



Measures to Foster University-Based Startups in South Korea

March 2025

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This report is compiled as part of a research that surveyed and analyzed science and technology innovation policies, research and development trends, and associated economic and social circumstances in the Asia-Pacific region. It is being made public on the APRC website and portal site to enable wide use by policymakers, associated researchers, and people with a strong interest in collaborating with the Asia-Pacific region; please see the websites below for more details.

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Executive Summary

This report discusses measures to foster university-based startups and the startup ecosystem based on industry-academia cooperation. By looking into the measures and actual conditions of support for university-based startups in South Korea via overseas cases, it aims to provide foundational data for future cooperation between Japan and Korea by identifying the current status and issues of Korea's university-based startups, while also seeking out points of recommendations for Japan.

First, the startup environments in Korea and Japan are compared based on a range of statistics and literature reviews to understand the current state of startups in Korea. The results of the author's investigation into the Korean government's policies related to startups, university entrepreneurship education, and startup incubation measures are documented, noting that Korea highly values government support policies and entrepreneurship education at the university level.

Next, four universities, KAIST, POSTECH, UNIST, and Hanyang University, were selected for interviews as they have advanced startup support programs. In-depth interviews were conducted with startup support managers at each university to gain an understanding of the current state and challenges of supporting university-based startups in Korea.

Lastly, the findings of the literature review and interviews with startup support personnel at universities are compiled in the report.

In March 2017, the Korean government announced the 'Plan to Revitalize University-Based Startups', which would foster universities as centers of innovation and entrepreneurship, to boost the economy and create jobs. Since then, the government has expanded university startup support projects and startup-friendly academic and personnel systems, including startup-focused universities and laboratory startup support projects.

Universities have been implementing measures to support university-based startups with an integrated package that covers all stages of startups, from education on entrepreneurship, discovery of entrepreneurs, commercialization, and up to scale-up support. As a result of these initiatives, achievements have been made in the development of entrepreneurship education programs at universities and in the creation of startups by students and faculty.

Although there are differences in their startup ecosystems, the four universities have exceptional science and engineering students and faculty, excellent research and development environments, and research achievements, enabling a relatively well-established foundation and system for cooperation in industry-academia collaboration compared to other universities. In addition, they serve as startup bases in their own regions, and have many cases of cooperation with other local universities and companies with the support from the national government and local governments.

However, there are still many challenges. The interest in entrepreneurship in Korean universities as a whole is still low. Students still prefer employment over entrepreneurship, and professors still emphasize thesis results and technology transfer. There are also great differences in the perception of entrepreneurship between universities in the capital area and provincial regions. Furthermore, changes

are needed in the education and training programs and standardized startup support programs that are centered on the United States.

Japan is also facing similar challenges. In particular, in Japan, the rate of entrepreneurship education in universities is lower than that of Korea, which can serve as a case study for reference. In both countries, the key to promoting university-based startups is to build an ecosystem where companies and venture capital firms are eager to participate by expanding the commercialization of university research outcomes and increasing the number of successful cases through the development of original entrepreneurship education programs, the creation of programs to discover and foster startups, and improvement of operational capabilities.

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1 Introduction

As global economic transformation accelerates, knowledge, technology, and innovation are becoming the engines of productivity and future growth. In this transformation, startups have emerged as essential drivers of knowledge, technology, innovation, and their rapid commercialization¹.

Although various challenges have emerged in Japan, the startup rate and number of unicorns² remain low compared with those in Europe and the United States. The Japanese startup ecosystem is small compared with the size of the economy and appears to be domestically oriented, with a tendency to develop results, train personnel, and develop human resource networks within Japan.³

In response, the Japanese government formulated the “Startup Development Five-Year Plan” in November 2022, and aims to create an ecosystem that nurtures startups in Japan by accelerating startup entrepreneurship and promoting open innovation by existing large companies to achieve a second startup boom after the postwar startup period. To achieve this, it promotes three main initiatives: building human resources and networks, strengthening funding and diversifying exit strategies, and promoting open innovation.

The plan aims to train a large number of people to assume the role of startup entrepreneurs and accelerate the business creation process. To this end, it aims to train young people with excellent ideas and skills by making practical use of mentors and educational institutions in Japan and overseas. Additionally, it has announced that it will train human resources to start businesses in Japan by sending young human resources to various countries for training and building a global network of such human resources.

This report focuses on specific initiatives for building human resources and networks, which are the first and most important pillars of university startup development.

First, to promote the creation of university startups, research universities across the country will develop the “One University, One Exit Movement,” in which each university will aim to create 50 startups, with the goal of one achieving an exit. With the participation of overseas accelerators and venture capitalists, the goal is to support the commercialization of university research results in over 5,000 cases over five years, including global development, focusing on the eight cities that form the basis of the startup ecosystem.

Additionally, as part of the Global Startup Campus initiative, to contribute to the global development of human resources and research seeds from Japanese universities and research institutions, top overseas universities and excellent researchers will be invited to establish a global startup campus that combines international collaborative research and incubation functions in the field of Deep Tech,⁴ with funding from

¹ Tokyo’s Startup Ecosystem, Tokyo Development Learning Center (TDLC), World Bank Cabinet Office, September 2021.

² Unlisted companies with market capitalization exceeding 100 billion yen.

³ Tokyo’s Startup Ecosystem, Tokyo Development Learning Center (TDLC), World Bank Cabinet Office, September 2021.

⁴ Although no clear definition exists, deep tech generally refers to technologies that can significantly impact society based on scientific discoveries and innovative technologies.

both the public and private sectors. The university announced that it will promote the establishment of long-term stable cooperation with top overseas universities. The concept also states that it will be possible to access overseas ecosystems and global inner circles by utilizing entrepreneurship development and incubation programs of overseas universities and forming networks with top overseas venture capital (VC) firms.

Therefore, this initiative not only focuses on the development of results but also takes a broad view of the world in terms of seed formation through research and development, talent development, and talent network building. To promote this initiative, understanding how top overseas universities are working to nurture startups is important. From this perspective, a survey was conducted focusing on South Korea, a neighboring country that has strengthened the promotion of science and technology and the cultivation of startups in recent years.

2 Survey Content and Methodology

2.1 Scope of Survey

Universities play an important role in startup creation and development by providing excellent human resources and research results. Therefore, this study surveys university-based startups, taking a broad view of startups in South Korea.

Although no fixed definition of university-based startups in South Korea exists, the term “university technology startups” is used to mean something similar. This definition includes both startups that use university-owned technology⁵ and startups founded by university members. Broadly, it also includes startups that utilize the human and material resources of universities. Based on this, university-based startups in South Korea can be divided into five categories, as shown in Table 2-1, according to the startup entity, technology, and resources used.

Table 2-1 Categories of university technology startups in South Korea

| | University | | | External |
|--|----------------|------------------|-----------------------|----------|
| | Teaching staff | Graduate student | Undergraduate student | |
| University-owned technology | I | II-1 | II-2 | III |
| Free invention | | IV-1 | IV-2 | |
| University startups using human and physical resources | V | | | |

Source: Ministry of Education, “2022 University Startup Management Guide.”

Type I in Table 2-1 refers to startups that use university-owned technology by faculty members. While the above conditions for university technology startups apply to startups based on free inventions of faculty members, in South Korea, startups by faculty members are generally required to be related to their work; therefore, free inventions by faculty members are excluded.

Type II refers to startups by students (undergraduate and graduate students) using the university’s technology and research results.

Type III refers to startups by an external party (including a company) that use the university’s technology and have received a technology transfer.

Type IV refers to startups established based on a student’s (undergraduate or graduate) invention. Finally, Type V refers to startups established based on the use of the university’s human and material resources, regardless of whether the founding entity is inside or outside the university (e.g., university members or outside companies). Additionally, although the founding of a company by an external company does not strictly meet the conditions of a university technology founding mentioned above, it is treated as

⁵ Here, the technology owned by the university is the result of research conducted at the university.

a university technology founding in a broad sense.

In this study, we will examine support policies for university startups in South Korea, focusing on Types I, II, and IV, based on these definitions.

2.2 Survey Content and Methodology

In this report, based on the background and awareness of the issues described above, we will consider support policies for university startups and the ideal form of industry-academia collaboration leading to a startup ecosystem.

The survey aims to understand the current situation and problems of university-based startups in South Korea and identify issues for Japan to consider by examining startup support policies and their actual situation in South Korea, as basic information for future cooperation between Japan and South Korea.

South Korea is actively supporting university-based startups in the Asia-Pacific region. Regarding various global startup-related indices, South Korea is more advanced than Japan in many areas. In this study, we will examine examples from South Korea and consider public and private sector startup support policies, university entrepreneurship education and training, and industry-academia collaboration initiatives to identify suggestions for Japan.

To examine the current state of startups in South Korea and the startup support policies of the government, private sector, and universities, the following survey was conducted.

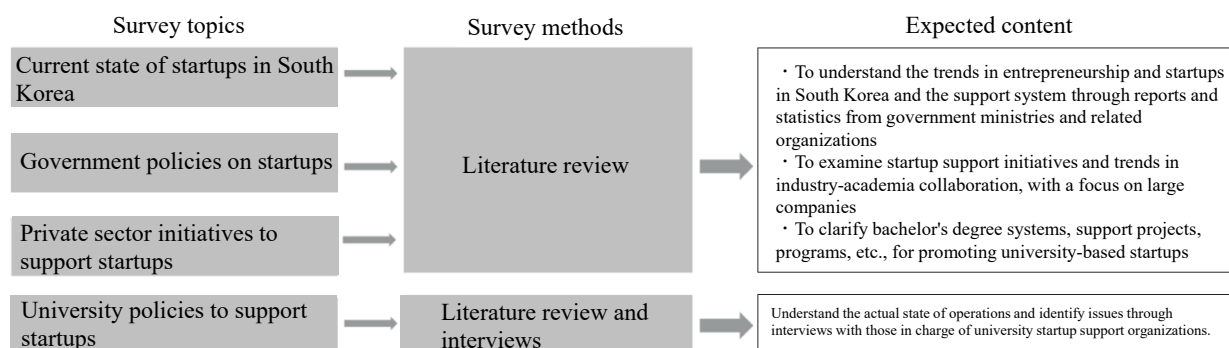


Figure 2-1 Survey flow

To understand the current state of South Korean startups, we first compared South Korea with Japan and other countries in terms of entrepreneurship and startups through various statistical data and literature reviews and clarified South Korea's position. We then examined the South Korean government's startup policies and the private sector's startup support measures.

Next, we narrowed down the list of four universities with excellent startup support policies to conduct interview surveys. We conducted interview surveys with startup support staff at the four universities to identify the current situation and problems with startup support policies at Korean universities.

Finally, we prepared a report based on the results of the literature review and interview surveys with the university startup support staff.

3 Startup Environment in Japan and South Korea

3.1 Comparison of the Current Status of Startups in Japan and South Korea

In this chapter, before discussing South Korea's startup support policies, we will compare the current situation of startups in Japan to better understand South Korea's startup environment and position.

Although a simple comparison is not possible owing to the different situations in the two countries, such as the size of the country and the economic and social environments, Table 3-1 summarizes the comparative data on startups in the two countries from various statistics. First, the ratio of VC investment to GDP is 0.061% in Japan and 0.258% in South Korea, with the figure being higher in South Korea. The ratio of R&D expenditure to GDP is 3.27% in Japan and 4.81% in South Korea, with the figure being higher in South Korea.

Table 3-1 Comparison of startup environments in Japan and South Korea

| | Japan | South Korea |
|---|---------------------------|---------------------------|
| VC investment ratio to GDP (OECD, 2021) | 0.061% | 0.258% |
| R&D expenditure ratio to GDP (OECD, 2020) | 3.27% | 4.81% |
| Number of startup companies (2022) | 142,189 | 113,889 |
| Business startup rate ⁶ (2020) | 5.1% | 15.5% |
| Business closure rate ⁷ (2020) | 3.3% | 11.2% |
| Business survival rate (5 years) | 81.7% ⁸ (2017) | 29.2% ⁹ (2020) |
| Number of unicorns ¹⁰ (September 2023) | 14 (12th in the world) | 21 (9th in the world) |
| Exits (M&A/IPO, 2021) | 143 M&A, 123 IPO | 75 M&A, 100 IPO |

Source: Prepared by APRC based on materials in footnotes.

⁶ Business startup rate = "the number of establishments where employment relations were newly established in the relevant year / the number of applicable establishments at the end of the previous year" x 100%, Employment Insurance Annual Report (Japan), National Statistics Portal (South Korea).

⁷ Business closure rate = "the number of business establishments where the employment relationship ceased during the year / the number of applicable business establishments at the end of the previous year" x 100%, Annual Report on Employment Insurance Business (Japan), National Statistics Portal (Korea).

⁸ "White Paper on Small and Medium Enterprises in Japan 2017," Small and Medium Enterprise Agency, 2017.

⁹ Administrative statistics on business births and deaths, Statistics Korea, December 2019.

¹⁰ The Crunchbase Unicorn Board (as of September 2023), <https://news.crunchbase.com/unicorn-company-list/>.

In terms of the number of new companies in 2022, Japan had 142,189 companies and South Korea had 113,889 companies, with Japan having a larger economy. However, when examining the startup rate, Japan's rate is 5.1%, and South Korea's rate is 15.5%, with South Korea having a higher rate. Japan's rate is lower than Western countries such as the U.K. (12.4%) and the U.S. (9.3%)¹¹. The business closure rate is 3.3% in Japan and 11.2% in South Korea, showing that South Korea is more active in both business startups and closures. As for the business survival rate, a simple comparison is not possible because the base year and calculation data for the two countries' statistics are different; however, the figures are 81.7% (2017) in Japan and 29.2% (2020) in South Korea. Incidentally, considering that the average five-year business survival rate for OECD countries is 45.4%,¹² the business survival rate in Japan is extremely high compared with South Korea and other developed countries. In other words, while the number of new companies is lower than that in South Korea, the percentage of companies that continue to operate in the long-term after being established is higher. In terms of entrepreneurship, South Korea is characterized by fluidity, while Japan is characterized by stability.

In terms of startups, South Korea has more unicorn companies than Japan (14 in Japan and 21 in South Korea). These are unlisted, venture-backed companies that have been in business for less than ten years and have a company valuation of over \$1 billion. Conversely, when looking at exits from startups, there were 143 mergers and acquisitions (M&A) and 123 initial public offerings (IPO) in Japan, and 75 M&A and 100 IPOs in South Korea.

3.2 Comparison of Attitudes Toward Startups in Both Countries

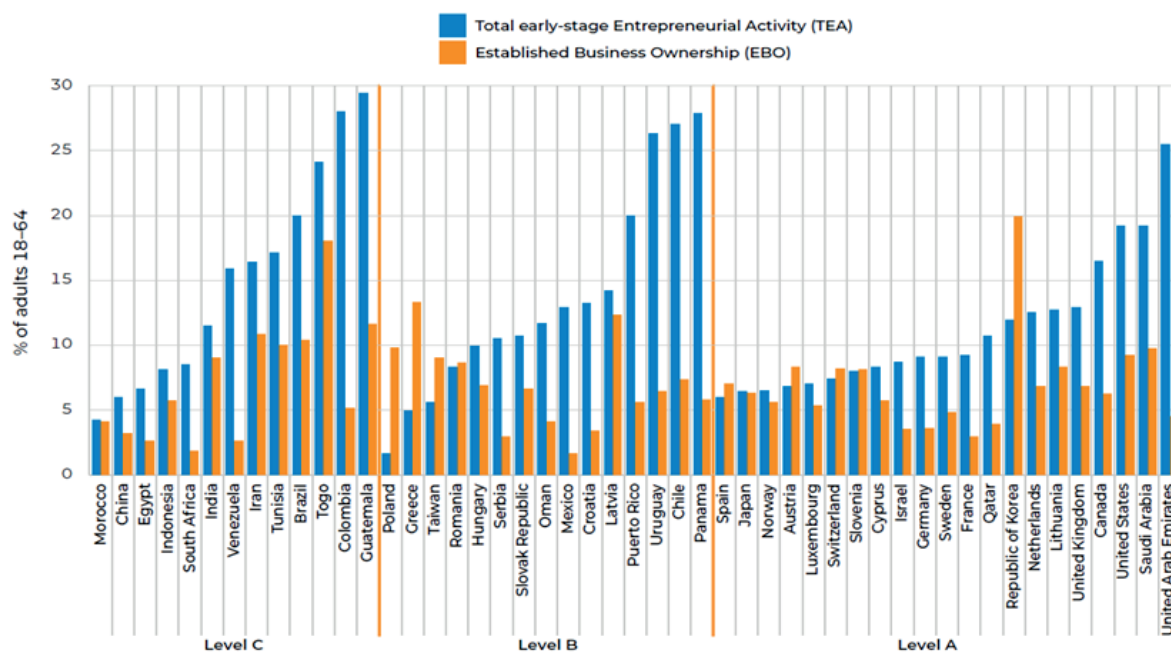
According to the "VEC YEARBOOK 2021," conducted by the Venture Enterprise Center on Japanese venture companies within five years of their establishment, the highest percentage of respondents, 60%, said that improving "awareness, culture, and trends" is necessary to increase the number of entrepreneurs in Japan.¹³ Since one of this study's purposes is to explore the reasons for this, we will analyze Japanese entrepreneurial activity through an international comparison.

The Global Entrepreneurship Monitor (GEM), an international research organization, compares and analyzes entrepreneurial activities in various countries, including Japan and South Korea, from the perspectives of attitudes, activities, and motivation. This is based on a framework for capturing the relationship between entrepreneurial activities and national economic growth, and for formulating effective policies to stimulate entrepreneurial activities.

¹¹ "Science and Technology Indicators 2023," National Institute of Science and Technology Policy, Ministry of Education, Culture, Sports, Science and Technology, August 2023.

¹² OECD Business Demography Indicators (OECD.Stat), the average 5-year business survival rates for 28 of the 38 OECD member countries for which data are available.

¹³ Basic Data Book on Startups, Cabinet Office, October 2023, https://www.cas.go.jp/jp/seisaku/atarashii_sihonsyugi/bunkakai/suikusei_dai1/siryou3.pdf.



Source: Global Entrepreneurship Monitor (2023)

Figure 3-1: Total early-stage entrepreneurial activity (TEA) rate and established business ownership (EBO) rate by economic zone

The survey targets adults aged 18 to 64 and measures the total early-stage entrepreneurial activity (TEA: the proportion of the population aged 18 to 64 who are engaged in early-stage entrepreneurial activity, also known as the “total entrepreneurial activity”)¹⁴ and the established business ownership (EBO: the proportion of the population aged 18 to 64 who are engaged in entrepreneurial activity that has progressed beyond the initial stage)¹⁵ by economic zone.¹⁶ In terms of TEA, Japan ranks 20th among the 21 Level A countries, while South Korea, which is also a Level A country, ranks 8th, showing that Japan’s total entrepreneurial activity is lower than that of South Korea.

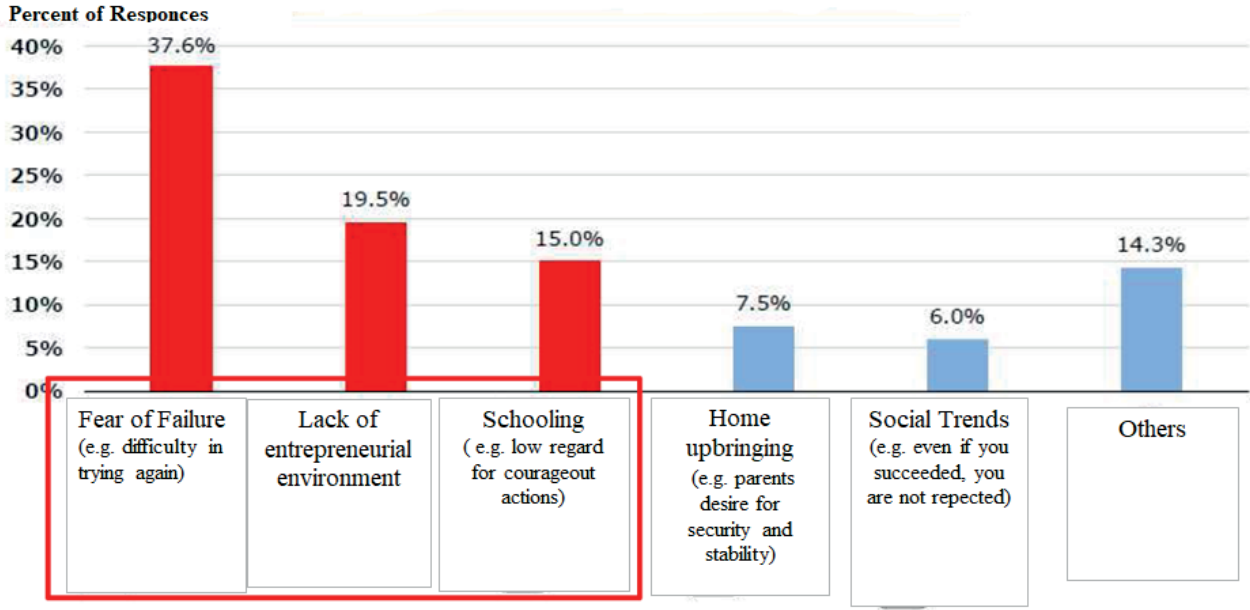
Looking at the results of the “VEC YEARBOOK 2020” survey¹⁷ in Figure 3-2, the most common reasons given for believing that few entrepreneurs exist in Japan are (in order): fear of failure, lack of entrepreneurs around them, and school education.

¹⁴ The percentage of the population aged 18–64 who are either early-stage entrepreneurs or owners/managers of new businesses.

¹⁵ The percentage of the population aged 18–64 who have already started a business and have been paying salaries/wages for more than 42 months.

¹⁶ The GEM survey classifies the surveyed countries into Levels A, B, and C based on GDP per capita. Level A countries have a GDP of \$40,000 or more, Level B countries have \$20,000 to \$40,000, and Level C countries have \$20,000 or less.

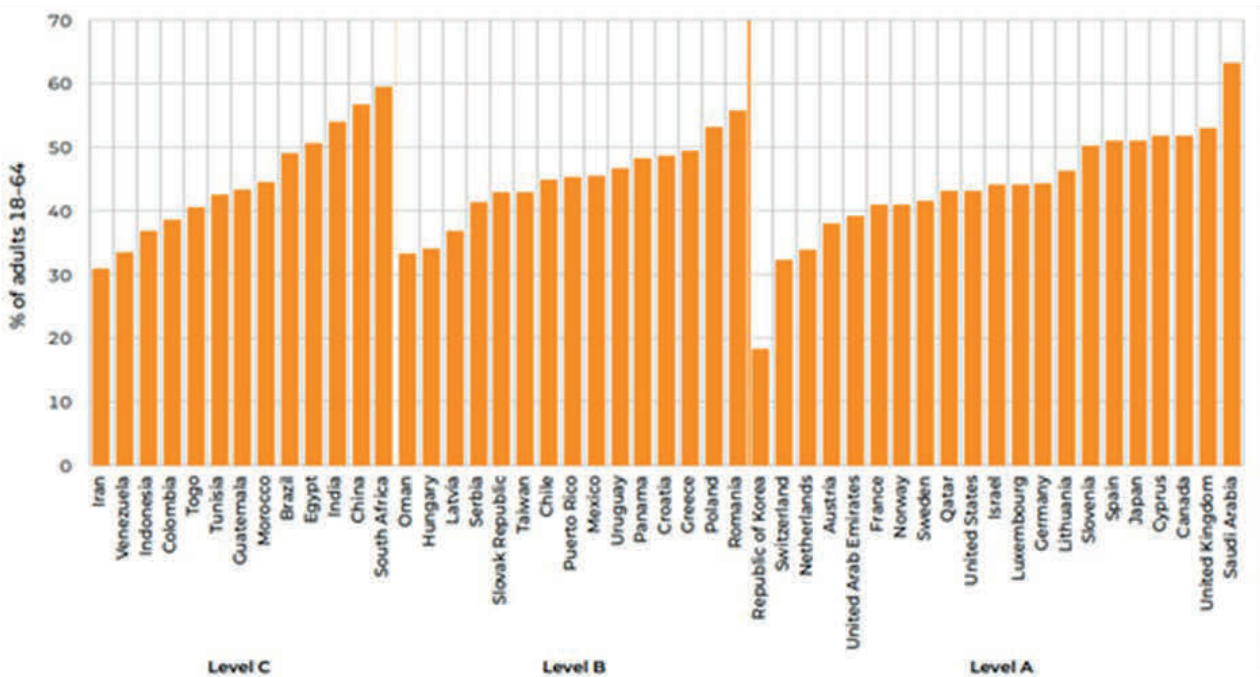
¹⁷ Results of a survey conducted from May 13 to June 12, 2020, of 1,459 startup companies that have been in business for less than five years (133 companies responded to this question).



Source: Venture Enterprise Center "VEC YEARBOOK 2020"

Figure 3-2: Reasons for the low number of entrepreneurs in Japan

Additionally, Japan’s high fear of failure can be observed in international comparisons. Figure 3-3 shows an international comparison of the fear of entrepreneurial failure. Of the 21 Level A countries, Japan ranks fifth in terms of fear of failure. Conversely, South Korea has the lowest fear of failure among the Level A countries.



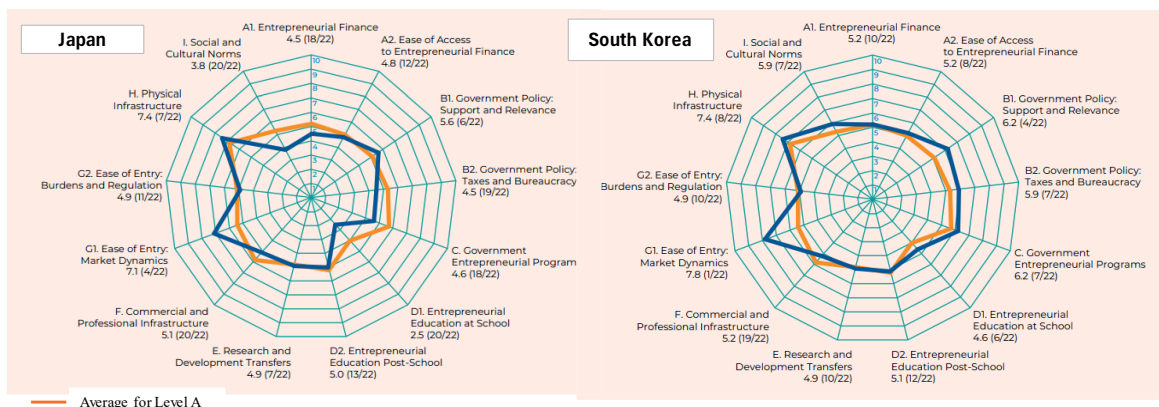
Source: Global Entrepreneurship Monitor (2023)

Figure 3-3 International comparison of fear of entrepreneurial failure

3.3 Comparing the Entrepreneurial Environment and Ecosystem in Both Countries

Next, we compare the current situation in Japan and South Korea in terms of expert ratings of factors such as attitudes toward entrepreneurship, education, infrastructure, and financial support. Figure 3-4 shows the expert ratings of the business environment in Japan and South Korea, as assessed by the GEM. South Korea's expert ratings were higher in many categories. Comparing the two countries, Japan received equal or higher ratings in only two of the 13 categories: physical infrastructure and R&D transfers.

However, large differences exist between Japan and South Korea in the ratings of government entrepreneurial programs, entrepreneurship education at schools, and social and cultural norms. In other words, more entrepreneurial programs and education can be assumed to exist in South Korea than in Japan, as well as a spreading positive culture and awareness of entrepreneurs. Incidentally, South Korea ranks at or above the average of the Level A group in all categories except commercial and professional infrastructure.



Source: Global Entrepreneurship Monitor (2023)

Figure 3-4 Comparing expert assessments of entrepreneurial framework conditions

Finally, based on international comparisons, we examine the current situation in both countries in terms of ecosystem formation, which is essential for the development and revitalization of startups. A startup ecosystem is a system in which large companies, investors, public institutions, and research institutions form a network and evolve while creating startups.

Startup Genome, a global startup ecosystem research organization, publishes an annual Global Startup Ecosystem¹⁸ ranking, evaluating performance, funding, market reach, connectedness, experience and talent, and knowledge.¹⁹

Startup ecosystems are necessary for startup growth, but the leading ecosystems are in Europe and

¹⁸ Startup Genome defines a startup ecosystem as a cluster of startups and related organizations and companies that can benefit from a shared pool of resources.

¹⁹ The 2023 Global Startup Ecosystem Report, <https://startupgenome.com/report/gser2023>.

Figure 3-4 Comparing expert assessments of entrepreneurial framework conditions

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the United States. Table 3-2 shows the 2023 Global Startup Ecosystem Ranking by city in each country. Among the top 30 cities in the 2023 ranking, Seoul, South Korea, ranked 12th, and Tokyo, Japan, ranked 15th.

Table 3-2 Global Startup Ecosystem rankings

| Order | Ecosystem (Country) |
|-------|-----------------------------------|
| 1 | Silicon Valley (U.S.A.) |
| 2 | New York (U.S.A.) |
| 3 | London (United Kingdom) |
| 4 | Los Angeles (U.S.A.) |
| 5 | Tel Aviv (Israel) |
| 6 | Boston (U.S.A.) |
| 7 | Beijing (China) |
| 8 | Singapore (Singapore) |
| 9 | Shanghai (China) |
| 10 | Seattle (U.S.A.) |
| 11 | Washington, D.C. (U.S.A.) |
| 12 | Seoul (South Korea) |
| 13 | Berlin (Germany) |
| 14 | Amsterdam Delta (The Netherlands) |
| 15 | Tokyo (Japan) |

Source: Startup Genome (2023)

We attempted to understand the current situation in Japan and South Korea in terms of startup conditions, awareness, environment, and ecosystem through statistics and international comparisons. Compared with Japan, South Korea generally has a higher awareness of startups, and the government and universities have well-developed programs and education for entrepreneurship.

In the following section, we examine the efforts to promote university-based startups in South Korea, where entrepreneurship education is relatively well-developed and awareness of startups is high, and identify the implications for Japan. To do so, this paper first provides an overview of the South Korean government's startup policies and private-sector initiatives, and then examines in detail the measures being taken to support university-based startups.

4 Initiatives to Promote Startups in South Korea

4.1 Startup Support Policies of the South Korean Government

4.1.1 Background and structure of startup support policies

Since the 1997 currency crisis, the South Korean government has actively pursued policies to support the establishment of startups to revitalize the economy. At that time, the rapid spread of the Internet led to a significant increase in the number of startups, especially IT companies, which is known as the first startup boom. After a period of adjustment, the global startup boom led to a second startup boom in Korea around 2020, and the rate of entrepreneurship accelerated. Table 4-1 shows the key startup support policies of the Korean government in recent years.

Table 4-1 Key policies of the South Korean government to support business startups

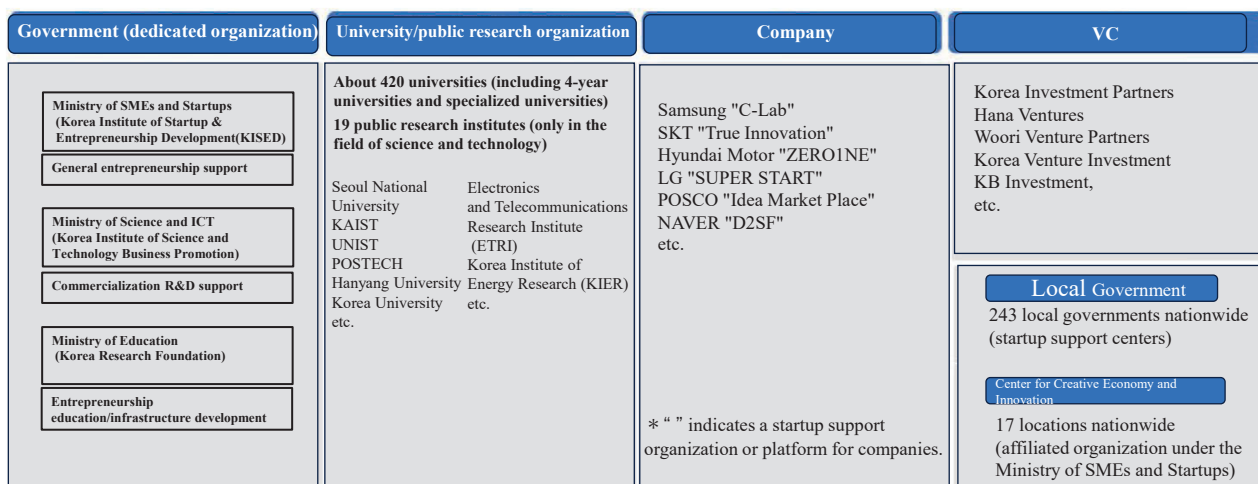
| Date | Policy |
|----------------|--|
| September 2013 | University Entrepreneurship Education 5-Year Plan |
| November 2017 | Innovation and Entrepreneurship Ecosystem Creation Plan |
| January 2018 | Measures for Innovation of the Private Sector-Centered Venture Ecosystem |
| March 2018 | Youth Entrepreneurship Revitalization Plan |
| March 2019 | Strategy for Disseminating the Second Venture Boom |
| April 2020 | K-Unicorn Project |
| May 2021 | Youth Entrepreneurship Revitalization Plan |
| November 2022 | Super Gap Startup 1000+ Project |
| November 2022 | Dynamic Venture Investment Ecosystem |
| August 2023 | Creation Plan Startup Korea Comprehensive Measures |

Source: Prepared by APRC based on South Korean government data

Looking back at recent policies, the Moon administration, which came into power in May 2017, set “creating a startup nation that supports innovation” as a core national policy issue and promoted policies to support entrepreneurship. To support this, the Small and Medium Business Administration, which was responsible for venture startups at the time, was upgraded to the Ministry of SMEs and Startups. Since then, the Ministry of SMEs and Startups has been the government ministry in charge of entrepreneurship and startup policies, developing support policies in cooperation with the Ministry of Science and ICT for R&D and the Ministry of Education for entrepreneurship education and infrastructure.

The Yoon administration, which came into power in May 2022, selected 10 major cutting-edge new industries, including system semiconductors, big data/AI, and quantum technology, and announced a policy

to nurture 1,000 promising startups with excellent technological capabilities and high potential to enter the global market. Under the various support policies of the South Korean government, the country has worked to create a startup ecosystem by establishing a cooperative system with companies, universities, public research institutions, local governments, and other organizations. Figure 4-1 summarizes the startup ecosystem in South Korea, focusing on the key players.



Source: Prepared by APRC based on South Korean government data

Figure 4-1 Startup ecosystem in South Korea

4.1.2 TIPS, a government-supported program led by private investment

Currently, the South Korean startup support program is centered on the Korea Institute of Startup & Entrepreneurship Development(KISED), which is under the Ministry of SMEs and Startups. It is conducted as an integrated package program from pre-startup to scale-up. The representative support program within this initiative is the Tech Incubator Program for Startup (TIPS). TIPS is a private investment-led technology startup support program that focuses on cultivating startup companies²⁰ with technologies that will lead the global market.²¹

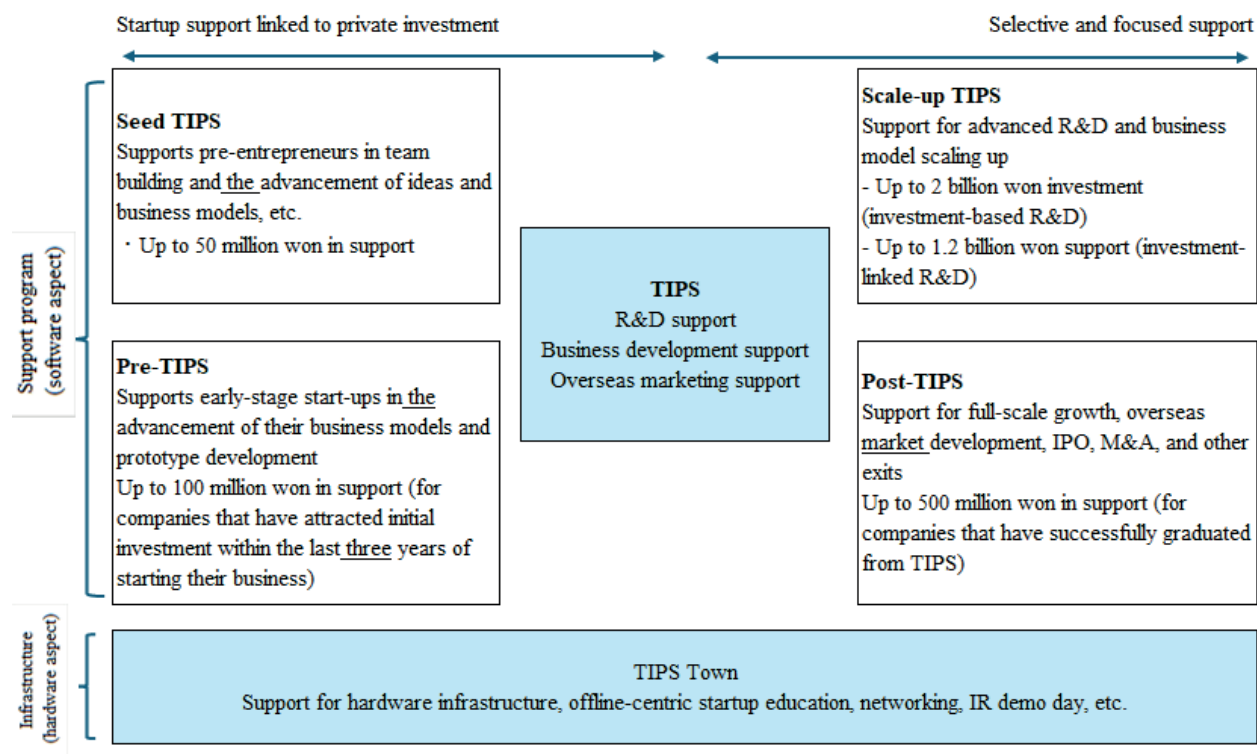
To provide opportunities for promising startup companies with technological capabilities, the Ministry of SMEs and Startups in South Korea has designated private investment institutions, such as successful angel investors, VC firms specializing in initial investment, and large technology companies, as “TIPS hosting institution.” These management companies support commercialization through investment and incubation, as well as mentoring and R&D funding support from the government.

TIPS was launched by the South Korean government in 2013 and was modeled after Israel’s Technological Incubators Program (TIP). TIPS is now positioned as a leading technology startup incubation program in South Korea, supporting the successful launch of new businesses through various

²⁰ The word “startup” is not often used in Korea, and the word “founding” is often used instead, so we will mainly use the word “founding” in the following text.

²¹ Korea Policy Briefing, February 2022, <https://www.korea.kr/special/policyCurationView.do?newsId=148865474>.

types of support that startup companies need, such as incubation, follow-on investments by the hosting institution, and funding.

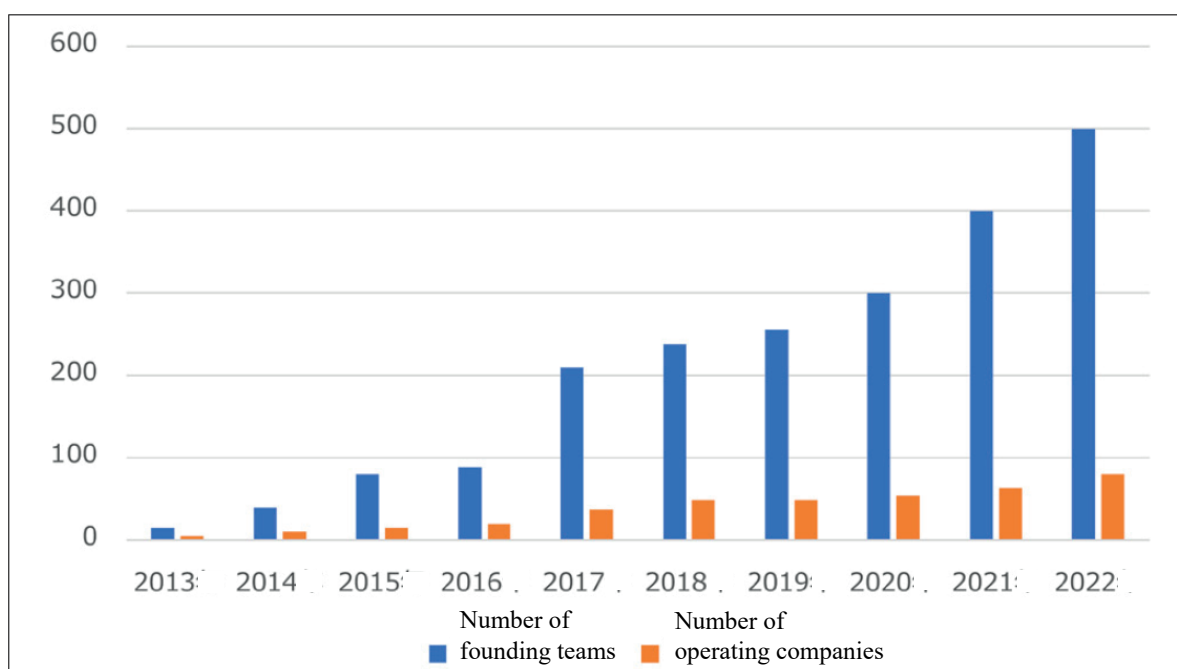


Source: Korea Science and Technology Policy Institute

Figure 4-2 TIPS Structure

TIPS aims to overcome the limitations of government-led startup support policies, such as government selection of startup support companies, low commercialization success rates, and limited policy funding, by harnessing the power of the private sector. TIPS is growing as a public-private partnership platform that nurtures technology startups, providing not only R&D but also commercialization and incubation infrastructure support. This enables startup teams discovered by the operating company to successfully enter the market and commercialize their businesses.

As shown in Figure 4-2, TIPS provides various support services for different stages of growth, including pre-TIPS, pre-TIPS seed, post-TIPS, and scale-up TIPS. Additionally, TIPS Town has opened in Seoul, Daejeon, and Pohang as a place where various entities, including TIPS startups, VCs, and startup support organizations, can meet and interact.



Source: Korea Advanced Institute of Science and Technology (STEPI)

Figure 4-3 TIPS management transition

Figure 4-3 shows the transition in the operation of TIPS. Looking at the scale of support provided by TIPS so far, the number of founding teams started at 15 companies in early 2013 and is expected to increase to 500 by 2022 and 720 by the end of June 2023. Beginning in 2023, a new track will be established to provide up to 1.5 billion won in support over three years to startup companies in the deep tech field, which requires a long period of technological development and large-scale funding.

The South Korean government will provide a total of 1.2022 trillion won to support the TIPS project over the next 10 years through 2023, and 56% (1,255 companies) of the startup teams that received support have attracted follow-on investment from the private sector, amounting to 12.4637 trillion won. As of the end of June 2023, the market capitalization of the 13 companies that had successfully gone public (IPO) is 4.5 trillion won, while 68 of the TIPS founding teams have completed M&A.

4.1.3 Major startup support projects and budgets by the South Korean government

(1) Total startup support budget by the government

The Ministry of SMEs and Startups announced that it would provide 397 startup support projects in 2024, with a total budget of 3.7121 trillion won from 99 organizations, including ministries, local governments, and startup-related organizations. The 2024 budget is the largest in history, with an increase of 45.3 billion won (1.2%) from the previous record of 3.6668 trillion won in 2022. Eight types of support projects exist: financing and guarantees; commercialization; R&D; facilities, space, and incubation; global expansion; mentoring, consulting, and education; events and networks; and human resource development. The budget for each of the eight types of support projects was as follows: financing and guarantees 2,054.6 billion won (55.3%), commercialization 793.1 billion won (21.4%), and R&D 544.2 billion won (14.7%), in that order.

Table 4-2 Budget scale by type of startup support project of the South Korean government (2024)

| Type of support business | Budget (%) | Number of projects (%) |
|---|---------------|------------------------|
| Loans – Guarantees | 20,546 (55.3) | 7 (1.8) |
| Commercialization | 7,931 (21.4) | 166 (41.8) |
| Technology Development (R&D) | 5,442 (14.7) | 1,341 (3.6) |
| Facilities - Spaces – Incubation | 1,341 (3.6) | 98 (24.7) |
| Global Expansion | 1,138 (3.1) | 23 (5.8) |
| Consultation (mentoring - consulting - education) | 451 (1.2) | 65 (16.4) |
| Events – Network | 226 (0.6) | 28 (7.1) |
| Talented person | 47 (0.1) | 4 (1.0) |
| Total amount | 37,121 | 397 |

Unit: 100 million won, %.

Source: Ministry of SMEs and Startups

Examining the figures by organization, the Ministry of SMEs and Startups, which is responsible for promoting entrepreneurship and startups, has the largest number of projects among central government ministries, with 37 projects (43%) and a budget of 3,403.8 billion won (95.6%) in 2024. This is followed by the Ministry of Culture, Sports and Tourism (12 projects, 60.9 billion won), the Ministry of Environment (four projects, 23.7 billion won), and the Ministry of Agriculture, Food and Rural Affairs (eight projects, 22.6 billion won). Among local governments, Seoul City supported 33 projects worth 38.5 billion won, accounting for 25.5% of the total local government support budget, the most of any local government.

Table 4-3: Budget scale of startup support projects by ministry

| The authorities | Number of projects | Budget (%) |
|---|--------------------|----------------|
| Ministry of SMEs and Startups | 37 | 34,038 (95.6) |
| Ministry of Culture, Sports and Tourism | 12 | 609 (1.7) |
| Ministry of Environment | 4 | 237 (0.7) |
| Ministry of Agriculture, Food and Rural Affairs | 8 | 226 (0.6) |
| Ministry of Science and ICT | 9 | 217 (0.6) |
| Korean Intellectual Property Office | 3 | 98 (0.3) |
| Ministry of Education | 2 | 81 (0.2) |
| Ministry of Oceans and Fisheries | 3 | 81 (0.2) |
| Ministry of Health and Welfare | 4 | 24 (0.1) |
| Ministry of Justice | 1 | 10 (0.0) |
| Ministry of Land, Infrastructure and Transport | 3 | 1 (0.0) |

Unit: 100 million won, %.

Source: Ministry of SMEs and Startups, South Korea

(2) Major government support projects for deep tech startups

The 2024 Startup Support Project will strengthen support areas through public-private cooperation to promote the growth of technology-based digital deep tech startups and implement support projects to promote the establishment of new industries.

Table 4-4: Budget for the South Korean government's main startup program

| Support project | Year 2023 | Year 2024 |
|--------------------------|-------------------|-------------------------|
| TIPS | 378.2 billion won | 471.5 billion won |
| Super Gap Startup 1000 + | - | 103.1 billion won (new) |
| Reinvestment Loan Funds | 75 billion won | 100 billion won |

Source: Ministry of SMEs and Startups, South Korea

The TIPS program saw the largest increase in the startup support budget in 2024. It increased by 93.3 billion won from 2023, reaching 471.5 billion won, supporting 1,925 companies. This is a significant increase compared with the 2023 results (378.2 billion won, supporting 1,591 companies).

In the field of new industry and technology startups, which are attracting attention as deep tech, 103.1 billion won will be provided to 505 companies through the Super Gap Startup 1000+ project. Super Gap Startup 1000+ is a project that selects promising startups with excellent technology in new industries and provides commercialization and technology development funds in a concentrated manner through joint public-private investment.

This project will invest 2 trillion won over five years from 2023 to 2027 in a joint public-private effort to nurture over 1,000 deep tech startups that will lead the future of the national economy in 10 major new industry fields: system semiconductors, bio/health, mobility, environment/energy, robotics, AI, big data, cybersecurity/networks, aerospace/marine, next-generation nuclear power, and quantum technology.

In 2023, 275 new startups were selected, and in 2024, approximately 380 new startups were selected. Particularly, the project targets startups that have been established for 10 years or less, rather than the usual seven years or less, because the R&D, technology commercialization, and demonstration of deep tech startups in new industrial fields take a long time.

The two main government-supported projects for deep tech startups under the 2024 program are the Deep Tech Incubator Project for Startups (DIPS) and Deep Tech TIPS Project. A closer examination of these projects is as follows.

A) Super Gap Startup Incubator Project (Deep Tech Incubator Project for Startups: DIPS)

In 2024, five additional fields (AI big data, cybersecurity, space/ocean, next-generation nuclear power, and quantum technology) were added to the five fields selected in the previous year (system semiconductors, bio/health, mobility, environment/energy, and robotics), and 217 deep tech startups were selected from the ten fields through a public call for applications and private and government nominations in three tracks.

The selected startups will receive a total of 1.1 billion won in support, including up to 600 million won in commercialization funding over the next three years and up to 500 million won in R&D funding for up to two years, depending on the company's needs. They will also receive support in the form of policy

funding, guarantees, and exports.

Additionally, 15 excellent deep-tech startups that received support under the Innovation Field Startup Package Project for three years from 2020 will receive additional support of up to 1 billion won for global scale-up commercialization for two years through a separate evaluation. Furthermore, 10 major research institutes and universities with expertise, support personnel, and networks in specific fields will be designated as specialized lead agencies to provide focused support for technology commercialization, open innovation, and global investment attraction to strengthen the global expansion of super-gap startups.

B) Deep Tech TIPS

A total of 150 deep tech startups that have received investments of 300 million won or more from TIPS hosting institutions among the 10 most promising startup fields will be selected. Selected startups will receive support of up to 1.7 billion won per company, including 1.5 billion won in R&D funding and up to 100 million won in commercialization and overseas marketing funding over the next three years. They will also receive policy support, guarantees, exports, and so on.

(3) Other startup support projects by the government

To enable entrepreneurs who have failed to start businesses, the government will increase the amount of funds for restart loans by 25 billion won from the previous year, bringing the total to 100 billion won. It will provide around 36.3 billion won to support the 17 Centers for Creative Economy and Innovation²² that serve as startup hubs in each region, aiming to achieve regional balance and development. To this end, it will support regionally specialized projects and infrastructure development to activate regionally based innovation startups across the country.

Furthermore, 21.1 billion won will be provided to support the production of prototypes, and approximately 36.4 billion won will be provided to support networking between startups and investors, investment briefings, and so on, through 17 creative economy innovation centers in regional startup hubs. Additionally, the Seoul Metropolitan Government, Busan Metropolitan Government, and other local governments will provide commercialization, accommodation, education, and consulting services to local startups (including pre-startups) through 311 projects worth 150 billion won.

Moreover, the globalization of startups and the startup ecosystem will be further promoted. Support will be expanded to help domestic startups enter global markets and encourage overseas talent to start businesses in South Korea.

As part of this, the government will provide support for commercialization through cooperation with global companies. It will provide 43 billion won in support to 290 companies under the Global Company Collaboration Project. It will also provide approximately 15.4 billion won in support for 140 projects under the “K-Startup Center” program, which provides local incubation programs, market information, and facilities for new startups (including pre-startups) to grow into global startups. Additionally, approximately

²² A foundation that supports the revitalization of technology-based startups under the Ministry of SMEs and Startups, and strengthens the technological innovation capabilities of small and medium enterprises and startups. It operates nationwide and provides support through cooperation among the government, local governments, and the private sector.

13.9 billion won will be provided to 60 individuals selected for the “Global Entrepreneurship School”²³ and approximately 9.9 billion won will be provided to 140 companies selected for the “Global Startup Incubation Program,” which supports overseas verification and other activities.

The “K-Global Overseas Expansion Support Project” selects information and communication technology startups with innovative technologies that are expected to achieve results in overseas markets and provides support to help them establish and grow in overseas markets. By 2024, it provided support of approximately 5.8 billion won to 150 companies. Additionally, the Tourism Global Leading Company Cultivation Project, which supports the overseas market development of tourism ventures, overseas expansion consulting, and investment attraction, will provide support of approximately 7.5 billion won to 30 companies.

The “Startup Focused Universities,” which are designated as universities with excellent startup support capabilities, will provide startup commercialization funds and specialized programs by university to 750 companies worth 67.5 billion won, and support 78 people with approximately 5.1 billion won through the First Time Young Startup Support Project, which provides commercialization funds, education, mentoring, and so on, to young pre-entrepreneurs who are undertaking the challenge of starting a business for the first time.

4.2 Private-Sector Startup Support Initiatives

The South Korean government has been working to promote entrepreneurship since 1986, when it enacted the “Support for Small and Medium Enterprise Establishment Act.” However, in the closed environment centered on conglomerates, expecting much in the way of large companies discovering and supporting startups was not possible. After the currency crisis, a structural reform occurred in the conglomerates, and through the first and second venture booms, an increased interest in social and economic ventures and startups occurred, along with a proliferation of startup support in the private sector.

Large corporations and other private sector organizations are actively supporting startups to create new markets and businesses through the acquisition and adoption of innovative ideas and technologies as a driving force for new growth, as well as to achieve synergistic effects with related affiliates and investment gains.

In recent years, corporate social responsibility (CSR) and environmental, social, and governance (ESG) management have become more widespread, especially among large companies. A growing expectation exists for co-creation with small and medium enterprises and startups, as well as social contributions. Large companies in South Korea, where many conglomerates exist, have traditionally conducted business in a vertically integrated manner. However, there is a growing need to build an ecosystem that also considers horizontal collaboration through the spread of open innovation. Additionally, technology

²³ It selects entrepreneurs who want to expand globally, provides education and mentoring programs, helps attract commercialization funding and investment, and uses global accelerators to support customized incubation programs for each country where expansion is planned.

competition is intensifying in areas where South Korea is strong, such as information and communications, semiconductors, and batteries, and large companies are actively supporting startups to attract talent.

Meanwhile, the South Korean government introduced the “Corporate Venture Program” in 2018 to encourage the development and support of private-sector startups. Additionally, in December 2021, the revision of the Enforcement Rules of the Fair Trade Act made it possible for large companies to directly invest in startups by allowing general holding companies to have corporate venture capital (CVC) in the form of wholly owned subsidiaries, while other legal system improvements are also being made.

Table 4-5 summarizes the major startup support initiatives of the 10 largest companies²⁴ in South Korea.

Table 4-5: Startup support measures of the 10 largest companies in South Korea

| Rank | Company name | Startup support systems and programs | ²⁵ CVC mgt. |
|------|--|--|---------------------------|
| 1 | Samsung | C-Lab Inside (Internal venture development, 2012~), C-Lab Spin-off (2015~), C-Lab Outside (External startup support, 2018~) | ○ |
| 2 | SK | SK Telecom “True Innovation, 2018-,” SK Hynix “HiGarage” (Internal venture incubation) | ○ |
| 3 | Hyundai Motor | Open innovation platform “ZERO1NE Accelerator, 2013-,” “H Startup” (Internal venture development, 2000-), “Open Innovation Lounge” (Open innovation product development platform, 2019-), TIPS hosting institution | ○ |
| 4 | LG | LG Electronics “LGE Adventure” (Internal venture support, 2019-), “Super Start” (Open innovation program brand) | ○ |
| 5 | POSCO | POVENTURES (Internal venture support, 2019-), “Idea Market Place” (Startup support, 2011) | ○ |
| 6 | Lotte | “L-CAMP” (Startup Accelerating Program, 2016-), Scale Up TIPS hosting institution | ○ |
| 7 | Hanwha | “Frontier” (Internal venture support), “Dream plus” (Startup development) | ○ |
| 8 | GS | “GS Beyond” (Open innovation), TIPS hosting institution | ○ |
| 9 | HD Hyundai Heavy Industries | “DT Open Innovation Program,” operates non-profit startup support foundation | |
| 10 | The National Agricultural Cooperative Federation | “ NH Digital Challenge+ ” (Startup discovery, 2019-), “ NH HarvestX ” (Startup Accelerating, 2023-) | ○ |

*As of May 2023

Source: Prepared by APRC based on materials from each company

²⁴ The 10 largest conglomerates in 2023, according to the Korea Fair Trade Commission.

²⁵ “CVCs in Korea: Current Status and Investment Activation Measures,” Startup Alliance, 2023.

5 Initiatives to Support University-based Startups in Korea

5.1 Government Programs to Support University-Based Entrepreneurship

In March 2017, the Korean government released the Plan to Revitalize University-Based Startups (the Plan) after the deliberation of the Council of Secretaries of State for the Revitalization of Businesses. In parallel, the government has been considering a revitalization plan for business building as the key to economic recovery and job creation and has designed a clear strategy to invigorate universities as centers of innovation and business startups.

Until then, the government was engaged in supporting different programs by various ministries and agencies and reinforcing the legal and institutional foundation to support university-based entrepreneurship. However, these efforts still face many challenges and have not yet taken root in the mindset of universities.

The Plan aims, therefore, to boost universities' startup launch efforts and their popularization, with a focus on technological innovation-type startups. To this end, the following three strategies are being pursued.

- (1) Strengthening universities' ability to create new businesses
 - ① Intensively training the core personnel with the mindset and ability to build a business
 - ② Promoting the commercialization of technologies developed by universities
 - ③ Expanding financial tools to support university-based startups and reinforcing guarantees of supports
- (2) Enriching hands-on entrepreneurial education and embracing student entrepreneurship
 - ① Using field-based learning for entrepreneurship
 - ② Embracing an entrepreneurial culture in the university
 - ③ Strengthened partnering among agencies related to building a new business
 - ④ Facilitating an international exchange of university-based startups and fostering the mobilization of global human capital
- (3) Developing a sustainable ecosystem to support university-based startups
 - ① Adopting a whole-of-the-university approach to establish an ecosystem to bolster university-based startups
 - ② Providing a dynamic support for entrepreneurial activities of faculty members
 - ③ Enhancing the entrepreneurial role of industry-academia cooperative groups

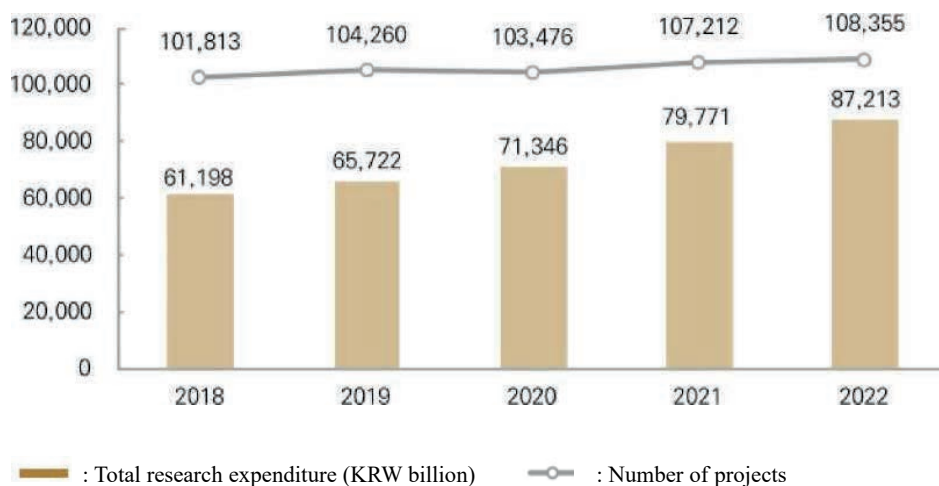
The Plan emphasizes that the universities should be strengthened as centers of innovation and business startups through necessary measures including curricula focused on entrepreneurship, a related bachelor's degree system, an entrepreneurial human resource system, and a reinforcement of financial bases meant

for university-based startups. In addition, by prioritizing support for introducing innovative technology-based business launch programs and by reorganizing the bachelor's degree system, the paradigm of universities should be shifted to focus on a business building mindset. To enable university-based startups to take on the challenge of starting a business with a lower risk of failure, financial support, such as related funding and angel investments, should be strengthened. Field-based learning for entrepreneurship should also be undertaken by leveraging online education platforms and school-based enterprises²⁶. Joint incubation and global expansion will be pursued through exchanges with related domestic and international institutions, such as a center for the creative economy and innovation of public institutions, as well as overseas universities. The government scrutinized approaches to encourage collaboration and partnership between university business support programs, which have so far been operated separately by individual institutes, and presented a plan to improve the system to motivate faculty members to start their own new businesses and commercialize their technologies, and to strengthen the support function for business launch through an industry-academia cooperation.

5.2 Current State of Research Funding at Universities

University-based startups originate from university research results. Therefore, investment in R&D in universities can help stimulate startup launches. Figure 5-1 shows trends in university research expenditures²⁷ in Korea. While the number of research projects at Korean universities has remained constant, R&D expenditures have increased sustainably over the last five years.

Of the KRW 8,721.3 billion in overall research expenditures in 2022, KRW 7,929.6 billion, or 90.3%, were spent on research in the natural sciences, representing a 42.5% increase in total research expenditure over 2018.



(Source: National Research Foundation of Korea)

Figure 5-1 University Research Expenditures in Korea

²⁶ Industrial education institutions or industry-academia cooperatives can establish a department that is in charge of manufacturing, processing, repairing, selling, or providing services directly related to a specific department or course of study to offer first-hand training and research for students and faculty, transfer technology developed at the industrial education institution to the private sector, and promote commercialization. This is called a School-Based Enterprise.

²⁷ Research expenditures incurred by full-time university faculty members as principal investigators.

As shown in Table 5-1, the largest portion of university R&D expenditure comes from the government (75.7%), while the remainder comes from the private sector (15.6 %) and universities (5.0%). While R&D funding from the central and local governments and private sector has been increasing over 2018–2022, that from the central government has dominated, accounting for an average share of 73.3% over the period.

Table 5-1 Number of Projects and Research Funding by Funding Agencies for Universities with a Four-year Plan in Korea

| Funding Agencies | Number of projects | Share of number of projects | Research funding(KRW million) | Share of research funding | Research funds per project(KRW million) |
|--------------------|--------------------|-----------------------------|-------------------------------|---------------------------|---|
| University | 38,775 | 35.80% | 434,746 | 5.00% | 11.21 |
| Overseas | 365 | 0.30% | 33,181 | 0.40% | 90.91 |
| Private company | 17,525 | 16.20% | 1,362,353 | 15.60% | 77.74 |
| Central government | 47,925 | 44.20% | 6,599,259 | 75.70% | 137.7 |
| Local government | 3,765 | 3.50% | 291,811 | 3.30% | 77.51 |
| Total | 108,355 | 100% | 8,721,350 | 100% | 80.49 |

(Source: National Research Foundation of Korea, as of 2022)

Table 5-2 shows the scale of research funding by universities in 2021. The top 15 universities ranked by their individual research expenditures consist of eight national universities, including Seoul National University, and seven private universities, including Yonsei University.

Table 5-2 Research Funding by University in Korea (as of 2021)

Unit: KRW million

| Ranking | University | Research funding | Share of research funding | Research funding per researcher |
|---------|--|------------------|---------------------------|---------------------------------|
| 1 | Seoul National University | 626,195 | 7.80% | 274.89 |
| 2 | Yonsei University | 531,266 | 6.70% | 249.3 |
| 3 | Korea University | 470,183 | 5.90% | 271.63 |
| 4 | Sungkyunkwan University | 445,779 | 5.60% | 299.58 |
| 5 | Korea Advanced Institute of Science and Technology (KAIST) | 421,763 | 5.30% | 634.23 |
| 6 | Hanyang University | 328,458 | 4.10% | 221.63 |
| 7 | Chonnam National University | 202,913 | 2.50% | 160.66 |
| 8 | Kyungpook National University | 201,321 | 2.50% | 145.25 |
| 9 | Pohang University of Science and Technology (POSTECH) | 186,937 | 2.30% | 660.56 |
| 10 | Kyung Hee University | 172,785 | 2.20% | 126.95 |
| 11 | Pusan National University | 170,889 | 2.10% | 121.03 |
| 12 | Chung-Ang University | 170,747 | 2.10% | 151.91 |
| 13 | Jeonbuk National University | 164,654 | 2.10% | 153.17 |
| 14 | Chungnam National University | 151,150 | 1.90% | 146.89 |
| 15 | Ulsan National Institute of Science and Technology (UNIST) | 144,780 | 1.80% | 446.85 |

Source: National Research Foundation of Korea (2022)

It is noteworthy that KAIST, POSTECH, and UNIST, which are universities that focus on science and technology, do not have as many faculty members as other universities and that their per-faculty research funding is much higher than that of the others, despite the inconspicuous total amount of research funding. Moreover, compared with the research funding of other universities, including humanities and non-science disciplines, universities focusing on science and technology, where most departments are overwhelmingly related to STEM education, are supported by loftier research funding than other universities are.

5.3 Current State of University-based Startups

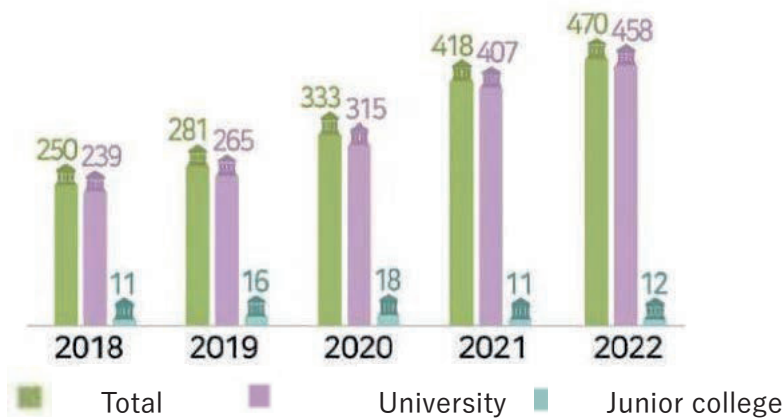
Startups by students, which showed an increasing trend until 2021, decreased by 9.2% to 1,826 in 2022. Of these, 392 had sales volumes that accounted for 21.5% of the sales volume of all startups established in the same year.



(Source: National Research Foundation of Korea)

Figure 5-2 Number of Student-driven Startups in Korea

By contrast, the number of faculty-driven startups has shown an increasing trend over the last five years. In 2022, 470 faculty-driven startups were launched nationwide by 111 universities (102 universities and 9 Junior colleges). This represents an 88% and 12.4% increase from 2018 and the previous year, respectively. Of these startups, 129 achieved sales, an increase of 63.3% over 2018.



(Source: National Research Foundation of Korea)

Figure 5-3 Number of Faculty-Driven Startups

5.4 Major Support Programs for University-based Startups

5.4.1 Startup-focused University

Based on the abovementioned Plan to revitalize university-based startups, the government has been implementing various programs to support such startups. This section describes major government-supported programs currently underway.

First, the Startup-focused University is a program initiated by the Ministry of SMEs and Startups (MSS) in 2022 to identify startups launched by young local entrepreneurs and support commercialization at different stages of development through a university with excellent entrepreneurial infrastructure and a collaborative network. The MSS promotes the program where universities contribute to fostering startups from identifying to scaling them up, stimulating university-based startup building activities and creating a harmonized and full-fledged startup ecosystem in which universities can be regional startup hubs.

The program provides support to pre-entrepreneurs, early-stage startups, and leapfrog startups amounting to 50 million won, 70 million won, and approximately 120 million won, respectively. Its budget in 2024 was 67.4 billion won, comprising funding for 750 companies for commercialization and startup-related projects.

Table 5-3 Support under Startup-focused University Program

| Funding for commercialization | Support according to Development Stages (other than financial aid) |
|--|--|
| Support for the cost of commercialization of business ideas, business model upgrading, etc. The amount of support varies with the year of operation and assessment findings. | Entrepreneurship education, business support, investment attraction, verification and validation of the business idea, sales channel strategy, overseas expansion, institute – business collaboration, etc. The support differs depending on the university. |

(Source: National Research Foundation of Korea)

In the 2024 program, pre-entrepreneurs and startups were selected according to two tracks: university-based and regional. On the university-based track, universities, university members including graduate students, faculty members, startups based on university-owned technologies, and entrepreneurs supported by these universities may apply regardless of the region. On the regional track, pre-entrepreneurs or entrepreneurs in the area where a startup-focused university is located may apply. The scope of the offers by track and development stage under the Startup-focused University Program is illustrated in Table 5-4.

Table 5-4 Numbers of Offers Sought by Track and Development Stage under the Startup-focused University Program

| Development stage | University-based track | Regional track | Total |
|----------------------|------------------------|----------------|-------|
| Pre-entrepreneurs | 144 | 207 | 351 |
| Early-stage startups | 54 | 126 | 180 |
| Leapfrog startups | 27 | 75 | 102 |

(Source: Commercialization Promotion Agency for R&D Outcomes)

Moreover, the 2024 program provides capacity-building training opportunities tailored to startup requirements. The program leverages universities' capabilities to deliver a variety of programs, including those for entrepreneurship education, mentoring, sales channel strategies, and investment attraction. Support is provided after taking into consideration the needs of startups through demand surveys after they are selected.

Table 5-5 Commercialization Funding Support by Development Stage under the Startup-focused University Program

| Development stage | Condition for support | Amount of funding | Maximum amount of support |
|----------------------|------------------------------|-------------------------|---------------------------|
| Pre-entrepreneurs | Before business registration | Approx. KRW 50 million | KRW 100 million |
| Early-stage startups | 3 years or less in business | Approx. KRW 79 million | KRW 100 million |
| Leapfrog startups | 3 to 7 years in business | Approx. KRW 120 million | KRW 300 million |

(Source: National Research Foundation of Korea)

In principle, the duration of support for pre-entrepreneurs and startups selected under the program is three years, but it can be extended for another two years depending on the assessment, the maximum being five years. As presented in Table 5-6, nine universities, including Hanyang University, were selected as entrepreneurship-oriented universities in the two years since the beginning of the program.

Table 5-6 List of the Selected Startup-focused Universities

| | Metropolitan Area | Chungcheong Province | Jeolla Province | Kangwon Province | Daegu Metropolitan City/ North Gyeongsang Province | Southeast Region | Total |
|------|---------------------------------------|---|--|---------------------------------------|---|---|-------|
| 2022 | Hanyang University (Seoul) | Hoseo University (Chungcheongnam-do) | Jeonbuk National University (Jeonbuk-teukbyeoljachido) | Kangwon National University (Kangwon) | Daegu University (North Gyeongsang) | Pusan National University (Pusan) | 6 |
| 2023 | Sungkyunkwan University (Gyeonggi-do) | Hannam University (Daejeon Metropolitan City) | | | | Gyeongsang National University (Gyeongsangnam-do) | 3 |

(Source: National Research Foundation of Korea)

When designated as Startup-focused University, a university is also designated automatically as the lead institute benefiting from laboratory-based early-stage startup packages under the Laboratory Startup Support Projects discussed in section 5.4.2. This additional support enables laboratory-based startups in an area where Startup-focused University is located to receive commercialization funding from the MSS, apart from R&D funding from the Ministry of Education (MOE) and Ministry of Science and ICT (MSIT).

5.4.2 Laboratory Startup Support Projects

The Laboratory Startup Support Projects supports an S&T-based entrepreneurship (lab to market) based on intellectual property rights owned by universities (e.g., patents and employees' achievements that belong to a university as the employee's invention) and those owned by faculty, students, and researchers belonging to a university, to promote (research) laboratory-based startups. The initiative supports universities, public research institutes, and organizations specializing in technology commercialization, among others. The three ministries involved in startup assistance—MOE, MSIT, and MSS—share the roles and responsibilities in rendering this assistance.

Table 5-7 Organization of the Implementation of Laboratory Startup Support Projects

| Ministries | MOE (Creation of foundation for startups) | MSIT (Technology development) | MSS (Commercialization) |
|-----------------------|--|---|---|
| Implementing agencies | National Research Foundation of Korea | Commercialization Promotion Agency for R&D Outcomes | Korea Institute of Startup & Entrepreneurship Development |
| Name of program | Lab-specialized Startup Leading University | Lead University of S&T-based Startup | Early-stage Startup Packages (Laboratory-based) |
| Nature of support | Entrepreneurship education for undergraduates, student allowance, etc. | Support for the commercialization of R&D | Funding for commercialization, space, mentoring, etc. |

(Source: Commercialization Promotion Agency for R&D Outcomes)

There are two schemes for universities in the Laboratory Startup Support Projects: the Lab-specialized Startup Leading University Project and Support Program for Feasibility Study of Public Technology to Market. Table 5-8 describes these programs in detail.

Table 5-8 Outline of Laboratory Startup Support Projects

| | |
|-------------------------|--|
| Supported Organizations | Universities, public research institutes, organizations specializing in technology commercialization, etc. |
| Support duration | <ul style="list-style-type: none"> - Lab-specialized Startup Leading University Development Program: maximum three years (two years in principle; one-year extension possible); - Support Program for Feasibility Study of Public Technology to Market: five-year for lead agency (two years in principle; three-year extension possible); 11-month support for laboratory-based startup teams; - Support Program for Public Research Results Sharing and Commercialization: March 2022–February 2023 (12 months), - Support Program for Science and Technology Employment Innovation Infrastructure: May 2022 – February 2023 (10 months) |
| Scope | <ul style="list-style-type: none"> - Lab-specialized Startup Leading University Development Program: Supports in identifying promising startups, providing preparatory funding for starting a laboratory-based business, commercializing targeted early-stage startups through business linkages, mentoring startups, etc. - Support Program for Feasibility Study of Public Technology to Market: Support to develop laboratory-based startups and incubate them for early commercialization of the results of basic/original research at universities and public research institutes. - Support Program for Public Research Results Sharing and Commercialization: Support to identify business building ventures (entrepreneurs) leveraging public technologies derived from the activities at universities focusing on science and technology and public research institutes, to draw up a sophisticated business plan and make direct investments (establishment of an investment company). - Support Program for Science and Technology Employment Innovation Infrastructure: Fact-finding surveys, employment projections, statistical database building, mid- to long-term strategy development, networking, etc. for formulating a policy for job creation in S&T infrastructure. |

(Source: National Research Foundation of Korea)

(1) Lab-specialized Startup Leading University Project

The Lab-specialized Startup Leading University Project aims to foster lead universities to create startups so that they can help innovation-based and high added-value startups actively create quality jobs based on the excellent research results of university laboratories. The program was jointly launched in 2018 by the MOE, MSIT, and MSS. Accordingly, the MOE builds creative infrastructure for entrepreneurship, while the MSIT and MSS support R&D and commercialization, respectively, thus covering all stages of support needed for entrepreneurship.

The program was planned and promoted as Phase One from 2018 to 2022. A subsequent program was considered and discussed from 2021 to 2022 among the participating ministries for preparing Phase Two; thereafter, the 2023 budget was appropriated for this phase.

Phase Two runs from 2023 to 2026, selecting lead universities for the first (2023–2024) and second terms (2025–2026). In principle, the support duration is one year, with a one-year extension being possible according to the assessment. Funding provided for Phase Two is approximately 14.4 billion won, consisting of 3.7 billion won from the MOE and 10.7 billion won from the MSIT. Fourteen lead institutions are supported, consisting of 13 universities (including a university alliance) and a professional education institution for entrepreneurship. Table 5-9 presents the summary of the program.

Table 5-9 Summary of Lab-specialized Startup Leading University Development Program (Phase Two)

| | Type | Lead Institute | Number of laboratories supported per lead institute | Funding allocated | | |
|----------------|---|----------------|---|-------------------------------|-------------------------|--------------------|
| | | | | MOE (creating infrastructure) | MSIT (support for R&D) | Total |
| All Ministries | Individual | 7 | Approx. 10 | Approx. KRW 230 million | Approx. KRW 750 million | KRW 980 million |
| | Business Linkage | 6 | Approx. 12 | Approx. KRW 320 million | Approx. KRW 900 million | KRW 1.22 billion |
| MOE | Professional education institution for entrepreneurship | 1 | - | Approx. KRW 100 million | - | KRW 100 million |
| Total | | 14 | Approx. 142 | KRW 3.729 billion | KRW 10.65 billion | KRW 14.379 billion |

(Source: National Research Foundation of Korea)

As noted in the nature of the support, the program designates universities (including a university alliance) as lead universities for entrepreneurship by their outstanding research results and startup support capabilities. It supports preparations for laboratory-based startups, such as upgrading the entrepreneurial infrastructure at the university, as well as continued R&D activities and business model development tailored to the selected laboratories. Table 5-10 presents the details of the program implementation.

Table 5-10 Details of Lab-specialized Startup Leading University Project

| | Details of the Program |
|---|--|
| Creating entrepreneurial infrastructure in laboratory | <ul style="list-style-type: none"> • Creation of infrastructure: Creating infrastructure encouraging joint entrepreneurship through business exchange and management under business agreements (MOUs), and upgrading infrastructure, including improvement of institutional regulations aiming to embrace student entrepreneurship. • Management of curriculum: Development of common courses for study of laboratory-based startups and their referencing. |
| Support for preparing laboratory-based startups | <ul style="list-style-type: none"> • Preliminary planning: This stage involves furnishing a proof of concept of the fundamental market needs, developing a business model, and strengthening the capability to identify promising university-owned technologies with high startup potential. • R&BD^[28]: Support for continued R&D (prototype development, development of MVP^[29], etc.), business modeling and its verification/ upgrade, preparation for incorporation, funding attraction, etc. |

(Source: National Research Foundation of Korea)

Among the lead universities for entrepreneurship selected by the MSS, universities that actively support laboratory-based startups in a university-wide manner and have excellent research results are evaluated and selected jointly by the MOE and MSIT.

Universities with excellent research capabilities, dedicated organizations to support startups, and systems to embrace entrepreneurship are provided with comprehensive support, ranging from an

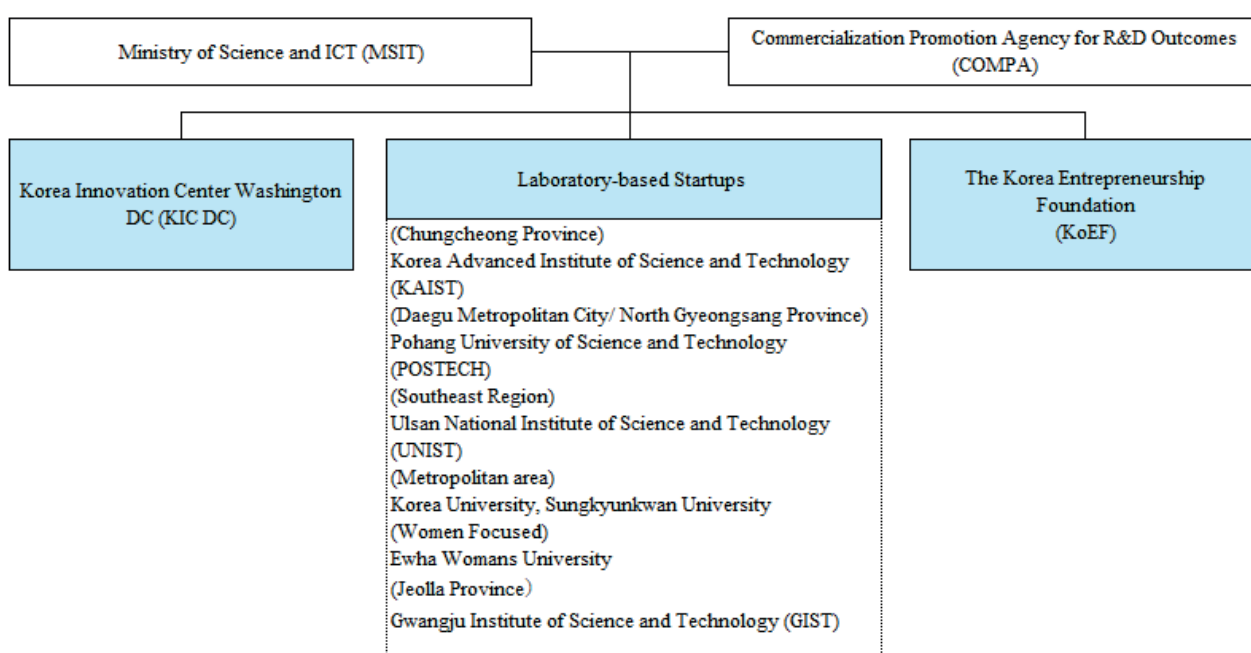
²⁸ R & BD: Research and Business Development

²⁹ MVP stands for Minimum Viable Product, which refers to a product with minimum functionality to test a hypothesis about a service or offering.

identification of business ideas to incorporation and continued support. A separate scheme has been set up under the startup support program provided by the MSS to facilitate subsequent support, such as incubation space, funding, and prototype development.

(2) Korean I-Corps: Support Program for Feasibility Study of Public Technology to Market

The program (hereafter referred to as I-Corps), known as the Korean I-Corps, is the Korean version of the Innovation Corps (Corps™) Program of the National Science Foundation (NSF) of the United States. Originally, the I-Corps program was a seven-week immersive entrepreneurial training program launched by the NSF in 2011, to facilitate a positive economic and social impact of invention. It is an attempt by scientists and engineers to develop their ideas beyond the laboratory and assess the marketability of their inventions early by undergoing a customer-finding process.



(Source: MSIT)

Figure 5-4 Organizations Involved in Promoting I-Corps: Support Program for Feasibility Study of Public Technology to Market

The I-Corps Support Program for Feasibility Study of Public Technology to Market supports the effort to identify the marketability of technologies arising from research at universities. After having been initiated by MSIT through a model project in 2015, the program was fully launched in 2016. It is currently operated by the Commercialization Promotion Agency for R&D Outcomes under the MSIT as part of the R&D support program. As products and technologies created in laboratories are undergoing market verification in advance, few failures and higher success rates are expected when they are commercialized afterward. Hence, the program is now regarded as a representative laboratory-based startup support program of the MSIT.

The I-Corps select universities that serve as laboratory-based startup corps in each region and provide support to pre-founding entrepreneurial teams composed of master’s and doctoral students

and postdoctoral fellows who wish to start their own businesses in the future, using the results of their research at universities and public research institutes. A team should include at least one pre-founding representative, one founding mentor who can be a faculty or staff member of the university or institute, and one professor from the relevant field or with relevant technical expertise.

A total of 125 teams will be selected from seven regions across the country. Each team will receive an average of 50 million won and eventually a maximum of 70 million won, including a 3-week training allowance in the United States, research funding, and 25 million won for prototype production. The teams will attend an orientation during May–June, followed by local and international courses during July–August as a joint education program. In September, they will sign an agreement to obtain funding for identifying possible business opportunities. Demonstration Day will take place in January–February of the following year, and the program will end with an award ceremony.

According to the MSIT, the number of laboratory-based startups supported by the program will, cumulatively, reach 194, with 1,362 people employed from 2016 to 2022.

5.4.3 Innopolis Campus Support Program

Since 2019, the MSIT has been promoting a Small Stronghold R&D Special Zones Program in which small-scale, high-density R&D towns are designated and fostered to create an innovative ecosystem centered on core technology institutes, such as universities, research institutes, and public enterprises, that will become major regional hubs. Currently, 14 zones have been designated nationwide based on selected specific areas of technology, such as future batteries (Ulju-gun, Ulsan Metropolitan City) and advanced new materials (Pohang City).

The Innopolis R&D Special Zone Promotion Foundation under the MSIT operates the Innopolis Campus Support Program primarily at regional hub universities located in the Small Stronghold R&D Special Zones. After conducting a model program in Daedeok-gu, Daejeon Metropolitan City, special zones were designated in other regions, with the program actually beginning in 2013.

At the time, universities in the United States and other countries played an important role in commercializing cutting-edge technologies derived from their research outcomes in specific industrial fields based on the local community. However, it was noted that in Korea, universities did not perform well in industry–academia cluster cooperation. The program leverages innovative tools such as technology, human capital, and entrepreneurial infrastructure in core universities located in a special zone, identifies and strengthens business ideas of pre-founding entrepreneurs, and supports them in solving the technical problems encountered in the zone. There are two types of programs: the Innovation Voucher Program to support overcoming the technological challenges of companies in a special zone, and Startup Idea Validation Program to help pre-founding entrepreneurs validate their commercialization using public and private technologies in a special zone. Pre-founding and early-stage entrepreneurs are identified by the core universities in each special zone, and support is provided from commercialization to scale-up through a verification of business ideas and assessment of the potential necessary for the business launch. Support is available to any university located in a special zone that offers STEM education or business startup-centered curricula, as well as to any university focusing on science and technology.

Universities selected under the Innopolis Campus Support Program provide assistance to qualifying

pre-founding and early-stage entrepreneurs, including entrepreneurship education, mentoring, funding for prototype production, participation in global acceleration programs, and funding attraction.

5.5 Bachelor's Degree and Personnel Systems to Embrace Entrepreneurship

Korean government has introduced bachelor's degree programs and adopted personnel systems designed for both students and faculty to start university-based businesses. The bachelor's degree programs help undergraduate students manage both their studies and efforts to create startups. The components and details of the programs vary from university to university. Table 5-11 presents the major programs.

Table 5-11 Bachelor's Degree Programs Dedicated to Entrepreneurship

| System or Program | Description |
|---|--|
| Entrepreneurship Leave | Bachelor's degree regulations accept entrepreneurship as a good reason for taking a leave of absence from university to prevent students from interrupting their studies due to business startup activities. The maximum allowable length of the leave is at the discretion of the university. This leave is dealt with differently from that allowed under the university's general leave system and may be applied for in combination with or separately from the latter. As of 2021, 259 universities have introduced the system. |
| Credit Option System for Entrepreneurship | Where the learning objectives can be achieved through preparative activities for entrepreneurship (startup training) and business startups (hands-on training), this system is designed to minimize interruptions in studies by enabling students to earn credits from their business building efforts, thus mitigating the difficulties associated with managing both business and studies. |
| Credit Transfer System for Entrepreneurship | This system allows students to earn credits by taking courses designated as entrepreneurship courses at other universities under mutual agreements with the students' university. As of 2021, 101 universities have implemented the system. |
| Entrepreneurship Scholarship Program | Students interested in starting their own business are selected and offered scholarships to enable them to gain business experience and embrace entrepreneurship. As of 2021, 99 universities have implemented the program. |
| Program to Select and Train Outstanding Students for Entrepreneurship | This program selects students with outstanding startup ideas and skills at university entrance examinations and trains them as pre-entrepreneurs. As of 2021, seven universities have introduced the system. |
| Programs to Open Major or Minor Department Focusing on Entrepreneurship | This program encourages universities to open a major department or offer a minor that focuses on entrepreneurship to train entrepreneurs. As of 2021, 16 universities have opened major departments, and 62 have introduced minors. |

(Source: National Research Foundation of Korea)

Personnel Systems to Embrace Entrepreneurship promote and support entrepreneurship by university faculty members by introducing a leave of absence and dual careers system and accounting for entrepreneurial performance in the faculty performance evaluation, among others.

University faculty members are said to have a high potential for entrepreneurship, thanks to their technological capabilities and professional networks, but few actually start their own business because of the risk of failure and need to manage research and teaching. To address this, an increasing number of

universities have introduced various systems to promote business startups by faculty members.

First, a leave of absence for entrepreneurship by faculty members and the dual careers system allow these members to take sabbaticals or be appointed to two or more positions so that they can focus on starting their business. As of 2020, 186 universities use these systems. The number of faculty members benefiting from the systems is 809, and the maximum period of approved leave of absence or dual careers is 108 months.

Second, the method of faculty performance evaluation, in which the main criterion for the reappointment and promotion of faculty members used to be their publication records, is a hurdle to faculty members' entrepreneurship. Therefore, many universities now include the entrepreneurship performance of faculty members as a criterion for their evaluation. As of 2020, 143 universities have appraised business launches by faculty members and the students they supervised in the members' performance evaluations.

Moreover, some universities appoint faculty members dedicated to entrepreneurship education and mentoring and introduce sabbatical leaves for entrepreneurship.

5.6 In-house Organization Dedicated to Entrepreneurship at University

Korean universities have increasingly set up in-house organizations that specialize in supporting entrepreneurship (hereafter referred to as In-house Organization Dedicated to Entrepreneurship), to efficiently deliver various entrepreneurship education programs and support entrepreneurs. Like the In-house Organization Dedicated to Entrepreneurship supported by government programs, there are Leaders in Industry-university Cooperation (LINC Program³⁰), the Incubation Center (Incubation Center Support Program), and the Business Startup Support Group (Pre-founding and Initial Startup Package Support Program).

The LINC Program has been established and is operated mainly by LINC-selected universities since 2011. The support programs concentrate on entrepreneurship education. Incubation centers are facilities that welcome for a certain period pre-founding and early-stage entrepreneurs who have technology or ideas but who have not yet commercialized them due to a lack of startup infrastructure. They provide comprehensive support for entrepreneurship, including providing generic equipment and a space for technological development, technical and managerial advice, and financial support. As of 2020, 206 universities have incubation centers.

The Business Startup Support Group leverages a university's strong entrepreneurial support infrastructure to assist students and pre-entrepreneurs in commercializing their ideas. The selected universities provide support in terms of commercialization funding, pre- and early-stage startup packages, and institute-specific dedicated programs.

³⁰ LINC (Leaders in Industry-university Cooperation) Program aims at furthering lead universities engaging in industry-academia-research institute collaboration to develop future human resources and entrepreneurial universities by spreading the growth model of industry-academia-research institute collaboration.

6 Interview survey of university-based startup support policies in the Republic of Korea (South Korea)

6.1 Survey Overview

The previous chapters have provided a bird's-eye view of the policies and measures taken by the Korean government and private sector to promote entrepreneurship and startups. Universities serve as centers for the creation of knowledge through education and research, and in recent years, their role as hubs for entrepreneurship—commercializing research outcomes—has grown significantly. Therefore, this chapter aims to understand the current state of university-based entrepreneurship and startup support policies in South Korea by analyzing actual university cases, including an overview of their measures, achievements, and challenges. Table 6-1 summarizes the profiles of the four universities examined in this study.

Table 6-1 Profiles of the Four Universities

| | The Korea Advanced Institute of Science and Technology (KAIST) | Pohang University of Technology (POSTECH) | Ulsan National Institute of Science and Technology (UNIST) | Hanyang University |
|----------------------------------|--|--|--|----------------------------------|
| Type | National specialized university of science and technology | Private specialized university of science and technology | National specialized university of science and technology | Private comprehensive university |
| Location | Daejeon Metropolitan City | Pohang City | Ulsan Metropolitan City | Seoul Special Metropolitan City |
| Number of Students | 4,912 | 1,675 | 2,411 | 22,284 (except ERICA) |
| Employment Rate (Undergraduate) | 68.90% | 70.60% | 73.30% | 71.40% |
| Number of International Students | 449 | 141 | 50 | 3,147 |

Source: University Information Disclosure in 2022

As of 2022, South Korea had 268 universities offering four-year undergraduate programs, comprising of 49 national/public universities, 219 private universities, and 145 specialized universities (junior colleges). In order to examine the current status of technology-based startup support policies, the main target of this survey was the science and technology research-oriented universities, referred to as specialized universities of science and technology. However, considering the unique characteristics of universities specializing in science and technology, Hanyang University, a private comprehensive university with strengths in science and engineering, was added for comparison with the other specialized universities,

resulting in the selection of four universities for this study. The survey was conducted through face-to-face interviews with business startup support personnel at the universities. It covered the current status, achievements, and challenges related to support organizations and systems, entrepreneurship education, business startup support programs and projects, as well as industry-academia collaboration and ecosystems.

6.2 Korea Advanced Institute of Science and Technology(KAIST)

6.2.1 KAIST Overview

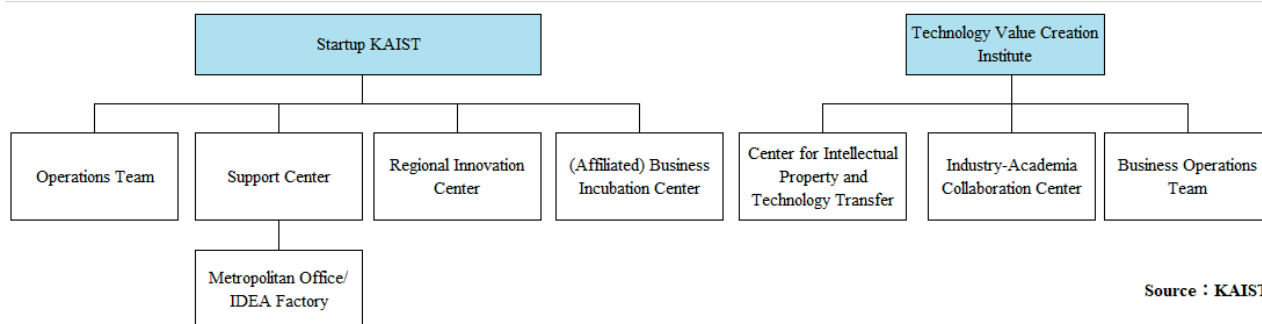
The Korea Advanced Institute of Science and Technology (KAIST) is a science and technology research-oriented university under the jurisdiction of the Ministry of Science and ICT set up to foster human resources in science and technology, and to conduct related research promoted as part of national policy. The decision to establish the university was made in 1971 in alignment with the South Korean government's goal of achieving economic development through science and technology, and admissions began in 1973.

Initially established as a graduate school called the Korea Advanced Institute of Science, it became the present-day KAIST consisting of both undergraduate and graduate programs after its merger with the Korea Institute of Science and Technology in 1981. In addition to science and engineering, the university also includes a School of Business, a School of Convergence Science in Humanities and Social Sciences, and a College of Interdisciplinary Studies.

6.2.2 KAIST Startup Support Framework

KAIST's entrepreneurship and startup support organization consists of the Startup KAIST, and the Technology Value Creation Institute, which is in charge of industry-academia collaboration. Startup KAIST was established in April 2014 as the KAIST Entrepreneurship Promotion Institute. It aims to promote entrepreneurship on campus, build a startup ecosystem, and support startups in entering the global marketplace. To this end, the institute runs a variety of practical programs to help KAIST students, faculty members, and aspiring entrepreneurs develop the essential skills needed to launch and thrive in the startup world.

KAIST supports laboratory startups in the Daejeon and Chungcheong regions through the Korean I-Corps "Support Program for Feasibility Study of Public Technology to Market" as government projects.



Source : KAIST

Figure 6-1 KAIST Startup Support Framework

6.2.3 KAIST Startup Support Measures

A new president took office in 2021, and KAIST accelerated the activation of business startups under the university’s vision of “One Lab, One Startup,” which calls for the creation of at least one startup for each laboratory. KAIST has approximately 700 laboratories and the results of their research are expected to be commercialized. As part of its startups, KAIST is working to establish the "KAIST Startup Model," which involves investigating the challenges of lab-based startups led by the Startup KAIST and compiling existing startup cases into a big data system. Table 6-2 summarizes KAIST’s main measures for supporting student startups.

Figure 6-2 KAIST Startup Support Measures

| Measures/Programs | Contents |
|---------------------------------|---|
| E*5 KAIST | KAIST’s flagship student startup support program, which upholds the five principles of being excited, encouraged, enthusiastic, educated, and experienced. This program identifies project teams, helps them refine their startup ideas, and supports them in preparing for actual company formation through a mission-based audition format. With mentoring from experts in various fields, the final winning team is awarded up to 15 million KRW in funding to establish a corporation. |
| Lab Startup KAIST | Lab-based startup audition program designed to intensively nurture and support startup units based on laboratory research infrastructure. This program aims to support the commercialization of promising pre-startup teams. |
| KAIST Loonshots Start Challenge | The program is designed to support students who are interested in entrepreneurship or have innovative ideas, by providing funding and coaching for activities such as idea exploration and development. Selected teams receive coaching from experienced entrepreneurs and financial support for their startup activities. |
| K-School | Established in 2016 to integrate entrepreneurship education into its specialized engineering curriculum, with the aim of nurturing future-ready talent. For undergraduate students, entrepreneurship and business-related theoretical education are offered as part of a minor program. At the graduate level, KAIST jointly operates 21 interdisciplinary departments focused on startup convergence. For the general student body, entrepreneurship and business-related courses and seminars are provided. In addition, KAIST operates a residential startup support space called the “Startup Village,” which is designed to support startup clubs and pre-startup teams. |

Source: KAIST

Other programs that allow students with business ideas to take on new challenges include the W8 Garage, which provides work and meeting spaces for startup teams; the Global Startup Camp, which provides opportunities to experience and learn about Silicon Valley startups; the Co-Foundation Camp, which aims to build and revitalize the local startup ecosystem; GRAFFITI, a startup festival born out of startup-related club activities; and the IDEA Factory, a collaborative prototype space where people can use 3D printers, laser cutters, and machine tools.

One of the programs, the KEP (KAIST Entrepreneurial Partnership), is a representative program for faculty members. It is a faculty startup promotion program that matches the technological needs of major companies with the technologies held by KAIST laboratories, supporting early-stage startup team formation and proof-of-concept (PoC) funding. It provides research funding of up to 80 million KRW depending on the stage of research.

6.2.4 Key Features and Achievements

Since its inception in 2014, a total of 118 student startups and 57 faculty startups have been established under the Startup KAIST up to October 2022. Of late, faculty startups have become increasingly active.

According to KAIST, the survival rate of KAIST-originated startups is high: among the 120 KAIST-originated startups, the 5-year survival rate (as of 2019) is 93.5%, which is substantially higher than the 66.7% 5-year survival rate of startups established with the support of the Ministry of Small and Medium Venture Business of Korea. The survival rate of KAIST's faculty startups is also reported to be relatively high compared to other universities.

A notable aspect of KAIST's startup support measures is the simplification of the startup process and the establishment of the K-School. To stimulate faculty startups, KAIST has streamlined the previously time-consuming deliberation process, which had been a major bottleneck. The review procedure, which used to take around six months and involved nine steps, has been simplified to just three steps. Currently, approval is granted once the requirements are met, resulting in the reduction of the overall processing time to less than half. In addition, to prevent faculty members and student entrepreneurs from spending too much time on administrative and business activities other than the technological development related to the startup idea, a "startup concierge service" is provided to assist them with everything from the administrative procedures necessary for starting a business to attracting investment. To promote student business startups that find it challenging to balance the startup and academic work, the term limit of the business startup leave system was completely abolished.

The K-School promotes and enhances entrepreneurship and leadership at KAIST through a variety of subjects, and special lectures and seminars by prominent figures. It offers a specialized master's program in startup convergence, providing practical entrepreneurial education alongside research activities. Currently, many departments are participants in this program, including the Department of Physics, the Department of Life Sciences, the Department of New Materials Engineering, and the Department of Biomolecular and Brain Engineering, and they conduct research in addition to providing entrepreneurial education.

Another feature of KAIST is its efforts to foster social entrepreneurship (SE). In 2013, KAIST established the SE MBA program with the support of the SK Group, a major corporate group, to nurture

entrepreneurs committed to solving social issues. The SK Group provides scholarships to 20 MBA students each year. Further, the KAIST-IMPACT Business Center was established to support incubation, the establishment of an MBA curriculum, faculty development, and academic activities for social entrepreneurs.

There have been many successful startups from KAIST. Over the years, KAIST graduates have founded NAVER, Korea's largest portal site; NEXON, a game company; TMON, an Internet shopping site; IDIS, a security solutions company; VITO, an artificial intelligence (AI) call application; and Rebellions, an AI semiconductor fabless company.

In 2023, KAIST teams won the Grand Prize in both the Pre-startup League and the Startup League of "Challenge! K-Startup," the largest startup contest in South Korea. This reflects the vibrant culture of entrepreneurial activities by alumni, current students, and faculty, making KAIST stand out among successful startup cases.

6.3 Pohang University of Science and Technology (POSTECH)

6.3.1 POSTECH Overview

Pohang University of Science and Technology (POSTECH), established in 1986 in the industrial city of Pohang, is a private, science and technology research-oriented university (specialized university of science and technology). It was initially established with financial support from Pohang Iron & Steel Corporation (POSCO), Korea's largest steel company, and has been working closely with both industry and academia. POSTECH conducts in-depth research on the theory and application of science and technology, and aims to foster world-class human resources and disseminate research results to industry through industry-academia collaboration.

As of the end of 2023, the university has 12 departments and one faculty, including the departments of Mathematics, Physics, Life Sciences, New Materials Engineering, Computer Engineering, and Semiconductor Engineering, as well as the departments of Humanities and Sociology. The graduate school consists of 12 departments, three faculties, one graduate school, two cooperative programs, one specialized graduate school (iron and steel, energy materials), and one special graduate school (information and communication). There are also approximately 120 research institutes, including the Pohang Accelerator Laboratory, Biotechnology Research Center, and Artificial Intelligence Research Institute.

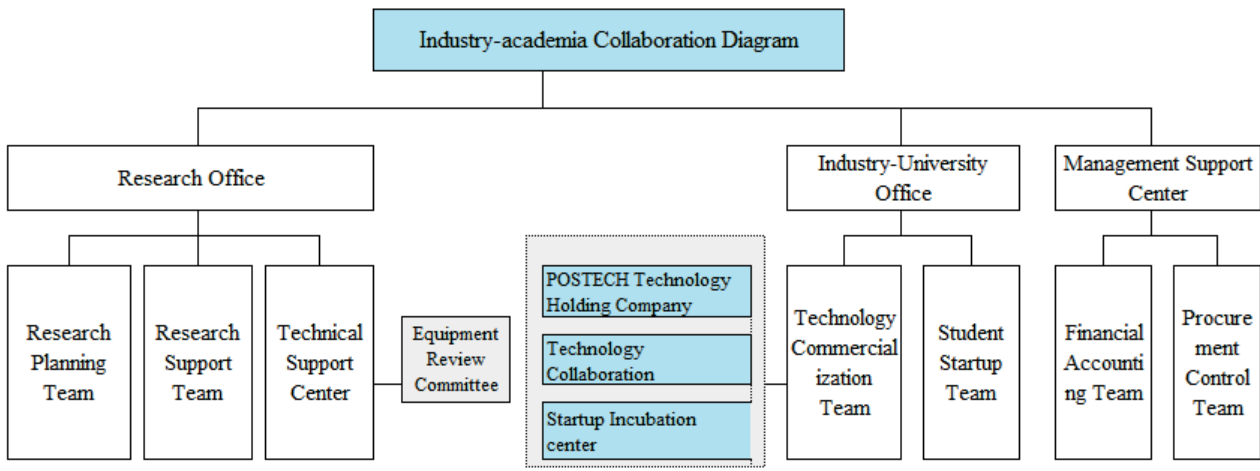
6.3.2 POSTECH Startup Support Framework

Figure 6-2 summarizes the organization of POSTECH's startup support. The industry-academia collaboration was established in 2004 with the goal of disseminating research results to society and creating synergies through the collaboration. Since then, the commercialization of POSTECH's technology has been very active with the establishment of the POSTECH Technology Holding Company (Holdings) in 2012.

POSTECH Holdings is an investment company established by POSTECH and serves as a startup accelerator. Its major investors, including POSCO, the local government of the Gyeongsangbuk-do Province, Nonghyup Bank, and Daegu Bank (now known as IM Bank) have established 10 investment

funds with a total capital of 72.1 billion KRW as of February 2024, investing in a variety of startups. In addition, since it was selected as a TIPS (Tech Incubator Program for Startup) program operator by the Ministry of Small and Medium Venture Business in 2016, the company has been actively working to find and foster early-stage startups as well as upgrading its support for business startups.

As shown in Figure 6-2, the Industry-University Collaboration Group consists of the Research Office, the Industry-University Office, and the Management Support Center. The Industry-University Office plays a central role and includes the Student Startup Team, which supports undergraduate and graduate students, and the Technology Commercialization Team, which supports faculty startups and the commercialization of university-owned technologies.



Source: POSTECH

Figure 6-2 POSTECH Startup Support Framework

Currently, POSTECH is engaged in business startup support activities through the “Innopolis Campus Project” in the Strong Small-Special Zone, the Korean-style I-Corps “Support Program for Feasibility Study of Public Technology to Market,” the Ministry of Education’s Regional Innovation Projects namely the “Industry-Academia Research Collaboration Project” and “Leading University for Business Innovation,” and the LINC (Leaders in Industry-University Cooperation) Project as a collaborative project.

6.3.3 POSTECH Startup Support Measures

POSTECH provides support for the entire entrepreneurial cycle from motivating entrepreneurs to materializing their ideas and attracting investment. Table 6-3 summarizes the main support programs in POSTECH.

Table 6-3 POSTECH Startup Support programs

| Programs | Contents |
|--|---|
| Tech + Community | <ul style="list-style-type: none"> • Forum aimed at fostering entrepreneurial spirit and motivating participants to pursue technology-based startups. • Facilitating the sharing of entrepreneurial experiences and know-how, as well as networking with venture entrepreneurs and venture capitalists (VCs) in a wide range of fields including AI, big data, and healthcare. |
| CUop | <ul style="list-style-type: none"> • Regarded as a regular course that includes either an internship program, where students gain hands-on experience at a venture company during the vacation period, or a capstone design project. • Recognized for academic credit, and participants receive financial support for their internship activities. |
| Entrepreneurship Enhancement Education | <ul style="list-style-type: none"> • A short-term intensive advanced education program focused on essential aspects of launching a business, including business model sophistication, fundraising strategies, and investor relations (IR). • Lectures by VCs and accelerators, targeting 30 aspiring entrepreneur teams. |
| Entrepreneurship Integration Minor | <ul style="list-style-type: none"> • Those who wish to pursue this minor may obtain it by completing designated entrepreneurship-related course credits. |
| Startup Circle Support | <ul style="list-style-type: none"> • Discover and support pre-startup teams consisting of two or more members. • Select 10 pre-startup teams and support them in business model development, prototype creation, company establishment, and marketing. |
| "Gua-Me-Gi" Startup Contest | <ul style="list-style-type: none"> • A startup package program named after the initials of a Korean phrase meaning "extremely attractive technology startup." It has become a gateway for future star venture companies. • Providing education through the I-Corps initiative, targeting technology-based entrepreneurs in pre-startup teams selected through a competitive process. Through expert mentoring, participants refine and validate their business ideas. Finally, a startup contest is held to identify outstanding startup teams, which are then connected to actual business launch and scale-up support programs. |
| SAM (Startup Activity Mileage) | <ul style="list-style-type: none"> • Mileage points are awarded based on participation in POSTECH's startup support programs. Participants can earn rewards by accumulating these mileage points. |

Source: POSTECH

6.3.4 Key Features and Achievements

The active investment and support of POSTECH Holdings, which utilizes the funds, group subsidiaries, and the network of the global company POSCO, are the driving forces of POSTECH's startup support. The POSTECH Technology Holding Company, with the support of POSCO, holds a large-scale technology startup contest called the "Idea Market Place (IMP)" every year, attracting aspiring entrepreneurs and startups from all over the country to Pohang.

IMP is South Korea's first external startup discovery and nurturing program, which aims to discover promising startups at an early stage and support their growth, as well as to discover new industries that will play a key role in the future of the POSCO Group. Selected teams and companies receive financial support, move into the "Changeup Ground" incubation facility, and undergo a full range of accelerating programs, including mentoring and attracting investments to scale up and expand globally.

Despite its regional location, "Changeup Ground", is home to approximately 90 promising early-stage startups from all over South Korea, with an occupancy rate of over 95% (as of the end of 2023). The current facility, however, does not allow for the requisite expansion to accommodate the growing number of companies attracting angel investments. Therefore, the company plans to establish a second "Changeup Ground" in the future.

Another feature of POSTECH is the development of an ecosystem of industry-academia collaboration.

In addition to the development of R&D infrastructure such as the Radiation Accelerator Research Center at POSTECH, the collaborative network among industry, academia, and research institutions—including POSCO, local governments, and the Research Institute of Industrial Science and Technology (RIST)—serves as a foundation for supporting startups.

POSTECH also aims to leverage its past know-how and achievements, and is in the process of upgrading its startup support system by operating its own startup package program, “Gua-Me-Gi” . In November 2023, the university was selected for the Ministry of Education’s “Glocal University” initiative. Over the next five years, it will invest 100 billion KRW to further enhance its startup infrastructure, aiming to become the “Pacific Valley” on par with the Silicon Valley in the future.

6.4 Ulsan National Institute of Science and Technology (UNIST)

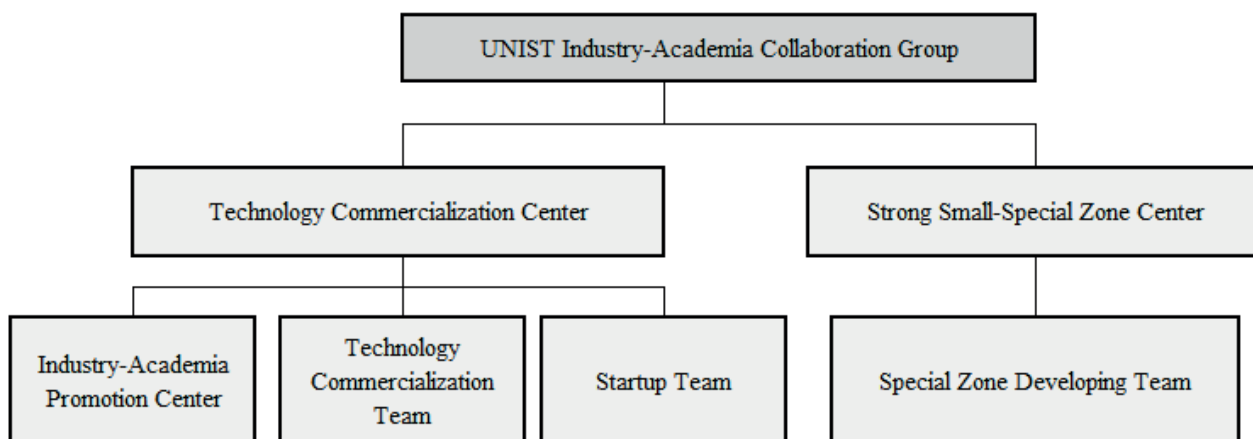
6.4.1 UNIST Overview

Ulsan National Institute of Science and Technology (UNIST) was established in 2009 as a national university corporation in Ulsan Metropolitan City. In 2015, it transitioned into a national specialized university of science and technology. UNIST has strengths in advanced materials, biotechnology, and next-generation energy, particularly in the field of secondary batteries.

The university has 15 departments across the College of Natural Sciences, the College of Engineering, the College of Information and Biotechnology, two faculties of Humanities and Business Sciences, and two Professional Graduate Schools and one Specialized Graduate School. There are three centers specializing in soft matter, multidimensional carbon materials, and genome integrity at the Institute of Basic Sciences (IBS), as well as research institutes such as the Institute for Fusion Research.

6.4.2 Startup Support Framework

Figure 6-3 shows the organization of UNIST's startup support. Under the Industry-Academia Collaboration Group, there are the Technology Commercialization Center and the Strong Small-Special Zone Center. The Technology Commercialization Center consists of the Industry-Academia Promotion Team, the Technology Commercialization Team, and the Startup Team. The Strong Small-Special Zone Center includes the Special Zone Development Team, which supports the Innopolis Campus Project.



Source: UNIST

Figure 6-3 UNIST Startup Support Framework

UNIST was selected as a core technology institute for the 2020 Special Zone for Small and Medium-Sized R&D in the field of future-type batteries. It has also been selected for the Support Program for Feasibility Study of Public Technology to Market and Lab-specialized Startup Leading University Project, and is implementing a business startup support program.

6.4.3 Startup Support Measures

UNIST implements support programs primarily through government initiatives such as the Innopolis Campus Project, the Support Program for Feasibility Study of Public Technology to Market, and the Lab-specialized Startup Leading University Project.

The university offers comprehensive entrepreneurship education for undergraduate students and participates in the previously mentioned collaborative program among science and technology-specialized universities, “CUop.” Table 6-4 summarizes UNIST’s main startup support measures/programs.

Table 6-4 UNIST Startup Support Measures/Programs

| Measures/Programs | Contents |
|--------------------------------------|--|
| Mentorship Program for Startup Teams | Regular one-on-one mentoring sessions conducted with experts possessing entrepreneurial knowledge, targeting aspiring entrepreneurs and startup companies. |
| Special Dormitory Residency | Dormitory accommodation offered to students belonging to startup companies or those on leave of absence, with the aim of promoting information sharing and interaction among them. |
| Business Startup Leave System | Leave of absence of up to two years is permitted for those who wish to take time off for starting a business. |

Source: UNIST

6.4.4 Key Features and Achievements

Among Korea's specialized science and technology universities, the UNIST is particularly active in faculty startups. The university emphasizes advanced technological fields such as secondary batteries and biotechnology, providing excellent R&D infrastructure that facilitates the commercialization of research outcomes. Additionally, UNIST supports faculty entrepreneurship through measures that allow for leaves of absence or concurrent positions, thereby fostering a culture that encourages faculty startups, which in turn promotes entrepreneurial spirit among students.

UNIST has produced more than 70 startups from a total of 490 faculty members up to the end of 2023. In addition, it has produced 10 laboratory startups from 2021 to 2023 as the lead university in the Phase 1 Lab-specialized Startup Leading University Project. Furthermore, in Phase 2 of the project starting in 2024, UNIST plans to provide various forms of support for lab-based aspiring entrepreneurs by linking the Support Program for Feasibility Study of Public Technology to Market with the Innopolis Campus Project, depending on the development stage.

One of UNIST's leading success stories is Clinomics, UNIST's first faculty startup. This is a biotechnology company that provides genome-based early diagnosis services for cancer and other diseases, and was successfully listed on the KOSDAQ (Korea Securities and Futures Exchange) in 2020. Student startups include Class101, an online lesson service that has expanded into Japan, and THYROSCOPE, which provides digital healthcare solutions for thyroid eye disease.

6.5 Hanyang University

6.5.1 Hanyang University Overview

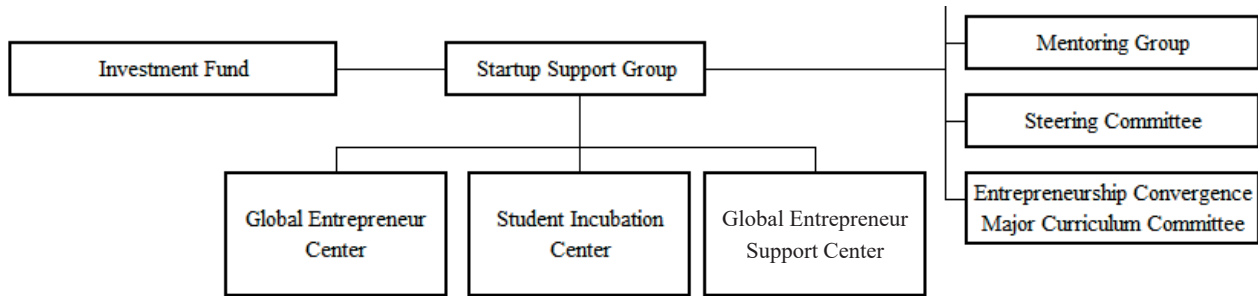
Hanyang University is a private comprehensive university based in Seoul. Its predecessor, Dong-A Engineering Institute, was established in 1939 with the goal of providing practical technical education. After transitioning to Hanyang Engineering College, it was elevated to a comprehensive university in 1959. Originally founded as an engineering college, Hanyang University is known to date for its strong competitiveness in the field of engineering. The university consistently ranks at the top in domestic evaluations of science and engineering universities. Additionally, in 2017, it was selected as a model university for the "Science and Technology-Based Startup Leading University" by the Ministry of Science, ICT and Future Planning (now the Ministry of Science and ICT), demonstrating its early and advanced efforts in entrepreneurship.

6.5.2 Hanyang University Startup Support Framework

In 2003, Hanyang University launched the Industry-Academia Collaboration Group, and in 2008, HYU Holdings was established as the university's technology-holding company. Since then, the university has been operating the Global Entrepreneurship Center to foster technology-based entrepreneurs and the Industry-Academia Research Digital Park to promote industry-academia collaboration among companies, research institutes, and universities. It has a number of achievements, including being ranked the best university for several criteria including business startup education, business startups, and producing

venture entrepreneurs and student entrepreneurs. Currently, it has been selected for a government project as a “core university for business startups” and as a “campus town” by the Seoul Metropolitan Government, and is providing support for the project.

The Startup Support Group serves as the core of Hanyang University's Startup Support Framework, as shown in Figure 6-4. This group was established in 2009 with the aim of fostering innovative entrepreneurs by increasing the success rate of startups through entrepreneurship education and field-oriented practical training. Under the Startup Support Group, there are the Global Entrepreneur Center, the Student Incubation Center, and the Global Entrepreneur Support Center.



Source: UNIST

Figure 6-4 Hanyang University Startup Support Framework

6.5.3 Hanyang University Startup Support Measures

The Hanyang University’s Startup Support Group provides support by establishing a one-stop integrated incubating system ranging from entrepreneurship education, startup training, networking, and entrepreneurship research and cooperation.

As a private university, it has introduced various support systems to promote startups, such as business startup leave system and business startup alternative credit recognition system (business startup training), business startup integration major, business startup credit exchange system, and business startup scholarships. In addition, the university operates a dormitory-style startup space for the intensive discovery and cultivation of innovative and talented startups. The progress and achievements of the startup teams are managed through special lectures for residents and mentoring through a dedicated mentorship program.

The university provides various forms of support, including idea advancement, educational programs for technology commercialization, technology transfer and industry-academia collaboration, laboratory startup support, and investment. These are offered through the closely linked Global Entrepreneur Center, Global Startup Support Center, and Startup Incubation Center within the Startup Support Group.



Source: Hanyang University

Figure 6-5 Hanyang University's Startup Support Programs

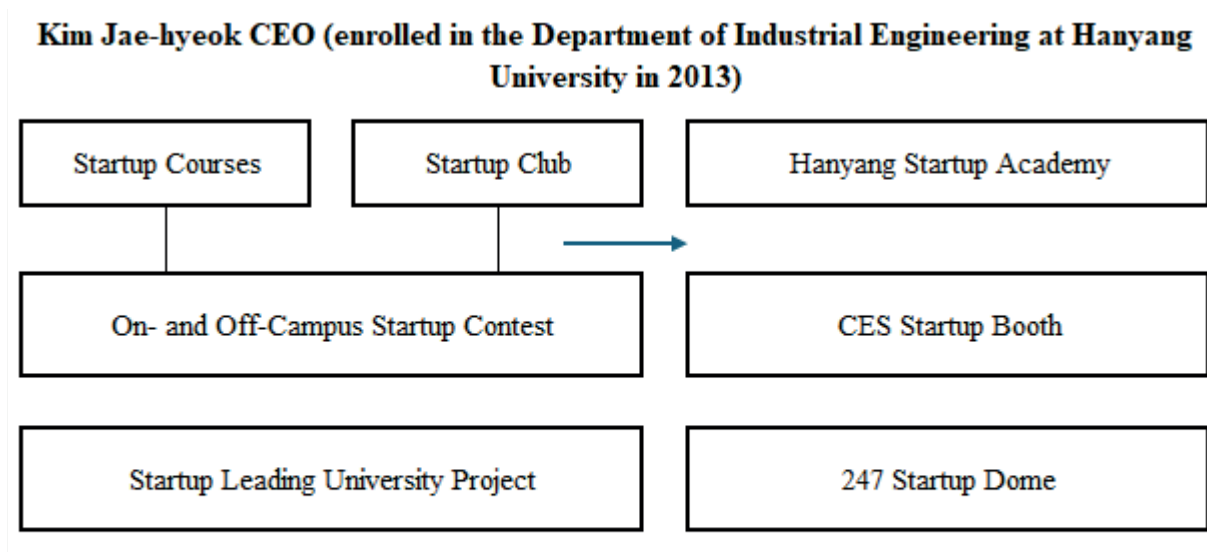
6.5.4 Key Features and Achievements

The Hanyang Startup Academy is one of Hanyang University's most distinctive and prominent entrepreneurial education programs, representing a core initiative in its startup support efforts. The academy aims to foster highly successful startups by equipping technology-based entrepreneurs with fundamental management knowledge and practical startup skills. It offers comprehensive education covering all aspects of entrepreneurship, including idea generation, business modeling, management, marketing, fundraising, and attracting investment. Top-performing teams are awarded funding from the Hanyang University Technology Holding Company. The program is intended for Hanyang University students, aspiring entrepreneurs from the general public, and early-stage startup founders. A notable feature of the program is that participants continue to share information and engage in networking even after completing the course.

Hanyang University operates the COMMAX Startup Town as an open space for student entrepreneurs. This facility includes open co-working spaces, student entrepreneur offices, a one-stop startup consultation office, and relaxation areas. Additionally, the university offers the "247 Startup Dome," a dormitory-style entrepreneurial space for students aspiring to start businesses. Specialized education, dedicated mentorship, and intensive support are provided to the residents with the aim of discovering and nurturing

entrepreneurs.

These support programs are organically linked, leading to actual startups and producing successful cases. One example is LetinAR, shown in Figure 6-6. LetinAR was founded in 2016 by Mr. Kim Jaehyeok, who was a third-year student in the Department of Industrial Engineering at Hanyang University at the time. While still a student, he participated in on-campus entrepreneurship courses and related club activities. After competing in a startup contest, he was selected for the Hanyang University Startup Academy, where he successfully launched his business with support such as exhibiting at CES in the United States and being admitted to a dormitory-style startup facility.



Source: Hanyang University

Figure 6-6 Startup Process in LetinAR

LetinAR is an optical solutions company for augmented reality (AR) devices and has developed the “Pin-Mirror” technology that enables slim AR glasses. The company received the Minister’s Award from the Ministry of SMEs and Startups in 2017 and has raised significant funding from major South Korean tech companies such as NAVER and Kakao (Kakao Investment).

7 Summary

This chapter summarizes the current status, achievements, and challenges of South Korea's startup support policies in the areas of human resources/education, infrastructure, commercialization, and ecosystem, based on the learnings from the interviews of startup support personnel at the four surveyed universities. It also briefly discusses the implications of the South Korean case studies for Japan.

7.1 Current Status, Achievements, and Challenges of South Korea's Startup Support Policies

7.1.1 Human resources/education

Many Korean universities offer a variety of entrepreneur-friendly bachelor's programs, such as entrepreneurship education, business startup leave system, minors, and fusion majors. Among them, the four surveyed universities are the leaders in technology-related business startups, with excellent education, bachelor's program and personnel system for students and faculty members. In particular, the minor, fusion major, and internship program for business startups have been established as a system, and credits are recognized, which has led to the spread of entrepreneurship.

Entrepreneurship education, tailored to the needs and circumstances of students (including graduate students) and faculty members, is conducted through online content, offline courses, and various scheduled and ad-hoc events, making it easily accessible. It is noteworthy that the four universities have been making efforts to cultivate the spirit of entrepreneurship not only among undergraduate and graduate students but also among faculty members to promote the establishment of technology-related laboratories.

Although many universities adopt hands-on education programs such as capstone and internship programs, these tend to be standardized and aligned with U.S. programs. The key challenge, therefore, has been to develop curricula and programs tailored to the university circumstances and student needs.

7.1.2 Infrastructure

The four universities have developed human resources and physical infrastructure through the adoption of government business startup support programs. In addition, they are also engaged in educational and commercialization support programs for students from other universities and general aspiring entrepreneurs who aim to start their own businesses, utilizing their human and physical resources as a base for business startups in the region. In particular, the excellent testing, analysis, design, and prototyping environment in the science and engineering fields has increased the likelihood of commercialization by eliminating the difficulties faced by aspiring entrepreneurs in technology startups. However, there is room for improvement in the organic linkage and utilization of the infrastructure formed by each business. The four universities host many companies in their incubation facilities and therefore need to allow for expansion, but in some cases, university regulations pose obstacles to new construction.

7.1.3 Commercialization

With the establishment of a support and consulting system by government-backed entrepreneurship support organizations and mentors, a certain level of facilitation is in place for the early stages of commercialization, including the discovery of business ideas and the development of advanced technologies, products, and business models. However, continued funding commensurate to the scaling up of startups and the establishment of international networks for global expansion are persistent major challenges.

While some universities, such as POSTECH, have relatively well-developed accelerating programs with financial support from the large corporate, POSCO, most universities are struggling to match private-sector investments to scale up their startups. Although the number of university-launched startups aiming to expand globally is small, the lack of information about overseas markets and the absence of networks are challenges for each support organization as more startups are expected to expand globally in the future. Some universities work with global accelerators to support global expansion; however, the scale and scope of help available are limited due to insufficient budgets.

7.1.4 Ecosystem

Open innovation, which has become increasingly important in recent years, cannot be realized without the establishment of an industry-academia-government collaboration ecosystem. Although there are some differences in the enabling environment across the four universities covered in this study, they have an advantage over other universities in having built a foundation for industry-academia collaboration and established cooperative frameworks due to their excellent science and engineering talent, faculty members, and outstanding R&D environments and research outcomes. In addition, research-oriented universities, such as KAIST, UNIST, and POSTECH, being regional hubs for entrepreneurship, have received strong support from local governments and actively collaborate with local companies.

As noted earlier, KAIST and UNIST jointly operate the Company-University Cooperation program (CUop) to form an industry-university cooperative network, expanding the ecosystem by providing on-site training to students and cooperating with local companies to solve technical problems. However, to achieve further growth through global expansion, a key challenge is to strengthen the development of global networks and exchanges, including those with overseas universities and global venture capitalists.

This report examines university-based startup support policies in the Republic of Korea (South Korea) from three perspectives: government policies, private sector initiatives, and the actual operation of startups in universities. In South Korea, support measures for university-based startups are being implemented as an integrated package that covers all the stages required to start a business, from entrepreneurship education to the identification of entrepreneurs, commercialization, and support for scaling up. Consequently, several university students and faculty members have espoused entrepreneurship and launched successful businesses.

However, except students covered in this survey and those studying at Hanyang University, interest in starting a business remains low among Korean university students specializing in science and technology. Many still prefer to find jobs rather than to start their own businesses. Further, the extent of interest

in entrepreneurship among science and technology students in universities in metropolitan areas differs significantly from that of students in other regions.

Over the past few years, the government has proactively supported entrepreneurship and startups, and most universities in South Korea have established startup support infrastructure such as entrepreneurship education programs and startup incubation facilities. This has led to changes in entrepreneurship support trends, as entrepreneurship education and support programs focus more on practical experience and evidence-based results.

Entrepreneurship promotion, and startup discovery programs and events that have traditionally been conducted at the university level are increasingly being implemented at the regional level and in the form of alliances. Regional contests and events can expect more participants, making it much easier to attract the participation of related institutions and companies.

In addition, by co-hosting events, each university spends less and can interact more extensively with other universities, thus increasing participant satisfaction. In particular, given that metropolitan and regional areas are characterized by a vast difference in entrepreneurship interest, joint programs and events between them provide great opportunities for universities and startups in rural areas, where attracting investment is relatively more difficult.

In the past, universities introduced programs that were either entirely aligned with startup opportunities in the Silicon Valley in the U.S., or were standardized programs from the government. At present, an increasing number of universities are developing distinctive entrepreneurship education and support programs that utilize the operational skills, success stories, and the characteristics of their students. At the same time, universities are also increasing direct investment through their own technology-holding companies.

From this review, it appears that South Korea has made some progress in establishing a foundation and network for supporting university-based startups. Going forward, the key to continue fostering such startups in South Korea is through the enhancement of universities' ability to involve companies and venture capitalists through creative entrepreneurship education, the development and operation capabilities of startup discovery and training programs, and the expansion of technology-related success through these programs.

7.2 Implications of South Korean Case Studies for Japan

As seen from the earlier comparison with South Korea, Japan faces challenges with respect to the awareness of entrepreneurship and the cultural climate around it. The primary cause of this is the fear of failure. In the case of South Korea, the fear of failure was reduced through entrepreneurship education, as well as detailed support and mentoring programs tailored to each situation from the stage of ideation right up to commercialization. In addition, systems that support balancing academics and entrepreneurship, such as entrepreneurship-friendly bachelor's programs and HR systems, have helped raise awareness on starting a business. The presence of familiar success stories—such as those of senior students, faculty members, and peers—also serves as a major source of motivation for entrepreneurship. Therefore, providing opportunities to share success experiences, networking, and mentoring are critical strategies to

cultivate entrepreneurship.

As South Korea has been lagging behind in entrepreneurship education and startup development compared to Western countries, many educational and training programs have been introduced in an effort to catch up with the West, particularly the U.S. The Korean-style I-Corps program bears the label “Korean-style,” but is in fact modeled after the American system. However, as an increasing number of programs are implemented and experience gained, there is a growing call to incorporate the experiences of various countries rather than entirely rely on U.S.-centric training and market validation. In Japan as well, while benchmarking and utilizing entrepreneurship education and incubation programs from overseas universities, it is essential to build original education and support programs that take into account Japan's unique context, learning from the South Korean case.

As in South Korea, Japan is also characterized by a gap between the metropolitan and regional areas with respect to the startup environment. Efforts are underway in Japan in startup ecosystem hub cities to build platforms through collaboration with universities and institutions. However, to revitalize these efforts and achieve tangible results in regional areas, it is necessary to establish a nationwide network for exchange and cooperation that goes beyond the boundaries of these hub cities. In this regard, Japan should take into account key elements from the case studies in South Korea—such as the entrepreneurship course credit transfer and recognition system, the joint organization and participation in startup support programs, events, and competitions between metropolitan and regional universities—as valuable references.

In South Korea, there have been cases where promising startups, despite being discovered and nurtured through well-developed local R&D infrastructure, incubation facilities, and support programs, have relocated to the capital area in search of better investment opportunities and ecosystems for scaling-up. In the future, it is essential to establish nationwide support and collaboration networks with companies and venture capitalists to enable startups to scale up even while remaining in regional areas.

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Documentation

The four discussion points described in Section 7 use data from interview-based surveys conducted in South Korea. The key issues are summarized from the detailed statements under each discussion point as outlined below.

Discussion point (1) Human resources/education

- The program enables the strengthening of entrepreneurship education for undergraduates. However, education for graduate students and faculty is optional. Since professors are skilled at research but unfamiliar with business operations, education for faculty is also being provided. Online services are being enhanced to support them in balancing research and teaching.
- Students are highly interested and curious about entrepreneurship because they hear many success stories from their seniors and peers.
- Until recently, there was a belief that undergraduate students would focus on ideas and only graduate students would actually start businesses, but we were surprised to see many undergraduate students and female students actively participating in the new class of 2023. An entrepreneurial culture has already spread to some extent throughout society, and there are now students who enter university not with the sole purpose of studying or for employment, but with the goal of starting their own business.
- Some students start businesses multiple times. There are also cases where they use their past failures as learning experiences and try launching a startup again.
- When faculty members start a business, balancing their academic responsibilities—such as research, teaching, and student supervision—with their entrepreneurial activities becomes a major challenge.
- Rather than a standardized program, we are focusing on flexible, frequent, and varied programs. We are broadening the scope of the program by introducing and changing various contents, such as programs focusing on specific themes, for specific members aligned with their level, and those in collaboration with other universities.
- Entrepreneurship is not an individual play but requires alignment with the market environment at the time, strong teamwork, and the ability to respond to external conditions. However, some students lack the capability to effectively integrate these factors. We provide guidance to help

students overcome unexpected situations or circumstances beyond their control.

- While there is a wide range of awareness of entrepreneurship among senior faculty members, newly appointed faculty tend to have a higher level of entrepreneurial awareness. Some newly hired faculty members join the university with this entrepreneurial mindset already in place.
- Items related to entrepreneurship are included in faculty evaluation criteria. Since most cases involve Science and Engineering departments, there is not much dissatisfaction. However, we have heard that at comprehensive universities where entrepreneurship has been included as a key performance indicator (KPI), faculty members in the Humanities sometimes express dissatisfaction.
- The focus is on technology-based startups, particularly those rooted in research laboratory technologies. As a result, attention is given to startups launched from graduate school laboratories and those in the Deep Tech sector. However, even if a graduate student is eager to start a business, there are cases where their academic advisor lacks interest or understanding in entrepreneurship. In such situations, advisors often prefer that students write academic papers and secure research funding rather than pursue startup ventures. Therefore, it is considered important to raise awareness and understanding of entrepreneurship among faculty members.
- Government officials in charge of lab-based startups and university representatives have been primarily discussing how to encourage faculty members to participate. At present, the most effective approach appears to be presenting successful case examples. When a neighboring laboratory produces a successful startup case, surrounding laboratories naturally become more interested in entrepreneurship.
- Since the entrepreneurship program is operated as a government-supported measure, it faces certain limitations. For example, there is a tendency to follow government-determined requirements, KPIs, and directions. Although we would like to continue developing programs that leverage the unique characteristics of each university, government demands sometimes make this difficult.
- As a university specialized in science and technology, many students go on to graduate school. In fact, 70% of undergraduate students pursue graduate studies. I would like to show students that in addition to the two typical options of further education or employment, starting a business is also a viable path.
- The most effective educational approach is to start a business oneself. However, since this involves high risks and limitations, startup internships can be considered the next best option. It is proposed that universities provide support for personnel costs, allowing students to gain hands-on experience over several months by working at startup companies.

Discussion point (2) Infrastructure

- Previously scattered, the organizations supporting entrepreneurship, startups, and industry-academia collaboration have been consolidated into a newly constructed building. As a result, the physical distance is eliminated, facilitating communication and business cooperation.
- We provide a university startup support website as a platform, allowing stakeholders such as

current students, the general public, alumni, faculty, and members of other universities to use it freely.

- Most entrepreneurship support organizations are informal entities, such as startup support groups or business foundations, established based on funds commissioned from government project budgets.
- Many applicants wish to move into a startup incubation facility, and although the university is considering establishing a new facility, it is unable to proceed promptly due to strict university regulations.
- We operate a program that provides unused university dormitory facilities to startup teams and offers intensive support for their development.
- POSTECH Holdings hosts a nationwide technology startup contest program. POSCO has established and operates a large-scale fund, making this a major event. The program targets startups from across the country, with a competitive ratio reaching 600 to 1. Winners of the October Idea Matching Pitching event gain access to facilities and angel funding. Award-winning companies from other universities and general enterprises also move into the facility. Since companies that have already received initial investments also participate, the competition is fierce.
- There is a significant gap between regional and metropolitan areas in starting businesses. Even if good teams are discovered and nurtured in regional areas, many of them move to the capital region where the infrastructure is better developed. Teams aiming to scale-up often relocate to Seoul.

Discussion point (3) Commercialization

- Even now, starting a livelihood-based business is a challenge as an individual student carries a heavy burden in case of failure. However, in the case of university-based or technology-driven startups, government support programs are finely structured, so there are quite a few programs that allow students to take on challenges without bearing the initial costs. Therefore, in reality, the burden of failure in the early stages is minimal.
- Currently, most entrepreneurship and startup support programs are funded by the government and municipal budgets rather than internal budgets, which raises concerns about business continuity.
- Although universities have talent and technology, they lack funding; therefore, they promote global networking to attract investment and expand marketing.
- At the university startup level, few students initially have global expansion in mind. For those who aim to expand globally, we arrange for them to receive consulting by matching them with overseas global accelerators. However, this involves a considerable cost, and successful cases are not necessarily common.
- In the case of faculty startups, although there are some professionals, many are first-time entrepreneurs. As many faculty members lack expertise in areas such as IR (Investor Relations) materials and valuation, consulting services are provided. Since the level of knowledge about entrepreneurship varies greatly among faculty members, we match them with experts through

demand surveys.

- There are considerable differences between faculty and student startups. Faculty startups are typically based on existing research outcomes and technologies developed by the faculty members themselves. However, since these outcomes are to be disclosed as part of their official duties at the university, the technologies are regarded as university-owned and must be transferred from the university through a formal technology transfer process. The procedures involved in this process can sometimes function like regulatory constraints and may hinder entrepreneurship.
- Since most startups are founded in the fields of science and engineering, some entrepreneurs may find management and finance particularly challenging as commercialization progresses. However, various support programs are already in place and mentoring is provided when needed. I have also heard that the government is considering policies to support the appointment of external professional CEOs to ease the management burden on entrepreneurs with engineering backgrounds.
- One of POSTECH's strengths is that in addition to its startup support organization, it receives backing from POSCO Holdings, one of its major investors. This support makes it relatively easy for technology-based startups established within the university to attract angel investment.
- The Korean-style I-Corps program does not place emphasis on the startup rate. Instead, commercialization is pursued only after thorough validation, which leads to fewer failures. As a result, external investors and companies show a strong interest in the program participants, many of who form well-trained and highly capable teams. We have requested follow-up support from the Ministry of Science and ICT, which oversees the program. However, since the Korean-style I-Corps is positioned as an R&D initiative, it appears that providing continuous support remains a challenge.
- Currently, scale-up support is mainly provided by TIPS under the Department of SMEs and Startups. However, we have heard that the Ministry of Science and ICT is also considering a program similar to TIPS to better support startups originating from laboratories. On the other hand, TIPS itself is becoming more diversified. The Ministry of Science and ICT is focusing particularly on fostering Deep Science startups. It appears that there is a paradigm shift from Deep Tech to Deep Science. Further, there is a movement toward shifting startup support from government-led to private-sector-led initiatives. It is expected that accelerators and startup teams will collaborate to apply for support from universities.
- KAIST established KAIST Holdings in 2022 to invest in its students, and direct investments are also increasing.
- Recently, an increasing number of startups have considered expanding into global markets, and they often struggle with deciding which market to enter and when. In response, universities are organizing events such as global forums, including lectures by entrepreneurship experts from American universities to demonstrate how Korean Deep Tech companies should prepare in order to enter the U.S. market. However, there is a tendency to focus exclusively on the U.S. market, leading to the discussion about diversifying from the U.S. to other markets.

Discussion point (4) Ecosystem

- We have heard that some people want to invest in Korean Deep Tech, but cannot because of a lack of information. Therefore, we also serve as intermediaries.
- Although Pohang is primarily known for its steel industry, many startups in the region are not related to POSCO's business concerns, but rather belong to research fields such as biotechnology and artificial intelligence (AI), which are the strengths of POSTECH. To help POSTECH-originated biotech and AI startups take root in the region, the local government supports them by adapting the local industrial structure to better suit them. POSTECH plays a central role in this region by creating new industries and jobs.
- The ecosystem — encompassing organizations, infrastructure, investment, and networks — is already in place. By fully internalizing and strategically leveraging it, we aim to support the growth and development of unicorn companies.
- Research and development infrastructure such as POSTECH, POSCO, the Research Institute of Industrial Science and Technology (RIST), and the Pohang Accelerator Laboratory are well established, with a strong understanding and cooperation from the local government.
- While an ecosystem centered on universities has been established to a certain extent, it does not appear to be fully developed across South Korea or uniformly supported by local governments. The ecosystem remains fragmented by development stages, institutions, and regions, suggesting that its overall establishment is not yet sufficient.
- Universities in the metropolitan area are believed to have a more well-developed ecosystem compared to those in regional areas. Since investors and major companies are concentrated in Seoul, people from the provinces must travel there to attract investment and access networks. However, being based in Seoul allows for immediate access to such opportunities.
- We are exploring the possibility of expanding our international network—including to countries like Japan—by leveraging our alumni network. However, it is proving to be difficult in practice.

List of authors and research projects

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Measures to Foster University-Based Startups in South Korea

Published March 2025

ISBN 978-4-88890-995-2

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