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The Political Power-Mediated Expansion of Science and Technology under the Park Chung Hee Regime

Geun Bae KIM

Abstract

Research on the position of the Park Chung Hee regime in the history of contemporary science and technology in South Korea has hitherto consisted of the search for answers to two opposed questions. The one question concerns the periods in which the dramatic development of science and technology in South Korea occurred; and the other concerns the origins of the problems currently faced by science and technology. In other words, studies have sought to highlight and to identify either positive or negative aspects of science and technology respectively during the Park era. However, This paper poses a different and original question: "How did the collusion between science and technology and politics, which may be the foundation of science and technology in South Korea, occur?" In fact, the government-led pursuit of science and technology, the industrial technology-centered development, and the nation's ambitious technology projects are partial phenomena derived from this collusion. The present study aims to dynamically track changes in the relationship between science and technology and the highest levels of government, and the social expansion of science and technology that occurred amidst such changes.

Keywords: science and technology, political power, Choi Hyung Sup, Park Chung Hee, KIST, KOFST, technological projects

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Geun Bae KIM is a professor in the Department of Science Studies and the Korean Research Institute of Science, Technology, and Civilization at Chonbuk National University. E-mail: rootkgb@jbnu.ac.kr

Introduction

In studies on the contemporary history of South Korea, politics and economics have been addressed separately from science and technology. Although these three are closely related in actual society, the former two were strangely segregated from science and technology in Korean studies. The history of science and technology has focused mainly on science and technology itself, while political historiography has tended strongly to view science and technology as a trifling external variable. Given this, we may ask how are science and technology linked to other sectors of society, and what approaches will make it possible to see all of them in unity?

The object of the present study, the Park era, can be characterized by "excess of political power." The field of science and technology in South Korea of the period was no exception. During that time, overarching political authority forged closer ties with science and technology and other areas in society. Moreover, scientific and technological networks comprising the various actors—i.e., individuals, communities, and the state—were expanded as well. From the perspective that political collusion was the touchstone of this period, science and technology and its inter-relationship with politics, society, and the economy can be newly examined as well.

Research on the relationship between science and technology and politics (including ideology and dictatorship) has progressed relatively steadily. The traditionally maintained position was that political misuse and abuse of science and technology has hampered and aggravated the progress of the latter. Primary examples of this view are studies on science and technology in Nazi Germany and the Soviet Union (Josephson 1996). However, more recent research has argued that the relationship between politics and science and technology may involve the participation of various agents and can take contextual and diverse aspects depending on the era, country, and field in question. The subjects of comparative research include not only totalitarian states but also democratic ones (Walker 2003). Considering the need for further case studies, this present study can expand our perspectives toward non-European countries.

Up to now, there has been very little research examining science and technology's relation to political power during the Park Chung Hee era. For example, one study has tentatively addressed political intervention in science and technology in the early years of the Park regime (G. Kim 2011); one has surveyed the historical position of science and technology and the role of Park Chung Hee (G. Kim 2017); while another has analyzed statements on science and technology in speeches by the highest leadership (Moon 2012). In addition, other studies have addressed the changing relationship between scientific organizations and the government in different eras of South Korea (Kang 2015); the South Korean state's role in science and technology across time periods (Campbell 2008); and the expansion and subsequent challenges of the "Tongil rice" variety under South Korean government coercion (T. Kim 2017). Although there exist several tentative studies and case studies, no research has yet to fully examine the complexity of science and technology in relation to political power in Park era of South Korea.

The present study seeks to examine closely the relationship between science and technology and politics as a key aspect of the Park era. What were the reasons for the encounter between science and technology and political power in South Korea of this period? How did political intervention occur in the research and development (R&D) process, which became the core of scientific and technological activities? How did the social expansion of science and technology mediated by political power develop? What did the scientific community and political authority come to obtain from each other? Ultimately, what were the positive and negative results? In the process of searching for answers to such questions, the characteristics of science and technology in the Park age and their significance in the overall history of contemporary South Korea will also be examined.

President Park Chung Hee and Engineer Choi Hyung Sup

During his 18-year rule, Park Chung Hee (1917–1979) had Choi Hyung Sup (1920–2004) as a key collaborator in the field of science and technology. An engineer Choi reinforced Park Chung Hee's governance by mobilizing science and technology and exercised authority over them as an agent of Park. Indeed, the collusion between these two figures became a touchstone to the the evolving nature of the relationship between political power and science and technology.

In the initial stage of his rule in the 1960s, Park Chung Hee tried to meet professionals in all fields to make use of their knowledge and insights. As a young member of the elite who had studied mining and metallurgy at Waseda University in Japan and had received a doctorate in chemical metallurgy from the University of Minnesota, Choi Hyung Sup was outstanding even among fellow scientists and engineers. Like his professional colleagues, he was a university professor, but unlike them, he also worked in various other fields, including industry, government, and at research institutes (Moon and Kang 2013, 227–228). In the early 1960s, Choi attracted Park Chung Hee's attention because, like Park, he was a former military officer and had commanded an air force depot during the Korean War. At the time Choi was serving as the head of the Atomic Energy Research Institute (AERI), President Park Chung Hee's first approach to engaging with science and technology was to enhance his own understanding by meeting with professionals like Choi Hyung Sup.

While serving as the head of the AERI, Choi met President Park at the Blue House. Park invited Choi after being impressed by Choi's article, "The Promotion of Canadian Science and Technology, Focusing on N. R. C.," which Choi authored in 1964. At the meeting Choi explained to Park that a general restructuring of science education, a nurturing of industrial research institutions, and presidential leadership in the fields were required for the development of Korean science and technology. When Park Chung Hee invited Choi to join his administration, in a capacity such as a member of the government's Council for Economy and Science, Choi (1995, 50–52) suggested instead that it would be more appropriate for him to lead a

governmental research institute.

Choi Hyung Sup was a leader of the new generation of scientists and engineers. The Pi (π) Club, which Choi led, was composed of about 30 scientists and engineers, most of them trained in the United States. It was a small, unofficial group that critically examined the status of Korean science and technology and tried to present a vision for its further advancement. Like scientists and engineers of previous generations, they emphasized research; but they focused more on practical research with direct applications rather than on long-term academic research (G. Kim 2011, 534). They believed that science and technology draw more attention and support from the government because it could contribute to national development.

When the Hanguk Gwahak Gisul Yeonguso (Korea Institute of Science and Technology, or KIST) was established in 1966, with US aid, the new institute's leadership was very important. As KIST was to be a comprehensive research institute equipped with the newest facilities, its director was given a very important task of leading Korean science and technology. The appointment to this position was a public recognition as a leader in Korea's science and technology sector. Furthermore, Park Chung Hee's choice to have KIST be led by Choi Hyung Sup was extraordinary given the traditional seniority system prevalent in Korea. Observers had generally considered another renowned senior scientist as the most promising candidate. Choi Hyung Sup was a relative newcomer in his forties and inferior to the older scientist in both status and fame.

Consequently, Choi emerged as the most powerful leader in the country's scientific community. And under his leadership, KIST became both the backbone and frontier of Korean science and technology—as well as the focus of high national expectations. KIST's new recruits, including Choi, were fundamentally different from earlier scientists and engineers. A major transition had occurred overnight: from the older to the younger generation, from scholars who had studied in Japan to those who had studied in the United States, and from scientists to engineers. Sometimes nicknamed the "Choi Hyung Sup Squadron," this group of individuals followed Choi loyally and practiced a strong group solidarity. Thus, a power

shift occurred in the fields of science and technology similar to that which had occurred in the political arena. With Choi Hyung Sup's direct and indirect involvement, KIST also came to play the role of government think-tank (Moon 2010, 117–158). This generational shift through KIST was Park Chung Hee's second approach to science and technology.

When the government established the Gwahak Gisulcheo (Ministry of Science and Technology) in 1967, Park Chung Hee also considered naming Choi Hyung Sup its first minister. Surprisingly, however, Park instead appointed Kim Kee Hyong (1925–2016), an engineer in his forties, who had received a doctorate in ceramic engineering from Penn State University. Park Chung Hee had noted Kim Kee Hyong when Korean newspapers touted him as a "world-class scientist" and "patent king" when he was working as a researcher for the Air Reduction Company, an electronic parts manufacturer in the United States. Park telegrammed congratulating Kim on his achievements and asked the engineer "to return to Korea to contribute to his fatherland's modernization." Since the government was pursuing the establishment of the Ministry of Science and Technology, Kim participated in the planning stages of this new project and ended up becoming its first minister (Kang 2015, 56–76).

In its early stages, however, the Ministry of Science and Technology was highly unstable. Because the regime had rushed to establish it in time for the looming presidential election, the new Ministry's officials were unprepared to tackle their new tasks. They took over the work that had previously been done by the Gisul Gwalliguk (Department of Technology Management) under the Economic Planning Board; but their new responsibilities were more extensive than the Department's previous work. As a newly minted administrative office, this ministry also had the lowest status among governmental ministries, as illustrated by the fact that it was not called a "*bu*" (ministry), but a "*cheo*" (lower-level ministry). It had difficulty pursuing new projects and securing budgets for them.

In 1971, President Park suddenly changed the Ministry's leadership, appointing Director of KIST Choi Hyung Sup to the post of minister. This was done under the banner of the "purification of officialdom," which had been one of Park Chung Hee's campaign pledges in the presidential

and general elections of 1971. Except for the ministries in charge of the economy, the heads of eight other ministries were replaced. Park must have wanted to elevate the role of the Ministry of Science and Technology in national projects by appointing a new chief. Choi Hyung Sup remained in this post for seven years and seven months, a record tenure for a minister-level official (Kang 2015, 92–106). This long term reflected Park's expectations for and trust in Choi. This attempt to raise the status of the Ministry of Science and Technology in his governance was Park's third approach to science and technology.

Under Choi Hyung Sup's leadership, the Ministry of Science and Technology was fundamentally transformed into a government agency to execute the Park regime's agenda and national projects. In a newspaper interview in the early stages of his leadership, Choi stated that he would do his best to "focus on assisting the president" and "play the role of a bridge between science and government."[1] He set forth three key tasks for the Ministry: the building and strengthening of the country's foundation for science and technology; the strategic development of industrial technology; and the creation of an environment favorable to science and technology. These key tasks were intended not only to promote science and technology, but also to support the Park regime's fatherland modernization project.

Choi Hyung Sup also actively tried to improve the ministry's relationship with the scientific community. To achieve this goal, he adopted policies that restructured financial support for research and development, supported science and technology organizations, and listened to the opinions of scientists and engineers. Due to these efforts, the scientific community responded positively to the government's policies and sometimes took the lead. As governmental support for and interest in scientists and engineers increased, the scientific community quickly adopted pro-governmental positions (Moon and Kang 2013, 230–232).

Meanwhile, in 1971, Park Chung Hee abruptly established the Second Secretariat in Charge of the Economy in the Blue House. This new agency was to focus on the heavy chemical and defense industries, along with the

1. *Dong-A Ilbo*, June 18, 1971.

science and technology that was their foundation. This move was a sign that Park wanted to take direct charge of the major national projects in the fields of science and technology by the early 1970s. He appointed O Won-chol (b. 1928), then Assistant Secretary of Commerce and Industry and in his early forties to be senior secretary in charge of this new secretariat in 1971. A graduate of Seoul National University's Department of Chemical Engineering, O Won-chol was a typical technocrat on his way up. Park Chung Hee was particularly impressed by his proposal to jointly develop the defense and heavy chemical industries amid escalating military tensions (H. Kim 2004, 165–173; O 1996, 23–27). For eight years, O Won-chol worked closely with Park Chung Hee as his senior secretary. This all-out involvement in national science and technology was Park Chung Hee's fourth approach to the field.

In the wake of above measures, in 1972, Park Chung Hee declared the October Yusin ("Restoration"), by which he abolished democratic institutions and secured his position as president for life. Park Chung Hee, as in the political and economic spheres (H. Kim 2004, 165–173), possessed the status of supreme commander in science and technology. His instructions on science and technology became absolute orders to be implemented in an immediate and military manner. In a sense, science and technology were not only the material foundations of Park's authoritarian regime, but also the most notable area of achievements. Described with epithets like "the best in Korea" and "the greatest in Asia," these major scientific and technological undertakings were symbols of the supreme commander's statesmanship and authority. At the same time, in some areas of science and technology, various agents, including technocrats and scientists, enjoyed some autonomy and took initiatives.

During this period, an intimate relationship was formed between political power and the scientific community. As stated, the leaders in these two areas were Park Chung Hee and Choi Hyung Sup, respectively. Based on this, political power and scientific power collaborated and mutually reinforced each other. This process resulted in the enclosure of science and technology within the boundaries of political power. Specifically, the president was expanding his connections with the leading figures within

administrative agencies and organizations in science and technology. Therefore, Park became the essential pathway for major decision-making processes and pursuits in these fields.

An Outpost of Research and Development

Universities, which had been centers of science and technology, tried to elevate their scholarly and social standings by adapting to the political changes of the Park era. Professors in colleges of natural sciences and engineering at major universities insisted on scientific and technological innovation and emphasized the importance of research as its foundation. They claimed that research was essential to the pursuit of economic development, which was Park Chung Hee's key focus.

The Park regime explored the pursuit of science and technology in a different manner from the previous Rhee administration. The regime approached science and technology not from the perspective of scholarship and education, but that of economy and industry. As a result, as with the scientific community, the Park government emphasized research over education. The regime wanted to utilize scientific and technological research that had been neglected until then to pursue modernization of the fatherland, including economic development. It attempted an "economic translation of science and technology" (G. Kim 2011, 530–533).

Yet the scientific community and political power had considerable differences in their approaches to research. While professors in academic institutions emphasized science and basic research, the government paid more attention to technology and applied research. While Korean professors in science and engineering thought they should focus on basic research in order to contribute to industrial development, based on the linear model, Korean officials thought differently. To achieve the regime's goals, government officials needed to focus above all on the developmental research of industrial technologies that could be directly utilized. The focus of the regime was on the need of policies and motivations in order to solve practical problems related to industrial development.

The government began working to establish a new type of research institute. The Economic Planning Board's Department of Technology Management, in charge of this preparation, already had a goal in mind: focusing on industrial and technological research in connection with economic development. In 1963, the Korean government sent an inspection team to the United States, upon invitation from the US National Academy of Sciences. Their objective was to explore policy options in order to promote science and technology and ways to connect scientific research and industrial development. In addition to administrative officials, core members of the Choi Hyung Sup-led Pi Club were included in this inspection team. One of the major recommendations in the team's report was "the establishment and development of an industrial research institute where research activities can be directly linked to industrial development" (Gisul Gwalliguk 1963).

In May 1965, when Park Chung Hee visited the United States, President Lyndon Johnson offered a surprise gift in exchange for South Korea's dispatch of troops to Vietnam and Korea's normalization of diplomatic relations with Japan: aid for building the Institute for Industrial Technology and Applied Science. Johnson's offer could not have been timelier for Park, who had been seeking development in science and technology. Korea's response to this offer was enthusiastic, especially because it came from the United States, the world's most advanced nation. The American Ambassador to Korea even sent an urgent message back to Washington, expressing his concern that there was excessive excitement about the aid in South Korea.[2]

Following Park's official visit to the United States, the Korea Institute of Science and Technology (KIST) was established, with the Battelle Memorial Institute as its model. Unusual in a developing country, this institute was based on a contract research system, whereby it operated with funding from both the government and industries for research. After conducting a survey on the current status of industry, with the guidance of their sister

2. "Korean Institute of Science and Technology," Department of State Airgram No. A-472, American Embassy, Seoul, June 10, 1966, US National Archives, RG 59, Box 3115.

institute in the United States, KIST selected key research fields: material, mechanical, electronic, chemical, and food engineering (G. Kim 1990, 44–69; Moon 2013, 128–133). In other words, applied sciences were the focus to the exclusion of basic science. Director Choi Hyung Sup recruited researchers for the Institute primarily from the pool of scientists and engineers then active overseas, in particular, in the United States (KIST 1971). By naming Park Chung Hee as its founder, KIST tried to secure generous support from the government.

As Korea's industrial interest in R&D was relatively low, KIST relied on government funding for about half of its budget (receiving some 24.57 billion won or 51 million dollars, between 1967 and 1980). Hence, it was difficult for KIST to achieve financial independence, despite its initial plan to do so. Notwithstanding heavy government investment, however, KIST did not produce visible achievements that directly contributed to economic development. South Korean economic development continued to depend mainly on the introduction of technology from abroad and the country's wealth of cheap labor. KIST contributed more to the strengthening of science and technology infrastructure than to research and development. In this period, KIST played a major role as a center for foreign technology transfer, a think-tank for industrial policies, and in heightening awareness of the importance of R&D (Moon 2013, 125–151; 2010).

The two key national agendas that the Park Chung Hee regime resolutely pursued were economic development and an independent national defense. In the late 1960s, as tensions with North Korea were heightening, the United States raised the possibility of its troop withdrawal from South Korea as a result of the intensification of the Vietnam War. In 1969, then US President Nixon announced what became known as the Guam Doctrine (or Nixon Doctrine), which stated that Asians themselves should be responsible for their own defense. In South Korea, this increased the need for an independent national defense capability, and accordingly, Park Chung Hee ordered the development of a national defense industry and research on military technology. The Gukbang Gwahak Yeonguso (Agency for Defense Development or ADD) was quickly established in 1970, modeled after KIST. Retired lieutenant general Shin Eung-gyun,

then KIST administrative assistant director, was appointed as ADD's first director. Most researchers at the Agency were secured from the country's army, navy, and air force academies, augmented by some researchers from KIST (An 2016, 43–51).

ADD pursued R&D under strict orders from President Park. As a former military man, Park Chung Hee had a keen interest in weapons development. In addition, his understanding of science and technology had deepened as his presidential tenure progressed. The Blue House Second Secretariat in Charge of the Economy took charge of the establishment and execution of the overall ADD project (nicknamed the "Lightning Project" to emphasize the need for rapid results). Their R&D was to replicate the latest American weaponry and modify them to fit Korean needs. As South Korea had little experience in modern weapons development, ADD approached it entirely through reverse engineering. Through much trial and error, this project progressed rapidly, with researchers working diligently and with military-style discipline. After the production of prototypes, a few weapons were produced and deployed with South Korean troops (An 2016, 44–84; Kwon 2017).

Thus, it was at ADD that national R&D projects were first pursued in Korea. Research formerly done in small-scale laboratories was now conducted on a large scale, focusing on the tasks initiated by the government, especially the president. These projects served as the template for contemporary national R&D research in Korea. Limited to the field of national defense, these national agendas and R&D were directly connected. For example, from 1972 to 1979, ADD's missile development mega-project, nicknamed the Baekgom ("White Bear") Project, mobilized some 500 researchers, with funding of 200 billion won, or about 440 million dollars (An 2016, 208–344). In order to achieve their goals in the least possible time, ADD focused on practical development rather than basic research. As a result, a reverse linear model, in which development came before research, was used.

Daedeok Science Town in Daejeon, the establishment of which had been led by the Ministry of Science and Technology, was greatly transformed starting in 1976. The Blue House's Second Secretariat in

Charge of the Economy, which emphasized connecting Daedeok Science Town with the heavy chemical industry, took on this project and pursued it with renewed vigor. In 1976, on the tenth anniversary of the establishment of KIST, Park Chung Hee demonstrated his determination to develop science and technology by writing a calligraphic work, *gwahak ipguk gisul jarip* ("nation-building based on science and independence supported by technology"). In the 1970s, government-supported research institutes in the mold of KIST increased rapidly amidst competition from different governmental offices. By the late 1970s, these research institutes numbered 19. Moreover, all of them inscribed Park Chung Hee's name as their founder on stone monuments, just as had been done at KIST. Research institutes were established for fields related to industries strategically preferred by the government. Many of these institutes moved into Daedeok Science Town, turning it into a grand scientific and technological research complex.

With the rapid growth of research institutes in South Korea, the demand for researchers also greatly increased. While attracting overseas Korean scientists and engineers, these organizations also needed to nurture domestic researchers. A project to establish the Hanguk Gwahak Gisulwon (Korea Advanced Institute of Science), called KAIS (currently KAIST), a professional graduate school, was pursued with the help of American financial assistance. Physicist Chung Kun Mo (b. 1939), a former student of the administrator of the US Agency for International Development (USAID), led the push for KAIS's establishment. KAIS focused on engineering to fulfill its mission of educating research personnel on industrial technologies. In order to secure top-notch students, extraordinary incentives were offered, such as tuition exemptions, financial aid for research, free room and board, and preferential treatment in the country's compulsory military service. From 1975 to 1980, KAIS produced around 1,000 masters and doctorate degree-holders (about 30 percent of all degree-holders in the fields of science and engineering in Korea during that period), most of whom went to work at government-supported research institutes in Korea (KAIST 1996, 11–71; Kim and Leslie 1998, 154–185). Many of these early KAIS graduates conducted research following the ADD approach.

Government-funded research institutes were at the center of scientific and technological research during this period. With US aid, South Korean political authority, led by Park Chung Hee, extended extraordinary benefits to these institutions, with the expectation that they would contribute to national industrial development. Modeled after KIST, research institutes in major fields of industry rapidly expanded to create a huge industrial research institute complex. Their goal was to find ways for science and technology to contribute to national economic development. In particular, they focused on developmental research. This effort was sometimes successful, as shown in ADD's weapons development programs. Nevertheless, the attempt to drive economic development through R&D remained largely on the level of expectations.

Pursuing Ambitious Technological Projects

The Park Chung Hee regime particularly favored the pursuit of what it called unprecedentedly large-scale enterprises. Under the banner of "modernization of the fatherland," the regime pursued massive technological projects. Nature was an unexplored area, where Park the supreme commander could freely materialize his ambitions through his absolute authority. Not only could he draw up plans at will, but there was little political risk in doing so, because nature had no immediate political resistance.

In order to carry out such ambitious projects, the regime naturally needed the assistance and input of diverse scientific and technological fields to include agriculture and medicine. The government also had to secure massive funding, mobilize a great number of people, and have the technological capabilities to carry them off. Without the participation of a sophisticated science and technology component, it would have been reckless to engage in such grand modernization projects. As scientific and technological know-how in South Korea still lagged, securing such expertise quickly and skillfully was a key task in implementing of such

projects. The government endeavored, both domestically and abroad, to secure the various scientific and technological resources such large-scale projects demanded. Such national technological projects were primarily initiated by several governmental ministries with supplemental support from the Ministry of Science and Technology.

Foremost among Park Chung Hee's ambitious projects, and upon which his name was deeply etched, was the construction of the Gyeongbu Expressway linking Seoul and Busan. During his second presidential campaign, in 1967, Park had pledged to build this expressway as a part of his Grand National Land Construction Plan. Many people were either opposed or worried about the Expressway construction—not only political opponents but also the media, Korean civil engineers, and international organizations (Roh 2012, 30–55). The opposition party leader, Yu Jin-o, sharply criticized the Gyeongbu Expressway project in a newspaper interview:

> It reminds me of that notorious autobahn, built by the dictator [Adolf] Hitler. The autobahn had greater military power than economic significance, but it is no secret that dictators like to leave huge structures. As the Gyeongbu Expressway plan is for the road construction, an infrastructure for modernization, I do not oppose the project itself. However, I question its timeliness in terms of priorities, considering our country's current economic situation. [As there is already a railway connecting the southern and northern regions of South Korea,] I believe it is more urgent to build a road connecting east and west. (*Dong-A Ilbo*, January 11, 1968)

Nevertheless, Park Chung Hee pushed through the Gyeongbu Expressway project, ignoring this widespread opposition. The construction of the Expressway, which began in February 1968, cost 43 billion won (about 150 million dollars, or 13 percent of the national budget in 1969) and employed some 9 million workers. Heavy construction equipment was hastily imported, including from the United States, using an USAID loan. Hyundai Construction and an engineering corps took sole charge of the

actual construction work, though drawing upon Korean financial sources, technology, and personnel. In particular, Hyundai (then headed by Chung Ju-Yung) had its two years of experience building the Pattani-Narathiwat Expressway in Thailand (1965–1967), their first and flawed undertaking in expressway construction (DiMoia 2018). The National Engineering Corps also contributed its expertise garnered from various other construction projects (though none of them expressways), both in Korea and Vietnam. A large number of soldiers also participated in the project as supervisors and technicians, particularly in challenging construction terrain. Under the slogan, "More Quickly, More Economically, More Sturdily," the massive work of building this 428-kilometer expressway from Seoul to Busan was completed in July 1970, only 29 months after it had begun.

Until the late 1970s, the Gyeongbu Expressway was notorious for being merely a "scenic road" as well as a "faulty road." As it turned out, the country had neither many cargo trucks nor many goods that required it. KIST investigated and published reports on the reality of express bus operations, which were operating under heavy deficits.[3] Further, because construction was done hastily and without adequate technology and expertise, it led to 77 official fatalities among construction workers, as well as numerous other casualties. Post-construction problems included issues with the pavement, median strips, and drainage. As soon as construction was completed, repair and improvement work had to begin, ultimately costing about the same amount as the original construction.

Nevertheless, the Gyeongbu Expressway was established as the grand backbone of the South Korean nation. As the country's newest and longest road, cutting across the national territory from south to north, the Park government justified its costs by pointing to its potential to contribute to the nation's modernization and prepare it for reunification (Jeon 2010). At the time, the president of the Greyhound Bus Company stated in interviews that the most Westernized things in Korea were the Gyeongbu Expressway and KIST.[4]

3. *Maeil Business Newspaper*, November 18, 1972.
4. *Dong-A Ilbo*, June 4, 1970.

In its pursuit of economic development, the Park Chung Hee regime was also interested in the steel industry as an essential industrial resource. The establishment of a large-scale and integrated steel-manufacturing company emerged as a means of elevating the level of existing, outdated steel manufacturing once and for all. KIST, headed by Choi Hyung Sup, was deeply involved in the planning of the steel-manufacturing plant and the assessment of its technological feasibility. As Korea could not independently pursue this project, the Park regime had to draw on foreign financial and technological support. Ultimately, with the full support of Park, in 1969 the government pursued the construction of the Pohang Iron and Steel Company (POSCO), as the symbolic project of the second Five-Year Economic Development Plan (1967–1971), with a production capacity of 1.03 million tons, a project that would ultimately require 120 billion won (340 million dollars) (Song 2002, 100, 118).

Park Chung Hee entrusted the massive project of building POSCO to Park Tae-Joon (1927–2011), one of his right-hand men. As a graduate of the technical college at Waseda University, Park Tae-Joon had an engineering background—unusual for a Military Academy graduate. Park Chung Hee had already appointed this former military aide to the post in charge of commerce and industry on the Gukga Jaegeon Choegohoeui (Nation Rebuilding Supreme Council), and as president of the country's largest exporter, Korea Tungsten Manufacturing Company (responsible for some 30 percent of all South Korean exports). Clearly, Park Chung Hee deeply trusted Park Tae-Joon as an industry specialist.

After taking charge of the POSCO project, Park Tae-Joon skillfully overcame enormous financial and technological difficulties by taking advantage of his Japanese background. He quickly secured a significant portion of the project's capital from Korea's property claims against Japan and received technological assistance from Nippon Steel Corporation. Under Park Tae-Joon's leadership, an advanced base was first built, and then the construction of a steel-manufacturing plant was speedily carried out in military fashion under the slogan, "Patriotism by Steel Manufacturing" (Im 2010, 37–76). Park Chung Hee showed exponential interest and support, for instance, by visiting the site seven times during its development.

The first phase of construction was completed in July 1973 with the completion of an enormous shaft furnace. The government evaluated that it had overcome various domestic and international criticisms regarding inadequate internal conditions for construction of a large-scale steel manufacturing plant and the excess of having such plant in a developing country.[5] Park Chung Hee presented the following three key goals to be accomplished in the 1980s: achieving 1,000 dollars per capita income, reaching 10 billion dollars in annual exports, and the construction of a heavy and chemical industry. During the ceremony to celebrate the completion of the POSCO construction, Park Chung Hee declared, "Korea has just entered the threshold of the age of heavy and chemical industries," and predicted, "By the early 1980s, Korea will truly enter the ranks of the advanced countries."[6] Built from scratch, the enormous enterprise of POSCO was a symbol of Park Chung Hee's political triumph, as well as a monumental economic achievement. It appeared visibly and materially to prove the emptiness of the criticisms of the Yusin dictatorship. Through second-and third-phase expansions, by 1978 POSCO's annual steel production capacity had expanded to 5.5 million tons and elevated steel manufacturing to a leading national industry (Song 2013, 95–123).

Another large-scale, ambitious technological project initiated by the Park regime was intended to deal with the rice shortage every year in Korea, traditionally dubbed "barley hill" (*borit gogae*) because people had to endure austerity, especially during the spring when the harvest rice runs out and the barley is not enough to harvest. Having grown up in the countryside, Park Chung Hee's attempts to solve this chronic food shortage problem began as soon as he took power. As rice was the favored Korean staple, Park expected he would be highly praised if he achieved a dramatic increase in the country's rice production. Initially, the Korean Central Intelligence Agency took the initiative, importing the bumper crop of "Nahda" rice from Egypt, which was then distributed to Korean farmers in 1967, after test cultivations. Showing a strong drive for the project, this

5. *Kyunghyang Sinmun*, July 3, 1973.
6. *Kyunghyang Sinmun*, July 4, 1973.

variety was named "Heenong 1," after Park Chung Hee. But within a year it proved to be a massive failure due to problems related to its new growing environment (T. Kim 2017, 114–118).

At this juncture, another high-yield rice variety was unexpectedly reported to Park Chung Hee, who was dispirited after the failure of Heenong 1. The product of a crossbreeding between the Japonica rice variety of the temperate zone and Indica of the tropical zone, this variety of rice was productive, although it was less sticky than Korean had liked. Its developer was Heu Mun-Hue (1927–2010), a professor in the Department of Agriculture at Seoul National University, who had been dispatched to do research at the International Rice Research Institute (IRRI) in the Philippines. By solving the problem of infertility, the result of the hybridization of varieties with little affinity, through a three-way cross breeding, Professor Heu produced a high-yielding variety, IR667 (T. Kim 2017, 118–129).

Following this development, the Nongchon Jinheungcheong (Rural Development Administration) under the leadership of Kim In-Hwan (1919–1989) led a project to put the hybridized rice to practical use through pedigree selection and feasibility and productivity tests. Park Chung Hee actively participated in policy-making and led its nationwide distribution, after he had received a highly promising report about this new variety. In 1971, at a meeting in the presence of cabinet members and economic leaders, the president expressed his satisfaction with its taste, although the participants were supposed to vote anonymously, after tasting it themselves (T. Kim 2017, 135–136). Eventually, entirely reflecting Park's opinion, the government decided to distribute this variety to farms, after naming it "Tongil (Re-unification) rice," with the intention of boasting of South Korean superiority over North Korea.

Despite resistance from opposition parties and farmers' associations, this rice began to be hastily distributed to farms nationwide in 1972, a little ahead of the declaration of Yusin, under the slogan "Reunification Asleep or Awake, Reunification Even after Death." The abundant production of fertilizers and agricultural chemicals, another result of industrialization, dovetailed nicely with Tongil rice, since it required particularly high

amounts of them. With the expansion of Tongil rice cultivation due to the government's forceful distribution, Korea achieved its first self-sufficient rice production in 1977 (T. Kim 2017, 133–179).

Park Chung Hee even expressed confidence that South Korea would be able to send surplus rice as humanitarian aid to North Korea, which was suffering from food shortages.[7] KIST tried to develop sustainable fertilizers and insecticides for increasing crop production and special storage facilities for surplus rice.[8] However, Tongil rice was soon plagued with various problems, again caused by its maladaptation to the Korean environment, including damage from disease and harmful insects as well as cold weather. As Tongil rice's mediocre flavor did not markedly improve, despite the government's efforts to develop new and tastier varieties, the Korean people eventually shunned it.

The three projects discussed here—the Gyeongbu Expressway, POSCO, and Tongil rice—are often mentioned as the great achievements of the Park Chung Hee regime. The Gyeongbu Expressway was a direct example of national land development, POSCO of industrial advancement, and Tongil rice of abundant agricultural production. They were also part and parcel of Park Chung Hee's mission, since large-scale national projects were interlocked with his underlying political ambitions. For example, the construction of the Gyeongbu Expressway was a way of overpowering his political opponents; the establishment of POSCO a tool for conveying the vision of his 1972 Yusin system; and Tongil rice an instrument to demonstrate South Korean superiority over North Korea. Of course, not everything went according to plan. Representatively, even with his vast political power, Park was helpless against nature with the Tongil rice project.

7. *Kyunghyang Shinmun,* January 12, 1977.
8. *Dong-A Ilbo*, January 6, 1975; January 21, 1977.

Scientific Organizations and Their Mobilization by the State

The Park Chung Hee regime's national projects were carried out like an all-out war; the president's political authority and fate depended on them. The regime not only actively utilized science and technology, but also mobilized scientists and engineers on a large scale. During the Park regime, the knowledge and tools of modern science and technology had a profound impact on the success of national projects and the positive image of the president.

In this process, scientists and engineers had their voices heard by either personally speaking out or doing so through their organizations. In so doing, they hoped to elevate the status of science and technology in society and to actively advance them. They quickly realized that the president, with his enormous power, would be the key promoter of science and technology. Therefore, the importance of forming a close relationship with Park, a potentially powerful ally, was self-evident. They adopted the strategy of devoting themselves to what he pursued in order to acquire his support for their activities.

When the establishment of a new scientific research institute (which later became KIST) emerged as an important agenda item, scientists and engineers moved quickly. They tried to find ways to gather and express their collective opinions in this new phase in which science and technology began to gain visibility. Under the leadership of university professors in science and technology, scientists and engineers formed the Korean Federation of Science and Technology Societies (KOFST) in 1966, by amalgamating existing scientific and technological societies. As the largest Korean lobbying group in science and technology, KOFST worked to achieve its goals by presenting its requests to the government.

KOFST's first president was Kim Yoon Ki (1904–1979), a technocrat with close ties to President Park. A graduate of the Department of Architecture at Waseda University in Japan, he had served as the South Korean Minister of Transportation, as well as the Minister of Construction, over a long public-service career. When KOFST was established, he was a Minister without Portfolio, carrying out the president's special orders. By choosing him as their figurehead, the lobbying organization hoped to gain the president's support (Kang 2015, 46–54).

In the 1970s, KOFST began to attract the Park government's attention. From 1972, the new Minister of Science and Technology Choi Hyung Sup offered rapid increases in financial support for science and technology organizations and, in return, requested their organizational cooperation. KOFST responded positively to this and actively participated in national projects that the government emphasized (Kang 2015, 126–156). In 1972, Park Chung Hee began to actively lead the Saemaeul (New Village) Movement, under the banner of "Lifestyle Improvement, Income Growth, and Edification of the Mind in Farming and Fishing Villages." Park Chung Hee notified the Ministry of Science and Technology that they should work hard "to support development and income growth in farming and fishing villages." Accordingly, the Ministry of Science and Technology urged KOFST to find a way to actively participate in the Saemaeul Movement. This resulted in the establishment of the Saemaeul Gisul Bongsadan (Saemaeul Technology Service Corps), led by Kim Yoon Ki (Lee and Hong 2012, 180–182). This was the eve of the declaration of Yusin in October of 1972.

To the Yusin Constitution, along with an article about the Saemaeul Movement, was added an article about science and technology: "Science and technology should be developed and promoted for the development of the national economy." The KOFST leadership expressed their will to actively participate in Park Chung Hee's Yusin. In their 1973 resolution, titled "Plan for Scientific Yusin," they stated: "We sincerely congratulate the inauguration of President Park Chung Hee, who will continue to lead a Korean national revival . . . and we feel strongly about the importance of the mission entrusted to scientists and engineers." In the same resolution, they also emphasized active pursuit of the "full mobilization of science and technology" and the Saemaeul Technology Service Corps.[9]

Supported by the government, the activities of the Saemaeul Technological Service Corps began to increase in 1973. It expanded

9. *Gwahak-gwa gisul* (Science and Technology) 6.1 (1973): 7–8.

its organization, installing not only a central headquarters but also a technological support corps in individual fields, such as agriculture and fisheries, environmental improvement, public health and hygienic, comprehensive natural science, and, later, Saemaeul factories. Calling the Corps the "vanguard of Saemaeul scientification," KOFST adopted a new approach to field technology guidance. This guidance system was composed of three stages: the presentation of technology through lectures and demonstration; villagers' acquisition of the technology through training; and the spreading of technology through trained village leaders (Kang 2015, 172–175).

These activities received massive media coverage and finally attracted the president's attention. From 1974, the size and scope of the corps expanded further: branch offices were established in all nine provinces, and 1,000–1,500 scientists and engineers per year participated in its activities. The Corps members established sisterhood relationships with individual farming and fishing villages and tried to improve their conditions through long-term technological guidance (Lee and Hong 2012, 187–189). At this stage, not only university professors, but also teachers in regional vocational schools participated in this movement on a large scale.

In recognition of these efforts, Park Chung Hee cited the Saemaeul Technological Service Corps for official commendation at the National Saemaeul Leaders' Convention, held at the end of 1974. KOFST actively publicized the achievements of its Saemaeul technological guidance through continuing coverage of them in its main press organ, *Gwahak-gwa gisul* (Science and Technology). From 1976, in order to publicize its achievements more widely, it also held a large-scale gathering called the Saemaeul Technology Guidance Cases Presentation. After having already been commended annually by the president, in 1977, the Saemaeul Technology Service Corps received highest honors, including the Order of Saemaeul Service Merit and the Order of Saemaeul Collaboration Merit, while two leaders of this Corps also received presidential commendations (Kang 2015, 184–192).

As the Saemaeul Technological Service Corps expanded and gained the president's attention, governmental support for the fields of science and technology rapidly increased as well. Not only did KOFST, which took charge of Saemaeul Technological Service Corps activities, receive dramatically increased financial support, but also many projects cherished for a long time in the fields of science and technology were carried out smoothly, such as the establishment of the Korea Science and Technology Foundation and the construction of the KOFST building (Kang 2015, 193–248).

The Korean scientific community operated in close connection with political power during the Park Chung Hee regime. This relationship occurred because Park Chung Hee firmly recognized the political value of science and technology, although these fields did not play as defining a role as expected in economic development—the central agenda of Park's fatherland modernization goal. Instead, the Saemaeul Movement, which was Park's key instrument for the justification of the October Yusin—his political liability—offered the opportunity for science and technology to attract Park's attention. Above all, KOFST's strategy of linking the Saemaeul Movement with the dissemination of scientific knowledge among the people proved effective. The behind-the-scenes political nature of the Saemaeul Movement could be wrapped in the shining image of modernity and an advanced nation led by science and technology.

Conclusion

The government's interest in science and technology was heightened with the emergence of the Park regime in 1961. After taking power, this regime wanted to secure its legitimacy through a strong drive for the "modernization of the fatherland." As it aggressively pursued the modern restructuring of the entire South Korean society—to encompass industry, agriculture, forestry, food, family planning, and social consciousness—science and technology emerged as essential resources for new state-driven projects, and as a result they were actively restructured and mobilized by political power.

The inter-relationship between science and technology and politics

was forged on various levels. First, important on the national level was the installation of agencies for managing science and technology, to which political power would spread its tentacles (Ministry of Science and Technology [MOST] and Office of the Second Secretary for Economic Affairs at the Blue House). Political power influenced scientific and technological R&D, thus formulating guidelines for them (Korea Institute of Science and Technology [KIST], Agency for Defense Development [ADD], and Daedeok Science Town). National projects to which science and technology were applied unfolded *en masse*, seeking to boast the grandeur of political power (Gyeongbu Expressway, POSCO, and Tongil rice). Scientists and engineers were mobilized for national projects, which they then actively supported (Saemaeul Technological Service Corps).

Thus, during the Park Chung Hee era, the relationship between political power and science and technology was not unidirectional; they were mutually reinforcing. Empowered by political patronage, the fields of science and technology were able to construct their institutional basis rapidly and to initiate R&D. With assistance from science and technology, political power, including the supreme leadership, was better able to secure public interest in and support for its national projects. At this time, as partners in science and technology, Park gained the support of the engineers Choi Hyung Sup and O Won-chol, along with the organizations KIST, ADD, and KOFST. Choi Hyung Sup's prioritizing of applied research and ADD's reverse engineering approach stood out. However, political privileges to and mobilization of science and technology internally bore new sets of problems, thereby leading to ruptures. The hypertrophy of newly established government-funded research institutes, lack of autonomy on the part of scientific organizations, and failure of the "Tongil rice" to adapt to the Korean environment are some examples. As a result, contrary to intentions, science and technology and political power also quickly eroded each other's authority.

Consequently, the Park era created the government-led pursuit and industry-centered development of science and technology, as well as the pursuit of ambitious technological projects, all of which can be identified as major characteristics of the scientific and technological landscape in South

Korea. These were the results of the intervention of political power, which was pervasive enough to fundamentally change the development of science and technology in South Korea. In addition, scientific and technological support was important for the full-fledged pursuit of national projects, including heavy chemical industrialization and the Saemaeul Movement. Thanks to such support, it became possible for national projects to be pursued with vigor and with the addition of scientific validity and technological efficiency. The relationship of political power and science and technology also saw the gradual rise of individuals and groups who were discontent with such a linkage. But in the end, behind all of this, the intangible power of the close alliance between science and technology and political authority remained.

REFERENCES

An, Dong-man, et al. 2016. *Baekgom, dojeon-gwa seungni-ui girok* (White Bear: Record of Challenges and Triumphs). Seoul: Planet Media.

Campbell, Joel R. 2008. *The Technology Policy of the Korean State since 1961: Successful Development of Science and Technology*. New York: The Edwin Mellen Press.

Cheon, Sang-geun. 1982. *Hanguk-ui gwahak gisul jeongchaek: han jeongchaek ibanja-ui jeungeon* (Korean Policy toward Science and Technology: A Policy-Maker's Testimony). Seoul: Jeongusa.

Choi, Hyung Sup. 1995. *Bul-i kkeojiji anneun yeonguso* (Research Institute with the Lights Never Off). Seoul: Chosun ilbo.

DiMoia, John P. 2018. "In Pursuit of 'Peace and Construction': Hyundai Construction and Infrastructure in South East Asia, 1965–1973." In *Engineering Asia: Technology, Colonial Development and the Cold War Order*, edited by Hiromi Mizuno, Aaron S. Moore, and John P. DiMoia, 209–239. New York: Bloomsbury Academic.

Gisul Gwalliguk (Technology Management Department). 1963. "Miguk haksulwon chocheong miguk gwahakgye sichal bogoseo" (Report on the Inspection of

the US Scientific World upon an Invitation of the US National Academy of Sciences). Seoul: Gisul Gwalliguk.

Im, Gyeong Soon. 2010. "Bak Tae-jun-gwa gwahak gisul" (Park Tae-Joon and Science and Technology). *Gwahakgisulhak yeongu* (Journal of Science and Technology Studies) 10.2: 37–76.

Jeon, Chihyung. 2010. "A Road to Modernization and Unification: The Construction of the Gyeongbu Highway in South Korea." *Technology and Culture* 51.1: 55–79.

Josephson, Paul R. 1996. *Totalitarian Science and Ideology*. Atlantic Highlands, NJ: Humanities Press.

KAIST (Korea Advanced Institute of Science and Technology). 1996. *Hanguk gwahak gisulwon sabansegi* (A Quarter Century of KAIST). Daejeon: KAIST.

Kang, Mi Hwa. 2015. "Hanguk gwahakja sahoe-wa jeongbu-ui gwangye byeonhwa: 1960–1970 nyeondae hanguk gwahak gisul danche chongyeonhaphoe-reul jungsim-euro" (Changes in the Relationship between the Scientific Community and the Government: Focusing on the Korean Federation of Science and Technology Societies). PhD diss., Chonbuk National University.

Kim, Dong-Won, and Stuart W. Leslie. 1998. "Winning Markets or Winning Nobel Prizes? KAIST and the Challenges of Late Industrialization." *Osiris* 13: 154–185.

Kim, Geun Bae. 1990. "Hanguk gwahak gisul yeonguso seollip gwajeong-e gwanhan yeongu: miguk-ui wonjo-wa geu yeonghyang-eul jungsim-euro" (A Study of the Process of Establishing the Korea Institute of Science and Technology: Focusing on US Aid and Its Influence). *Hanguk gwahaksa hakhoeji* (Korean Journal for the History of Science) 12.1: 44–69.

_____. 2011. "An Anatomical Chart of South Korean Science and Technology in the 1960s: Their Relationships with Political Power." *East Asian Science, Technology and Society: An International Journal* 5.4: 529–542.

_____. 2017. "Bak Jeong-hui jeongbu sigi-ui gwahak gisul-eul eotteoke bol geosinga? Gwahak daetongnyeong damnon-eul neomeoseo" (How to Understand the Science and Technology of the Park Chung Hee Regime: Beyond the Discourse on the "President of Science"). *Yeoksa bipyeong* (Critical Review of History) 118: 142–168.

Kim, Hyung-A. 2004. *Korea's Development under Park Chung Hee: Rapid Industrialization, 1961–79*. London & New York: RoutledgeCurzon.

Kim, Tae Ho. 2017. *Geunhyeondae hanguk ssal-ui sahoesa* (Social History of Rice in Modern Korea). Seoul: Teullyeok.

_____, ed. 2018. *"Gwahak daetongnyeong Bak Jeong-hui" sinhwa-reul neomeo: gwahak-gwa gwollyeok geurigo gukga* (Beyond Myth of "Park Chung Hee as the President of Science": Science and Power and the State). Seoul: Yeoksa Bipyeongsa.

KIST (Korea Institute of Science and Technology). 1971. *Resume of Research Staff.* Seoul: KIST.

Kwon, Peter Banseok. 2017. "Beyond Patron and Clients: Historicizing the Dialectics of US-ROK Relations amid Park Chung Hee's Independent Defense Industry Development in South Korea, 1968–1979." *Seoul Journal of Korean Studies* 30.2: 185–216.

Lee, Young-Mi, and Sungook Hong. 2012. "'Technoscience and Politics in Korea in the 1970s: 'Scientification of All People Movement' and the 'Saemaeul Technical Service Corps.'" *Historia Scientiarum* 21.3: 174–192.

Moon, Manyong. 2010. *Hanguk-ui hyeondae-jeok yeongucheje-ui hyeongseong: KIST-ui seollip-gwa byeoncheon, 1966–1980* (Formation of the Modern Korean Research System: Establishment and Vicissitudes of KIST, 1966–1980). Seoul: Seonin.

_____. 2012. "Bak Jeong-hui sidae damhwamun-eul tonghae bon gwahak gisul jeongchaek-ui jeongae" (A Discourse Analysis on Science and Technology during the Park Chung Hee Era). *Hanguk gwahaksa hakhoeji* (Korean Journal for the History of Science) 34.1: 72–108.

_____. 2013. "Technology Gap, Research Institutes, and the Contract Research System: The Role of Government-Funded Research Institutes in Korea." In *Bridging the Technology Gap: Historical Perspectives on Modern Asia*, edited by Youngsoo Bae and Buhm Soon Park, 125–151. Seoul: SNU Press.

Moon, Manyong, and Mi Hwa Kang. 2013. "Bak Jeong-hui sidae gwahak gisul 'jedo guchukja': Choe Hyeong-seop-gwa O Won-cheol" (People Who Built Scientific and Technological Institutions during the Park Chung Hee Era: Choi Hyung Sup and O Won-chol). *Hanguk gwahaksa hakhoeji* (Korean Journal for the History of Science) 35.1: 225–244.

Munhwa Gongbobu (Ministry of Culture and Information). 1973. *Hongbo jaryo: jeon gungmin-ui gwahakhwa undong* (Press Release: All People's Scientification Movement). Seoul: Munhwa Gongbobu.

O, Won-chol. 1996. *Hangukhyeong gyeongje geonseol: enjinieoring eopeurochi* (Korean-Style Economy Building: Engineering Approach). Seoul: Kia Gyeongje Yeonguso.

Park, Tae Gyun. 2012. "The Roles of the United States and Japan in the Development of South Korea's Science and Technology during the Cold War." *Korea Journal* 52.1: 206–231.

Roh, Yong-Bo. 2012. "Gyeongbu gosokdoro-ui tansaeng: guktogaebal-ui gosokdoro-eseo Bak Jeong-hui gosokdoro-ro" (Birth of Gyeongbu Expressway: From the Expressway of National Land Development to Park Chung Hee's Expressway). Master's Thesis, Chonbuk National University.

Song, Sungsoo. 2002. "Hanguk cheolgang saneop-ui gisul neungnyeok baljeon gwajeong: 1960–1990 nyeondae-ui Pohang Jecheol" (Historical Development of Technological Capabilities in Korean Steel Industry: POSCO from the 1960s to the 1990s). PhD diss., Seoul National University.

_____. 2013. "The Historical Development of Technological Capabilities in Korean Steel Industry: The Case of Posco." In *Bridging the Technology Gap: Historical Perspectives on Modern Asia*, edited by Youngsoo Bae and Buhm Soon Park, 95–123. Seoul: SNU Press.

Walker, Mark, ed. 2003. *Science and Ideology: A Comparative History*. New York: Routledge.