< Government R&D Innovation Plan >

< Development of Korean Science and Technology >

Science and technology (S&T) and research and development (R&D) in Korea have developed in step with the past five decades of Korea's growth, playing an integral role in the economic and social development of the nation.

After Korea’s liberation from Japanese colonial rule in 1945, many young people looking to build a better future for Korea in S&T began to study abroad. Building on these initial developments, the Korean government used foreign aid to establish the Korea Institute of Science and Technology in the mid-1960s, where top Korean scientists who had trained abroad could return and continue their work.

The government continued to establish national S&T policies through the subsequent decades, from "heavy and chemical industries" in the 1970s to "technology drive policy" in the 80s, "post catch-up technological innovation" in the 90s, and "expanding investment in R&D with global competitiveness" in the 2000s. These concerted efforts enabled Korea to succeed in remarkable economic development.

< Status of Korea's National R&D >

According to the OECD, R&D is defined as "any creative activity that expands knowledge and its application." Government-led R&D is conducted
through direct government funding for science research and technology development, focusing on research fields such as pure basic sciences, aerospace and nuclear power. These require large financial investment and often exceed the capacity of the private sector.

Korea's public R&D expenditure ranks among the top countries of the world. The Korean government has increased its R&D by an annual average of 12% over the past ten years, reaching 6th in the world in investment and 1st in investment as a percentage of GDP.

However, it was often pointed out that Korea's R&D lags in the actual number of results that lead to commercialization compared to the amount of capital invested. In fact, successful commercialization of R&D achievements for major countries range from 70.7% for the United Kingdom and 69.3% for the United States, to 54.1% for Japan, but a dismal 20% for Korea. Other oft-cited deficiencies include the lack of partnership between the public and private sector or between industry, academia and research centers; isolated research by single research institutes or universities that ignore the market; and an overly complex assessment and management system.

To address these issues, the Korean government has initiated efforts to reform the R&D ecosystem so that investments will lead to profit and business achievements. This commitment reflects the government's understanding of the need for strategic innovation in R&D in order to achieve tangible results in the Creative Economy, where investment can seamlessly turn into real technologies, products and services. This new direction can be labeled as research and business development, or R&BD.

The government has also become aware of the need to provide an environment where our scientists and researchers can fully focus on R&D,
allowing universities, government-backed research institutes (GBRIs) and companies to fulfill their roles through S&T innovation.

This newfound awareness has culminated in the "Government R&D Innovation Plan" announced last May, to provide a road map for enhancing the efficiency of Korea's R&D investment.

< Establishment of the "Government R&D Innovation Plan" >

The central pillars of the "Government R&D Innovation Plan" are (1) the reorganization of R&D support systems to place greater emphasis on small and medium enterprises (SMEs) and (2) the creation of a user-oriented optimal environmental for research. The key component of this plan is to boost technological support for SMEs and mid-sized companies in order to create world-leading "hidden champions," ultimately enhancing the contribution of S&T toward national economic development.

The R&D innovation plan, therefore, aims to enhance the quality of R&D products and accelerate support for SMEs by rebuilding the fundamental structure of government-backed R&D.

The plan calls for a clear division of roles between the government and the private sector, allowing the government to focus on fundamental technologies and future growth drivers that are difficult tasks for the private sector to manage, while businesses take charge of commercialization. In addition, the plan will ensure that SMEs and mid-sized companies have access to personnel and equipment in universities and GBRIs for their research programs, in order to increase their contribution to national economic development.
Comprising almost 99% of Korea's corporate world, SMEs and mid-sized companies are the backbone of Korea's economic and social development and play an important role in strengthening the overall soundness of Korea's economy. Despite the obvious need to secure continuous technological development and higher competitiveness for SMEs and mid-sized companies, however, they have been sidelined in terms of personnel and financial support for R&D and large conglomerates or universities have been favored. The plan, therefore, places special emphasis on enhancing support for SMEs and mid-sized firms.

To enhance the efficiency of the R&D process, cumbersome assessment policies will be improved and unnecessary administrative red tape removed, allowing researchers to focus on their research. The plan also includes measures for strengthening related government agencies in order to strategically allocate R&D investment.

Specific measures included in the innovation plan are as follows:

First, the plan will strengthen the role of GBRIs by applying the Fraunhofer Model, the international gold standard in industry-academia partnership. Reliance on a project-based system (PBS) has forced GBRIs to compete with other universities, companies and research centers to win government research contracts, limiting their ability to carry out fundamental research which is required to engage competitively. In addition, little support was made available by GBRIs or universities for SMEs that often lack high-quality research personnel or equipment.

* PBS (Project Based System): a system that allows agencies to finance their research, hiring and other expenses through open competition of
research assignments.

The government will reorganize the financing structure of R&D by reducing the PBS and increasing outsourcing to the private sector, allowing GBRIs to focus on basic and original technologies that the private sector are often unable or reluctant to conduct.

Applying the Fraunhofer Model, developed in Germany, which links government with private financing in a way that suits Korea's R&D environment, the plan aims to encourage GBRIs to place a greater importance on real-world needs and work closely with the private sector.

In particular, the plan will gradually increase the weight of outsourced projects for Korea's six major GBRIs* from the current 14% to 21% by 2018 in order to create a research ecosystem that is better suited for Korea's needs.

  * Electronics and Telecommunications Research Institute, Korea Institute of Industrial Technology, Korea Electrotechnology Research Institute, Korea Research Institute of Chemical Technology, Korea Institute of Machinery & Materials, Korea Institute of Materials Science

In addition, the government will support and further develop GBRIs so they can function as research centers for the SMEs and mid-sized companies that face technological barriers, providing the human and technological resources and know-how of GBRIs.

SMEs in Korea are responsible for providing jobs to 88% of nation's workforce and play a central role in keeping korea's economy strong. Arming SMEs and mid-sized firms with better technologies will naturally increase the nation's economic power and competitive edge, but currently the R&D
environment for these companies is quite dismal. While there are over 30,000 research centers operated by these companies, for example, the average staff size is less than 5.5. Unlike large companies, SMEs and mid-sized firms lack the R&D financing and equipment, which further crimps their potential.

The high-quality research staff, equipment and technological know-how retained by GBRIs will be deployed to support the R&D activities of SMEs and mid-sized companies, in order to improve their technological capabilities and the competitiveness of their products.

In particular, the number of joint research facilities that bring together universities, GBRIs and SMEs will be significantly increased to expand the technology innovation and commercialization capabilities of SMEs. The ownership rights of equipment acquired or purchased for government-led R&D will be reorganized to allow equipment used by universities and GBRIs to be purchased by a government agency specializing in logistics for research equipment, and transferred to SMEs and mid-sized firms.

The second major pillar of the innovation plan is an overhaul of the government's R&D planning, management and evaluation system. R&D assignment has formerly relied on a bottom-up system where R&D tasks were distributed to meet the needs of each government agency, without forming a coherent picture of R&D investment for the entire nation. Some R&D projects that require preliminary feasibility studies have taken as much as three years before the project is even launched, missing the "golden window" when that research would have done the most good. This caused technological development through government R&D to be inefficient.

There has also been a lack of a systematic support structure that classifies each level of research, from basic to original and commercialization, for
providing financial support. Excessive focus on the number of papers generated, quantitative rather than qualitative assessment criteria, and complex administrative hurdles have also been highlighted as factors that hinder more quality-based research achievements.

To address these issues, the government will form a medium and long-term R&D strategy using the R&D innovation plan. This includes reforming the requirements for preliminary feasibility studies and other administrative processes to boost the strategic qualities and timeliness of R&D investment.

For key R&D projects that need to receive funding quickly, there will be an assessment of the optimal timing and financing method, making funding more efficient with standards and procedures for a streamlined funding process.

Should there be a lack of available funds to address an immediate research need, a "fast-track system" will be created where budgets will be adjusted for existing projects to put the high-priority projects first, with a concurrent feasibility study conducted to provide additional funding if the project merits it.

To improve the assessment process, evaluation of research results will rely on expert assessment and peer review rather than a simple tally of the number of papers produced or patents received.

To ensure a fair and uniform evaluation process, several members of the initial evaluation panel will return for the final review board for the research results. The current rules, which strictly prohibit the involvement of experts who are acquainted with the researchers in the assessment panel, will be relaxed, to maintain a level of expertise among the reviewers.

* Relaxation of exclusion rule: restrictions will be changed from the current prohibition of anyone working in the same organization to the exclusion of only those
Cumbersome regulations, complex administrative processes and other barriers that restrict researchers will be minimized, and the numerous research templates maintained by each agency and ministry will be reduced to less than ten, with research reports also being streamlined to include only the core information.

A "moving target" system will be adopted to allow research programs to be wrapped up ahead of schedule if they achieve their targets before the planned due date, and allow them to make changes. Future projects that achieve excellent results may also carry over any remaining funds to a subsequent project, with the proper approval from the oversight agency.

< Future Direction and Goals of the Innovation Plan >

While the Korean government has announced a number of plans to improve R&D in Korea, the latest innovation plan focuses less on addressing specific issues and more on making a cross-ministry overhaul of the entire R&D process. It seeks to transform the big picture of government ID by addressing the needs of the organizations and entities that actually do the research. The plan concentrates on creating a user-oriented research system that can improve the application of research results, promote commercialization and industrialization, and support SMEs and mid-sized companies.

The government will work to strengthen Korea's R&D ecosystem and establish a powerful base for innovation that will bring Korea's position to 6th in the world on the OECD Science and Technology Innovation Index. It will also increase Korea's technology exports to $8 billion, thereby raising the commercialization rate and overall quality of Korea's R&D initiatives. The
strategic profile and efficiency of R&D investment will also be increased.

These efforts are expected to allow Korea's R&D to play a key role in the nation's economic development and support SMEs and mid-sized companies with advanced technologies, stabilizing the economy and increasing Korea's competitive edge.

The European Union has also been promoting innovation in R&D in a manner similar to that of Korea. From 2014 to 2020, the EU will pour 80 billion euros into the "Horizon 2020" project, which is designed to strengthen investments in activities that bring together R&D and the market. It will create an environment where researchers can better focus on research, and make EU a global leader in science and industry. This is similar to Korea's program, which also seeks to strengthen the commercial aspects of R&D so that research results translate seamlessly into economic and social benefits.

In recognition of this common goal, Korea recently held the "5th Korea-EU Science and Technology Joint Committee" with the Directorate-General for Research and Innovation, the EU body overseeing Horizon 2020. This meeting highlights the Korean government's efforts to increase international partnerships, in order to achieve innovation and make Korean R&D more successful. Korea and the EU agreed to conduct a 90 billion-won joint research program and increase cooperation across the entire R&D life cycle, which includes expert exchange programs, joint R&D efforts and commercialization programs. This will bring about win-win results for both parties and advance the government's plans to achieve R&D innovation.