

The Making of South Korea's COVID-19 Test Success

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At least 120 countries have asked South Korea for COVID-19 test kits and other materials to fight against the ongoing coronavirus pandemic. South Korean biotech firms are shipping the kits everywhere from Europe and the United States to the Middle East and Southeast Asia. Once the coronavirus crisis is over, policymakers across the world will look at South Korea and ask themselves how they can replicate its success in quickly developing and manufacturing hundreds of thousands of reliable test kits. They should skip Seoul, and head straight to Daejeon instead.

South Korea's fifth largest city lies a 50-minute high-speed train ride from the capital. It is home to Daedeok Innopolis. Not many outside of South Korea have heard of the country's main R&D cluster. But it is the cradle of South Korea's biotech.

In 1973, Park Chung-hee had the vision, and craziness, to establish KAIST, South Korea's answer to MIT. Today it is one of the top under 50 universities in the world, as per the QS World University rankings. Out of KAIST grew Daedeok Innopolis, home to over 230 government and corporate research institutes and educational institutions.

This includes the Korea Research Institute of Bioscience and Biotechnology (KRIBB). Established in 1985, KRIBB covers all aspects of basic and applied research. It has strong synergies with KAIST and other research institutions across

At least 120 countries have asked South Korea for COVID-19 test kits and other materials to fight against the ongoing coronavirus pandemic. South Korean biotech firms are shipping the kits everywhere from Europe and the United States to the Middle East and Southeast Asia. The secret to South Korea's test development and manufacturing success lies in Daejeon. This city is home to Daedeok Innopolis, South Korea's main R&D cluster, including for biotech. Developed since the 1990s, South Korea's biotech industry is a textbook case of the country's industrial policy. It is based on two pillars: public-private cooperation and continuity across administrations. This is what Daedeok Innopolis and South Korea's COVID-19 test success embody.

Daedeok Innopolis – as well as with other institutes in South Korea and across the world. KRIBB arguably is the country's biotech jewel in the crown.

Awash with government money, KRIBB conducts the type of basic science research that even the most profitable *chaebol* balk at. It places bets on which sectors to develop. KRIBB, for example, hosts the Viral Infectious Disease Research Center and the BioNano Health Guard Research Center. They are two important pillars of South Korea's pandemic research, detection and monitoring.

South Korea, along with fellow newly developed East Asian countries Singapore and Taiwan, decided to bet on becoming a global biotech leader in the 1990s. And it was a bet. South Korea had become rich by manufacturing cheaper and better products than others had invented. That model was not suitable for a country with increasingly expensive workers. South Korea had to compete at the technological frontier. It had to innovate. Biotech was one of the areas that the government and the private sector decided to prioritize.

South Korea is said to be hopelessly divided between liberals and conservatives. This isn't true when it comes to many aspects of industrial policy and economic policy-making though. Following from the Asian Financial Crisis, Kim Dae-jung, South Korea's first-ever liberal president, had no qualms to double down on his conservative predecessors' push to make the country a leader in biotech.

Kim's government realized that Korea had the necessary infrastructure, but did it have the necessary brains? His government launched Brain Korea 21 (BK21) in 1999. Rebranded BrainKorea21^{Plus}, it has survived three liberal and two conservative administrations. Hundreds of billions of US dollars have been spent on training the next generation of South Korean innovators, with a focus on the natural and applied sciences, as well as engineering.

From the beginning, Seoul had the intention to make biotech a pillar of South Korea's export-oriented economy. In other words, commercialization was key. The Kim government even set up BioValley in San Diego in 2002. The goal was to use government money to facilitate private sector exports by building infrastructure and providing below market or free leases to South Korean firms trying to crack the U.S. market.

By the mid-2000s, however, South Korea seemed to have failed. It was not in the same league as the United States, neighboring Japan or European powerhouses France, Germany and the United Kingdom. South Korea's biotech firms were having trouble becoming internationally competitive.

The Global Financial Crisis helped to give new impetus to South Korea's biotech push. The Lee Myung-bak government launched the 577 initiative to foster 'high risk, high return' sectors such as nanotechnology, brain research and, certainly, biotech. Funding increased. Seoul also introduced policies to bring foreign researchers to universities and research institutes.

Today, OECD data indicates that South Korea is one of the global leaders in the biotech sector. When combining R&D spending, number of patents and number of firms, only the United States and Japan can compete with South Korea.

The MERS outbreak of 2015, however, laid bare one of the inadequacies of South Korea's approach to biotech. In short, it was unsuited to the manufacturing of the necessary products in times of crisis. There were too many regulatory loopholes for manufacturers to jump. With 38 casualties, South Korea had the second largest number of deaths from MERS. The minister of Health and Welfare lost his job.

Reforms brought forward by the Park Geun-hye and Moon Jae-in governments allowed biotech firms to obtain fast-tracked regulatory approval for test kits when the COVID-19 pandemic broke out. Approval of new products can take up to one year and a half. Companies have received it within a week during the current pandemic. 'Test, test, test' has only been possible by the mass production of test kits. Without regulatory reforms, South Korea would have wasted precious weeks, or perhaps even months, to start producing them.

Certainly, some of the firms now manufacturing and exporting test kits are based in Seoul or nearby cities like Suwon. Similar biotech firms are based in Pangyo and Bundang, also close to Seoul. After all, many scientists and researchers also prefer to live in South Korea's economic and cultural heart. And Seoul's universities also have many strengths in the area of biotech. Especially Seoul National University, which can match KAIST in many areas of biotech research.

But South Korea's key biotech cluster is in Daejeon. Its roots can be traced back to almost 50 years ago. The test kits ubiquitous in South Korea and increasingly across different parts of the world were first envisaged there.

South Korea's success in test development and manufacturing is underpinned by two pillars of its industrial policy: public-private cooperation and continuity across administrations. This is what Daedeok Innopolis embodies.

ABOUT THE AUTHOR



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