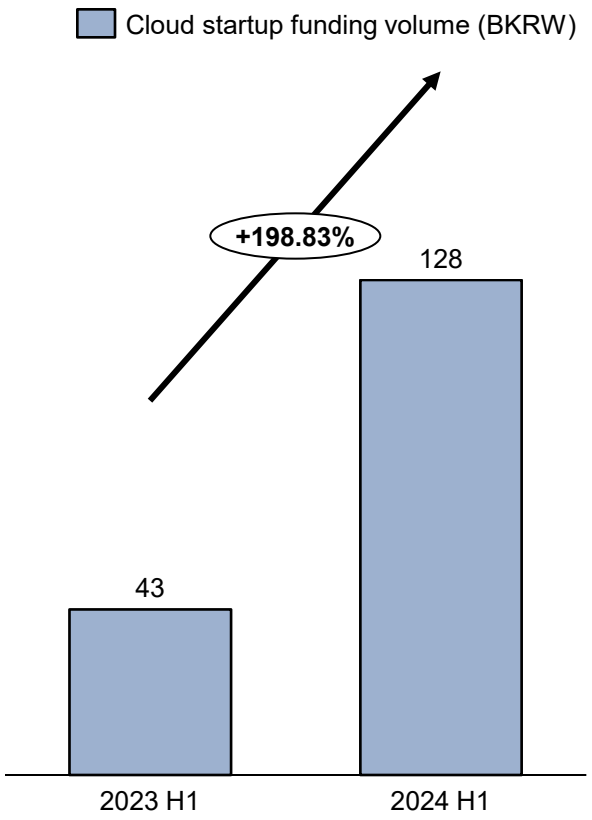
[1]Startups are categorized by business model: tech startups focus on R&D, analytics, and manufacturing, offering deep-tech solutions and products. "Others" cover trading, platforms, and investment activities.
[2]Renewables here includes solar, wave, wind, hydro power, and integrated platform and solutions for renewables.
Source: The VC, Korean Ministry of Environment, HANI, News tree, Asia Business Law Journal, InvestKorea, KVCA.

REDDAL

Cloud market is experiencing general upward trend in revenue while profitability issue persists; high-performance, cost-addressing solutions have a significant market potential

Investments and growth perspectives – Cloud and network

Cloud startup VC funding trend



Major cloud operators' financial performances

Included in Reddal's deep tech list

Company	Revenue (2022, BKRW)	Revenue (2023, BKRW)	Change (%)	Op. profit (2022, BKRW)	Op. profit (2023, BKRW)	Change (%)
Megazone Cloud	1 266	1 427	13%	(34.6)	(69.0)	-99%
Samsung SDS	1 163	1 881	62%	Not available	Not available	
Naver Cloud	1 013	1 197	18%	102.9	8.3	-92%
KT Cloud	432	678	57%	20.8	43.1	107%
Bespin Global	335	406	21%	(21.9)	(15.7)	28%
Metanet Tplatform	315	410	30%	1.1	2.5	127%
NHN Cloud	117	141	21%	(7.8)	(54.7)	-601%

Internal factors

- Increasing revenue driven by the implementation of cloud solutions in public and private sectors
- Large variance in company profitability due to cost increases; rising importance in leveraging existing infrastructure and talent utilization

External factors

- Advancement of data security solutions accelerating cloud market growth
- Network separation regulations for financial institutions continuing to challenge cloud solution adoption

Future perspectives

- Profitability of cloud startups will become increasingly important
- Component suppliers capable of delivering high performance at low cost will have greater market capture potential

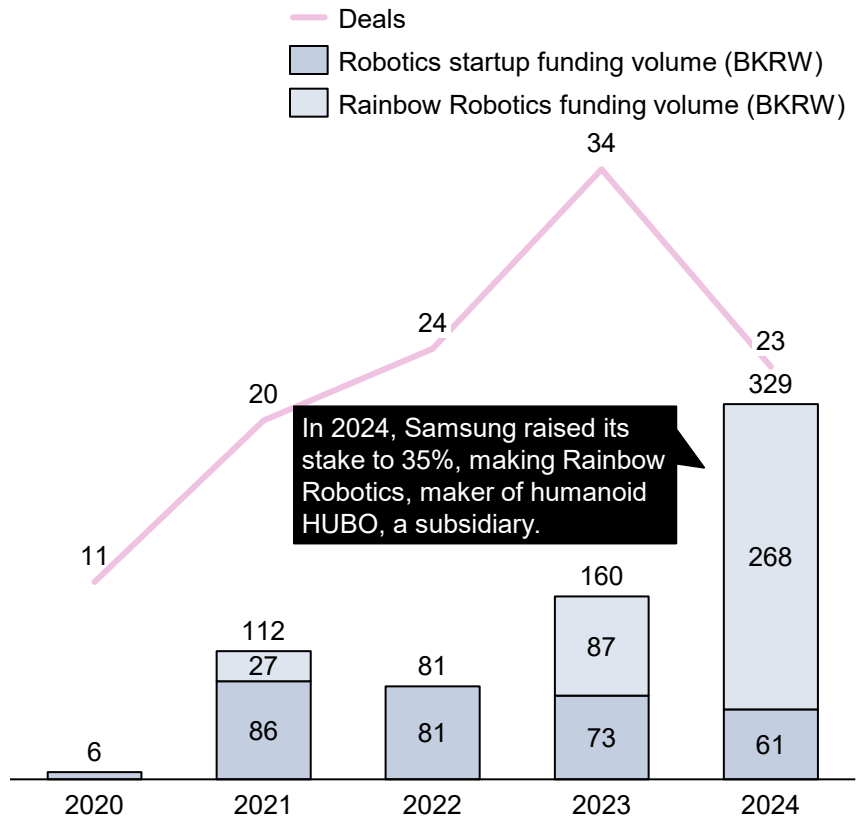
Source: Ministry of Startups and SMEs (2024), Money Today (2024), Korea Capital Market Institute (2024).

REDDAL

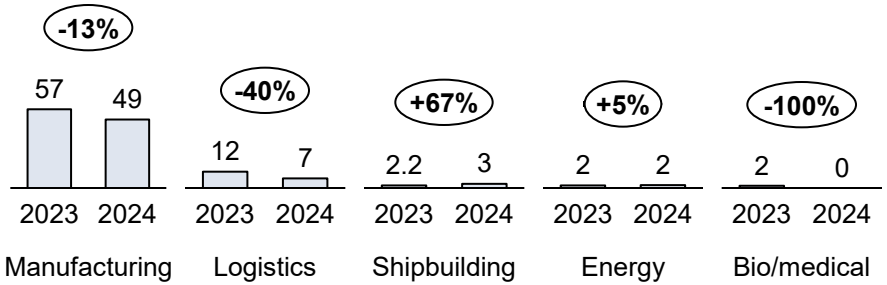
Despite Samsung's investment in Rainbow Robotics, overall domestic robotics investment remains slow with limited scale and sales performance; strategic differentiation is crucial amid foreign competition

Investments and growth perspectives – Robotics

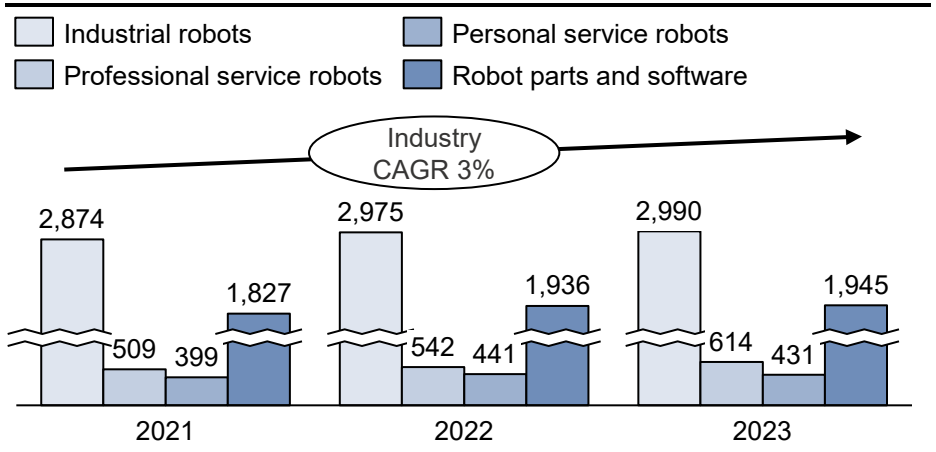
Robotics startup investment in South Korea, BKRW, 2020-2024



Investment in robotics startups by sub-sectors, BKRW, 2023-2024*



Robotics sales performance, BKRW, 2021-2023*



Internal factors
- Highest robot density and large industrial robot adoption
- Heavy reliance on imported parts
- Lagged sales growth; deficit of major robotics companies (Hyundai, Doosan)
- Challenges in achieving economies of scale due to limited size

External factors
- Rapid global growth and diversifying applications with hardware and software
- Massive government and conglomerate investment
- Intense competition from China, tech leadership of US, Germany and Japan

Future perspectives
- Long-term profitability is questioned while overseas sales can be a key growth driver
- Continued interests of Korean conglomerates in domestic/foreign tech firms expected as strategic bets
- Domestic firms should leverage manufacturing strengths while investing in AI/software and niche applications

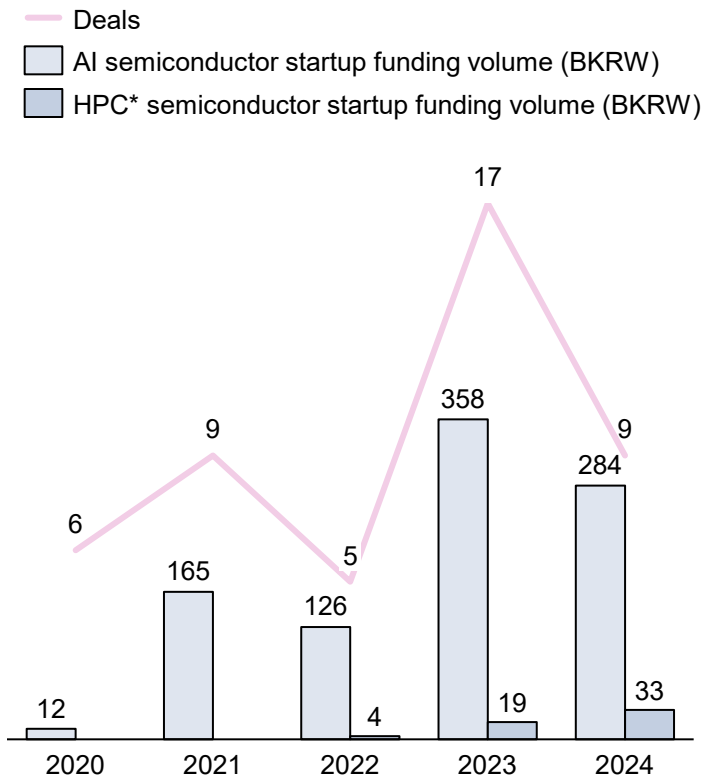
*Rainbow Robotics case not included.
Source: The VC, Thomas Net, Irobot News, KIRIA, Maeil Business Newspaper, Korea Herald, Business Korea, SIMTOS, The Robot Report, YNA.

REDDAL

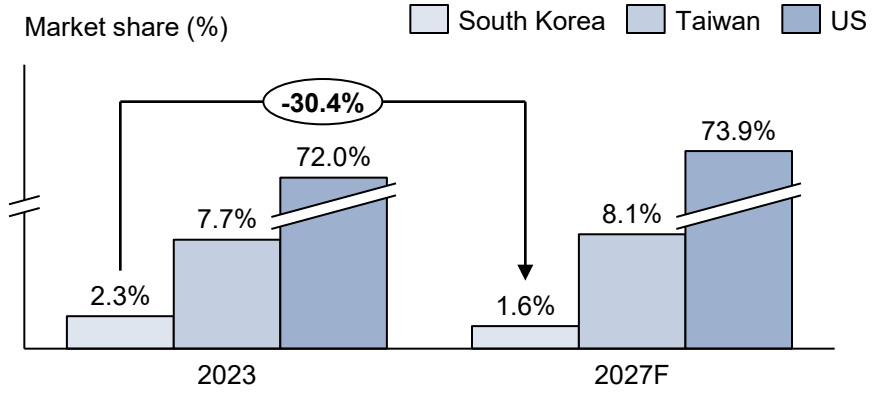
Fabless SMEs and a balanced semiconductor ecosystem are key growth enablers for South Korea's system semiconductor industry

Investments and growth perspectives – System semiconductor

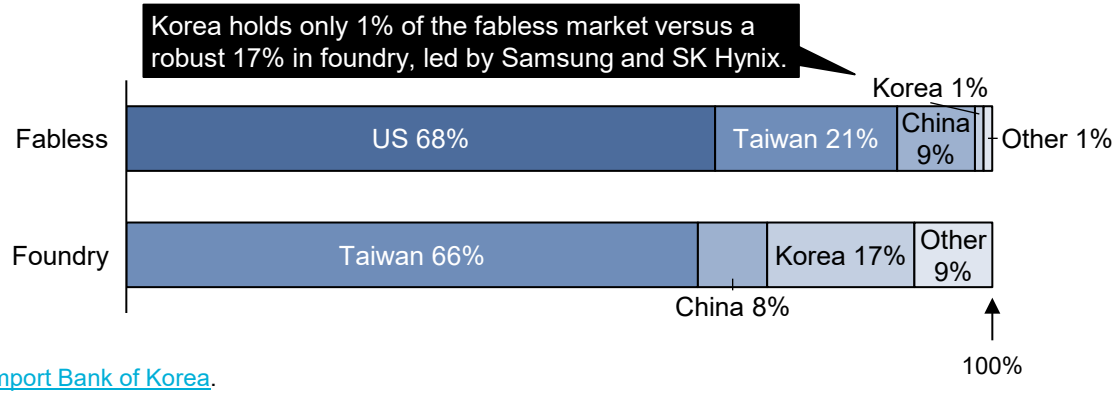
System semiconductor startup investment in Korea, BKRW, 2020-2024



Global system semiconductor market share forecast, 2023 and 2027F



Global foundry vs. fabless market share, 2022



Internal factors

- Access to robust domestic manufacturing (Samsung, SK Hynix)
- Limited fabless sector and design talent
- Remaining reliance on foreign materials, equipment and software
- Dominance in memory semiconductor led by conglomerates, with a weaker system semiconductor ecosystem

External factors

- Surge in AI semiconductor
- Geopolitical tensions and trade restrictions opening opportunities for Korean suppliers
- Fierce foreign competition with Nvidia's dominance in AI semiconductor

Future perspectives

- AI semiconductors are attracting the most investment in system semiconductors
- Korea need to shift from a memory-centric industry to a balanced market, driven by fabless startups and stronger foundry-fabless collaboration

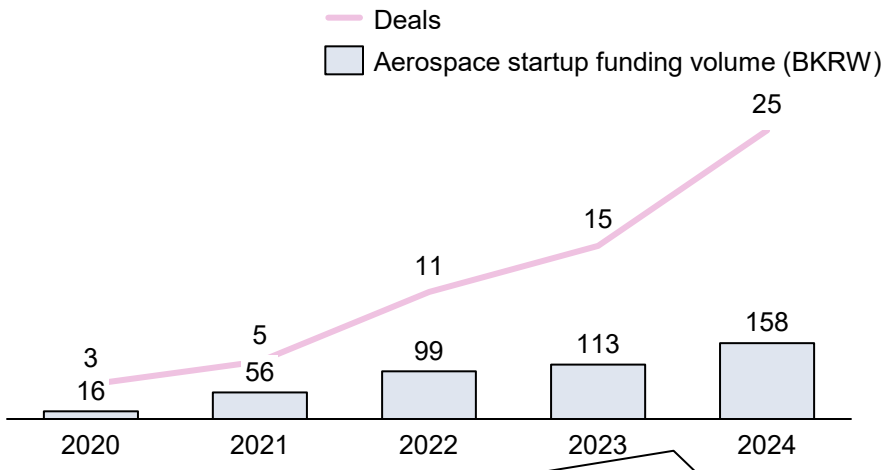
*HPC: High Performance Computing.
Source: The VC, SE Daily, NIS2030, Business Korea, KDI, Export-Import Bank of Korea.

REDDAL

With KASA's launch in 2024 and the small satellite boom, space tech investment is rising, but scale limitations and a talent gap leave room for development

Investments and growth perspectives – Aerospace

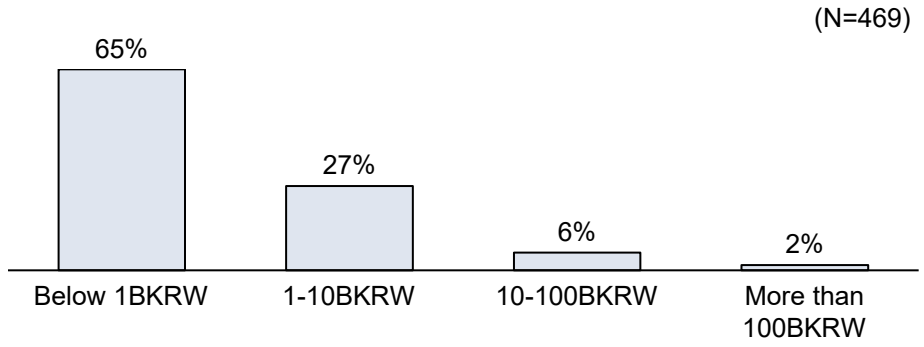
Aerospace startup investment in South Korea, BKRW, 2020-2024



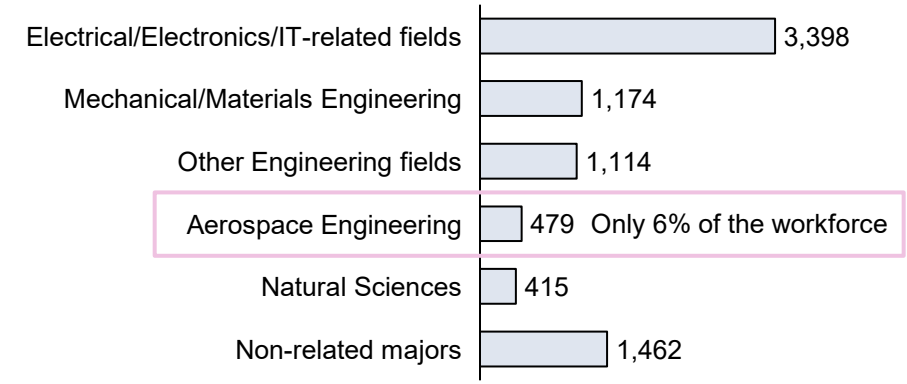
South Korea's aerospace milestones in 2024

- January 2024: The National Assembly passed the Special Space Administration Act, laying the legal foundation for the establishment of the Korea Aerospace Administration (KASA)
- May 2024: Government officially launched The Korea Aerospace Administration (KASA)
  - For private sectors, KASA aims to create 2000 innovative aerospace companies, supporting private-led development of advanced radar satellites, hypersonic propulsion, swarm drones and hydrogen-powered aircraft

Korea's company distribution by space-related revenue brackets, 2023



Korea's aerospace workforce by academic major, 2023*



Internal factors

- Growing expertise in satellite and launch tech
- Institutional R&D support
- Shortage of aerospace engineers
- Private sector lacking scale and infrastructure

External factors

- KASA offers support and a roadmap, but it is still in planning
- Intensifying regional space race from Japan, China and India
- LEO satellite boom drives satellite manufacturing and analytics growth
- Government expanding civil satellites and defense-civilian integration

Future perspectives

- Due to its sensitive and capital-intensive nature, domestic conglomerates will play a big role in financing space startups
- Startups need to leverage government support (KASA) and defense funding as a launchpad for growth

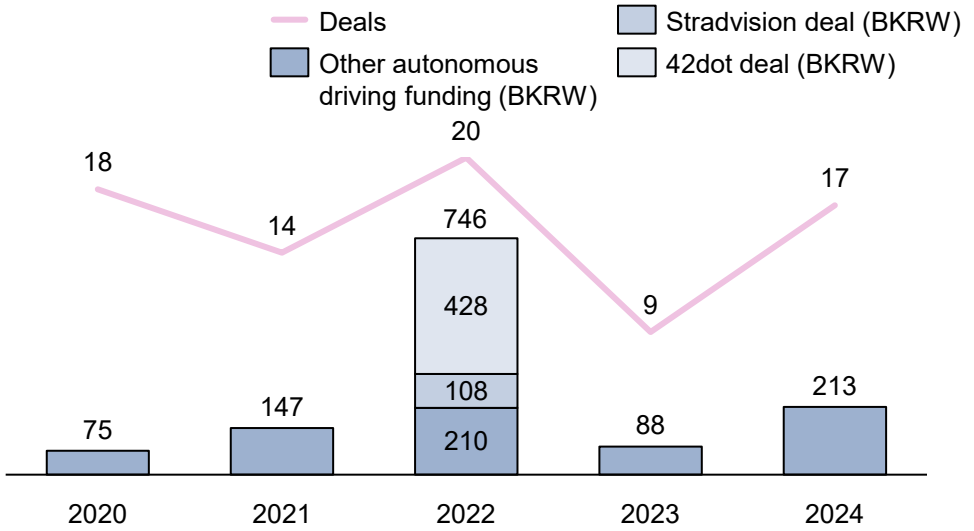
*Based on the reported workforce of 469 surveyed space companies in KASP annual Space Industry Survey.
Source: National Assembly Library, MSIT, Korea Times, Business Korea, YNA, Invest Korea, KASP.

REDDAL

As the industry shifts to software-defined vehicles, AI and software-driven mobility startups have strong global potential, but scaling remains tough amid conglomerate dominance

Investments and growth perspectives – Mobility

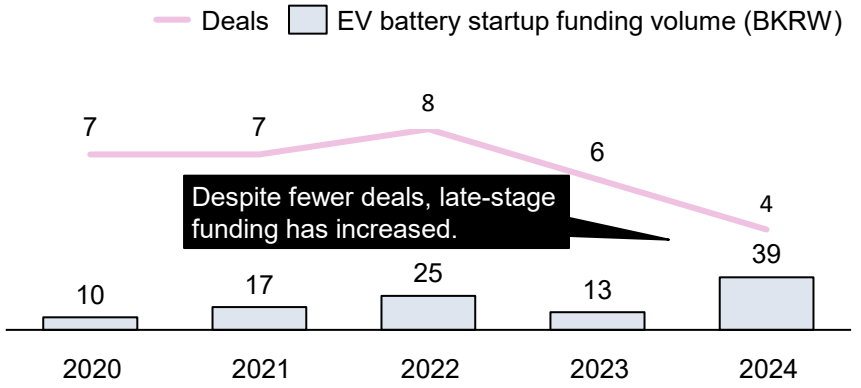
Autonomous driving startup investment in South Korea, BKRW, 2020-2024



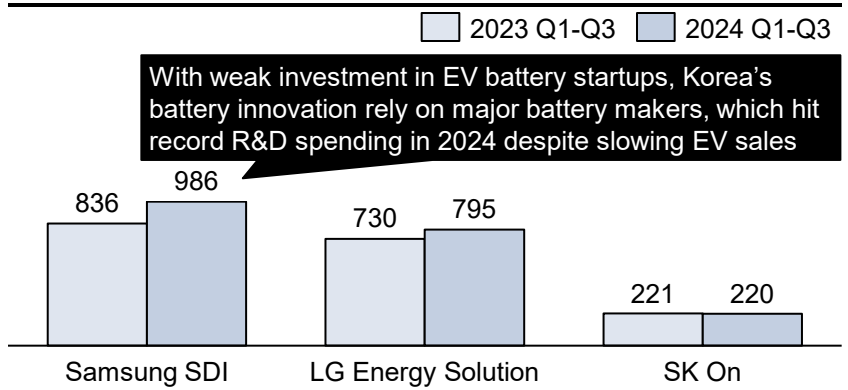
Largest deals in autonomous driving in the last 5 years:

- StradVision, Series C, 2022 – Aptiv PLC, a world's top-three autonomous driving tech firm and Hyundai's US partner, invested 50BKRW for a 15% stake in StradVision, an AI-based perception processing company, while ZF Group, a leading German auto parts maker, acquired 6%
- 42dot, buyout, 2022 – Hyundai Motors and Kia acquired 42dot, an autonomous driving software and mobility platform startup, for 428BKRW; Hyundai has redirected its Transportation-as-a-Service division and AI functions to 42dot

EV battery startup investment in South Korea, BKRW, 2020-2024



Major South Korea battery maker's R&D investments, BKRW, 2023-2024 Q1-Q3



Internal factors

- Strong tech capabilities in software-defined vehicles (SDVs) and AI-driven mobility solutions
- Conglomerates' transformation toward SDVs drives investments in mobility software and AI startups

External factors

- Rising demand for AI and software as the industry shifts to SDVs
- Growing global investment in startups with breakthrough technologies
- Government's Mobility Innovation Roadmap boosts high-tech mobility

Future perspectives

- Startups will need to pivot to niche areas with exclusive tech, as chaebols dominate core R&D and production
- AI and software-driven mobility startups have strong global potential, but scaling remains tough – securing early foreign investments and partnerships can help

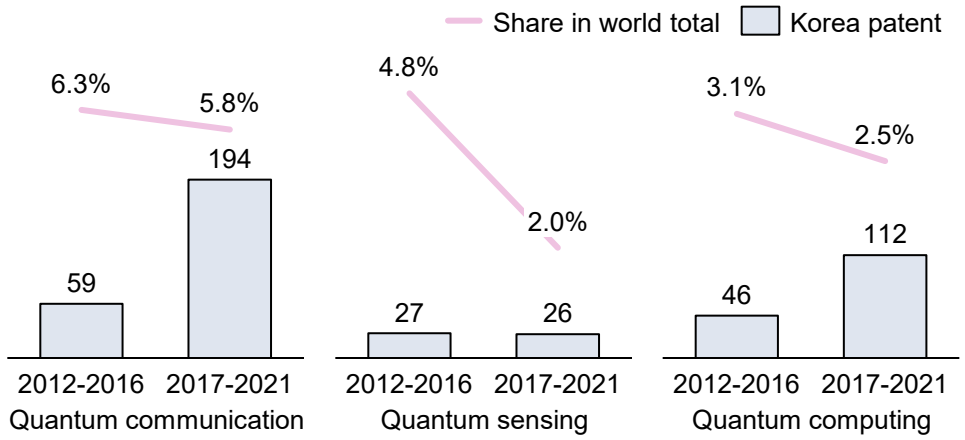
Source: The VC, KED Global 1 2, Hankyung, Korea Herald, Mobility Innovators, Industry News.

REDDAL

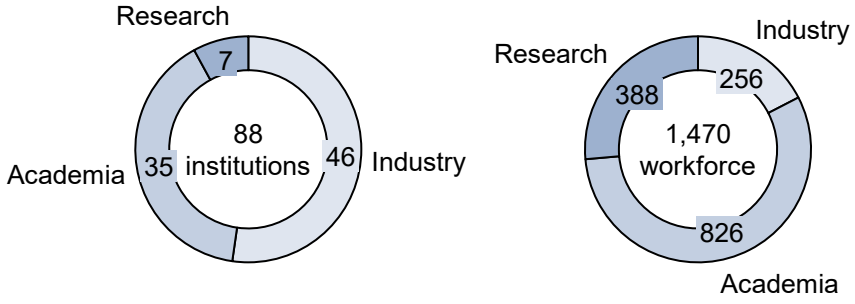
Korea's quantum industry is still in its early stages, with global collaborations advancing technology amid challenges in R&D and private-sector participation

Investments and growth perspectives – Quantum technology

Number of quantum patents by South Korea, 2012-2021



Korea's quantum industry, academia, research institutions, 2024



Examples of foreign partnership in Korea's quantum development

Government driving global partnerships

- Act on the Promotion of Quantum Science and Technology and Quantum Industry, 2024
  - Article 29 and 30 promote international collaboration
- Korea-US(2022) and Korea-Europe(2023) Quantum Technology Cooperation Center
- Ministry of Science and ICT has signed MoU with IBM and IonQ for training programs in 2023

Businesses accelerating development with foreign tech

- Norma is launching quantum computer "Qrion", achieving fast development in one year with in-house QPU and components from global partners like IQM, Zurich Instruments and QuantWare
- Qunova's HiVQE algorithm advances quantum chemistry simulations through partnerships with IQM, AQT, IBM and RIKEN, leveraging global platforms for testing and development

Academia strengthening capabilities with global leaders

- Yonsei University partnered with IBM to launch the Institute of Quantum Information Technology with IBM Quantum Cloud in 2022
- Yonsei deployed the IBM Quantum System One, Korea's first commercial quantum computer, in 2024

Internal factors

- Growing R&D momentum in academia and SMEs in recent years ↑
- Limited R&D output with talent shortage ↓
- Weak private-led sector leadership, limited conglomerate participation ↓

External factors

- Growing government support with regulatory backing and funding, though budget concerns remain ↑
- Active international collaborations accelerating technological catch-up ↑
- Intensifying global competition, especially from the U.S. and China ↓

Future perspectives

- Korea's quantum industry is in its early stages, led by academia and SMEs, with limited corporate involvement
- Scaling private investments, cultivating expertise, expanding R&D, and reducing foreign reliance are key to competitiveness

Source: KQIC, Korea Government Briefing, Ministry of Science and ICT, NIA, KDI, IBM, Quantum Insider, The JoongAng, Qunova.

REDDAL

Despite strong performance in the traditional nuclear sector, few domestic startups with leading technologies are spotted; foreign examples indicate the need for significant R&D funding

Investments and growth perspectives – Next generation nuclear

Domestic R&D and commercialization activities

Small modular reactors (SMR)

Entity	Commercial design
KHNP Public – power plants	**i-SMR** "Innovative SMR" 170MWe
KEPCO Public – utilities	**BANDI** Offshore SMR 60MWe
KAERI Public – research	**SFR** Sodium-cooled fast reactor >150MWe
KAERI Public – research	**SMART** All-in-one SMR 110MWe

Foreign nuclear startups

Company	Country	Tech	Latest status	Total funding*	Selected investors
NuScale	US	SMR	IPO	1.3BUSD+	Public company
Oklo	US	SMR	IPO	300MUSD+	Public company
Terra Power	US	SMR	Series C	2.6BUSD+	US DOE, SK
X-Energy	US	SMR	Series C	1BUSD+	Amazon, Segra Capital Management
Kairos Power	US	SMR	Series B	100MUSD+	New Mexico gov., BloombergNEF
Helion	US	Fusion	Series F	1BUSD+	Lightspeed Venture, SoftBank, Sam Altman
Common-wealth Fusion	US	Fusion	Series B	~2BUSD	Tiger Global, Google, Bill Gates
Tokamak Energy	Germany	Fusion	Private rounds	200MUSD+	East X Ventures, Lingotto Investment
Marvel Fusion	Germany	Fusion	Private rounds	10-100MUSD	Bayern Kapital, HV Capital, Earlybird
Energy Singularity	China	Fusion	Series A	10-100MSUD	miHoYo, NIO, Sequoia China

Internal factors

- Strong nuclear sector with robust R&D capabilities and a well-established value chain for traditional reactors ↑
- Limited startup activity in the domestic nuclear sector, particularly in reactor design ↓

External factors

- Growing global interest in small modular reactors (SMRs) ↑
- Many investors remain skeptical about investing in nuclear startups due to high R&D costs ↓

Future perspectives

- Government interest in the private nuclear market may signal the introduction of systematic support for startups
- Private investor (including IT CVCs and foreign VCs) interest based on global examples can further fuel the growth

*Includes government funding and grants.
Source: Company websites, KHNP, KEPCO 1 2, American Nuclear Society (2024), Hello DD (2013), C3 (2023), Climate Insider (2024).

REDDAL

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