

Understanding Compressed Growth of Science and Technology in South Korea: Focusing on Public Research Institutes*

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Introduction

The two measures most referred to when assessing a country's level of scientific and technological development or competitiveness are the rankings for "scientific infrastructure" and "technological infrastructure" reported by the Swiss organization International Institute for Management Development (IMD). Each year, IMD evaluates and ranks the competitiveness of sixty nation states and publishes the results through the *World Competitiveness Yearbook*.¹ According to the 2014 yearbook, South Korea ranked sixth and eight in scientific competitiveness and technological competitiveness, respectively. Historically, South Korea ranked seventeenth in scientific competitiveness in 2004, rose to third place in 2009, showed a slight decline in ranking since then, but is slowly on the rise again in recent years. Similarly for technological competitiveness, after attaining second place in 2005, it dropped to as low as eighteenth place, but has shown steady improvement in ranking since then. These rankings are impressive when considered in comparison to South Korea's overall national competitiveness, which is at twenty-sixth place. In other words, the competitiveness in science and technology is in essence sustaining the declining level of national competitiveness. South Korea's scores on quantitative measures such as total expenditure on R&D, total R&D personnel, number of patents, and so on, have been very high and have contributed greatly to its overall ranking. These outcomes were unanticipated for a country that had been under extreme poverty, that relied heavily on the agricultural sector, and with a per capita GNP of just a little over 100 USD only half a century ago.

The first official investigation on science and technology (S&T) research activities were carried out by the Economic Planning Board (EPB, *Gyeongje gihoeok won* 경제

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¹ IMD, *IMD World Competitiveness Yearbook 2014* (Lausanne: IMD World Competitiveness Center, 2014).

기획원) in 1963 under the rubric of the “Survey on Research Institutions.” The results were published in the following year in the *Gwahak gisul yeon’gam* 과학기술연감 (Yearbook of Science and Technology).² According to this report, there were a total of 83 research institutes and 1,750 researchers, and the total research budget amounted to a mere 2.22 million USD. In a matter of fifty years, however, the R&D budget and the number of researchers have increased significantly. In 2013, South Korean expenditure on R&D totaled over 54 billion USD, putting the nation at sixth place in terms of absolute spending on R&D, with a gross domestic expenditure on R&D as a percentage of GDP of 4.15%, second only to Israel.³ There were a total of 410,333 research personnel in 2013, with a full time equivalent (FTE, reflecting the number of hours devoted to research activities) of 321,842 individuals—sixth greatest number of full-time researchers in the world. As these numbers show, South Korea has made astonishing quantitative progress—in terms of the number of researchers, R&D expenditure, number of international publications, and patents, and so on—within a short period of time. Although there do exist criticisms that qualitative growth is yet to match up to the quantitative achievements, South Korea’s accomplishments are unusual and laudable. The South Korean economy is widely and often referred to as having achieved compressed growth within a short period, but so has its S&T.

Various studies exist on the progress and growth of the South Korean economy. However, discussions on the advancement of its S&T remain relatively scarce.⁴ This article aims to reveal the key to South Korea’s compressed growth in S&T by focusing on its public research institutes. In the South Korean context, S&T policy began with public research institutes—they were the main means through which the government had promoted and invested in S&T, and where the outcomes of S&T policies were best manifested. In the process of advancing S&T in Korea, which is often characterized as government-led, the role of government-funded research institutes (GRIs, *Jeongbu churyeon yeon’gu gigwan* 정부출연연구기관) was both uniquely Korean and critical.⁵ GRIs were the origin as well as the most instrumental tool in

² EPB, *Gwahak gisul yeon’gam*, 1964 과학기술연감, 1964 (A Yearbook of Science and Technology, 1964) (Seoul: EPB, 1964), 27.

³ OECD, *Main Science and Technology Indicators*, Volume 2014, Issue 2 (Paris: OECD Publishing, 2014), 21.

⁴ For more information on the history of S&T in contemporary Korea, see Joel R. Campbell, *The Technology Policy of the Korean State Since 1961* (Lewiston: The Edwin Mellen Press, 2009); Korea Institute of Science & Technology Evaluation and Planning (KISTEP), *Dynamic History of Korean Science and Technology* (Seoul: Ministry of Education and Science and Technology, 2010).

⁵ OECD, *Republic of Korea: Reviews of National Science and Technology Policy* (Paris: OECD Publishing, 1996), 63-70; Yim Deok Soon and Kim Wang Dong, “The Evolutionary Responses

the construction of S&T infrastructure and the recruitment of talented human resources for rapid advancement in S&T. Therefore, understanding the history of GRIs is the key to understanding compressed growth in South Korean S&T.

This research aims to trace the history of the creation and growth of public research institutes in Korea, with a focus on GRIs, from 1945 to the 1980s. Since the early post-liberation years, when scientists and engineers argued for the establishment of research institutes for national reconstruction, this paper will trace the birth of South Korea's current S&T research system by investigating the rise and growth of representative research institutes.⁶ Following independence, national institutes were the only publicly-funded research agencies, and the government introduced GRIs in the 1960s in order to avoid red tape. Through GRIs, the government was able to increase investments and political support for S&T. However, due to the dependency on governmental funding, there was a limit to the autonomy of GRI operation. During the 1970s, as more specialized GRIs were established, the research activities of the institutes gradually became more closely connected to the relevant industries. One of the most prominent characteristics of Korea's public research institutes was the shift in representative institute as a result of intensive governmental investment. Focusing on periodical changes in this context, this paper will argue that the government's emphasis on a specific institute or field was the key to compressed development of S&T in Korea.

“Give Us a Laboratory, and We Will Build Our Nation!”

The research institutes in Korea started out as experiment stations during the colonial period. The Japanese Government-General of Korea established these experiment stations in the areas of agriculture, fishery, forestry, and industry. However, the main function of these stations was to conduct surveys and to introduce Japanese technology, rather than promote new research, and only a very small number of Korean researchers were employed.

After liberation in 1945, Korean scientists took over the experiment stations. However, it was very challenging to concentrate on research due to the political and social turmoil, financial constraints, and shortage of human resources. Despite these adverse research environments, scientists stuck to their beliefs that scientific and technological prowess was crucial for true independence and the construction of a new nation. They maintained that Korea had been colonized in the first place because of

of Korean Government Research Institutes in a Changing National Innovation System,” *Science, Technology, & Society* 10:1 (2005), 31-55.

⁶ In this paper, “S&T research system” is used as a collective term to describe both S&T research institutes and the related institution to them.

its lack of a strong S&T foundation, and that liberation had been possible due to the advanced S&T capacities of the United States. This belief led to the “post-colonial desires” of Korean scientists, which could also be found in many newly independent countries, such as India and China.⁷ Similarly, Japanese intelligentsia had believed that S&T was the most urgent and important asset for the integrity, survival, and progress of the nation during and after the war, and Mizuno Hiromi referred to this as “scientific nationalism.”⁸

Korean scientists pushed the government to promote S&T and presented various measures of doing so. In general, professors and researchers had great interest in the enhancement of scientific research. For example, Ree Taikyue 이태규 of Seoul National University submitted a plan to establish a *Gwahak gisulbu* 과학기술부 (Ministry of Science and Technology) that would oversee research institutes. He proposed that the experiment stations built during the colonial period be expanded and that new institutes be established under the ministry. Ree also suggested that an umbrella institute called the “Comprehensive Research Institute” be built to function as “a science palace,” like the Institute of Physical and Chemical Research (RIKEN) in Japan.⁹

Although different individuals proposed different names and had different points of emphasis, there was a common aspiration for an agency that would systematically manage research at the national level, centrally coordinate all research institutes, and improve the quality of S&T education. Scientists including Ree seemed to say, “Give us a laboratory, and we will build our nation,” but everyone seemed to propose a slightly different idea of what the laboratory should be and how to advance S&T. Understandably, the scientists also had the intention of strengthening their professional interest through these post-colonial desires. They wanted to expand their influence within the scientific circle by enlarging their institutes and building new organs in their respective fields.¹⁰ Although their idea of centrally managing all the

⁷ Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton: Princeton University Press, 1999), 201-226; Wang Zuoyue, “Saving China through Science: The Science Society of China, Scientific Nationalism, and Civil Society in Republican China,” *Osiris* 17 (2002), 291-322.

⁸ Mizuno Hiromi, *Science for the Empire: Scientific Nationalism in Modern Japan* (Stanford: Stanford University Press, 2009), 181.

⁹ Ree Taikyue 이태규, “Geon’guk seolgye ui hanaro gwahak gisul bu reul seolchi haja” 건국설계의 하나로 과학기술부를 설치하자 (Let’s Establish the Ministry of Science and Technology as a Planning for Nation Building), *Hyeondae gwahak* 현대과학 (Modern Science) 1 (1946), 10-15.

¹⁰ Hong Sung Joo 홍성주, “Han’guk gwahak gisul jeongchaek ui hyeongseong gwa gwahak gisul haengjeong chaegae ui deungjang, 1945-1967” 한국 과학기술정책의 형성과 과학기술 행정체계의 등장, 1945-1967 (Formation of a Science and Technology Policy in South Korea and Its Administrative System, 1945-1967) (Ph.D. diss., Seoul National University, 2010), 26-31.

laboratories and S&T policies would not always be in accordance with autonomy in research, scientists emphasized the role of S&T in nation-building. However, their desires were accepted by neither the US Army Military Government in Korea, nor the newly launched government of the Republic of Korea. Because the government was confronted with other urgent issues such as economic downturn, food deficiency, and national security, S&T was not high on the list of priorities. Considering the dearth of scientists and engineers, building new research institutes seemed to be an impractical plan. Thus, the government established national universities as an effort to increase human resources in S&T. Although the post-colonial desires of Korean scientists were not immediately realized, their continued advocacy for the promotion of S&T heightened the awareness for national science policy.

The Korean War and Protection of Scientists: MND Scientific Research Institute

War played a major role in building the new nation of Korea. For example, although the Korean War wrought incalculable damage to Korean society, the enlargement of the army and police forces during the war strengthened state control over society, which was an important element for the development of the nation state. Similarly, expansion of a science research institute also occurred against the backdrop of war.

In 1950, the Ministry of National Defense (MND) founded the Institute of Scientific Research and Development (ISRD, *Gukbangbu gwahak gisul yeon'guso* 국방부 과학기술연구소) for the R&D of arms and ammunitions. In fact, the need for the institute was not so great because the South Korean armed forces depended heavily on US aid. Thanks to the efforts of military officers who had majored in science and engineering, this small organ was able to refer to itself as a research institute. Unfortunately, its research activities were put on hold by the Korean War, which broke out ten days after the establishment of the institute. Paradoxically, however, the war served as an opportunity to acquire high-quality scientists and engineers. As the institute was evacuated from Seoul to Busan, it hired top-level scientists and engineers as non-regular staff, with the intention to prevent them from being kidnapped or defecting to North Korea.¹¹

By attracting new recruits, the institute secured skilled workforce in all fields of S&T. While the Korean society in general faced great hardship during the war, the military institute flourished because it had a larger role to play. Consequently, the

¹¹ Gwayeonhoe 과학회 ed., *Gukbangbu gwahak yeon'guso* 국방부 과학연구소 (The MND Scientific Research Institute) (2003). This self-published book by former staff of the MND Scientific Research Institute is the only literature that includes much information on the institute.

MND ISRD functioned as a shelter for scientists and a forum for scientific discussion, although it was not well endowed in scientific equipment and facilities.

The institute was subjected to several instances of reorganization and was unable to sustain research projects because it was not established under a long-range plan. Notwithstanding, the researchers tried to emphasize the identity of a research institute and, from 1952, published mimeographed copies of *Gwayeon hwibo* 과학회보 (The Journal of the Institute of Scientific Research and Development).¹² As the contents of the journal were classified as military secrets, it was distributed only to MND and the military. The notable research topic was about military rations for Korean soldiers. The publication of the journal was of great academic significance, because most scientific societies of the time could not issue their own independent journals due to the shortage of funds and manpower.

After being granted a higher legal position in 1954, and renamed as the Scientific Research Institute (SRI, *Gukbangbu gwahak yeon'guso* 국방부 과학연구소), the institute became a national organ with upgraded experimental facilities. It was obvious that the MND SRI was a rare space where various types of research were being conducted, but it was not without its drawbacks. Because it was a military organization, non-affiliated researchers were prohibited from using the experimental equipment and its library.¹³ Furthermore, because the founding of the institute preceded the establishment of any form of national S&T policy, the institute lacked political and administrative support. This meant that the institute was founded on shaky grounds, and eventually, following a military coup and the emergence of a new regime in 1961, it was abruptly dissolved under the excuse of public administration simplification.

Despite its brief existence, the MND SRI was the representative science research institute in Korea during the 1950s. It functioned as a meaningful locus that accommodated a sizable number of scientists and engineers during the war, and it was able to attract young scientists by providing an alternative to military service. Little had been known about the MND SRI until now mainly due to its sudden shutdown, which prevented it from making a bigger impression on the public and on modern Korean history. However, the value of the MND SRI must be recognized, for it produced a large number of scientists and engineers that later went on to play key roles in academia and industry.

¹² Kim Geun Bae of Chonbuk National University is putting this journal in storage and I browsed through the journal with his help.

¹³ Leonard Reiffel, *Daehan min'guk wonjaryeok yeon'gu e gwanhan bogoseo* 대한민국 원자력 연구에 관한 보고서 (The Report on the Atomic Research in Korea) (Seoul: OAE, 1960), 2-3.

“Atoms for Peace” and the Institute for Atoms: The Atomic Energy Research Institute

The significance of atomic power resonated greatly among the Korean people because the surrender of the Japanese colonialists and restoration of national rights and freedom had been made possible by nuclear bombs.¹⁴ The Korean War raised public concern over nuclear weapons and the scientists expected that atomic energy would help resolve the problem of electric power shortage of the time. Nuclear weapons and the pursuit of nuclear energy became the symbol of the “power of S&T that Korea should actively seek to acquire in order to emerge as a strong, modern nation.”¹⁵ Against this backdrop, the Korean government actively promoted the development of atomic power following Dwight D. Eisenhower’s “Atoms for Peace” declaration in 1953. During the Cold War, atomic power was subject to the dichotomous perceptions of “peaceful atom of the free world” and “destructive atom of the Communist bloc,” and these served as the background for investment by the Korean government in atomic research.¹⁶ Around a dozen elite scientists gathered to study atomic energy. The aforementioned MND SRI also made its way into atomic research with the development of the nuclear bomb in mind.

After signing the “Agreement for Cooperation between the Government of the Republic of Korea and the Government of the United States of America concerning Civil Use of Atomic Energy” in 1956, the US government provided a nuclear reactor and radioactive isotopes to South Korea. For the operation of a research reactor and the national nuclear program, the Office of Atomic Energy (OAE, *Wonjaryeok won 원자력원*) and the Atomic Energy Research Institute (AERI, *Wonjaryeok yeon’guso 원자력연구소*) were established in 1959. Interestingly, North Korea also signed a nuclear agreement with the Soviet Union in 1956, and another with the People’s Republic of China in 1959.¹⁷ The similar trajectories of the two Koreas demonstrate

¹⁴ Kim Dong-Won, “Imaginary Savior: The Image of the Nuclear Bomb in Korea, 1945-1960,” *Historia scientiarum* 19:2 (2009), 105-118.

¹⁵ Sheila Jasanoff and Kim Sang-Hyun, “Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea,” *Minerva* 47:2 (2009), 130.

¹⁶ Kim Seong-Jun 김성준, “Han’guk wonjaryeok gisul cheje hyeongseong gwa byeonhwa, 1953-1980” 한국 원자력 기술 체제 형성과 변화, 1953-1980 (Formation and Changes in the Technological Regimes of the Nuclear Program in South Korea, 1953-1980) (Ph.D. diss., Seoul National University, 2012), 32-34.

¹⁷ Lee Choon-Kun 이춘근, *Bukhan haek* 북한 핵 (Nuke of North Korea) (Seoul: Saenggagui namu 생각의나무, 2005), 72-75.

that the quest for atomic research proceeded within the context of the Cold War tensions.¹⁸

From 1956 to 1966, the Korean government dispatched 260 young scholars who sought to study nuclear science and engineering to the United States and Europe. The International Atomic Energy Agency (IAEA), the US International Cooperation Agency (ICA), and other international organizations provided financial support for this study-abroad program, with the majority of the funding coming from the Korean government. Given that there had been a lack of foreign exchange reserves in Korea at the time, the fact that the “atomic research fellowship program” promoted students to study abroad shows that the Korean government had high expectations for its nuclear projects. As the government invested more and more in atomic energy research and the staff of the MND SRI transferred to AERI, the latter replaced the former as the most significant science research institute in South Korea.

AERI’s researchers would function as a stepping-stone for the future of Korean S&T. They tried to build proper foundations for fundamental research in all fields of S&T, without limiting itself to nuclear science. Also, because atomic energy research was a broad field touching on various disciplines, AERI encompassed areas ranging from the natural sciences to engineering and medicine. In 1959, the first year of its conception, AERI held a comprehensive academic meeting called the “Atomic Energy Academic Conference,” covering diverse fields.

Over 500 scientists and engineers from academia and research institutes, and representatives of academic societies from across the country participated in this conference. Together, they drafted a document entitled “Geonui mun” 건의문 (A Proposal).¹⁹ The document, which was submitted to the government, raised several important issues regarding the promotion of S&T. At the heart of this proposal was the enactment of the “Science and Technology Promotion Act,” which would encompass the improvement of science and engineering education as well as the establishment of a “Science and Technology Center.” As a central academic institution responsible for S&T policy and research, the center was envisioned as an “organization fulfilling an academic yet dynamic and practical function.” The guiding idea was that in order to prevent bureaucratization, this center should be established as an independent committee or organ, have a research center per subfield, conduct a variety of studies on the needs of the society, and, in the long term, mature into the nation’s highest S&T council. This proposal expressed the scientists’ persistent goal

¹⁸ For the discussion of the disguised intention of the “Atoms for Peace” program, see John Krige, “Atoms for Peace, Scientific Internationalism, and Scientific Intelligence,” *Osiris* 21 (2006), 161-181.

¹⁹ Jeilcha wonjaryeok haksul hoeui 제1차 원자력학술회의 (The First Academic Conference on Atomic Energy), “Geonui mun” 건의문 (A Proposal) (July 1959).

for the promotion of S&T at the national-level, and was significant in that it represented the collective voice of scientists.

However, this aggregated opinion did not resonate with the government due to the consecutive political maelstrom soon after: the April 19 Revolution in 1960 and the May 16 Coup in 1961. With such political instability, the average term of AERI directorships was less than a year, and there were conflicts between scientists and bureaucrats, and among researchers in AERI.²⁰ The ultimate goal of the government in supporting the institute was to obtain practical gains such as atomic energy generation. However, scientists at AERI deemed the establishment of a foundation for comprehensive S&T to be important as well. As the South Korean government dispatched young scholars to study abroad without thorough planning, a sizable proportion of them studied basic sciences and did not return to Korea, or opted to pursue other areas of study. This implied that scientists tried to take advantage of the US-Korea atomic energy cooperation to expand manpower and research experiences in other fields of science. Additionally, scientists focused on fundamental research to develop research capacity, for it would require considerable amount of time to accomplish a task in the new field of nuclear research.²¹ Considering Korea's economic condition at the time, Korean industries had not achieved systemized in-house R&D. As scientists had little experience in practical R&D, they tended to prefer basic research with which they were more familiar, in the name of S&T promotion.

Although the MND SRI vanished, AERI was able to replace it. AERI, which emerged within the context of the Cold War, functioned as a significant science research institute from the early to mid-1960s. Korean scientists wanted to promote S&T using the institutes as leverage, but their ideas needed to evolve in order to meet the government's demand. Notwithstanding, Korean scientists still maintained their post-colonial desires for a proper science institute and S&T governmental agency, and the aspiration served as the compass for the national S&T policy that soon followed.

²⁰ On the tension between scientists and bureaucrats in AERI and OAE, see Park Buhm Soon, "Technonationalism, Technology Gaps, and the Nuclear Bureaucracy in Korea, 1955-1973," Bae Youngsoo and Park Buhm Soon eds., *Bridging the Technology Gap: Historical Perspectives on Modern Asia* (Seoul: Seoul National University Press, 2013), 163-197.

²¹ US advisers such as W. Wayne Meinke expressed concern that AERI was too academic in its endeavors. He believed that the institute and its research were regarded as being far from practical. W. Wayne Meinke, "Report on Visit to Korea," (April 1962), 7-8, folder "Phoenix. Organizations. ICA", box 24, Michigan Memorial Phoenix Project, Bentley Historical Library, University of Michigan, USA.

The Birth of Government-funded Research Institutes: Korea Institute of Science and Technology

Although AERI was regarded as the best research institute in South Korea by the mid-1960s, it was unable to meet the expectation of the scientists. AERI, as a national institute, had to obey the regulations regarding civil servants in terms of quotas and salaries. These restrictions were obstacles to attracting and providing appropriate remunerations to distinguished researchers as regular staff, and to performing creative research activities. Recognizing the problems of the national institute, a considerable number of scientists raised the issue of the necessity of building non-governmental institutes in order to avoid bureaucratic red tape.

The Korea-US summit meeting held in 1965 provided the much-needed momentum for the future development of S&T. During the summit, US president Lyndon B. Johnson offered to send his science advisor to Korea to explore the feasibility of US cooperation in establishing a Korean institute for industrial technology and applied science. President Johnson's proposal was an expression of gratitude to the Korean government for its decision to dispatch combat troops to Vietnam. At the same time, this suggestion was designed to placate Koreans' opposition to the normalization of the Korean-Japanese diplomatic relations, and to launch a pilot project for mitigating brain drain in Korea.²²

Interestingly, North Korea made an agreement for S&T cooperation with the Chinese Academy of Science in July 1965. A US government official of the Office of Science and Technology believed that the US proposal to South Korea irritated socialist states including North Korea. He added that this kind of competition was much welcomed.²³ This reveals that the relationship between Korea's efforts for promoting S&T and the Cold War was similar to the case of AERI in the late-1950s.

In 1966, with the aid of the US government, the Korea Institute of Science and Technology (KIST) was established as a non-profit organization. The US government granted 7.18 million USD to KIST, and the Korean government endowed 14.1 million USD for its establishment and operation during its first five years. Although the establishment of KIST was financed by the Korean and US governments, it was legally an independent corporation as a non-profit organization to avoid the inefficiency of national research institutes. Park Chung Hee became the founder of KIST in a private capacity. Despite its non-government status, KIST was able to secure

²² Moon Manyong, "Technology Gap, Research Institutes, and the Contract Research System: The Role of Government-funded Research Institutes in Korea," *The Korean Journal for the History of Science* 33:2 (2011), 301-316.

²³ Margolies' memorandum to Hornig, "Communist North Korean Reaction to President Johnson's Offer to President Park" (August 19, 1965), Office of Science and Technology, RG 359-part 2, NARA.

stable government support through the “Promotion Act for KIST,” which stipulated the payment of endowment funds and the transfer of state-owned property. As a result, a new form of research organization, called “government-funded research institute,” or GRI, was born. Although KIST was established using funds provided by the Korean and US governments, its goal was to provide technical aid to industries by adopting the contract research system. This was a major difference from its model and sister institute Battelle Memorial Institute (BMI). Therefore, KIST and BMI had needed to figure out the appropriate operation policy at KIST.

KIST recruited Korean scientists working abroad to serve as its core researchers, and took on a role as the “reverse brain-drain center.” The institute’s goal was to contribute to the development of Korea’s economy through industrial research. This meant that S&T research came to be closely connected to the economic development plan of the South Korean government. Despite the name “Science and Technology Institute,” the majority of research projects conducted by KIST fell under the rubric of industrial technology. Although some scientists raised the problem that KIST placed too much emphasis on moneymaking and industrial contract research projects, the KIST staff members became increasingly conscious of these projects. Kim Geun Bae coined the expression “economic translation of S&T” to describe the changing perception that scientists held toward scientific research.²⁴

Under the aegis of the Korean government, KIST grew rapidly and became a significant scientific research institute, just as AERI had been a few years before. The emergence of KIST paved the way for the promotion of S&T in Korea. Having acquired a proper research institute, scientists demanded that a governmental agency for S&T governance be established. This was another aspiration that Korean scientists had held for a long time. As the Korean government also understood the socio-political and economic value of S&T, President Park decided to accommodate the demand. Finally, the Ministry of Science and Technology (MOST, *Gwahak gisulcheo* 과학기술처), an administrative office for S&T policy, was founded in April 1967, and the long-standing hope that scientists had held for the promotion and political stability of S&T had finally been realized. As a ministry-level agency, MOST established a twenty-year plan and tried to secure governmental budget for S&T development, and encouraged the foundation of institutions for the promotion of S&T. This signaled the beginning of a systematic approach to national S&T development, a process for which KIST was a very effective catalyst. In other words, the establishment of KIST as the first GRI in 1966 became a starting point for the formation of the modern S&T system in Korea, composed of research institutes, administrative

²⁴ Kim Geun Bae, “An Anatomical Chart of South Korean Science and Technology in the 1960s: Their Relationships with Political Power,” *EASTS: an International Journal* 5:4 (2011), 529–542.

agencies, and other supporting sub-systems.²⁵

Tensions between the Two Koreas and Weaponry Research: Agency for Defense Development

Having recognized the value of an institute dedicated to research by the experience of KIST, the South Korean government established new institutes modeled upon KIST even before it had reached its maximum potential. The Agency for Defense Development (ADD, *Gukbang gwahak yeon'guso* 국방과학연구소) was built on a site next to KIST in 1970, and in the following year, the Korea Development Institute (KDI, *Han'guk gaebal yeon'guwon* 한국개발연구원), an economics research institute, and the Korea Advanced Institute of Science (KAIS, *Han'guk gwahag won* 한국과학원), a science and engineering graduate school, were newly built. With the founding of these additional institutes, the Hongneung 홍릉 district in Seoul became the first research complex of South Korea.

At the time, the Korean government had a series of national defense concerns, which had provided direct motivations for setting up a defense research institute. The government felt that national security was under threat for three reasons: the January 21 Incident, when North Korean special forces penetrated into Seoul with a mission to assassinate the South Korean president, the seizure of the American intelligence ship USS *Pueblo* by North Korea, and the announcement of the “Nixon Doctrine,” which consequently led to the retrenchment of the US armed forces in Korea.²⁶ The Park Chung Hee regime, which came into power through the 1961 coup d'état, had been making up for its lack in political legitimacy by employing rhetoric grounded in national security and economic development. Therefore, it was only natural for it to respond sensitively to matters of security. In addition, given that South Korea had been relying heavily on the United States for defense, the retrenchment of the US armed forces in Korea had severe implications. Against this backdrop, the Korean government set in motion the planning of another research institute, this time for defense development.

ADD was established as a GRI and this decision had been made based on the KIST experience of attracting distinguished researchers from abroad and curtailing bureaucratic inefficiency. A couple dozen KIST researchers were transferred to ADD,

²⁵ Moon Manyong 문만용, “1960 nyeondae ‘gwahakgisul boom’: han'guk ui hyeondaejeok gwahakgisul cheje ui hyeongseong” 1960년대 ‘과학기술 붐’: 한국의 현대적 과학기술체제의 형성 (‘Science and Technology Boom’ in 1960s: The Formation of Science and Technology System in Korea), *Han'guk gwahaksa hakhoeji* 한국과학사학회지 (The Korean Journal for the History of Science) 29:1 (2007), 67-96.

²⁶ O Won-chol, *The Korea Story* (Seoul: Wisdom Tree Publishing, 2009), 116-151.

and ADD's first and second directors were former KIST vice-directors. ADD housed an interesting pool of researchers; its researchers maintained civilian status by default, but a sizable number of officers were on secondment to the institute.

Immediately following its establishment, ADD received urgent orders for weapons development by President Park, and swiftly launched six projects for developing basic weapons, including small arms and trench mortars. The institute was soon committed to and led the reinforcement of military equipment and modernization programs, thereby serving its intended role as the command post for defense research. Although the institute started off with development through imitation, relying on technological transfers from the United States, the institute soon developed technologies that were applied to the heavy and chemical industries. In this way, ADD's research outcomes were making significant contributions to the development of the private industrial sector. For example, the need for credibility, accuracy, and durability in military industry led to the institutionalization of quality assurance and evaluation protocols, which were adopted by the private sector. During the 1970s, therefore, military industry began to take on an important role in advancing Korea's manufacturing sector, especially in mechanical engineering.²⁷

ADD began with a total of 169 researchers, and steadily increased its personnel. It grew exponentially as President Park made the decision for nuclear weapons development. Details of the plan have not been fully publicized, but it is known that the decision was made between late 1971 and early 1972. ADD was put in charge of designing guided missiles and nuclear warheads, while the Korea Atomic Energy Research Institute (KAERI) was left in charge of research on reprocessing nuclear fuel.²⁸ However, following the Indian nuclear test in 1974, the United States urged the South Korean government to give up on the nuclear development project. Given the Korean government's heavy reliance upon the United States for military and economic support, the Korean government had little choice but to officially bring the project to an end. Despite the closing of the nuclear project, ADD continued to recruit elite scientists both domestically and internationally through the mid-1970s, and was referred to as the "assembly point for young, overseas, elite science brains of the 1970s." By 1979, it housed more than 2,500 personnel, not including those employed by its affiliated centers. ADD had surpassed its model institute KIST in terms of scale by a large margin, and naturally and proudly, became Korea's representative research institute of the 1970s along with KIST.

²⁷ Kim Jin Ki 김진기, "Park Chung Hee wa Han'guk ui mug, bangwi saneop" 박정희와 한국의 무기, 방위산업 (Korea's Weaponry, Defense Industry, and Park Chung Hee), in Lee Ji Sue 이지수 ed., *Park Chung Hee sidae-eul hoegohanda* 박정희 시대를 회고한다 (Retrospection on Park Chung Hee Era) (Seoul: Seonin Books, 2010), 183-201.

²⁸ Kim Seung-Young, "Security, Nationalism, and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1972-82," *Diplomacy & Statecraft* 12:4 (2001), 53-80.

An Invented Science City and the Reproduction of the KIST Model

Although Hongneung housed KIST at its center and received great attention for being the first research complex in Korea, it faced limitations due to the fact that it was not initially conceived to be such a complex. It was not possible to physically expand the complex due to limitations on available land plots. It was also criticized because the surrounding environment was not appropriate for research facilities, mainly due to the expansion of Seoul: noise, vibration, traffic, and etc. In the face of these limitations and challenges, MOST tried to create a genuine and efficient research complex. These efforts were realized as Choi Hyung-Sup 최형섭, the first director of KIST, took his office as Minister of Science and Technology. By the end of 1973, the President approved the “Basic Plan for the Research and Education City of Daedeok.” This plan envisioned a self-sufficient city where research facilities and universities, and five new strategically selected research institutes for industrial technology would be constructed. This plan encompassed not only the establishment of research institutes, but the design and construction of an entire city from scratch. This differed from the more common models in developed nations, where research complexes developed more organically around universities, institutes, or industrial areas. Daedeok would be different—an “invented science city” planned by the government, similar to perhaps Tsukuba Science City in Japan and Akademgorodok of Novosibirsk in Russia.²⁹

The original plan for Daedeok Science City had envisioned the reorganization and expansion of the five existing research labs at KIST, and the establishment of five institutes following the footsteps of KIST. Consequently, KIST set the standard for future research institutes, and it has been asserted that KIST was the template for all GRIs. However, it was soon pointed out that building new institutes by dismantling the organization of KIST and diverting its human resources would have more negative impacts on KIST. KIST’s Board of Directors was deeply concerned about setting up auxiliary bodies or disassembling the existing organization before the institute reached maturity. However, the government had been greatly inspired by KIST’s expeditious achievements and pushed forth with policies for promoting S&T research by establishing specialized research institutes for each field. As a “quasi-government organization,” KIST was not in a position to refute the government’s

²⁹ James W. Dearing, *Growing a Japanese Science City: Communication in Scientific Research* (Routledge, 1995); Marie-Laure Couderc, “The Role of Former Scientific and Technological Facilities in Russian Industrial Restructuration: The Case of Akademgorodok-Novosibirsk,” CERN paper (1997), <http://www.cerna.mines-paristech.fr/Documents/MLC-Splitconf.pdf> (accessed on 2015. 4. 5).

orders. Henceforth, the government assigned a new role for KIST as “research institute incubator.”³⁰

Daedeok Science City served as a direct factor that influenced the expansion of GRIs. At first, new GRIs were supposed to be located only in Daedeok. However, with alterations to the construction plans, research institutes diffused beyond the city limit. The amendment of 1976 curtailed the original plan from building a “research and education city” to a “research town,” because construction of a downtown had to be canceled due to the first oil shock. In addition, it had also become possible to build GRIs in other industrial complexes, such as Changwon and Gumi. In 1976, for example, four new institutes were established out of Daedeok: two in the Changwon Machine Industrial Complex, and one in the Gumi Electronic Industrial Complex, and lastly, the Telecommunication Technology Institute in Seoul as an affiliate of KIST. As a result, the system of GRIs that began in Hongneung was forming its new base in Daedeok and branched out through the country, as far south as Changwon and Gumi. There was a boom of GRIs in the 1970s, which continued to the mid-1980, when Korea had nineteen GRIs in full operation, including one affiliated institute. The increase in the number of GRIs as a result of the construction of the Daedeok Science Town essentially formed the core of the government’s S&T policy in the 1970s. Supported by the government, GRIs became influential entities in the fields of S&T.

The formation of Daedeok Science Town and the creation of GRIs signified the simultaneous foundation of development in S&T and political value. However, there arose a competitive atmosphere amongst ministries, each striving to create a GRI within a short time span, which led to several problems. Above all, GRIs were not created as part of a long-term or comprehensive policy. GRIs made impressive quantitative advancements and were filled with grand-looking hardware, but the plans that oversaw their expansion lacked policy coordination, comprehensiveness, and farsightedness.³¹ Such growth-oriented policies were bound to be faced with problems often described as myopic. For example, the Korea Research Institute for Shipbuilding, and the Korea Ocean Research and Development Institute were established as affiliates of KIST in 1973, and the two were integrated to form the Korea Shipbuilding and Ocean Research Institute in 1976. However, the Korea Ocean Research and Development Institute eventually separated itself to become an independent affiliate of KIST in 1978. Research institutes for shipbuilding and maritime research

³⁰ Moon Manyong, *Han’guk ui hyeondaejeok yeon’gu cheje ui hyeongsyeong: KIST ui seolip gwa byeonchyeon, 1966-1980* 한국의 현대적 연구체제의 형성: KIST의 설립과 변천, 1966-1980 (The Formation of the Modern Research System in Korea) (Seoul: Seonin Publishing, 2010), 189-190.

³¹ Moon Manyong, “STI in History: The Creation of Government-supported Research Institutes during the Park Chung-hee Era,” *STI Policy Review* 2:2 (2011), 63-64.

then underwent several instances of independent establishment, mergers, and separations within a period of less than five years. This demonstrates that the research institutes established by the government were unstable due to the lack of a long-term master plan.

Comprehensive adjustments in GRIs could not be accomplished because the main ministries in charge of the research institutes could not be clearly identified. This resulted in conflicts among GRIs in the early stages of their establishment as institutes overlapped in terms of functions. Ultimately, discussions on whether to merge certain institutes were held even before the construction of the buildings were completed. As research centers that started off as affiliates of KIST spun-off into independent institutes that had no ties to KIST, it became difficult to manage and oversee the roles of all the institutes at the national level. In other words, because each institute was self-governing with its own board of directors, competition among the institutes was inevitable. This was the side-effect brought on by rapid compressed growth. It is often stated that the development of South Korean S&T has been state-driven. However, a closer look at the process of development shows that state intervention was neither well-structured nor strictly top-down. In fact, the decision to construct the Daedeok Science City had not been a result of inter-ministerial coordination, but an initiative proposed by the Minister of Science and Technology and approved by the President. Therefore, there was low agreement among the ministries that were in need of research activities and results. As can be drawn from the competitive atmosphere in which GRIs were established, inter-ministerial competition was an influential factor that affected the compressed growth of S&T in South Korea.³²

As the years passed, a good number of former KIST researchers took up positions as directors of the newly established research institutes, so much so that the phrases “KIST circle” or “Choi Hyung-Sup division” became widespread. Nevertheless, it also happened that the influence and status of KIST itself diminished. This typical model of compressed growth by creating a novel system of research agencies such as the GRIs, fostering early stage growth through intensive support, heralding the initial agency as the paragon of establishing numerous agencies in order to rapidly construct a national R&D system, was the Korean government’s method of choice. This method was extrapolated and applied to other policy areas, such as the national R&D project, S&T-specialized universities, and R&D special zones or Inno Polis in the 1980s and beyond. Rigorous support for a single model and its subsequent reproduction were the keys to South Korea’s government-led compressed growth. This method made great strides in terms of quantitative growth within a short period, but was not free of its limitations of being unable to promote multi-party coordination, or assure long-term and qualitative development in R&D.

³² Campbell, *Technology Policy of the Korean State* (cit. n. 4), 45-111.

Reorganization of GRIs and the Rise of Electronics and Telecommunications Research Institute

Rapid expansion of GRIs in the 1970s was the essence of the Park Chung Hee's S&T policy, and by naming himself as the founder of all GRIs, President Park paraded his image as an avid supporter of S&T. However, a sudden increase in the number of GRIs resulted in managerial difficulties. As mentioned in the previous section, inter-ministerial competition and the absence of a systematic, overarching, and long-term master plan meant that comprehensive coordination of the institutes was low. Secondly, the institutes were facing difficulties in securing budgets, for funds were barely enough cover construction costs. In addition, the second oil shock put many businesses under pressure, which made them skeptical to investing in R&D. GRIs had to compete for projects. They also experienced difficulties attracting qualified researchers because the institutes were located in a newly built area, where living amenities and infrastructure were still under construction or absent.

Against this backdrop, President Park died in 1979 and a new president came into power. This raised possibilities for the organizational restructuring of GRIs. Wary of the impact of the economic crisis during the late 1970s, the new government shifted its economic priorities from growth-centered to stabilization, and promoted the organizational restructuring of the heavy and chemical industries. The government also restructured the labor unions, educational institutions, and the media. GRIs were also subject to mergers and abolitions. The government criticized that there were too many overlaps in function that some institutes were not justified to stand as independent institutes, and thereby caused unnecessary competition amongst each other. It also pointed out the lack of overall management due to the involvement of multiple ministries as supervising bodies. As a result, in October 1980, the government announced that it would conduct mergers and abolitions on sixteen GRIs to reduce the number to nine.³³

As a result, KIST merged with KAIS, a research-centered graduate school, to form KAIST. It was believed that the merger would bring synergy by consolidating research and education, but by having to give up the name KIST, the institute had in effect lost its long-built reputation. Also, the Korea Atomic Energy Research Institute (*Han'guk wonjaryeok yeon'guso* 한국원자력연구소) was merged with the Korea Nuclear Fuel Company (*Han'guk haek yeonryo gaebal gongdan* 한국핵연료개발공단) to give birth to the Korea Advanced Energy Research Institute (*Han'guk*

³³ Moon Manyong 문만용, "1980 nyeon jeongbu churyeon yeon'gu gigwanui jaepyeonseong: KIST ui KAIST roui tonghapeul jungsimeuro" 1980년 정부출연연구기관의 재편성: KIST의 KAIST로의 통합을 중심으로 (Reorganization of Government-Supported Research Institutes in 1980: Focusing on the Merger of KIST and KAIST), *Han'guk gwahaksa hakhoeji* (The Korean Journal for the History of Science) 31:2 (2009), 505-543.

eneoji yeon'guso 한국에너지연구소). The term “nuclear energy” was lost in the names during the merger. In addition, the country's largest GRI of the 1970s, ADD, had to see its missiles development team dissolved and one-third of its researchers leave. This move had strong political implications, for it was a way for the new government to prove to the United States that Korea had indeed terminated its nuclear weapons program. In addition, the mode of governmental support shifted from providing research funds to operation expenses, which led to increasing government intervention in GRIs. Eventually, the distinction between GRIs and national institutes grew thin.

On one hand, the mergers and abolitions provided new opportunities for some institutes. The government made plans to merge Korea Telecommunication Research Institute (*Han'guk tongsin gisul yeon'guso* 한국통신기술연구소), Korea Electric Research & Testing Institute (*Han'guk jeonja gisul yeon'guso* 한국전자기술연구소), and Korea Institute of Electronics Technology (*Han'guk jeon'gi gigi si-heom yeon'guso* 한국전기기기시험연구소) to create the Electronics and Telecommunications Research Institute (ETRI, *Han'guk jeonja tongsin yeon'guso* 한국전자통신연구소). Due to opposition from International Bank for Reconstruction and Development (IBRD), which was to provide South Korea with a loan, the merger was completed only in 1985. ETRI would become the most active and productive GRI of the 1980s. The electronic telephone exchange TDX (Time Division Exchanger), which was hailed as the greatest R&D product of the 1980s, is a poster child of ETRI. The scale of the TDX project had been the largest in Korean history at the time, with an overall budget of 24 billion Korean Won. As voices opposing the big project grew louder, the researchers had to sign agreements that stated that “the researchers involved in the development of TDX will be fully accountable for the failure of the project.” Ultimately, by successfully developing the first domestic electronic telephone exchange, Korea became the tenth country in the world to be in possession of the switching system technology. ETRI also played a major role in the development of 4M DRAM, a technology that serves as the foundation for what would later be one of South Korea's main exports—semiconductors. The development of 4M DRAM took the form of a “National R&D Program” that was carried out by a semiconductor research consortium composed of large corporations such as Samsung, Goldstar, and Hyundai, and overseen by ETRI. ETRI became a central player as the electronics and information technology industry boomed following the development of domestic computers for educational purposes and digital mobile communications systems in 1989.³⁴ Korea also gained its reputation as an “IT powerhouse” as a result

³⁴ Science and Technology Policy Institution (STEPI), *ETRI 35nyeon yeon'gu gaebal seonggwabunseok-segye odae yeon'gu gigwan bigyo* ETRI 35년 연구개발 성과분석—세계 5대 연구기관 비교 (Analysis on 35-year R&D of ETRI: Comparison with 5-top Research Institutes in the World) (Daejeon: ETRI, 2012), 61-72.

of ETRI's performance. ETRI still functions as the largest GRI and has maintained its position as the top player in the US patent evaluation for three consecutive years since 2012.³⁵

In the 1980s, private corporations began to establish their own research centers, creating the currently existing R&D system where the private sector boasts its quantitative superiority. As a result of the government's promotion and support for corporate research, there were more than one hundred private research centers by July 1983, and more than five hundred in April 1988. This was not just an exponential increase in mere numbers. Corporations diversified their research activities and structures by establishing central research centers, or forming research complexes where different departments and affiliate research centers were gathered, or even built research centers abroad. In the late 1980s, mega-sized corporate research centers were built that housed approximately half the number of the total number of researchers working in GRIs. It was not long before private investment and human resources in R&D eclipsed those of the public sector.

Under these changing circumstances, GRIs that had so far spearheaded national development needed to redefine themselves for new missions, and differentiate themselves from corporate research centers or research universities. Although the portion they take up in the nation's R&D enterprise has been reduced, GRIs still remain as the core component that utilizes the lion's share of public R&D expenditure. GRIs, established with the aim to supply industrial technology for private industry, were the key to South Korean compressed growth in S&T. Today, they strive to serve as the S&T hub for future demands, and will need to stay true to their identity as public research centers, and persevere in research that have high value as "public goods."³⁶

Conclusion

Research institutes are often referred to as "modern icons."³⁷ With the end of the Middle Ages, modern scientific inquiry, which had been within the realm of personal investigation, became a concerted, organized endeavor. The research centers was valued as spaces where researchers gathered to collaborate and carry out scientific

³⁵ "ETRI tops US patent evaluation for 3rd year," ETRI News (2014. 4. 2), https://www.etri.re.kr/eng/bbs/list.etri?b_board_id=ENG02 (accessed on 2015. 4. 5).

³⁶ OECD, *Public Research Institutions* (Paris: OECD Publishing, 2011), 61.

³⁷ Deepak Kumar, "Scientific Surveys in British India: A Survey, 1760-1900," Uma Das Gupta ed., *Science and Modern India: An Institutional History, c.1784-1947* (Center for Studies in Civilizations, 2011), 3.

inquiry through the use of equipment and machines. As the place where new horizons are conquered through modern science, research institutes symbolize modernity itself. If the strategic space that gave the material world meaning in the Middle Ages had been the church, it was the factory in the modern ages, and further on, the laboratory in the present time. The factories of the present are also in need of the support of laboratories and research institutes. In other words, laboratories function as the central space where changes in the present society take place.

The geneses of research centers for S&T in Korea were the experiment stations installed by the Japanese Government-General during the colonial era. However, due to the limited functions of the institutes themselves, and the repression of advanced S&T activities in colonized Korea by the colonialists, Koreans had limited exposure to and opportunities for experiencing modernity through laboratories. Following liberation, Korean scientists and engineers demanded that the government set up proper research institutes as part of the nation's reconstruction efforts. They believed that research institutes had to be the main actor in building a modern nation of "scientific Korea." Their belief was that laboratories must exist and serve as the nation's icon in the new era.

It is usually said that meaningful advancement in S&T in Korea began in the mid-1960s, but scientists had demanded for the promotion of S&T well before then, and these "post-colonial desires" served as the grounds on which the government's S&T policies were designed and implemented. Although far from satisfying the expectations and desires of the scientists and engineers, research institutes were established since the 1950s. For each period in modern Korean history, there exists an institute that represents the period. It is the sum of these institutes that led the development of S&T in Korea. Although there did not exist a formal process or a set of objective criteria for qualifying an institute as the representative institute of a period, there definitely existed institutes that were more superior to others in terms of scale, facilities, and research activities. The regular changes in representative institutes could be regarded as reflecting the instability of the research system, as well as its dynamic quality for advancement or expansion.

During the Korean War in the 1950s, the MND SRI served as a haven for researchers, and was the best equipped research institute at the time. However, with the founding of AERI, which had plans for recruiting domestically- and internationally-trained researchers in nuclear sciences and engineering, the MND SRI had to give up its position as the representative research institute. When KIST emerged as the first GRI in 1966, operating autonomously in terms of administration and funding, AERI also had to give up its reputation along with a number of its best researchers. With the government's unwavering support, KIST became the heart of R&D and the government's main S&T think tank. It ultimately served as the "mother institute" for further specialized GRIs that were modeled on it. However, as parts of its organization and personnel were transferred to institutes that followed it, the growth of KIST

itself dwindled. By the 1970s, KIST had to hand over its position as the largest institute to another for which it had served as a model—ADD. ADD was given a highly specialized and specific responsibility of developing military technology, and it grew in scale and scope within a very short period of time. It eventually gained the reputation of being the “assembly point for science brains of the 1970s.” In the 1980s, however, a series of mergers and abolitions were undertaken, and ADD had to endure the blow of losing one-third of its personnel. Meanwhile, KIST lost not only the reputation it had worked hard to attain for years, but also its name. In their stead, ETRI arose as the major national R&D institute, strongly supported by the government and the policy promoting electronics and telecommunication. Although their glory has been described above as short-lived, all these institutes, with the exception of the MND SRI, have continued to strive after having handed over their position as the “top” research institute. As such, the process of compressed growth in S&T in Korea involved intensive investment in a given institute or system, and fostering competitive reproduction of the successful system over a short time span to cultivate quantitative growth.

The periodic changes in Korea’s S&T do not only concern the representative research institutes. Research systems have changed over time, and along with them, the meaning of research as well. Until the 1960s, national institutes were the only spaces where scientists and researchers could gather for research activities, but following the mid-1960s, a new research system of GRIs led national R&D. This new system, which was borne out of KIST, stabilized itself as Korea’s system for research institutes as it spread its influence over Hongneung and the Daedeok Science Town in the 1970s. The realization of the value of R&D through the performance of GRIs, coupled with the government’s support policies, led to an increase in the number of corporate-run research laboratories. It was not long, however, before private investment in R&D quantitatively surpassed that of the government. This tendency intensified during the 1990s, but then the university sector showed the greatest rate of growth and emerged as an important actor in R&D.

The alternation of the representative research institutes was greatly influenced by the changes in the regime and the international environment. It was the outcomes of governmental policy rather than the result of the actual needs of the institutes. The discontinuous tempo of development of public research institutes was one of the elements of Korea’s compressed growth in S&T under the authoritarian regime.³⁸ No one system or institute was able to dominate the course of progress for an extended period, but new institutes and new systems constantly replaced old ones,

³⁸ Kim Geun Bae’s forthcoming book will point out four instances of discontinuous progress in S&T since liberation from Japanese rule, and described it as “punctuated-elevated growth.” Kim Geun Bae 김근배, *Han’guk gwahak gisul hyeokmyeong ui gujo* 한국과학기술혁명의 구조 (The Structure of S&T Revolution in Korea) (forthcoming).

thereby producing rapid and widespread growth.

Since the 1990s, there has not been any huge change in public research institutes. This could be understood as the Korean research system having attained a stable structure. This, in turn, calls for more than the rapid quantitative growth of the past, but for GRIs, universities, and private sector research institutes to each define their particular roles and responsibilities, to collaborate, and to live by the spirit of “apart but together.”

Abstract

In South Korea, research institutes are the starting point of science and technology (S&T) policy—the main means through which the government had promoted and invested in S&T, as well as where the outcomes of policy measures for scientific and technological development were best manifested. In particular, government-funded research institutes (GRIs) were the points of origin as well as the most instrumental tool in the construction of S&T infrastructure and recruitment of talented human resources for rapid S&T advancement. This paper traces the birth of South Korea's current S&T research system by investigating the rise and growth of Korea's representative research institutions. Different periods in modern Korean history had its own representative institute that led the development of S&T. Such regular changes in representative institutes could be a sign of an unstable research system, but it could also serve as opportunities for advancing to the next level or to other fields. The process of compressed growth in S&T in Korea involved intensive investment in given institutes or system, and fostering competitive reproduction of the successful system over a short period to cultivate quantitative growth. As such, new research institutes constantly replaced old ones, thereby producing rapid growth.

Keywords: post-colonial desires, compressed growth, Ministry of National Defense Scientific Research Institute (MND SRI), Atomic Energy Research Institute (AERI), Korea Institute of Science and Technology (KIST), Agency for Defense Development (ADD), Government-funded research institutes (GRIs), Electronics and Telecommunications Research Institute (ETRI)