Higher Education Governance & Policy

ISSN: 2717-8676 **Volume:** 2 **Issue:** 1

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Article Type: Review Article

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Cite as: Lee, S. J. (2021). Research university initiatives in South Korea: Accomplishments and challenges. *Higher Education Governance & Policy, 2*(1), 45-55.

Access: https://dergipark.org.tr/en/download/article-file/1771087

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Volume: 2
Issue: 1

Research University Initiatives in South Korea: Accomplishments and Challenges

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Abstract

This study investigates the accomplishments of national initiatives for building research universities in South Korea. Focusing on the top six research universities, it analyses whether they have achieved world-class university status in terms of three dimensions: sufficient research funding, talented human resources, and shared governance and academic freedom. Through government initiatives such as the Brain Korea 21 project, the Korean government actively invests in university research because of its importance to the country's economic development. As a result, the research productivity of Korean universities has grown immensely. This study's findings suggest, however, that despite this rapid growth and strong financial support, Korean research universities are still lacking in terms of the quality of their doctoral education and have not yet achieved shared academic governance and a culture of academic freedom. The study concludes that Korean research universities still have challenges to overcome before they can be considered truly world-class universities

Keywords: Research university, research funding, talented human resources, shared governance, academic freedom, South Korea

Introduction

Worldwide, the notion of "world-class universities" has affected many countries' higher education policies and led to research universities embracing strategies to gain high positions in international university rankings (Deem, Mok, & Lucas, 2008; Hazelkorn, 2015; Shin & Kehm, 2013). Asian higher education is no exception, especially in South Korea (hereafter, Korea). Korea has shown remarkable achievements in education (Lee, Kim, & Adams, 2010), and the idea of "post-secondary education for all" is closer to reality in Korea than in any other country (Grubb, Sweet, Gallagher, & Tuomi, 2006, p. 16). In addition, the Korean government has, for decades, invested heavily in research and development (R&D) through university-based research funding projects (Shin & Jang, 2013). One of the most famous government initiatives to strengthen university research is the Brain Korea 21 (BK21) project. The motivation of the BK21 project is to improve the global competitiveness of Korean universities and to restructure university systems (Shin, 2009). Such policy initiatives have been successful in leading to the emergence of strong research universities in the Korean higher education system. Through these policy initiatives, the research performance of Korean research universities has grown significantly at a time when increased research competitiveness is being emphasized in international comparative research and global rankings (NRF, 2019; Teichler, Arimoto, & Cummings, 2013). However, Korean research universities still may face challenges to becoming competitive world-class universities (Kim & Cho, 2014), and whether they have succeeded is open to question (Shin & Lee, 2015). One of the main issues for Korean research universities is their reliance on external policy involvement and strong government-led policies. Furthermore, just because a university is at the top of the international university rankings does not necessarily mean that it is the best in all aspects (Altbach, 2004). A truly world-class university must be able to demonstrate not only academic achievement but affective

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(Review Article) **Cite as:** Lee, S. J. (2021). Research university initiatives in South Korea: Accomplishments and challenges. *Higher Education Governance & Policy, 2*(1), 45-55.

Received: May 16, 2021; ***Revised:*** June 15, 2021; ***Accepted:*** June 15, 2021; ***Published:*** June 30, 2021

achievement (e.g., intrinsic motivation, self-efficacy), talented human resources, academic freedom, shared governance, and a well-established academic culture (Kim & Cho, 2014).

This review article aims to examine the accomplishments and challenges of Korean research universities in terms of important characteristics of world-class universities. The study focuses on how Korean research universities have developed under government-driven and growth-oriented policies and the specific challenges they face on the road to becoming world-class universities.

National Initiatives for Building Research Universities in South Korea

The Korean government designed systems for R&D to efficiently support national economic development (Kim, 1997). Given the country's scarce natural resources, R&D and human resources are the main drivers of economic development in Korea (Adams, 2010; Kim & Cho, 2014). The government has strengthened education in science and engineering, and as part of this effort, the Korea Advanced Institute of Science and Technology (KAIST) was launched in 1971 and the Pohang University of Science and Technology (POSTECH) was established in 1986. The Korea Science Foundation initiated projects to promote excellent research groups such as the Science Research Center (SRC), the Engineering Research Center (ERC), and the Regional Cooperation Research Center (RRC) during the 1990s. The demand for talent to carry out creative research activities has continued to increase, and universities continue to fulfill important functions for national economic development (Lee et al., 2010). The number of students in higher education rapidly increased during the 1980s and 1990s, from 402,979 students in 1980 to 1,040,166 in 1990 to 1,665,398 in 2000 (MOE & KESS, 2019). The number of universities also expanded following the Kim Young-Sam administration's 5.31 Education Reform in 1995, from 131 in 1990 to 161 in 2000. Figure 1 shows the increase in student numbers at Korean universities between 1980 and 2019.

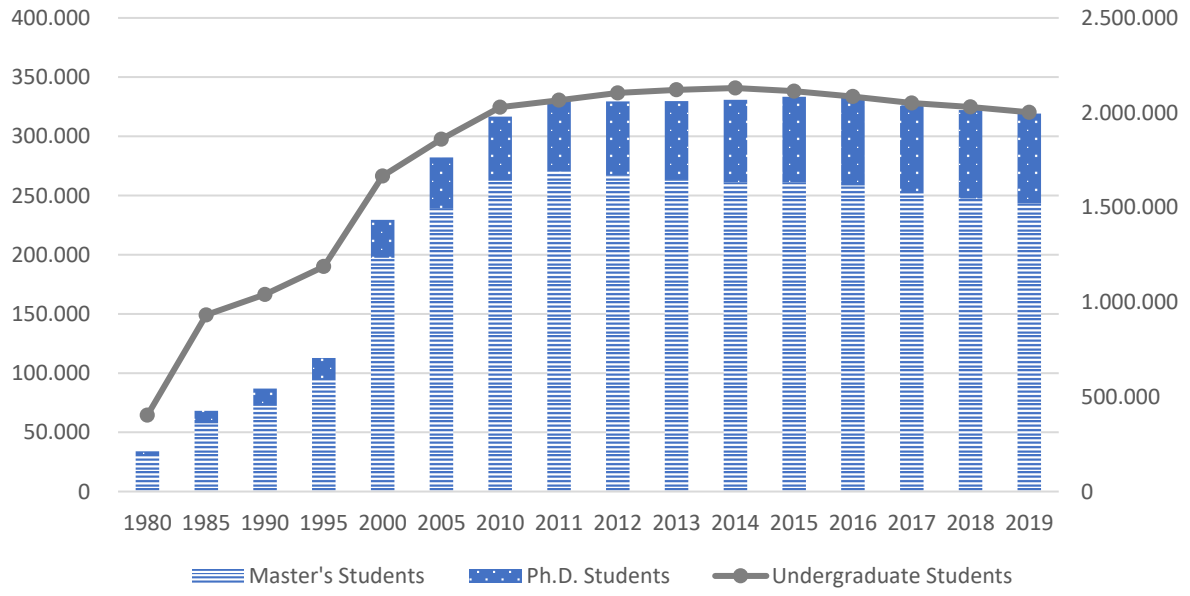

Figure 1. Increase in numbers of undergraduate and graduate students in Korea, 1980–2019
Data source: MOE & KESS, 2019

Government initiatives emphasize basic research and the training of human resources at universities (Ministry of Science & ICT, 2017). For instance, the BK21 project, launched in 1999 and currently in its fourth stage, aims to cultivate high-quality professional manpower, secure research performance, and foster graduate schools with international competitiveness. The first phase of the BK21 project spent KRW 1.3 trillion to support 438 project groups at 72 universities from 1999 to 2005. The second phase spent KRW 1.8 trillion in supporting 568 project groups at 74 universities from 2006 to 2012. In its third phase, the BK21 project merged with the World-Class University Project (2008–2012), which aimed to recruit internationally renowned faculty members, build innovative educational and research

environments, and further enhance the international competitiveness of Korea's universities (Byun, Jon, & Kim, 2012). From 2013 to 2020, the third phase of the BK21 project spent KRW 1.9 trillion and supported 522 project groups at 65 universities. The BK21 project is now in its fourth phase, during which it plans to invest KRW 2.9 trillion to support 562 project groups at 68 universities from 2020 to 2027 (MOE, 2019; 2020). To date, the BK21 project is the longest running and most successful project to enhance the global competitiveness of Korean universities (Shin, 2009). It has led to improving the research productivity of Korean universities, and as a result, the number of Science Citation Index (SCI)-level journal articles published by faculty members participating in the BK21 project increased significantly from 4,392 in 1999 to 24,968 in 2017 (MOE, 2019). The numbers of master's and doctoral students almost doubled between 1995 and 2000: from 93,993 to 197,436 master's students, and from 18,735 to 32,001 doctoral students (MOE & KESS, 2019). The BK21 project has changed the landscape of Korean universities by increasing the competitiveness of university research, enhancing graduate schools, and pushing top universities to shift toward a research orientation (Shin, 2009; Shin & Lee, 2015).

Outcomes of Research University Initiatives in South Korea

Through governmental policy involvement and funding, the research capability of Korean research systems has grown enormously. This increased research capability is reflected in international comparative studies and global rankings. For example, a 2013 study on the Changing Academic Profession (CAP) project reported that the research productivity of Korean academics per professor was the highest among the 19 countries that participated (Teichler et al., 2013). In 2019, Korea ranked 12th in the world in Science Citation Index (SCI) publications and 13th in number of citations (KISTEP & KAIST, 2020). The number of SCI journal papers published by Korean researchers in that year was 69,618, up 8.47% from the previous year (i.e., 64,179 in 2018; NRF, 2019). Twenty top Korean universities accounted for 42.4% of all of the 2019 journal publications from Korean institutions, with Seoul National University producing the largest number of SCI journal publications (4,372 based on first author or corresponding author, 8,289 based on co-author; KISTEP & KAIST, 2020). Figure 2 shows the increase in publications from Korean researchers between 2005 and 2019.

The number of research institutes affiliated with universities increased by 12.5% from 4,528 in 2014 to 5,092 in 2018, and the number of full-time researchers in university-affiliated research institutes increased by 36.8% from 2,794 in 2014 to 3,822 in 2018 (NRF, 2019).

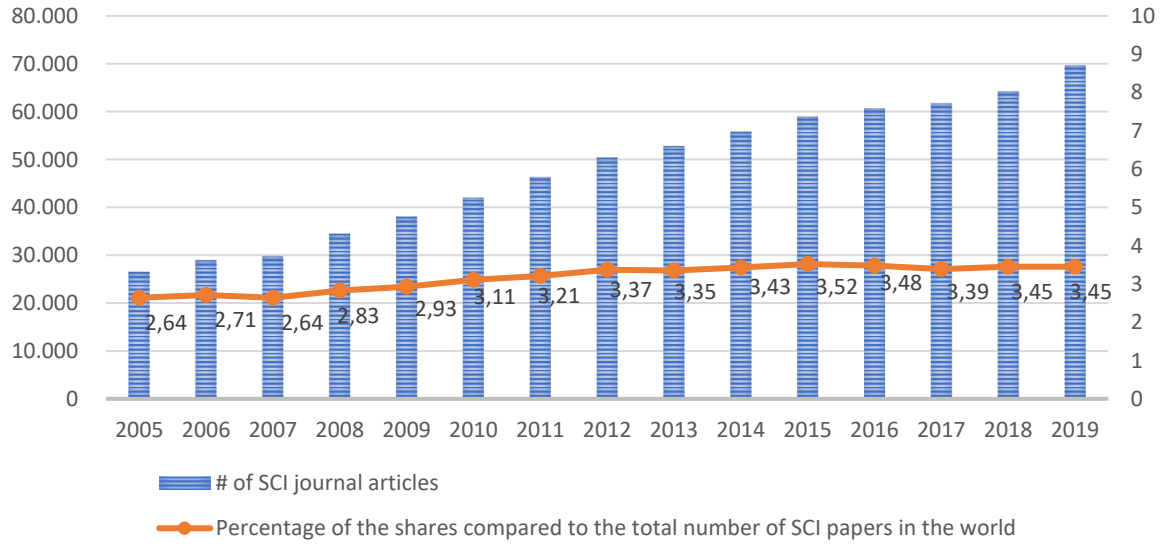

Figure 2. Increase in international publications by Korean researchers, 2005–2019
Data source: KISTEP & KAIST, 2020

According to the Times Higher Education (THE) World University Rankings, the number of Korean universities ranking in the top 200 grew from four (Seoul National University, SNU; Korea Advanced

Institute of Science and Technology, KAIST; Pohang University of Science and Technology, POSTECH; and Yonsei University) in 2011 to six (the previous four plus Korea University and Sungkyunkwan University, SKKU) in 2020. Table 1 presents status data on these six research universities.

Table 1. Top Six Research Universities in South Korea, 2020

University	Number of full-time faculty members	Number of students		Number of SCI journal publications 2019	Third-party funded research funding per professor (KRW 1,000)	THE ranking 2020
		Undergraduate	Graduate			
SNU	2,256	16,608	11,205	4,372	217,217.2	64
SKKU	1,487	19,310	7,790	2,429	194,653.2	89
KAIST	634	3,766	6,738	1,748	623,739.6	110
POSTECH	291	1,422	2,159	854	504,493.5	146
Korea	1,477	20,822	8,758	2,279	199,041.1	179
Yonsei	1,724	17,825	11,100	3,038	225,314.9	197

Note: Number of SCI journal publications is based on first author or corresponding author.
Data sources: KISTEP & KAIST, 2020; www.academyinfo.go.kr; www.snu.ac.kr; www.skku.edu; www.kaist.ac.kr; www.postech.ac.kr; www.korea.ac.kr; www.yonsei.ac.kr

Research Universities in Korea: Globally Competitive?

The BK21 project was successful in supporting university research and the emergence of research universities (Shin & Lee, 2015). But, as Shin and Lee (2015, p. 192) pointed out, "there is still controversy over whether the newly emerged research universities in Korea are truly competitive, and whether they are sustainable in the long run because the rapid growth of research performance has been mainly obtained through external policy intervention."

This paper addresses the question of whether today's Korean research universities are truly world-class universities by assessing them in terms of a set of specific characteristics. While the concept of the world-class university has become embedded in higher education policies and strategies, its definition remains ambiguous (Deem et al., 2008; Huisman, 2008; Yang, Yang, & Wang, 2021; Yang & Welch, 2012). This is partly because the definition varies depending on focus and perspective (Huang, 2015). However, they do share some common characteristics (Altbach, 2009; Salmi, 2009), of which the most basic is that they are research universities (Altbach & Balan, 2007). Lee (2013) suggested that a world-class university must be research-intensive, resource-intensive, and technologically smart, and have institutional autonomy and high-level internationalization. Shin and Kehm (2013), focusing on the East Asian context, emphasized world-class universities' global competitiveness, value orientation for humanity, and primary goal of teaching and research. Altbach (2009) described world-class universities as having the most funding from public resources, fulfilling multiple functions, being resource-intensive, and having the best students and professors. Salmi (2009) proposed that the three critical factors are flexible governance, sufficient research funding, and talented human resources. Drawing on these previous studies, this study reviews research universities in Korea in terms of three main factors: sufficient research funding, talented human resources, and shared governance and academic freedom.

Sufficient Research Funding

The Korean government actively supports the economy and research development with large investments in R&D. According to the 2018 Main Science and Technology Indicators, gross domestic expenditure on R&D (GERD) as a percentage of GDP is 4.52% in Korea. This figure is relatively very high (see Figure 3); for example, the corresponding numbers are 2.42% for the Organization for Economic Cooperation and Development (OECD) and 2.07% for the European Union (27 countries). In Korea, while most of these resources for research are used by private companies (80.29%) and public research institutes (10.07%), a substantial portion goes to universities (8.22%). The newly emerged research-focused universities receive most of the competition-based research grants given to universities by the Korean government. For instance, for 2012, Shin and Lee (2015) examined public research funding to 212 universities and found that the research universities received 37.2%. Similarly, in the United States, about 150 research-focused universities obtain about 80% of competitive research grants from public resources (e.g., Altbach, 2009). Shin and Lee (2015) concluded that, considering the amount

of research funding as share of GDP and the concentration of resources, selective research-focused universities have a well-developed financial foundation in Korea.

Nevertheless, coordination between the different types of research—pure, applied, and developmental research—may or may not be ideal from an international comparative perspective as shown in Figure 4. Korea, like China and Singapore, invests a great deal in applied and developmental research, and relatively little in pure research. The heavy emphasis on applied and developmental research and on short-term results can translate to a weak foundation for research universities and the discouragement of pure and/or long-term research.

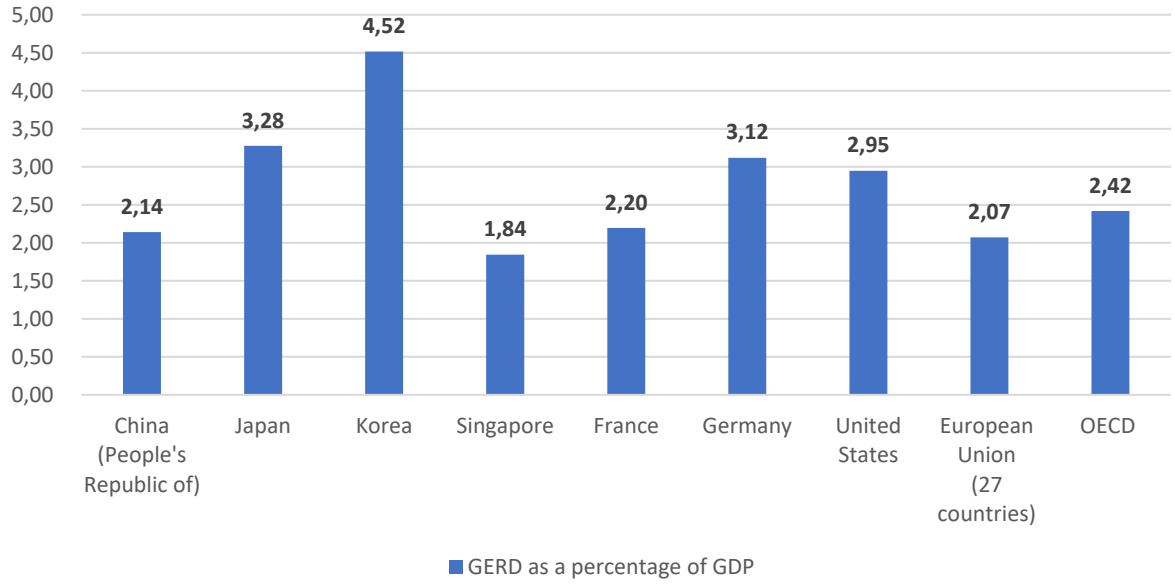

Figure 3. Gross domestic expenditure on R&D (GERD) as a percentage of GDP, 2018
Data source: https://stats.oecd.org

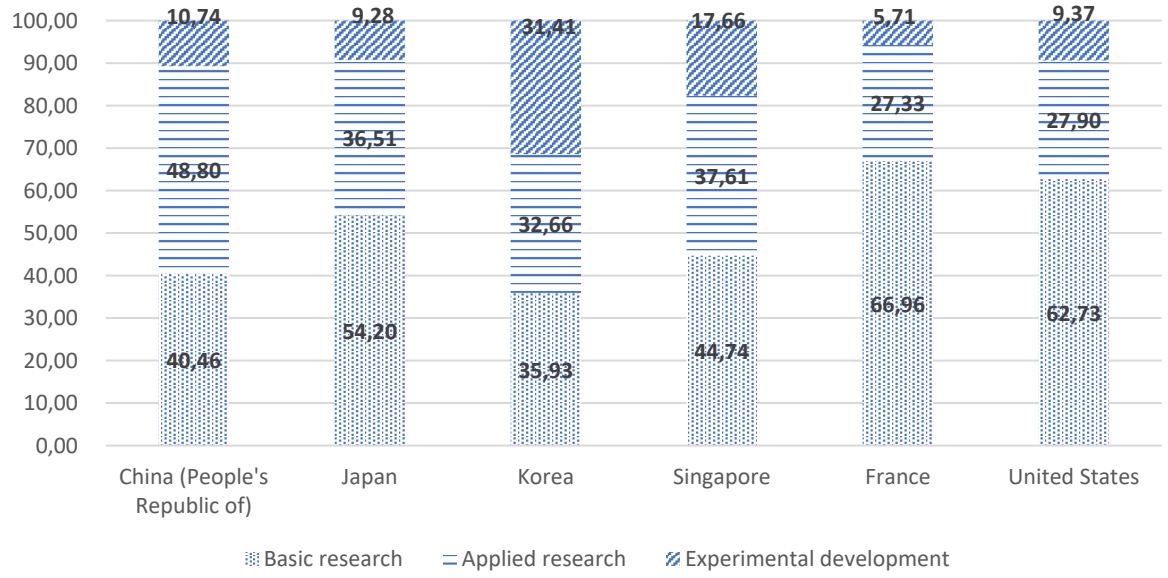

Figure 4. Percentage of gross domestic expenditure on R&D by type of R&D in higher education sectors of six OECD countries, 2018
Data source: https://stats.oecd.org

Talented Human Resources

The admission process to enter top universities in Korea is highly competitive; only very high achievers in the National Assessment for College Admission are admitted to undergraduate programs at the top-ranked universities. Research universities, therefore, have highly talented students in their undergraduate programs. The so-called SKY universities (**S**eoul National, **K**orea, and **Y**onsei) have long been the three most prestigious in the country. KAIST and POSTECH are top science and technology universities, and SKKU is emerging as a prestigious university with the support of the Samsung group. However, their graduate programs are not as competitive as their undergraduate programs because many Korean students prefer to do their graduate work, particularly doctoral studies, abroad (Shin & Lee, 2015). From this point of view, Korea's research universities are successful for their undergraduate programs, somewhat less successful for their master's programs, and somewhat unsuccessful for their doctoral programs.

Foreign students are also important resources in universities. As shown in Figure 5, the number of foreign students in Korean undergraduate programs went up and down between 2005 and 2014, and has since been increasing slightly, reaching 66,479 in 2020. On the other hand, the number of foreign students in graduate programs has steadily increased from 5,742 (4,023 in master's programs, 1,719 in doctoral programs) in 2005 to 38,152 (24,996 in master's programs, 13,156 in doctoral programs) in 2020. Research universities actively recruit excellent international students, and the proportion of foreign students at them is relatively high, with the exception of the undergraduate programs at SNU and POSTECH, as shown in Table 2.

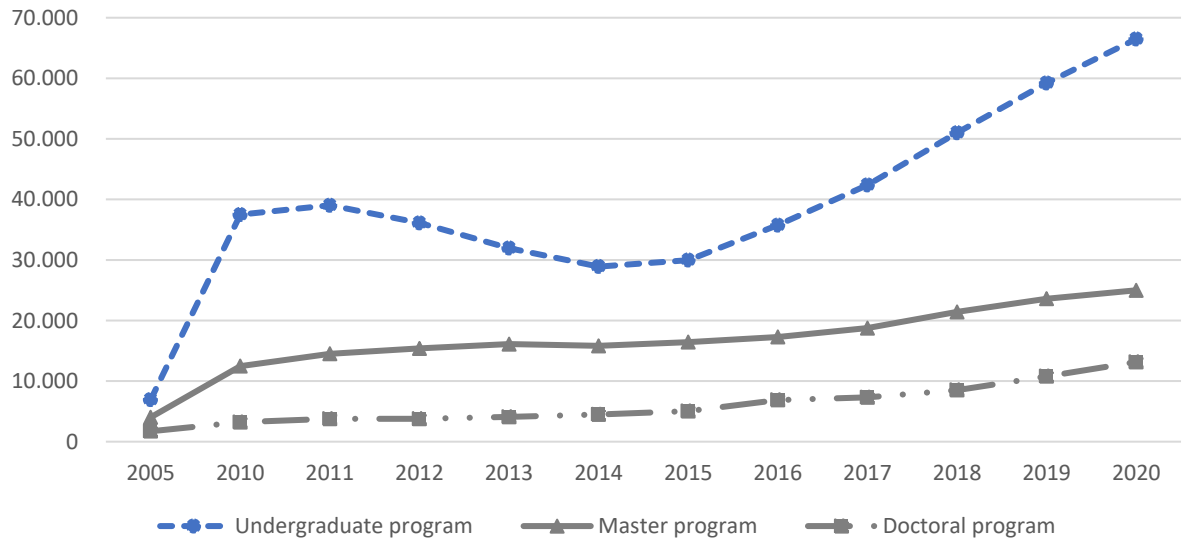

Figure 5. Changes in the numbers of foreign students in Korea, 2005–2020
Data source: MOE & KEDI, 2020

The number of full-time faculty members at all Korean four-year universities has increased from 25,337 in 1990 to 66,054 in 2020, and 87.9% of full-time faculty members have doctoral degrees (MOE & KEDI, 2020). Of full-time faculty members at all universities, 35.2% have doctoral degrees from foreign countries, while at the research universities, most of the professors have earned a Ph.D. abroad, especially in the United States. This is one of the interesting characteristics of Korean research universities. In addition, research universities have begun to aggressively hire international professors in recent years, but the share of foreign professors is still low. For example, at SNU, the leading university in Korea, foreign professors comprised only about 4.83% of all full-time faculty members in 2020, a much lower proportion compared to the competing research universities in Singapore and Hong Kong.

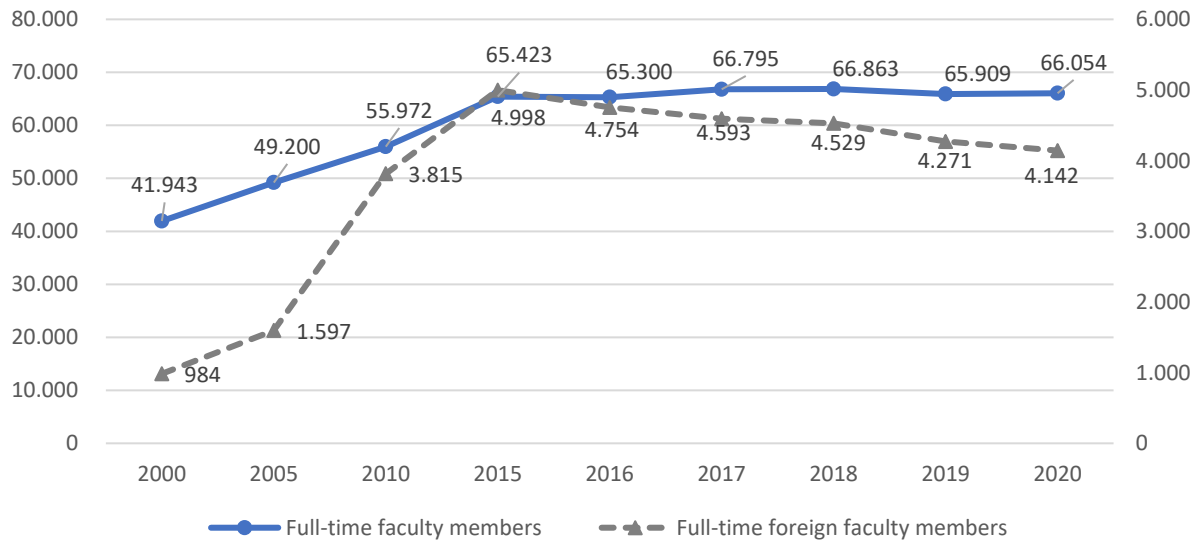

Figure 6. Change in the number of full-time faculty members in Korea, 2000–2020
Data source: MOE & KEDI, 2020

Table 2. Internationalization in Research Universities in South Korea, 2020

University	Number of full-time faculty members	Number of full-time foreign faculty members	Number of students		Number of foreign students	
			Undergraduate	Graduate	Undergraduate (Training courses)	Graduate
SNU	2,256	109 (4.83%)	16,608	11,205	226 (725)	1,087
SKKU	1,487	105 (7.06%)	19,310	7,790	2,677 (899)	1,516
KAIST	634	53 (8.36%)	3,766	6,738	309 (39)	546
POSTECH	291	8 (2.75%)	1,422	2,159	0 (16)	96
Korea	1,477	111 (7.51%)	20,822	8,758	2,154 (981)	597
Yonsei	1,724	129 (7.48%)	17,825	11,100	1,282 (1,402)	934

Note: Training courses cover language training courses, exchange programs, etc.
Data sources: www.academyinfo.go.kr; www.snu.ac.kr; www.skku.edu; www.kaist.ac.kr; www.postech.ac.kr; www.korea.ac.kr; www.yonsei.ac.kr

Shared Governance and Academic Freedom

The Korean government has tried to make universities more autonomous and accountable based on neo-liberal policies since the mid-1990s. National universities are legally government organizations, so they are bound by government rules and regulations in their personnel policy, organization structure, and financial management. For instance, they must release self-evaluation reports and disclose university budget information. In the 1990s, government regulations came to be considered a stumbling block to university innovation, and the Korean government-initiated reforms to the governance structure to provide flexibility in university management, leading to policies giving universities more autonomy. SNU obtained independent corporation status in 2012. Among the six top research universities, the two national universities (SNU, KAIST) are now independent corporations, and the other four are private. Thus, all six top research universities in South Korea have relatively flexible governance structures compared to other universities (Shin & Lee, 2015).

Shared governance and academic freedom are considered core components of a research university because academic excellence is not obtainable without academic freedom and faculty autonomy (Salmi,

2009). Faculty members of world-class universities are empowered to make decisions, such as when recruiting new faculty members and developing curricula. Because both learning and research are complex and unpredictable processes, they require a high degree of freedom from intellectual constraints to be performed effectively by higher education institutions (Schmidtlein & Berdahl, 2011). However, Korean research universities have a seniority-based academic culture, institutionalized during the country's long history of respect for Confucian traditions (Shin & Jang, 2013; Shin & Lee, 2015). Junior academics are not independent of their seniors in their academic activities. The strong seniority culture has been reinforced by a closed disciplinary culture, where professors major in the same field from their undergraduate to their doctoral degree. Academic disciplines are channels for knowledge production and dissemination as well as for the training of younger scholars. When the discipline is the unit of academic training, faculty hiring and promotion, and academic activities, this situation reinforces a rigid hierarchy.

Academic inbreeding is also associated with the strong seniority culture. The faculty inbreeding rates of the research universities are relatively high, especially at the three SKY universities, where over 50% of the faculty received their degrees from the same institution at which they now teach (Shin, Jung, & Lee, 2016). These high rates add to junior academics' lack of independence in their academic activities, as their senior professors may well have been their professors when they were undergraduates.

Nevertheless, there is a slow change occurring in academic governance and academic culture; for instance, a 2005 policy initiative was aimed at capping the percentage of professors who graduated from the same university (Shin et al., 2016). Nevertheless, Korean universities are far behind western universities in terms of shared academic governance and a culture of academic freedom, and how to change this situation is a critical challenge for the advancement of Korean research universities (Shin & Lee, 2015).

Conclusion

This study examined the accomplishments of Korean research universities through government-driven initiatives such as the BK21 project in terms of three main characteristics of world-class universities: a strong foundation of research funding, talented human resources, and shared governance and academic freedom.

Korean research universities have developed under government-driven and growth-oriented policies based on the perspective that science should benefit national economic development. The research performance of Korean universities has therefore grown enormously in terms of the quantitative aspects, but it is aligned with industry needs and focused on applied and developmental research much more than is the case in other advanced countries. Although this approach of focusing on applied and developmental research based on the needs of industry might be efficient to quickly build research performance and support economic development, it also might explain why the foundation for academic research in Korea is relatively weak. The quality of research universities is more closely related to sufficient research funding, talented human resources, and shared governance and academic freedom than to quantitative figures on research productivity.

Korean research universities have relatively sufficient research funds compared to other types of Korean universities, but most invest more in applied and developmental research and less in pure and basic research. The excessive emphasis on applied and developmental research and short-term results can lead to weak foundations for research universities and limit the ability of academics to conduct pure and/or long-term research.

Korean research universities have highly talented students in their undergraduate programs, but they are less competitive in their doctoral programs because many talented students prefer to go abroad, especially to the United States, to obtain their doctoral degrees. This preference results from the history of the formation of research systems in Korea. The Korean government established research strategies to import new technologies from advanced countries and send top talented researchers abroad to study advanced knowledge and technology (Kim, 1997). Therefore, foreign degree holders have been

acclaimed in Korean academic society, and this tendency to prefer foreign degrees over domestic degrees has affected Korean academic culture.

Korean research universities have actively recruited excellent international students and aggressively started hiring international professors in recent years, but the share of foreign professors and students is still lower than at other competing research universities in Singapore and Hong Kong. Therefore, Korean research universities need to strengthen their international competitiveness.

Korean research universities have long played key roles in contributing to economic development through growth-oriented policies, but now they are faced with the need to establish the quality of their doctoral programs and to transition to shared governance and a culture of academic freedom to become genuinely competitive, world-class universities (e.g., Braxton, Luckey, & Helland, 2002; Smeby & Try, 2005). The quality of academic work depends on academic freedom as well as funding, governance, and human resources because scholars are a self-motivated species; they prefer to choose their own research topics and develop their own ideas for their research careers (Shin & Lee, 2015).

Korean research universities have enjoyed remarkable success in terms of research performance. As the enrolment rate for higher education is exceptionally high and research productivity has increased dramatically over recent decades, these universities have the potential to improve the quality of their systems. Based on their quantitative performance, Korean research universities are well-positioned to turn their efforts to improving their doctoral education systems and bringing in a more open academic culture that supports scholars' initiative.

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