

Moon Manyong 문만용, *Hanguk gwahakgisul yeongucheje-ui jinhwa* 한국 과학기술 연구체제의 진화 (The Evolution of Science and Technology Research Systems in South Korea). Paju: Deulnyeok, 2017. 470 pp.

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How does one narrate the history of science and technology in any given context? One can follow the so-called “internal” approach and trace their ideas and artifacts in order to understand the emergence of new knowledge and technologies. Alternatively, one can take the “external” approach and pay more attention to the social, political, and cultural context that shaped the new knowledge and technologies. The two approaches—internal and external—can be seen as extreme positions along a broad spectrum. Most histories of science and technology can be categorized as occupying a place somewhere in between the two extremes.

Within this framework, Moon Manyong’s book, *The Evolution of Science and Technology Research Systems in South Korea*, clearly takes an external approach in telling the story of science and technology in modern South Korea. Rather than focusing on the activities of individual scientists and engineers, the author takes the institutions of science and technology as a primary unit of analysis. By tracing the evolution of these institutions through time, Moon hopes to reveal the character of the “science and technology research systems” in modern South Korea. In the book, he divides the institutions into several types: national, non-profit, corporate, and university. The main argument is that the leading sector for the South Korean research system changed through time. The new leader built upon the accomplishments of its predecessors, which led to rapid expansion and growth of scientific activities in South Korea.

The chapters in this book runs chronologically, each covering roughly a decade. Chapter 2 discusses the role of the “national” research institutes in the years following liberation. Even within the devastating conditions of the post-liberation years, the small number of Korean scientists and engineers harbored “post-colonial desires” (47). Through their experiences during the colonial period, they understood

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the importance of science and technology for nation-building. The desires were materialized in several key national research institutes, including the Central Industrial Research Institute, National Horticultural Technological Institute, the Ministry of National Defense Scientific Research Institute, and the Atomic Energy Research Institute. As national institutions, they were subject to some limitations, not the least of which was that the number and salary of the researchers were under strict government scrutiny. Given the paucity of financial support for these institutions, many of their research projects were elementary in nature, leading to the continued desire for a “proper research institute” (98).

Chapter 3 is singularly focused on the Korea Institute of Science and Technology (KIST), which was a completely new kind of institution. As opposed to the government-controlled national research institutions, KIST was established in 1966 as a “government-funded” non-profit research institute. This meant that KIST could exercise much more autonomy in its operations, offer higher salaries to the researchers (many of whom were recruited from established positions abroad), and avoid bureaucratic red-tape. The author argues that KIST represents a new era in the history of science and technology in South Korea. Together with the establishment of the Ministry of Science and Technology (MOST) in 1967, KIST signaled the shaping of the “modern science and technology research system” (151). Many scholars still believe that the key character of South Korea’s innovation system has been the major role played by the government-funded research institutes (GRIs). If we accept this premise, the origins of the system can be traced to 1966-1967, when KIST and MOST were established.

In the 1970s, the importance of GRIs grew rapidly, and Chapter 4 follows the establishment of specialized GRIs throughout the decade. By 1980, nineteen GRIs were in operation, many of which began as KIST spin-offs. In this way, the semi-autonomous GRIs dominated the field, conducting applied research for the burgeoning heavy and chemical industries. Most of the new GRIs were located in or relocated to Daedeok Science Town, currently a district of Daejeon. The story of the rapid proliferation of GRIs is the best example for the Moon’s argument that the new leader built upon the accomplishments of its predecessor. The real and perceived success of KIST elevated it to the status of a template that could be easily replicated in various specialized fields. This led to the transformation of the research system from one led by national research institutes to one dominated by GRIs.

If you have been following Moon’s scholarship, you would realize that Chapters 3 and 4 are based on his previous works. In Chapter 5 and 6, however, he treads on new grounds dealing with subsequent period leading up almost to the present. Chapter 5 focuses primarily on the rapid expansion of corporate research institutes, and chapter 6 on the rise of university research institutes. In terms of R&D budget, it is abundantly clear that the private sector had taken over as the leader of scientific and engineering research since the 1980s (372). If private companies were reluctant to invest in R&D and required the active assistance of GRIs in the 1970s, they began

to actively pursue R&D activities in the 1980s. Both large *chaebol* companies (like Samsung Advanced Institute of Technology) and small and medium sized enterprises (like Cuckoo Electronics R&D Center) conducted applied research to develop new products, sometimes in cooperation with the relevant GRIs. The vitalization of the academic sector as important institutions of scientific research occurred in the 1990s. This was primarily a product of the redirection of government support for academic research during this period. Although smaller in scale compared to the GRI or corporate sectors, the growth of the academic sector as an active member of South Korea's science and technology research system completed the "triple helix" model of the nation's innovation system.

The key strength of this book is in its chronological comprehensiveness, although it can also be its weakness. Moon ambitiously attempts to cover the period between the 1940s to the 2010s, with an aim to analyze the episodic transformation of the research system in South Korea. From a 30,000-foot level, the book makes a persuasive argument about the regime change from national laboratories to non-profit GRIs to corporate R&D centers to university research institutes. The attempt works quite well in the earlier period when the "system" was relatively simple. However, once the scale and scope of the R&D activities grew to a substantial level in the 1980s and 90s, the story becomes more complex, requiring more detailed evidence to allow for a streamlined narrative. Is Samsung representative of the *chaebol* companies? Do the experiences of elite universities such as Seoul National University and the Korea Advanced Institute of Science and Technology (KAIST) tell the whole story of university research in South Korea? These questions can only be answered through more down-to-earth historical research on individual cases of corporate and university research, both of which are lacking in the existing corpus of scholarship.

To narrate the story of a country's science and technology system is difficult. Moon's book gracefully takes on this herculean task in a single volume. The resulting product provides us with a basic framework to understand the evolution of a system through more than six decades. However, in undertaking the task, the author sometimes seems to assume that the end of this story is the nicely-balanced triple-helix of government, corporate, and academic sectors. For example, when assessing the rise of the academic sector, Moon describes it as "belated" (287), which is a curious word choice for a historian. Should we take this phenomenon to be inevitable in the evolutionary process? As scholars of evolution point out, the process of evolution does not lead to organisms perfectly suited to their environments. If we take this idea seriously, perhaps it may be beneficial to emphasize the contingencies that led to a range of imperfect institutions that possessed traits good enough to survive within the overall South Korean experience. This will be a task reserved for the future historians of science and technology interested in Korea. Until that time, Moon's book will serve as a towering classic, which will be cited over and over again.