

Forge ahead

South Korea's march from fast follower to first mover in science and technology.

The explosive growth of South Korea's economy in the second half of the twentieth century took a country that had been devastated by war and transformed it into one of the world's 15 richest nations, as well as one of the most technologically advanced. Although this rapid industrialization is fascinating in itself, the next stage of the journey is just as intriguing: how to establish South Korea as a creative, innovation-led economy.

Recognizing the multitude of benefits in investing in science and technology, the country has regularly increased its research and development spending, going from 2.2% of growth domestic product in 1995, to 4.15% in 2013 — more than twice that of many other Organisation for Economic Co-operation and Development nations (www.oecd.org/sti/rds). In spite of this, Korean science finds itself in a quandary: the country benefits from a highly educated workforce, relatively high levels of funding, and is home to a number of world-renowned scientists. But it is presently not a hotbed for scientific innovation¹, preferring instead to import ideas or technologies from abroad and then develop them further. The Korean government wants this to change.

Facing the challenge of becoming more scientifically innovative requires a shift in scientific attitude. Such cultural changes are not easy to implement, particularly as many of the policies and institutions that assisted economic development in the past may actually be holding back reform today, tending, for example, to focus on research that can be commercialized, rather than on basic science. But things are certainly already changing.

First, South Korea is putting its money where its mouth is when it comes to investment in science. Moreover, in 2011 the government launched a new institute that it hopes will rank alongside the world's leading basic-research institutions: the Institute for Basic Science (IBS).

The initial plan for the IBS was to attract 3,000 researchers and staff members to 50 research centres around the country. The centres' directors would then be given multi-million dollar budgets, and have a substantial degree of autonomy. With no funding worries, a peer-review-based assessment that relieves researchers from the pressure of having to publish, and no real penalties for failure — in the short-term anyway — the hope was that these centres would stimulate a scientific



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culture of adventurous and creative long-term research projects, which would then feed back into the broader communities².

The IBS now boasts more than 600 employees in 25 research centres, and although things are certainly headed in the right direction, progress has been slowed for a number of reasons. One of these is that the IBS is having to perform a delicate balancing act between providing researchers with the resources they feel necessary, while maintaining support for scientists who do not have access to such resources. This is being carefully managed, but many inquisitive eyes will be analysing their output over the coming years — with value for money likely to be a future topic of conversation.

In addition to the IBS, there are a number of other government-funded research institutes that hope to play a leading role in the nation's creativity-development initiative. The first of these, the Korea Institute of Science and Technology (KIST), was founded in 1966, and contributed greatly to Korea's development during the 1970s and 1980s. It does not plan to step aside: with a rich heritage, a proven track record and over 1,800 research scientists, KIST is already planning how it will tackle the next 50 years. And there are plenty of other institutes that will be hoping to have their say.

There are also a number of aspiring universities, such as the Ulsan National Institute of Science and Technology (UNIST), that have big plans, with resources to match. Located in the heartland of Hyundai, UNIST has strong support from central and local governments, and aims to be one of the

world's top ten science and technology universities by 2030 — an ambitious goal for a university that opened in 2009.

But with new national facilities, such as the country's first X-ray free-electron laser and rare-isotope accelerator, many scientists will find themselves better equipped to become global leaders. It is safe to say that the Korean government didn't place all its eggs into one IBS-shaped basket.

Interestingly, private enterprise is also playing its part. Samsung has programmes in place to fund breakthrough and innovative research with one simple criterion: a novel idea. Samsung also reacquired Sungkyunkwan University and, like POSCO, a major steel producer that founded and has bankrolled Pohang University of Science and Technology since 1986, is hoping that heavy investment in their own university will be rewarded with future science and engineering leaders.

Korean scientists know that changes need to be made if they are to create a stimulating and productive environment. And they know that retaining their top-class young researchers — who still often seek careers overseas — and increasing the number of foreign researchers both need to remain high on the agenda. But with strong backing from government and business, and considering their development over the past 50 years, would you bet against them? □

References

1. *OECD Science, Technology and Industry Scoreboard 2015: Innovation for growth and society* (OECD, 2015); <http://doi.org/89j>
2. Park, S. B. South Korean research centre seeks place at the top. *Nature News* (17 May 2012); <http://doi.org/89k>