



アジア・太平洋総合研究センター
Asia and Pacific Research Center

Industry-Academia Collaboration in Korea: Recent Status and Trends

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Purpose and Content of the Survey

- This study examines the current state and relationships of industry–academia cooperation at major South Korean universities and large corporations, focusing on cutting-edge science and technology fields, from the perspectives of human resource development and joint research.
- To this end, this study investigates the following aspects:
 - The university system in South Korea, financial management status, and the current state of laboratory operations and research funding
 - University research funding, patent counts, and utilization of university research outcomes
 - Overview of industry–academia cooperation, contract departments, and joint research
 - The status and relationships of industry–academia cooperation between major universities and large corporations



1. South Korea's University System and Operational Status

To enhance understanding of South Korea's universities, this overview summarizes the characteristics of their university system and financial management.

1.1 The University System in South Korea

Types of Institutions (Higher Education Institutions)	(Higher Education Act: 392 institutions) Universities, Industrial Universities, Colleges of Education, Junior College, Open Universities, Correspondence Universities, Open and Distance Learning Universities, and Cyber Universities (Distance Learning Universities), Technical Colleges, Various Schools, Graduate Schools (Other Laws: 19 institutions) Science and Technology Specialized Universities (KAIST, UNIST, etc.)
Number of Universities by System	Four-year universities: 223, Junior College: 144, Graduate schools: 44, Total: 411 (2022)
Standard Duration of Study at Universities and Graduate Schools	Bachelor's: 4–6 years, Integrated Bachelor's/Master's Program: 6 years or more Master's/Doctoral Programs: 2 years or more each, Integrated Master's/Doctoral Program: 4 years or more (Higher Education Act)
Academic Year	Most universities operate from March to the end of February the following year, adopting a two-semester system (fiscal year runs from January 1 to December 31)
Student Selection	<ul style="list-style-type: none"> • General Selection: Regular Admissions (Students are selected through the College Scholastic Ability Test and each school's own examinations) Rolling Admissions (Selecting students through methods other than the College Scholastic Ability Test (CSAT), such as student records and essays) • Special Selection: Selection for students with special talents in music, art, physical education, etc.; Special Selection for graduates of specialized high schools; Special Selection for students from farming/fishing villages; Special Selection for students requiring special education (disabled); Selection for overseas nationals/foreigners; Equal-opportunity special selection
Education Finance	The state and local governments may support or subsidize the financial resources necessary to maintain the quality of education when schools face sudden changes in the educational environment, such as disasters, or to achieve their objectives. (Higher Education Act)
Provision of Experimental and Practical Training expenses	The state must take the necessary measures to promote academic and scholarly research and educational research, such as providing experimental and practical training fees, research development funds, and scholarships. (Higher Education Act).

1.2 Characteristics of University Financial Management

Although universities are not legally eligible for support from the Local Education Finance Grant, a special account was established to provide temporary support in response to the deterioration of university finances.

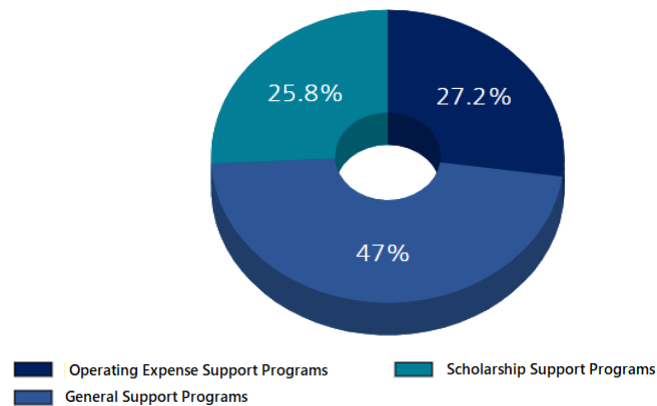
- Although South Korea has introduced an education autonomy system, education authorities (city and provincial education offices) rely almost entirely on revenue from the central and local governments. The Local Education Finance Grant, which is funded by the central government, accounts for over 70% of the revenue of these authorities.
- The Local Education Finance Grant is allocated by the central government to local education authorities and is fixed at 20.79% of domestic tax revenue. This budget supports elementary, middle, and high schools, as well as special schools nationwide, forming the backbone of education finance. However, higher education institutions, such as universities, are not legally eligible for this support.
- **While elementary, middle, and high schools have improved their financial management due to increased education grants from rising domestic tax revenue and a declining school-age population, universities face worsening financial conditions due to restrictions on increasing enrollment numbers and tuition fees.**
 - Example: Education Grant: approx. 68.87 trillion KRW (2024) → approx. 88.68 trillion KRW (2028 estimate) Per-student education grant for elementary, middle, and high schools: 5,248,000 students / 13,100,000 KRW (2024) → 4,562,000 students / 19,400,000 KRW (2028 estimate)
 - *1 KRW = 0.11 JPY (as of November 2024)"2024–2028 National Fiscal Management Plan"
- In response to deteriorating university finances, the "Special Account for Higher and Lifelong Education Support" was established in 2022. This allows local education grants to support higher education institutions, including universities, temporarily for three years, until 2025. The Special Account for Higher and Lifelong Education Support totaled approximately 15.5 trillion KRW in FY2024. Of this amount, support from local education grants amounts to approximately 2.2 trillion KRW. An extension beyond 2025 is under consideration.
- Additional funding from the special account will support the promotion of autonomous innovation at universities, foster regional universities, improve education and research environments, enhance the training of elementary and secondary school teachers, and promote balanced development across academic disciplines.

1.3 Current Status of University Financial Management

In response to deteriorating finances at universities, the government will expand its comprehensive general financial support for national universities.

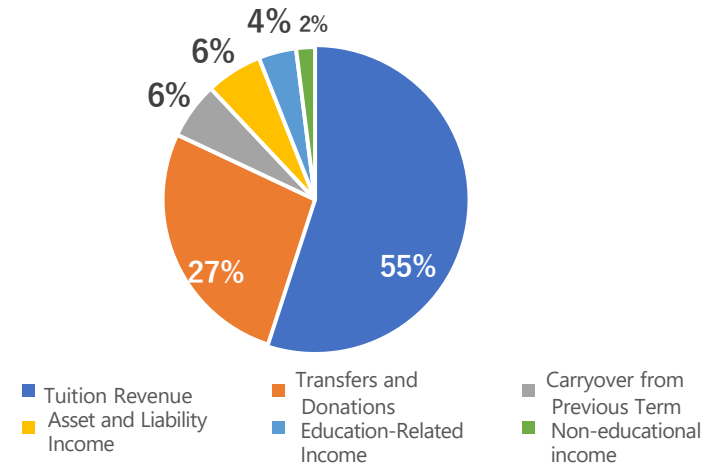
- In South Korea, the primary sources of university funding are tuition fees, corporate transfers (donations from companies, commissioned research fees, etc.), government subsidies, research support grants (competitive funds allocated per research project), and revenue-generating activities. Private universities rely on tuition fees for over 50% of their funding.
- Fiscal support for national and public universities, including regular operating expenses, amounted to approximately 7.9 trillion KRW in FY 2022, while support for private universities amounted to approximately 6.9 trillion KRW.
- The Ministry of Education announced the "Basic Plan for University Innovation Support Projects and National University Development Projects," which will expand comprehensive general financial support to universities starting in 2024. The average support per national university increased from 12.3 billion KRW to 15.4 billion KRW (2024 National University Development Project Basic Plan).

Percentage of Financial Support for Higher Education (National and Public Universities) (2022)



*General Support Programs: Programs planned and operated to achieve specific objectives, such as human resource development and research and development.
 *Scholarship Support Programs: Programs that provide scholarships.
 *Operating Expense Support Programs: Programs that support the operating expenses of national and public universities, as well as other educational institutions.

Percentage of Financial Revenue for Private Universities (2020)



2. Research Funding and Laboratory Management at Universities in South Korea

To understand the state of university research funding and laboratory operations in South Korea, a survey was conducted on operational regulations under relevant laws, the scale and sources of research funding, universities with the highest research funding, and the outcomes of research funding.

2.1 Regulations Concerning University Research Funds and Laboratory Operations

- Research funds are various expenses provided by the university or supporting institutions, such as government entities, local governments, government-funded organizations, industrial entities, and private organizations, to support research activities. This includes indirect costs collected or provided to facilitate the smooth operation of research activities.
- Management of these funds is delegated to the Director of the University-Industry Collaboration Foundation, the university's organization dedicated to University-Industry Collaboration. The director may designate units within the university, such as faculties and graduate schools, as well as research institutes, as research management bodies to ensure efficient management of research funds.
- Usage of National Research and Development Funds (Enforcement Decree of the National Research and Development Innovation Act)

Direct Costs	Indirect Costs
<ul style="list-style-type: none"> • Personnel Expenses • Student Personnel Expenses* • Research Facility Equipment Costs: Purchase, installation, rental, operation, and maintenance costs for research facilities and equipment; research infrastructure development costs • Research Materials Expenses: Purchase costs for research materials, management fees for research and development projects, production costs for research materials • Contract Research and Development Expenses • International Collaborative Research and Development Expenses • Research and Development Contribution Fees • Research Activity Expenses: Intellectual Property Creation Activity Expenses, External Expert Technical Utilization Fees, Membership Fees, Travel Expenses, Software Utilization Fees, Laboratory Operations Expenses*, Research Personnel Support Expenses, Comprehensive Project Management Fees, Other Expenses • Research Allowance 	<ul style="list-style-type: none"> • Personnel Support Expenses: Personnel expenses for research support staff, performance-based bonuses, etc. • Research Support Expenses: Institutional Common Expenses, Project Group/Research Group Operating Expenses, Infrastructure/Equipment Construction and Operating Expenses • Laboratory Safety Management Expenses • Research Security Management Expenses • Research Ethics Activity Expenses • Research Activity Support Funds • Research Outcomes Utilization Support Funds: Science and Culture Activity Funds, Intellectual Property Application and Registration Fees • Contributions and Investment Funds for Technology-Based Startups

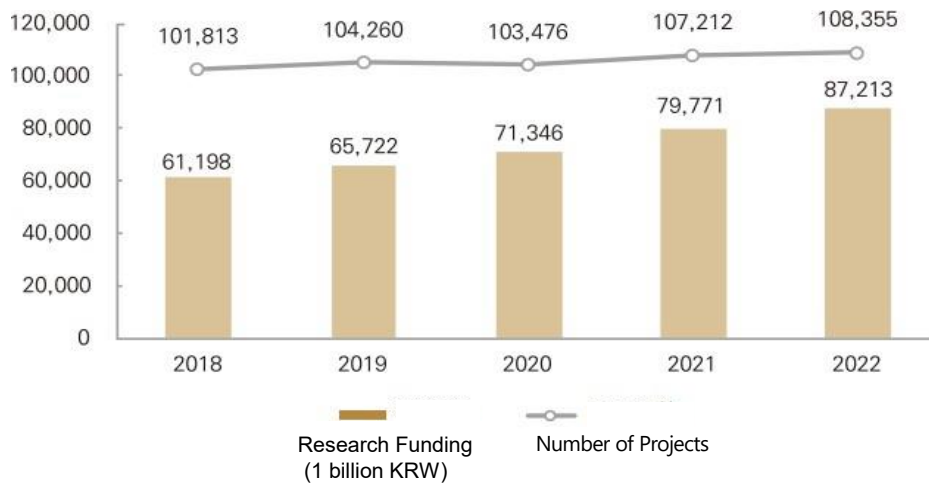
* Amid concerns over the exodus of STEM researchers and deteriorating research environments, the South Korean government will provide a grant-based scholarship called the "Researcher Living Scholarship" to all graduate students starting in 2025. This aims to enable STEM graduate students to balance research and daily life. The monthly amount will be approximately 800,000 to 1,100,000 KRW.

* Expenses for purchasing, installing, lending, or leasing office equipment and software necessary for R&D project execution; office supplies; consumable expenses required for laboratory operation; or purchasing and maintaining equipment/furnishings necessary for laboratory heating/cooling and maintaining a clean environment.

2.2 University Research Funding

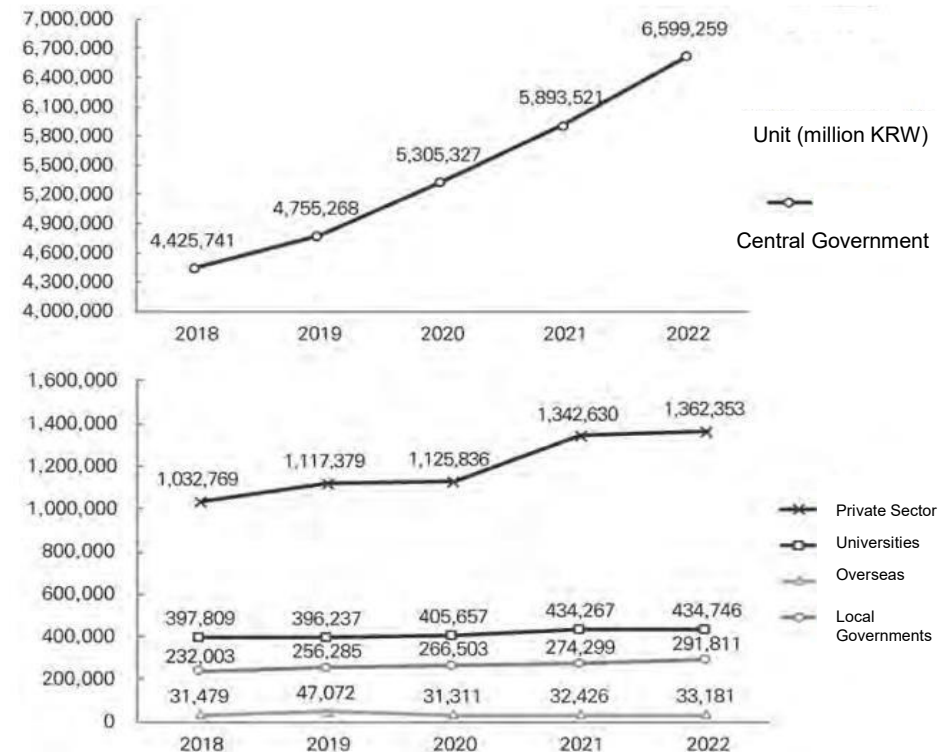
- Total university research funding in South Korea for fiscal year 2022 reached 8.7 trillion KRW, a 9.3% increase from the previous year. Approximately 90% of this funding was allocated to science and technology research.
- The sources of university research funding are the central government (75.7%), the private sector (15.6%), and the universities themselves (5.0%).
The central government provided the largest amount of funding per research project at 137.7 million KRW, approximately 1.7 times the overall average.
- By field, engineering, medicine and pharmaceutical sciences, and natural sciences received the most funding. Per-student research funding at national and public universities was about 1.7 times higher than at private universities.

Trends in University Research Funding in South Korea



Source: National Research Foundation of Korea

Trends in Research Funding by Support Agency in South Korea

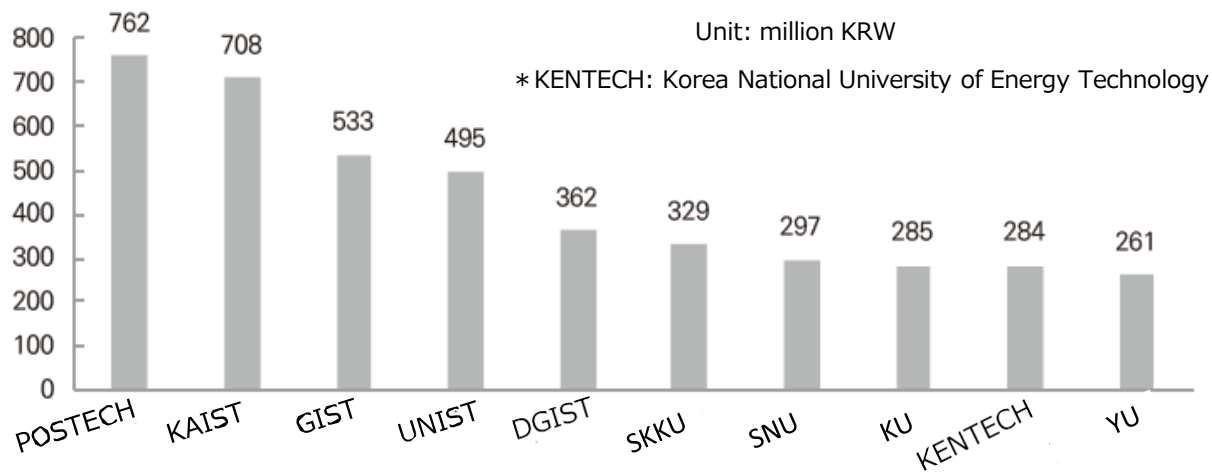


2.3 Top Universities by Research Funding

Seoul National University leads in total research funding, while POSTECH leads in per capita research funding.

- As of 2022, the top-five universities by research funding are Seoul National University (7.9%), Yonsei University (6.4%), Korea University (5.7%), Sungkyunkwan University (5.6%), and KAIST (5.4%). Together, the top-20 universities account for 63.4% of total research funding.
- With 5.74 research projects and 761.73 million KRW in research funding per full-time faculty member, POSTECH has the highest numbers in both categories.
- In terms of research funding per faculty member, Sungkyunkwan University, which receives financial support from the Samsung Foundation, ranks alongside five specialized science and technology universities.

Universities with the highest research funding per faculty member



Top-20 Universities by Research Funding (million KRW)

University	Research Funding (million KRW)
Seoul National University	685,533
Yonsei University (Private)	558,085
Korea University (Private)	498,439
Sungkyunkwan University (Private)	489,377
KAIST	474,328
Hanyang University (Private)	381,485
Chonnam National University	222,367
Kyungpook National University	220,180
POSTECH (Private)	216,331
Pusan National University	194,483
Chung-Ang University (Private)	192,611
Kyung Hee University (Private)	186,517
Chonbuk National University	178,515
Chungnam National University	170,108
UNIST	158,517
Inha University (Private)	144,041
Ulsan University (Private)	142,858
Ewha Womans University (Private)	142,024
Catholic University (Private)	140,041
AJOU	135,369

Source: National Research Foundation of Korea (2023)

2.4 Collaborative Research Papers Between Major Universities and Companies

- In 2022, Seoul National University had the highest number of research papers, followed by Yonsei University, Sungkyunkwan University, Korea University, and Pusan National University.
- Regarding co-authored papers between the five major conglomerates and universities, every company ranked Seoul National University, Yonsei University, KAIST, and Korea University among their top-five co-authors.
- Notably, Samsung and Sungkyunkwan University (where the Samsung Group is involved in university management) and POSCO and POSTECH (POSCO was the primary founder of POSTECH) each ranked first in co-authored papers due to their special relationships, including the exchange of financial support.

Top-10 Universities in Co-authored Papers with Major Corporations (as of September 2024, Web of Science)

Rank	Samsung	Hyundai Motor	SK	LG	POSCO
1	Sungkyunkwan University 5107	Seoul National University 800	Seoul National University 732	Seoul National University 1230	POSTECH 275
2	Seoul National University 4805	Yonsei University 625	KAIST 482	Yonsei University 923	Seoul National University 269
3	Yonsei University 3085	Korea University 548	Yonsei University 469	KAIST 822	KAIST 197
4	KAIST 2979	KAIST 539	Korea University 463	Korea University 810	Yonsei University 190
5	Korea University 2717	Hanyang University 533	Hanyang University 403	Sungkyunkwan University 678	Korea University 181
6	Hanyang University 2189	Sungkyunkwan University 491	Sungkyunkwan University 366	Hanyang University 621	Hanyang University 174
7	Pusan National University 1575	Pusan National University 385	Kyungpook National University 284	Pusan National University 518	Sungkyunkwan University 164
8	POSTECH 1442	Kyungpook National University 303	Pusan National University 275	Kyungpook National University 450	Pusan National University 138
9	Kyung Hee University 1440	Chungnam National University 296	POSTECH 249	Kyung Hee University 433	Kyungpook National University 130
10	Kyungpook National University 1351	Kyung Hee University 286	Kyung Hee University 243	POSTECH 402	Chungnam National University 99
Co-authored Papers Field	① Engineering ② Physics ③ Materials ④ Computers ⑤ Other	① Engineering ② Materials ③ Physics ④ Chemistry ⑤ Computer Science	① Engineering ② Physics ③ Materials ④ Computers ⑤ Other	① Engineering ② Materials ③ Physics ④ Chemistry ⑤ Other	① Materials ② Engineering ③ Metals ④ Physics ⑤ Others

Source: Created by APRC based on WoS DB

2.5 Universities with the Most Patent Registrations

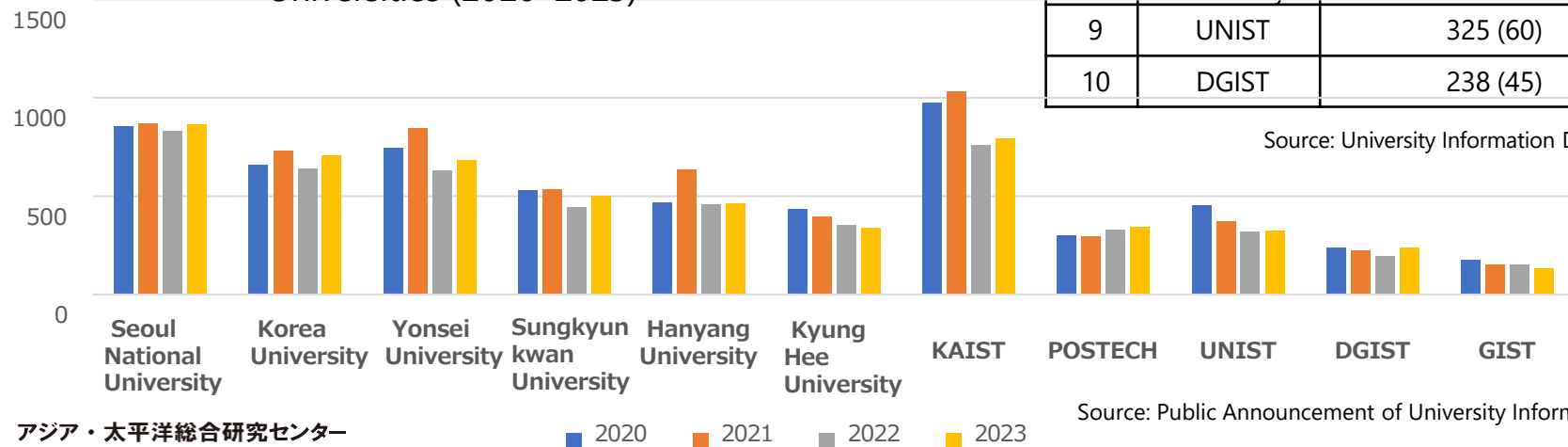
Seoul National University and KAIST lead in terms of patent registrations. Many joint patents are held by the top-five major corporations and Seoul National University and KAIST.

- For patent registrations in 2022, the order is as follows: Seoul National University (864), KAIST (793), Korea University (706), Yonsei University (682), and Sungkyunkwan University (500).
- Among the five major conglomerates, all except POSCO have numerous joint patents with Seoul National University and KAIST.
- Samsung and Hyundai Motor tend to have many joint patents with Sungkyunkwan University; LG, with Yonsei University; SK, with Hanyang University; and POSCO, with POSTECH.

Top-10 Universities by Patent Registrations (2022)

Rank	University	Registration Count (Overseas Patents)
1	Seoul National University	864 (279)
2	KAIST	793 (201)
3	Korea University	706 (166)
4	Yonsei University	682 (142)
5	Sungkyunkwan University	500 (142)
6	Hanyang University	461 (132)
7	POSTECH	342 (103)
8	Kyung Hee University	338 (93)
9	UNIST	325 (60)
10	DGIST	238 (45)

Trends in Patent Registrations at Major Universities (2020–2023)



Source: University Information Disclosure

Source: Public Announcement of University Information

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3. University-Industry Collaboration at Major South Korean Universities and Companies

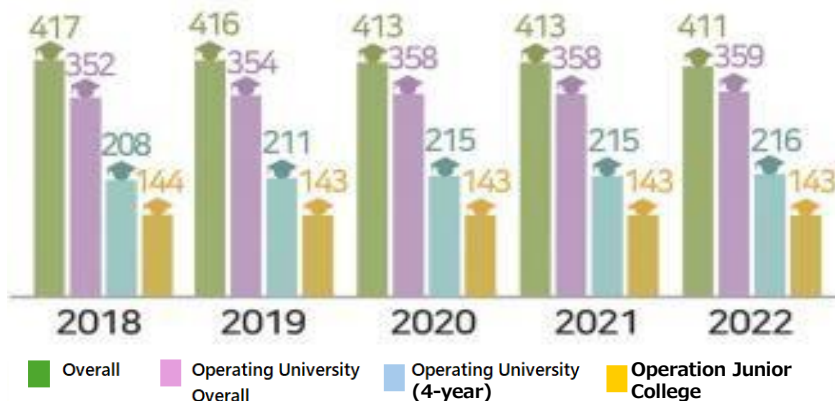
This study examined the current state of University-Industry Collaboration in South Korea, including its organizational framework, technology transfer, and utilization of research outcomes, along with the objectives of such cooperation.

3.1 Overview of University-Industry Collaboration at Universities

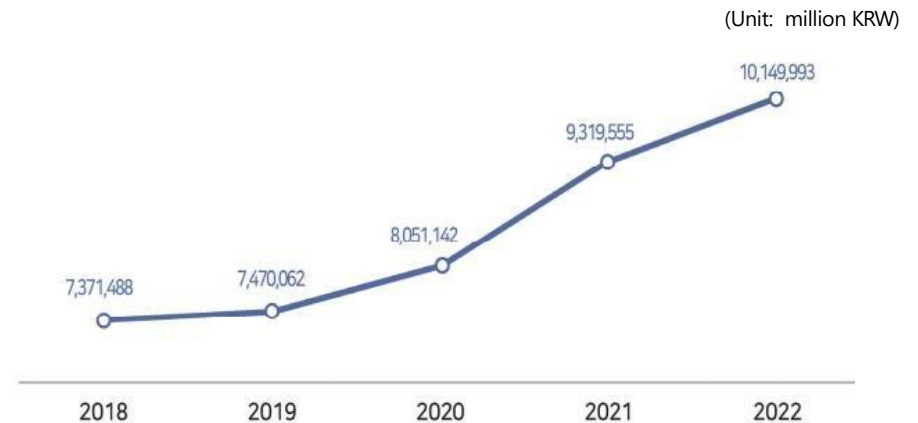
Many universities operate dedicated University-Industry Collaboration organizations called "University-Industry Collaboration Foundation" with the primary revenue source being education and research income from the government and companies.

- South Korea's universities lacked legal personality, making it difficult to enter into University-Industry Collaboration agreements or acquire intellectual property rights. Consequently, University-Industry Collaboration Foundation have been established since 2004.
- In 2022, 359 universities (216 universities and 143 colleges) operated University-Industry Collaboration Foundation, accounting for 87.3% of all universities (411 institutions). In 2022, there were 362 University-Industry Collaboration Foundation (legal entities), with 219 established at universities and 143 at colleges. University-Industry Collaboration Foundation established at science and technology specialized universities, such as KAIST, are not included, as they do not have legal entity status.
- Operating revenues of University-Industry Collaboration Foundation are increasing. In 2022, the total operating revenue of these organizations across all universities was approximately 10 trillion KRW, with education and research revenue accounting for the largest portion, at about 7.85 trillion KRW.

Trend in the Number of Universities Engaged in University-Industry Collaboration in Korea



Trend in Operating Revenue of University-Industry Collaboration in South Korea

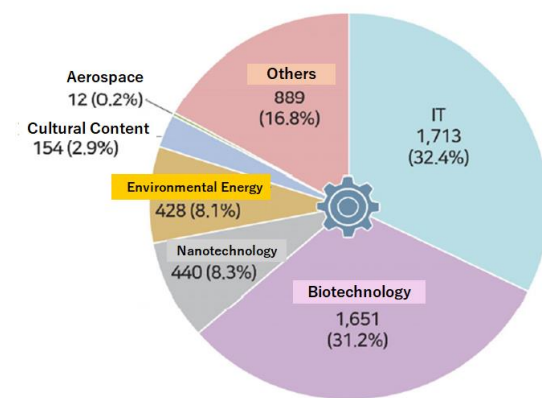


Source: National Research Foundation of Korea

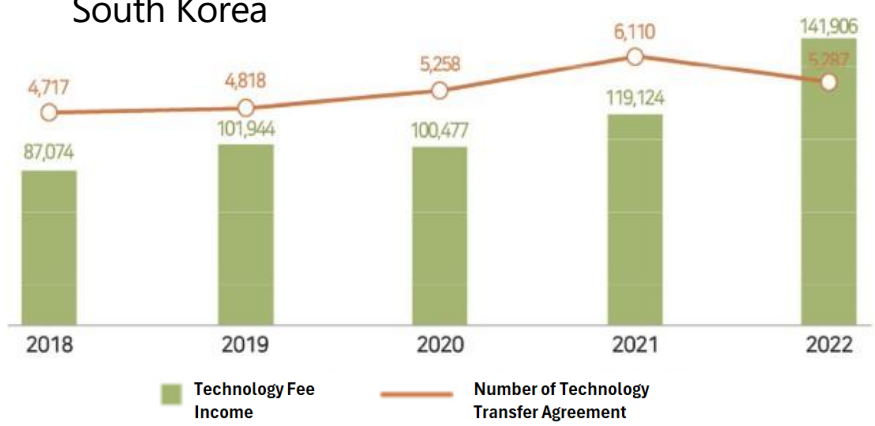
3.2 Current Status of Technology Transfer at Universities

- In 2022, universities concluded 5,787 technology transfer agreements. Among these, agreements with general SMEs accounted for the largest share at 84.1% (4,444 agreements), followed by agreements with venture SMEs at 9.9% (523 agreements).
- In 2022, technology transfer fees from large corporations totaled 36.4 billion KRW, an increase of 25.8 billion KRW (243.3%) compared to the previous year. The share of large corporations in total technology transfer fees rose from 8.9% to 25.7%.
- IT and biotechnology accounted for 63.6% of all technology transfer cases.

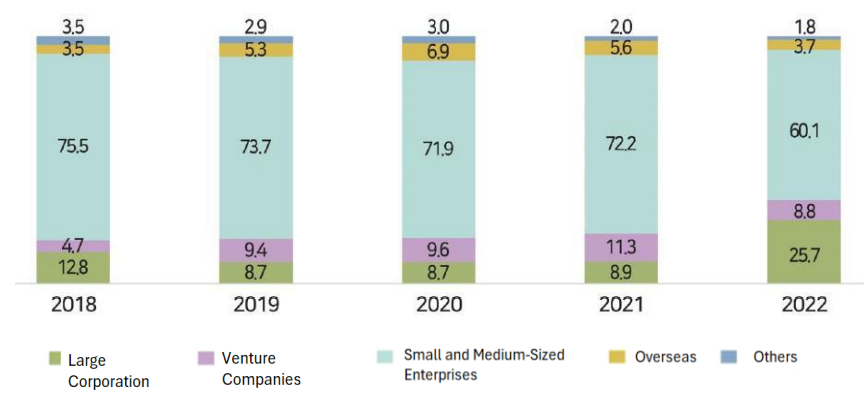
Current Status of Technology Transfer by Future Technology Classification



Trends in University Technology Transfer Performance in South Korea



Trends in Technology Royalty Rates by Recipient



Source: National Research Foundation of Korea

3.3 Utilization of University Research Results

- University technology transfer revenue in South Korea is approximately 100 billion KRW annually. Most is generated by KAIST and Seoul National University, with annual revenue estimated at around 7 to 8 billion KRW annually.
- Hanyang University signed a technology transfer agreement with LG Chem in March 2022 for an estimated 25 billion KRW, the highest amount ever for a university technology transfer fee.
- Hanyang University's annual technology transfer revenue had been around 2 to 3 billion KRW, but this agreement propelled it to the top of the university technology transfer income rankings in 2022.
- The transferred technology consists of approximately 40 patents related to high-nickel cathode materials developed by Professor Yang-Kook Sun (Energy Storage and Conversion Materials Laboratory).
- This technology is expected to increase the driving range of EVs by 20–30% and significantly reduce the fire risk, considered a drawback of high-nickel materials.
- Hanyang University and LG Chem also agreed to jointly research and develop secondary battery materials and to select and support industry–academia cooperation scholarship students.

Ranking of University Technology Transfer Fee Income for Fiscal Year 2022

Rank	University Name	Number of Contracts	Revenue (KRW)
1	Hanyang University (excluding ERICA Campus)	51	27.8 billion
2	Seoul National University	81	8.0 billion
3	KAIST	85	6.9 billion
4	Kyung Hee University	98	5.1 billion
5	Saison University	53	5.1 billion
6	Yonsei University	96	4.6 billion
7	Korea University	120	4.1 billion
8	Kyungpook National University	127	3.7 billion
9	Chungnam National University	199	3.5 billion
10	POSTECH	37	3.5 billion

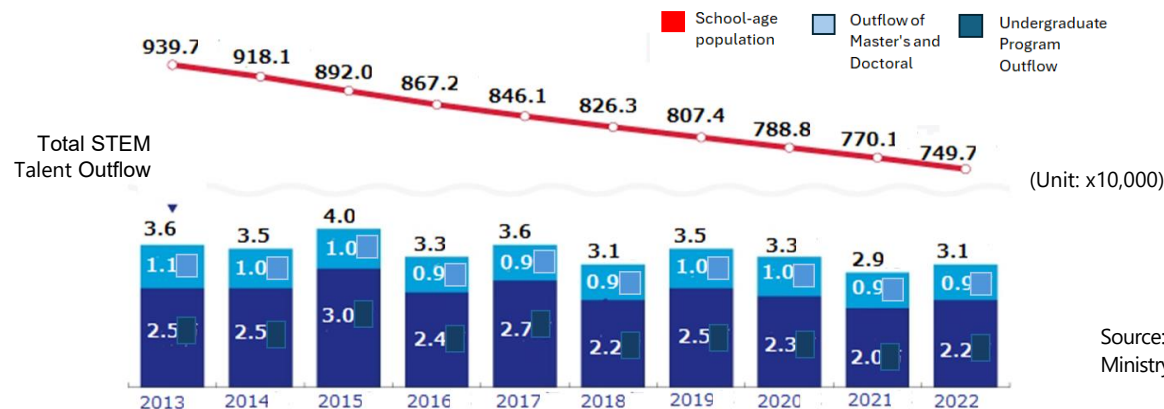
Source: University Information Disclosure

3.4 Drivers of Industry–Academia Cooperation in South Korea

Declining school-age population, competition for technological supremacy leading to severe talent shortages in advanced technology fields, and worsening brain drain overseas

- Against the backdrop of a declining school-age population and intensifying technological supremacy competition, the demand for highly skilled personnel, particularly in advanced technology industries, is increasing. This, coupled with the outflow of talent overseas, is leading to a severe shortage of highly skilled personnel. Even in graduate schools, which cultivate such talent, the number of applicants is declining significantly, resulting in a notable shortfall in new student enrollment.
- Demand for outstanding talent and highly skilled personnel at the master's and doctoral levels is increasing, particularly in fields such as semiconductors and secondary batteries where technological competition is intensifying.
 - ✓ Semiconductors: Required personnel projected to increase from 177,000 in 2021 to 304,000 in 2031, growing at an annual rate of 5.6%. Approximately 12,000 people needed annually. However, the supply of talent is projected to be only about 5,000 people (Korea Semiconductor Industry Association).
 - ✓ Batteries: As of the end of 2020, the shortage of master's and doctoral level personnel exceeded 1,000. Including bachelor's degree holders, the shortage is approximately 3,000 (Korea Battery Industry Association).
 - ✓ Advanced Mobility: By 2028, 89,068 personnel in future vehicle-related technologies will be needed. However, master's and doctoral graduates in automotive engineering fields were 209 in 2020 and 173 in 2021 (Ministry of Trade, Industry and Resources).

Trends in the Outflow of STEM Talent in South Korea



Source: Ministry of Science and ICT, Ministry of Data and Statistics



4. Industry–Academia Cooperation Case Study: "Contract Department"

This paper examines the overview, current status, achievements, and challenges of contract departments, which have recently gained attention as an effective industry–academia cooperation measure for cultivating outstanding talent.

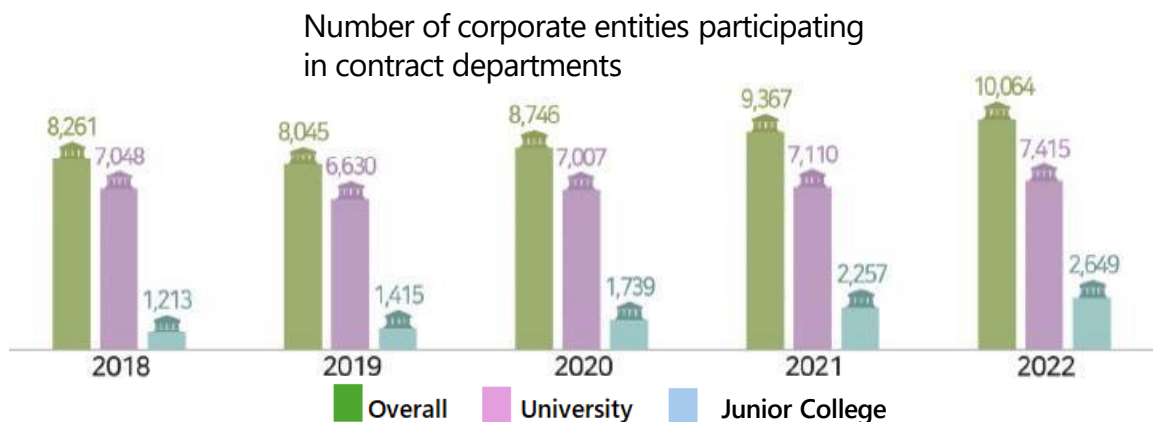
4.1 Overview of Contract Departments

Introduced in 2004, these programs gained attention with the establishment of Employment-Guaranteed Contract Departments in advanced technology fields by major corporations.

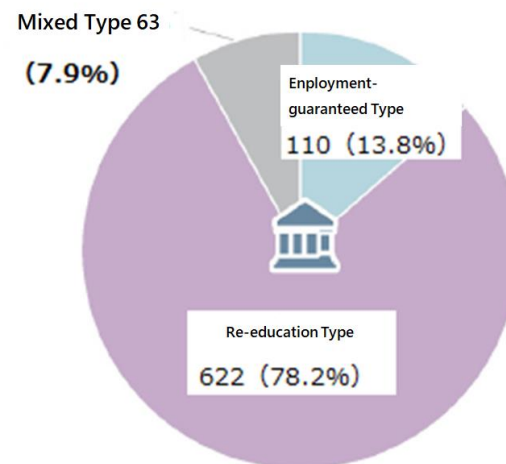
- Contract departments refer to faculties or departments established and operated by educational institutions conducting education and research through contracts with companies or other entities. They also include the "contract enrollment system," whereby existing departments increase enrollment by up to 20% of their capacity without establishing separate departments to provide education.
- Contract departments were established based on the "Industrial Education Enhancement and Industry-Academia-Research Cooperation Promotion Act" enacted in 2003, and were introduced in 2004 primarily for the continuing education of employees.
- Reviews aimed at improving operational efficiency and quality have been conducted, and the establishment of the 2018 Ministry of Education Notice "Regulations on the Establishment and Operation of Contract Departments" further revitalized their establishment.
- Since 2020, large corporations such as Samsung Electronics have primarily established employment-guaranteed contract departments. These programs offer generous support, including scholarships and job guarantees, and have gained recognition and attracted attention from prospective students.
- Contract departments are increasingly being established and expanded, particularly in cutting-edge technology fields such as semiconductors, batteries, and AI.

4.2 Current Status of Contract Departments at Universities

- The growing need for customized talent development tailored to corporate requirements and the competition to secure top talent early on has led to an increase in contract departments. These departments sign agreements with companies to select students and provide bespoke education.
- In 2022, the number of contract departments reached 795 (613 at universities, 182 at Junior Colleges). Although declining since 2018, the trend has been increasing since 2020.
The recent increase stems from talent shortages and outflows in cutting-edge technology fields.
- The number of students enrolled in contract departments in 2022 was 19,735, a 10.4% increase from the previous year (15,203 at universities, 4,532 at junior colleges).
- By major field, the order is Engineering 453 (57.0%), Humanities and Social Sciences 249 (31.3%), and Natural Sciences 65 (8.2%).
- By degree program: Bachelor's degree programs 13,092 (66.3%), Master's and integrated Bachelor's–Master's programs 5,731 (29.0%), and doctoral and combined master's–doctoral programs 912 (4.6%).
- In 2022, the number of participating companies in contract departments was 10,064. Joint contract departments numbered 110 (13.8%); third-party contract departments numbered 263 (33.1%); and independent contract departments numbered 208 (26.2%).



Types of Contract Departments



4.3 Employment-Guaranteed Contract Departments

Students receive generous support including tuition and training upon employment, while companies benefit from securing talented personnel early and developing human resources tailored to their needs.

- Employment-guaranteed contract departments are categorized into corporate employment-based, military service-based (requiring military service after graduation), and early employment-based (allowing enrollment as a company employee after two years of study). Among these, corporate employment-based contract departments are particularly popular. They often involve major corporations or companies in cutting-edge technology fields, offering substantial support such as job offers from large companies, scholarships, and training.
- Employment-guaranteed contract departments are primarily offered at prestigious private universities such as Yonsei University and Korea University, as well as science and technology-focused universities such as KAIST with contract companies predominantly being large corporations such as Samsung Electronics, SK, Hyundai Motor, and LG.
- Students in contract departments receive various benefits. These include tuition support, academic scholarships, training/internships, and graduate school advancement support. Additionally, students are guaranteed employment with the contracting company (a system requiring a certain period of employment).

Overview of Employment-Guaranteed Departments

Legal Basis	“Industrial Education Enhancement and Industry-Academia-Research Cooperation; Promotion Act,” Regulations on Establishment and Operation of Contract Departments (Public Notice)
Capacity Standard	May operate beyond capacity, but recruitment must be within 20% of the total enrollment for the relevant academic year or the total enrollment capacity
Establishment Procedure	Educational request from company → University review → Establishment notification to the Ministry of Education → Contract conclusion → Revision of university regulations → Department establishment and operation
Cost Burden	Corporate entities: 50–100% burden, Students: 50% or less, In-kind contributions: Maximum 30%
Employment	Department establishment contingent upon hiring graduates
Operation Method	Establish separate new departments; develop and operate curricula tailored to departmental characteristics while incorporating needs from companies and other entities.
Reporting Obligation	Report to the Minister of Education at least two weeks prior to contract execution

Source: Ministry of Education

4.4 Current Implementation Status of Employment-Guaranteed Contract Departments at Major Universities (Undergraduate Programs)

University Name	Degree Awarded	Contract Program Name	Capacity	Current Cost Burden Status	Contract Company
Korea University	Integrated Bachelor's and Master's Program	School of Smart Mobility	50 people	100% Industry-Affiliated	Hyundai Motor
	Bachelor's	Communications Engineering	30 people	100% Industry-Affiliated	Samsung Electronics
	Bachelor's	Semiconductor Engineering	30 people	100% Industry-Affiliated	SK Hynix
Yonsei University	Bachelor's	System Semiconductor Engineering	100 people	Industry 63%, University 37%	Samsung Electronics
	Bachelor's	Integrated Display Engineering	30 people	Industry 63%, University 37%	LG Display
Hanyang University	Bachelor's	Semiconductor Engineering	40 people	100% Industry-Affiliated	SK Hynix
Sungkyunkwan University	Bachelor's	Semiconductor Systems Engineering	70 people	Industry 72%, University-provided reduction rate 9%, Student contribution 19%	Samsung Electronics
	Integrated Bachelor's and Master's Program	Intelligent Software	50 people	100% Industry-Affiliated	Samsung Electronics
Sogang University	Bachelor's	System Semiconductor Engineering	30 people	100% Industry-Affiliated	SK Hynix
Soongsil University	Bachelor's	Information Security	20 people		LG Uplus
Kyungpook National University	Bachelor's	Mobile Engineering	30 people	100% Industry-Affiliated	Samsung Electronics
Gachon University	Bachelor's	Cloud Engineering	30 people	50% industry contribution, 50% university tuition reduction rate	Kakao Enterprise
KAIST	Bachelor's	Semiconductor Systems Engineering	100 people	100% Industry-Affiliated	Samsung Electronics
GIST	Integrated Bachelor's and Master's Program	Semiconductor Engineering	30 people	100% Industry-Affiliated	Samsung Electronics
DGIST	Integrated Bachelor's and Master's Program	Semiconductor Engineering	30 people	100% Industry-Affiliated	Samsung Electronics
UNIST	Integrated Bachelor's and Master's Program	Semiconductor Engineering	40 people	100% Industry-Affiliated	Samsung Electronics
POSTECH	Bachelor's	Semiconductor Engineering	40 people	100% Industry-Affiliated	Samsung Electronics

[Reference] Sungkyunkwan University Department of Semiconductor Systems Engineering (Partner Company: Samsung Electronics)

- The program is organized into three tracks—Circuit and Device Design, System Architecture, and System Software—to enable students to pursue core courses in specialized fields aligned with their aptitudes.
- Through the Steering Committee, discussions are held regarding the curriculum and program management. The curriculum is flexibly designed to meet corporate needs based on the latest trends.
- Student benefits include guaranteed employment at Samsung Electronics upon graduation, a full tuition scholarship for all enrolled students for two years, and academic achievement awards or software scholarships for top performers. Additional perks include Silicon Valley study tours, on-site visits and internships at Samsung Electronics, a faculty advisor consultation system, and priority housing allocation for dormitory residents.

Major Track-Specific Courses

Track	Overview	Subject
Circuit and Device Design	This track focuses on learning semiconductor chip design methods, covering semiconductor devices, circuit design, and overall system architecture with an emphasis on integrated circuit design.	Fundamental Electrical Circuits, Microelectronic Circuits, Analog Integrated Circuits, Digital Integrated Circuits, Memory Devices and Structures
System Architecture	The System Architecture track curriculum is organized around subjects that bridge circuits and software, covering theory and practice from software design to hardware design.	Logic Circuits, Digital System Design, Computer Architecture Overview, Microprocessors, SoC Design and Practice
System Software	Learn about operating systems and compilers that connect application software and hardware. This track was created to train embedded software specialists with semiconductor knowledge, offering specialized education in the system software field and semiconductor-related major subjects.	Problem-solving methods, data structures and algorithms, system operating systems, system programming, embedded system design

Source: Sungkyunkwan University

[Reference] Hanyang University Department of Semiconductor Engineering (Partner Company: SK hynix)

- The curriculum includes core subjects alongside courses focused on semiconductor design, software, and processes, as well as subjects such as leadership and entrepreneurship.
- Student benefits include scholarships (full tuition, monthly academic support grants, full tuition and academic support grants for advancing to the integrated master's/doctoral program, notebook PCs for new students, and the Semiconductor Leadership Scholarship for student council participants), domestic and international training programs (SK hynix internships, CES exhibition and Silicon Valley tours, visits to SK hynix research institutes in the US and China), industry-integrated non-curricular programs (lectures by corporate experts, undergraduate lab internships, entrepreneurship seminar/program management), and graduate school advancement benefits (laptop computers for graduate school entrants).

Four-Year Curriculum

1st Year		2nd Year		3rd Year		4th Year	
First Semester	Second Semester	First Semester	Second Semester	First Semester	Second Semester	First Semester	Second Semester
Calculus 1	Calculus 2	Linear Algebra	Signals and Systems	Random Processes	Digital Signal Processing 2		
	Probability and Statistics	Industrial Mathematics 1	Industrial Mathematics 2	Digital Signal Processing 1	Embedded System Design		
					VLSI Engineering		
Semiconductor Leadership Seminar	Digital Logic Design	Circuit Theory 1	Circuit Theory 2	Electronic Circuits 1	Electronic Circuits II	SoC Design	Analog Circuit Design
Career Development 1: Employment and Entrepreneurship Roadmap	Specialized Academic English	Electromagnetics	Microprocessors	Computer Architecture	Specialized Academic English		
Philosophical Understanding of Science and Technology	Creative Computing for Engineering Students		Global Leadership (HELP2)	Technology Management (Startup Design)	Entrepreneurship and Business Leadership (HELP3)		
Speech and Writing		Data Structures	Object-Oriented Programming	Operational Structure	Algorithms	Introduction to Artificial Intelligence	Computer Vision
Practice of Love 1 (Hanyang Endowment)						Fundamentals and Practice of Artificial Intelligence Platforms	Nanoelectronics
General Chemistry and Laboratory		Introduction to Solid-State Electronics	Semiconductor Devices	Semiconductor Circuit Processes		Display Design and Processes	Electronic Materials
General Electronic Physics 1	General Electronic Physics 2	Modern Physics	Quantum Mechanics	Integrated Circuit Device Process Experiment	Memory Semiconductor Devices	System Semiconductor Devices	Semiconductor Engineering Capstone PBL
				Semiconductor Device Analyzer Heavy T	Semiconductor Device Process Experiment		
					Optoelectronics		

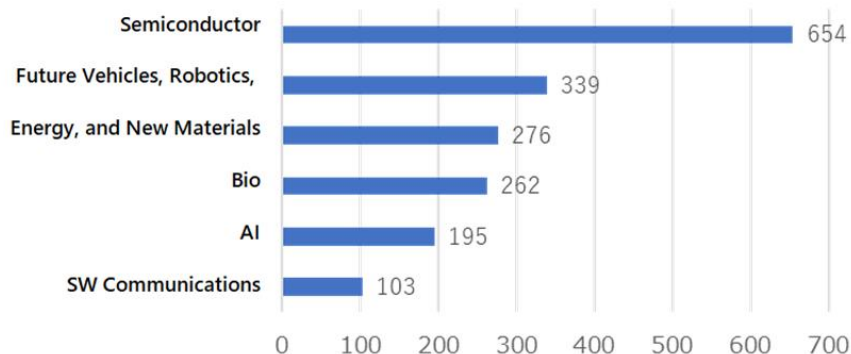
Source: Hanyang University

4.5 Expanding Talent Development Measures

Contract enrollment systems that relax restrictions on admission quotas and separate department establishment, as well as programs open to students from other departments, are also available.

- Contract departments face constraints on establishment because of enrollment quotas at universities in the metropolitan area, and their setup requires significant time and expense. Consequently, an increasing number of universities are establishing them at graduate schools, which are subject to less stringent enrollment restrictions.
- In May 2023, revisions to the "Enforcement Order of the Industry–Academia Cooperation Act" and the "Regulations on the Establishment and Operation of Contract Departments" significantly relaxed the contract department system. This introduced the "**contract enrollment quota system**," allowing universities to add contract enrollment quotas to existing general programs without establishing separate contract programs (undergraduate departments). This system took effect for undergraduate programs starting with the 2024 academic year and for graduate programs starting the second semester of the 2023 academic year. Enrollment quotas have also been relaxed, allowing existing universities to expand their enrollment.
- Anticipating future demand for talent in cutting-edge technology fields, universities are now **operating various curricula such as tracks open to students from other departments, talent development courses, and joint majors**. Changes to selection and operational regulations also mitigate the loss of outstanding students to contract departments and the burden of early career decisions associated with increased enrollment in medical schools. Example: KAIST: Students are permitted to transfer to other departments after completing a certain number of credits.
- The Ministry of Education significantly increased enrollment quotas for advanced fields such as semiconductors, future vehicles, and robotics for the 2024 academic year.

Breakdown of 2024 Academic Year Advanced Field Enrollment Quota Adjustments (General Universities)



Source: Ministry of Education

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【Reference】Revised Content of Enforcement Orders and Notifications Concerning the Establishment and Operation of Contractual Departments

Category / Period	Revision Details	Before Revision	After Revision																		
Enforcement Order (Effective March 2023)	Expansion of Student Capacity (Non-Regular)	<ul style="list-style-type: none"> Conditional Admission Type: Within 20% Re-education Type: Within 20% However, up to 50% is possible with certification from the Minister of Education.	<ul style="list-style-type: none"> Employment-Conditional Type: Within 20% For cutting-edge industries: Up to 50% <ul style="list-style-type: none"> Retraining Type: Within 20% However, up to 50% is possible with certification from the Minister of Education.																		
	Introduction of a Contracted Quota System	No basis	Operate by adding contracted enrollment quotas to existing general departments without establishing separate contracted departments * Limited to advanced field recruitment-based programs, operation within 20% of existing general department quotas permitted																		
	Reducing the burden on companies, etc.	Companies bear at least 50% of the operational costs for contract departments.	When establishing contract-based departments with regional universities in advanced fields, a burden of 50% or less is permitted.																		
	Improving student selection	For entrance exams of contract departments under a joint contract format involving multiple companies, applicants may apply to only one company.	When applying to a contract department under a joint contract format involving multiple companies, applicants may apply to two or more companies (excluding fixed-term contracts).																		
	Changes to university admissions selection	No basis	In unavoidable circumstances such as changes in corporate hiring situations, the university entrance examination implementation plan may be modified.																		
Notice (Effective May 2023)	Relaxation of Establishment Area Restrictions	<ul style="list-style-type: none"> City/prefecture level or 50-km straight-line distance <table border="1"> <thead> <tr> <th></th> <th>Universities in the metropolitan area</th> <th>Universities outside the metropolitan area</th> </tr> </thead> <tbody> <tr> <td>Conditional Admission Type</td> <td>Nationwide</td> <td>Nationwide</td> </tr> <tr> <td>Re-education Type</td> <td colspan="2">City/prefecture level or 50-km straight-line distance</td> </tr> </tbody> </table>		Universities in the metropolitan area	Universities outside the metropolitan area	Conditional Admission Type	Nationwide	Nationwide	Re-education Type	City/prefecture level or 50-km straight-line distance		<ul style="list-style-type: none"> Expand the establishment area for re-education programs <table border="1"> <thead> <tr> <th></th> <th>Universities in the Metropolitan Area</th> <th>Universities outside the metropolitan area</th> </tr> </thead> <tbody> <tr> <td>Employment-Based</td> <td>Nationwide</td> <td>Nationwide</td> </tr> <tr> <td>Re-education Type</td> <td>City/Prefecture Level or 50-km Straight-Line Distance</td> <td>Nationwide</td> </tr> </tbody> </table>		Universities in the Metropolitan Area	Universities outside the metropolitan area	Employment-Based	Nationwide	Nationwide	Re-education Type	City/Prefecture Level or 50-km Straight-Line Distance	Nationwide
			Universities in the metropolitan area	Universities outside the metropolitan area																	
		Conditional Admission Type	Nationwide	Nationwide																	
	Re-education Type	City/prefecture level or 50-km straight-line distance																			
	Universities in the Metropolitan Area	Universities outside the metropolitan area																			
Employment-Based	Nationwide	Nationwide																			
Re-education Type	City/Prefecture Level or 50-km Straight-Line Distance	Nationwide																			
Autonomous Operation of Mobile Classes	<ul style="list-style-type: none"> Operation subject to deliberation by the Education Committee Application for university approval of mobile classes → Notification of results following deliberation by the Education Committee	<ul style="list-style-type: none"> Autonomous operation based on university (statutory) decisions: When certain criteria related to facilities and an automated attendance system are met. 																			
Expansion of Remote Classes	Within 20% of graduation requirements	Within 50% <ul style="list-style-type: none"> - Compliant with the "Directive on Remote Instruction Operations at Universities and Other Institutions." - For 100% online degree programs, approval from the Ministry of Education is required. 																			

Source: Ministry of Education

[Reference] Example Track: Sogang University "Samsung Electronics Semiconductor Track Program"

- Samsung Electronics Device Solutions (DS) Division aims to secure a certain number of outstanding talent at the bachelor's and master's levels in the semiconductor field (design, process/device, software) to cultivate specialized semiconductor technical personnel.

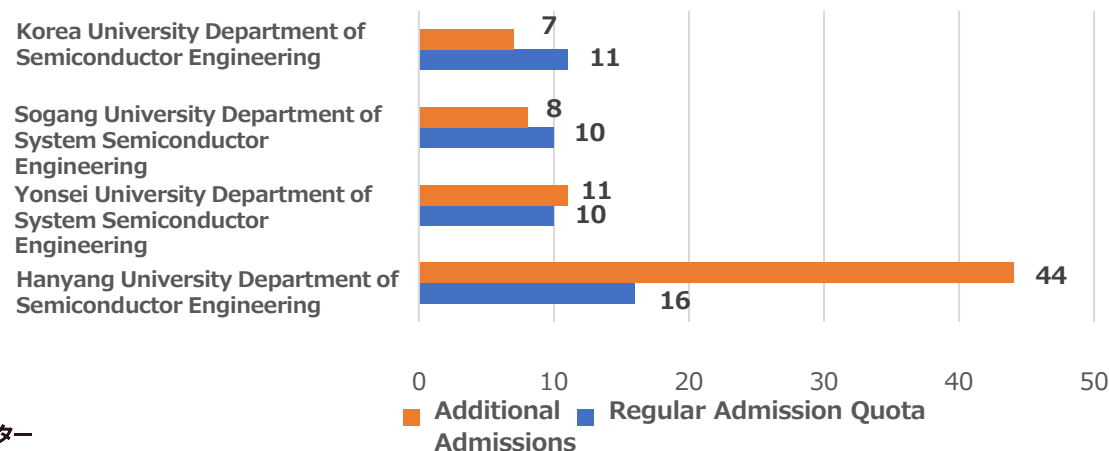
Track Program Overview

	Content	
Eligible Candidates	Outstanding students at the bachelor's or master's levels whose primary major is in the Department of Electronic Engineering, Department of Computer Engineering, Department of Chemical and Biological Engineering, Department of Mechanical Engineering, Department of Physics, or Department of Chemistry	
Course Requirements	Complete nine required courses and two elective courses designated as the track curriculum by graduation	
Scholarship	Bachelor's Scholarship Recipient: Prescribed tuition assistance (no tuition support); Master's Scholarship Recipient: Tuition and tuition assistance	An obligation to serve for a period twice the duration of the scholarship period applies
Internship	Industry-Academia Track Scholarship recipients must complete a four-week internship program at Samsung Electronics during their studies.	
Advising Professor System	Track program coursework and academic guidance management	
Graduate School Admission Preferential Treatment for Advancement	Students wishing to advance to higher degrees may do so through a technical interview selection process and receive research guidance from Samsung Electronics researchers.	
Software Certification Education	For those wishing to work in the software field, we provide educational programs and exam support to help obtain qualifications before joining the company.	

4.6 Achievements and Challenges of Employment-Guaranteed Contract Departments

- Achievement 1: **employment-guaranteed contract departments contribute to securing top talent.**
 - In the 2024 academic year survey of top-tier university admissions, the admission scores (College Scholastic Ability Test) for the contract programs at Korea University's "School of Smart Mobility" and Yonsei University's "Department of System Semiconductors" were the highest among all science programs at their respective universities.
- Challenge 1: **The persistent "preference for medical schools" hinders securing outstanding talent for employment-guaranteed contract departments.**
 - The admission scores for contract departments at universities such as Yonsei and Korea are lower than those for their respective medical, dental, pharmacy, and veterinary schools. Many applicants apply concurrently to both medical schools and contract departments, using the latter as a safety net. This leads to high rates of withdrawal before enrollment registration and after enrollment.
 - As of the 2025 academic year, the planned increase of 2,000 medical school spots and the expansion of "undeclared" admissions (in which majors are not decided at enrollment) are expected to make attracting top talent to contract departments even more difficult.
- Challenge 2: **Early career decisions expose students to the risk of changing paths, while companies face potential losses from mid-term withdrawals.**

Current Status of Additional Regular Recruitment Acceptances for Major Semiconductor Contract Departments (2023 Academic Year)



Source: Jongno Academy



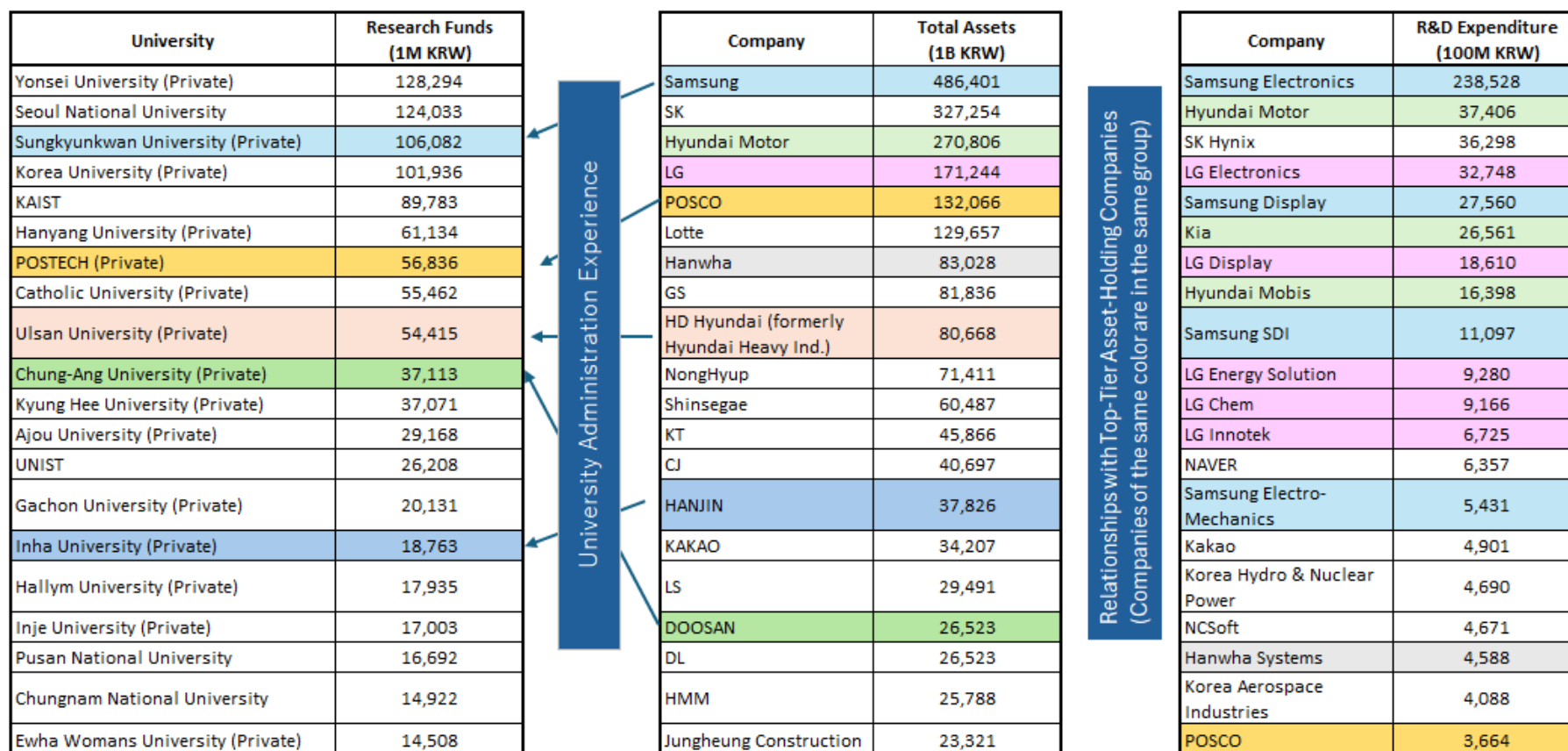
5. The Relationship Between Major South Korean Universities and Large Corporations

Based on previous investigations, a study was conducted focusing on universities with contract departments and those receiving the highest research funding. The study examined specific instances of industry–academia cooperation between these universities and major corporations. The analysis summarized the relationship between universities and corporations with respect to education and research.

5.1 Involvement of Large Corporations in University Management

- Many examples exist of conglomerates involved in university management through establishment, acquisition, and financial support.
- Nearly all top R&D investors are group companies of conglomerates, driving R&D.

Relationships between Major Korean Universities and Large Corporations



5.2 Current Status of Industry–Academia Cooperation by University

① Seoul National University

Human Resource Development	As a top national university in South Korea, it avoids establishing employment-guaranteed contract departments at the undergraduate level to minimize criticism of training personnel for specific companies. However, because of high corporate demand, it established the "Future Automotive Mobility Department" (enrollment: 20) as an employment-guaranteed contract department with Hyundai Motor Company at the graduate-school level in 2024.
Joint Research and Facility Investment	<p><u>August 2024, Hanwha Systems: MOU for industry–academia joint research in defense industry and ICT/AI-based space sector</u> Through 2029: Develop low-orbit communication satellite payload design, network technologies for 6G communication systems and satellite network integration, advanced object recognition AI for ship navigation and autonomous operation, and autonomous unmanned system countermeasures. Provide scholarships and employment opportunities to outstanding students with exceptional research achievements.</p>
	<p><u>June 2024, Samsung Electronics: MOU for Establishing AI Joint Research Center</u> Develop detailed technologies for on-device AI and multimodal AI over the next three years at the AI Joint Research Center. Additionally, recruit master's and doctoral researchers participating in research projects.</p>
	<p><u>April 2024, SKT: MOU for joint R&D in quantum technology and specialized talent development</u> Seoul National University will leverage its fundamental science and applied technology in the quantum technology field, while SKT will use its commercialization capabilities and resources to collaborate on research and development and specialized talent development.</p>
	<p><u>December 2023, Hanwha: Hanwha and Seoul National University signed an MOU to establish a Joint Research Center for New Materials in the Department of Chemistry</u> Aiming to develop innovative technologies and cultivate outstanding talent in IT and bio-based new materials through the establishment of an R&D network. Research focuses on developing new materials for semiconductors, displays, and energy sectors, as well as new bio-based materials such as biopharmaceuticals and active pharmaceutical ingredient intermediates. Supports research activities by selecting outstanding students from Seoul National University's Department of Chemistry with the intent to hire them.</p>
	<p><u>July 2023, Hyundai Motor: MOU for Establishment of Battery Joint Research Center</u> Signed an MOU in 2021 for the establishment of a battery joint research center and medium-to-long-term joint research. Plans to invest over 30 billion KRW by 2030.</p>
	<p><u>January 2023, LG Energy Solution: MOU for Industry–Academia Cooperation Center Establishment</u> Selected nine industry–academia cooperation projects, including material development for sulfide-based all-solid-state batteries and lithium–sulfur batteries, and agreed to cultivate outstanding talent.</p>
	<p><u>September 2021, Samsung Electronics: MOU for establishing Future Home Appliance Drive Technology Center</u> Research personnel from various fields, including electrical and electronic engineering, mechanical engineering, and materials engineering, will be assembled to develop detailed technologies for achieving high energy efficiency, low vibration and noise, and improved durability in compressors and motors, which are core components determining home appliance performance.</p>

5.2 Current Status of Industry–Academia Cooperation by University

② Korea University

Human Resource Development	<ul style="list-style-type: none"> Undergraduate Departments: Smart Mobility (Hyundai Motor), Semiconductor Engineering (SK Hynix), Communications Engineering (Samsung Electronics), Graduate School: Battery–Smart Factory Department (LG Energy Solution), AI Data Science Department (LG CNS), Advanced Security Major (Samsung SDS, to be established in the 2025 academic year), e-Battery Track (POSCO Future M). The Department of Semiconductor Engineering has a partnership with UC Davis, providing all second-year students with the opportunity to study at UC Davis for one quarter (semester).
Joint Research and Facility Investment	<ul style="list-style-type: none"> <u>July 2024: KT: MOU for joint R&D in AI application technologies</u> <ul style="list-style-type: none"> Advancing R&D initiatives to enhance AI technology maturity and strengthen business competitiveness; establishing the Korea University–KT Joint R&D Center (with KT) for swift and substantive collaboration; joint utilization of GPUs for industry–academia R&D Research topics include Korean-style Vertical SLM technology development, Responsible AI, and Model of Mixture, with technology development to be completed by the end of 2025. <u>September 2023, SKT: MOU for quantum technology R&D and cooperation</u> Cooperation in R&D and human resource development with the Quantum Sapience Human Resource Development Center, an industry–academia human resource development consortium in quantum technology involving Korea University, Hyundai Motor Group, and Samsung SDS. <u>September 2021, Samsung Electronics: MOU for the establishment of a Green Energy Research Center</u> <ul style="list-style-type: none"> Establishment of joint research for green energy–related technology development and field-specific customized education programs for human resource development. Research topics include technological cooperation to achieve carbon neutrality, such as improving the energy efficiency of core components in major home appliances such as refrigerators, strengthening green material technologies such as expanding the use of recycled plastics and developing resource-recycling packaging materials, and developing air conditioner components for the application of environmentally friendly refrigerants. In 2024, nine research projects will be promoted, including mechanical engineering, smart mobility, convergent life engineering, and new materials engineering. Major industry–academia collaborative research projects include improving the energy efficiency of core components in major home appliances, developing technologies to expand the use of recycled materials such as recycled plastics, and developing anti-fouling materials and high-efficiency heat-insulation materials.

5.2 Current Status of Industry–Academia Cooperation by University

③ Yonsei University

Human Resource Development	Established and operates undergraduate programs in System Semiconductor Engineering (Samsung Electronics), Integrated Display Engineering (LG Display), and graduate programs in Intelligent Data & Optimization (LG CNS), System Semiconductor Track (Master's and Doctoral Programs, Samsung Electronics), and e-Battery Track (POSCO Future M).
Joint Research and Facility Investment	<ul style="list-style-type: none"> • <u>March 2023: POSCO Future M: MOU signed for e-Battery Track operation</u> ➤ Operates the Battery Materials Master's and Doctoral Program "e-Battery Track." Selects outstanding talent to execute joint research projects.
	<ul style="list-style-type: none"> • <u>March 2023: LX Semicon (Fabless): MOU for establishing the "LX Semicon Industry–Academia Cooperation Center"</u> ➤ Collaborate on talent development and technology advancement across all semiconductor fields, including next-generation analog and digital semiconductor circuit design technologies and power semiconductors. For talent development, operate industry–academia internship and scholarship programs. Identify industry–academia challenges in the semiconductor field and cultivate next-generation technologies.
	<ul style="list-style-type: none"> • <u>February 2023, LG Electronics: MOU for Software Talent Development</u> ➤ Launched the "Connected Platform Theory and Practice" lecture for third- and fourth-year students in the Computer Science Department of the AI Convergence Faculty.
	<ul style="list-style-type: none"> • <u>November 2022, SK on: MOU for Next-Generation Battery Industry-Academia Cooperation</u> ➤ Established an industry–academia cooperation center for next-generation lithium-ion battery material research and talent development. Will provide 1.65 billion KRW in support over three years starting in 2023. Recruiting master's and doctoral students.
	<ul style="list-style-type: none"> • <u>October 2022, LG Chem: MOU for establishing a "Battery Materials Industry–Academia Cooperation Center"</u> ➤ Joint research on next-generation battery technologies, such as long-life silicon-based anode materials, high-safety sulfide-based electrolytes, and binders for green electrodes.

5.2 Current Status of Industry–Academia Collaboration by University

④ Science and Technology Specialized Universities

KAIST	Human Resource Development	Undergraduate Department of Semiconductor Systems Engineering (Samsung Electronics), Graduate School Interdisciplinary Program in Division of Future Vehicle(Hyundai Motor)
	Joint Research and Facility Investment	<ul style="list-style-type: none"> • Since 2021, it has operated an Industrial Liaison Program (ILP) program that comprehensively provides corporate innovation, educational consulting, industry–academia project development and new industry discovery, technology transfer, and entrepreneurship. • <u>August 2024: GS Construction: MOU for Future Urban Technology R&D</u> ➤ Four-year joint research on urban infrastructure DX, digital city intelligence, urban–human interaction, and development of digital city toolkits (Smart City). ➤ Since 1995, it has operated an industry–academia cooperation council with Samsung Heavy Industries. It implements an advisory professor system, custom-designed courses, and shipbuilding and marine technology research projects. • <u>February 2024: Hyundai Motor: Establishment and Agreement for On-Chip LiDAR Joint Research Lab</u> ➤ Development of LiDAR sensors for fully autonomous driving (Level 4-5). Miniaturization of sensors using silicon photonics, Technology development for performance improvement. • <u>October 2022: Hasol: MOU signed to establish the Materials and Components Innovation Research Center</u> ➤ Conduct research focused on eco-friendly material applications, low-energy consumption, and precision processes with an annual budget of 500 million KRW until 2025. • <u>May 2022: KYOBO-DPLANEX-KAIST Future Insurance AI Research Center established</u> ➤ Conducting AI-based future insurance research in collaboration with KYOBO Life and DPLANEX (KYOBO subsidiary, data analytics), including insurance sales management on digital platforms, AI-based product trend and risk prediction, and data-centric customer management. • <u>May 2021, Hanwha Space Hub: MOU for Establishing Space Research Center</u> ➤ Hanwha Space Hub, overseeing Hanwha's space business, and developing low-orbit satellite communication technology (ISL) • <u>March 2021, Shinsegae INC: Launch of AI Research Center</u> ➤ Researching AI technologies specialized for retail, including platforms for collecting and processing structured and unstructured big data, personalized recommendations for new products, demand forecasting, and demand-based price optimization. • <u>March 2021, Samsung SDS: Established AI Joint Research Center</u> ➤ <u>Researches AI-related technologies including software engineering (e.g., natural language processing) and human–computer interaction.</u>

5.2 Current Status of Industry–Academia Collaboration by University

⑤ Science and Technology Specialized Universities

POSTECH	Human Resource Development	Undergraduate Department of Semiconductor Engineering (Samsung Electronics)
	Joint Research and Facility Investment	<ul style="list-style-type: none"> • <u>November 2022: LG Energy Solution: Industry–Academia Cooperation MOU</u> <ul style="list-style-type: none"> ➤ Develop next-generation battery technologies by leveraging R&D achievements, patents, and other intellectual property related to batteries; material field research outcomes; and precision analysis technologies. Cultivate specialized talent in the field of batteries. Establish the Battery Innovation Research Center. • <u>July 2021: POSCO ICT-POSTECH MOU for Industry–Academia Cooperation</u> <ul style="list-style-type: none"> ➤ Launch of AI Industry–Academia Integration Research Center for joint AI research and researcher exchange
UNIST	Human Resource Development	Integrated Bachelor's/Master's Program in Semiconductor Engineering (Samsung Electronics), Graduate School Programs in Battery Science and Technology (Master's Program, SK On), Battery Excellence Program (Samsung SDI)
	Joint Research and Facility Investment	<ul style="list-style-type: none"> • <u>February 2023: LG Electronics: MOU to enhance industry–academia cooperation</u> <ul style="list-style-type: none"> ➤ 2020 Industry–Academia Cooperation MOU Signed, Technical Exchange in Five Fields Including AI and Power Electronics. Agreement Reached on R&D, Human Resource Development, and Establishment of Industry–Academia Cooperation Center
GIST	Human Resource Development	Integrated Bachelor's/Master's Program in Semiconductor Engineering (Samsung Electronics), Graduate Program in Intelligent Motor Track (Samsung Electronics)
DGIST	Human Resource Development	Bachelor's/Master's Integrated Program in Semiconductor Engineering (Samsung Electronics)

5.3 Current Status of Industry–Academia Cooperation at Major Corporations

① Samsung

- Samsung SDI cultivates customized talent in key areas such as AI, next-generation communications, and semiconductors through various programs including contract departments, major tracks, and joint majors.
- Samsung SDI has operated battery talent development programs at POSTECH, Seoul National University, KAIST, Hanyang University, Sungkyunkwan University, and UNIST since 2021. Starting in 2026, it plans to operate a contract department for a bachelor's degree program, "Battery Engineering," at Sungkyunkwan University.

Examples of Samsung Group's Industry–Academia Cooperation

Human Resource Development (Contract Departments/Major Tracks)	Joint Research
<ul style="list-style-type: none"> Operates 9 contract departments/joint majors with 7 universities in the communications and semiconductor fields <Semiconductors> Sungkyunkwan University (2006), Yonsei University (2021), KAIST (2022), POSTECH (2023), UNIST, DGIST, GIST (March 2024–) <Communications> Korea University, POSTECH (Joint Major), Seoul National University (Joint Major) <AI> Sungkyunkwan University (Intelligent Software Department, 2024) <Home Appliances> GIST (Intelligent Motor Track, 2023, 15 Master's students), <Robotics> KAIST Talent Development Program (2023, 10 Master's students) <Battery> Sungkyunkwan University <Bio: Samsung Biologics> Seoul National University, Yonsei University (Bio Talent Development Track) 	<ul style="list-style-type: none"> Korea University: Green Energy Research Center (August 2021) Seoul National University: Future Home Appliance Drive Technology Center (September 2021) Yonsei University: Green New Materials and Surface Nanotechnology Research Center (July 2022) Launch of the "High-Efficiency Peltier Cooling Research Consortium" (April 2024): Sungkyunkwan University, POSTECH, Yonsei University, Kongju National University, Korea Institute of Ceramic Engineering and Technology (KICET)

5.3 Current Status of Industry–Academia Cooperation at Major Corporations

② LG

- In talent development, the focus has expanded beyond home appliances and displays to include batteries, AI, DX, and cybersecurity.
- Recent joint research has centered on industry–academia cooperation, particularly in the fields of batteries (LG Energy Solution) and AI (LG CNS).

Case Studies of LG Group's Industry–Academia Cooperation

Human Resource Development (Contract Departments/Tracks)	Joint Research and Industry–Academia Cooperation Activities
<ul style="list-style-type: none"> • LG Electronics: Engineering Talent Development, LG Track (2015–) • LG Chem (Batteries): Hanyang University (Battery Engineering Department, 2023) • LG Energy Solution (Batteries): POSTECH • LG CNS (DX): Yonsei University (Intelligent Data & Optimization Contract Program, Graduate School), Korea University (AI Data Science Contract Department, Graduate School), Seoul National University (Master's Program, Talent Development Track) • LG U+ (Cybersecurity): Soongsil University <p>* Direct-hire Internship Program: Graduate students from Seoul National University, KAIST, Korea University, Yonsei University, Chung-Ang University, etc.</p>	<ul style="list-style-type: none"> • Seoul National University: MOU with professors from the Department of Industrial Engineering for collaborative research in mathematical optimization, data analysis, and production systems (August 2024) • Korea University: Industry–academia cooperation MOU (June 2020) for technology development and human resource training in three fields: next-generation battery material research, smart-factory construction, and big-data/AI education. • Hanyang University: Established an Industry–Academic Cooperation Center. Joint research for next-generation cathode material development (April 2023) • UNIST: Industry–Academia Cooperation MOU (July 2020), research cooperation in AI, power electronics, ergonomics, and design fields • POSTECH: Industry–Academia Cooperation MOU (November 2022), battery material and process technology development, specialized human resource development

5.3 Current Status of Industry–Academia Cooperation at Major Corporations

③ Hyundai Motor/SK

- Hyundai Motor operates contract departments for future mobility, conducting industry–academia collaborative research in which multiple universities participate in specific research projects.
- SK has established numerous contract departments in its core semiconductor and battery fields, actively engaging in the research and development of quantum technology and the cultivation of human resources.

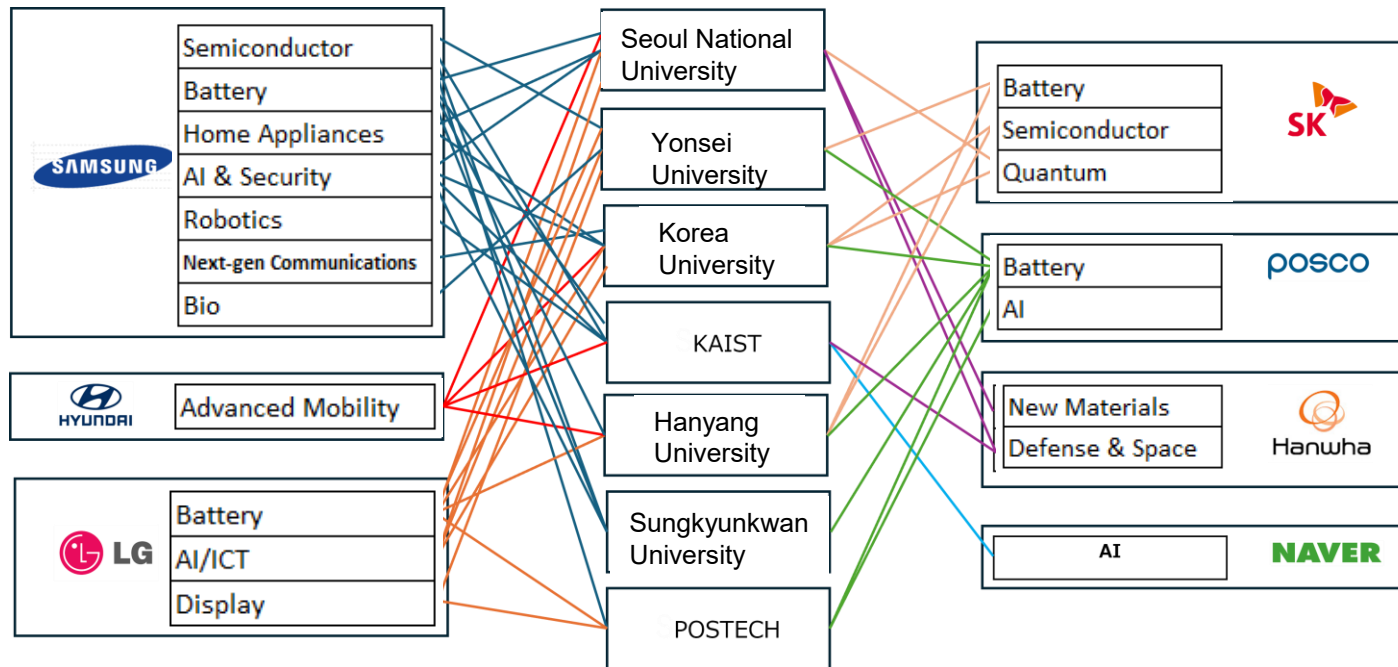
Case Study of Industry–Academia Cooperation between Hyundai Motor Company and SK Group

	Human Resource Development (Contract Departments/Tracks)	Joint Research and Industry–Academia Cooperation Activities
Hyundai Motor	<ul style="list-style-type: none"> Smart Mobility: Korea University Division of Future Vehicle: KAIST (Master's Program) 	<ul style="list-style-type: none"> Battery Joint Research Center Opens at Seoul National University (July 2023): Joint research with KAIST, UNIST, DGIST, Hanyang University, Sungkyunkwan University, etc. Established the "Carbon Neutral Joint Research Lab" (July 2023) with participation from Hanyang University, Korea Institute of Energy Technology, and others.
SK	<ul style="list-style-type: none"> SK Hynix (Semiconductors): Korea University, Sogang University, Hanyang University SK on (Batteries): Yonsei University, Hanyang University (Graduate School) 	<ul style="list-style-type: none"> Seoul National University: Quantum Technology Research Korea University: Participates in the industry–academia quantum technology talent development consortium "Quantum Sapience Human Resource Development Center in Korea"

5.4 Cooperative Relationships Between Industry and Academia at Major Corporations

- In South Korea's key industries of semiconductors and batteries, technological competition has become extremely fierce. Competition in talent development and industry-academia cooperation is also intensifying. Particularly among companies with related businesses such as Samsung, LG, and SK, the race to secure top talent from the nation's leading universities has grown fiercer.
- Samsung overwhelmingly partners with leading universities across a wide range of technical fields for talent development and joint research.
- Recently, industry-academia cooperation in AI has increased, and cooperation in future technology fields such as quantum and space is also advancing.

Industry-Academia Cooperation Relationships in Major Corporations



6. Summary

- In South Korea, **university finances are deteriorating** because of a declining school-age population and regulations limiting enrollment quotas and tuition hikes.
- Although university research funding is increasing, government support exceeds 70%, while private funding accounts for only about 15%.
- Since South Korea's universities lacked legal entity status, it has been difficult for them to enter into industry-academia cooperation agreements or acquire intellectual property rights. Consequently, legislation was enacted in 2004 to establish University-Industry Collaboration Foundation as dedicated entities within universities, possessing legal entity status to facilitate industry-academia cooperation.
- Today, most universities have established University-Industry Collaboration Foundation, which pursue research outcomes and engage in education and joint research through industry-academia cooperation.
- In recent years, against the backdrop of a shortage of personnel in advanced technology fields such as semiconductors and secondary batteries, universities have increasingly entered into contracts with companies to recruit students under "employment-guaranteed contract departments," which are premised on employment at the company.
- **Contract departments are attracting attention as a strategy for companies to secure talented individuals early and cultivate human resources tailored to corporate needs. Furthermore, experiencing the company at an early stage is expected to enhance students' adaptability.**
- Amid difficult job markets and strong preferences for large corporations, **these departments** attract top talent by offering **employment guarantees at major companies**, along with generous support including **tuition coverage, academic scholarships, training, and internships**. However, **the persistent preference for medical school admissions continues to hinder the recruitment of top talent.**
- **Competition among major conglomerates such as Samsung, Hyundai Motor, SK, LG, and POSCO for industry-academia cooperation, centered on top universities, is intensifying.** Joint research with universities has become a primary means not only for R&D but also for nurturing and securing talent.
- **The core of industry-academia cooperation on the corporate side is carried out by large conglomerate companies**, which engage in talent development and joint research with top universities across a wide range of technological fields, including semiconductors, batteries, AI, and biotechnology.

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Topic Research

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