South Korea invests big in basic research

Internationalizing the science community, encouraging creativity, and becoming a world research leader are the aims of an initiative in a country better known for its industry than for its science.

When times are tough, the tendency among Western countries is to knuckle down and demand that research produce results fast. South Korea, with its new Institute for Basic Science (IBS), is doing the opposite. Starting with 15 or so research centers this year, the IBS is on an ambitious track to grow by 2017 into a network of 50 centers with a total annual budget of $600 million.

At the 17 May IBS inauguration ceremony, South Korean president Myung-bak Lee said, "We have thus far only emulated advanced technologies of other countries and traced their footsteps. In order for us to emerge as an advanced, leading nation, however, we need to become a creative pacesetter based on basic science and original technologies."

The countries that lead in science and technology, he said, have "not only produced numerous Nobel laureates but also generated colossal national wealth on the strength of the achievements of basic research." With the launch of the IBS, Lee said, "the nation is marking a new beginning. Our future depends heavily on the science community."

Research centers

In South Korea, "[people] have been trained well and we work hard. There are lots of incentives to excel," says a Korean physicist who has played an advisory role from the start but didn't want his name printed. He points to the country's successful semiconductor, auto, and ship-building industries. "But while individuals are creative, new thinking—creativity—is collectively missing here," he says. The IBS is intended to "elevate the science sector and provide a backbone to industry, which has been mostly a fast follower, to become a first mover."

The biggest challenge, this adviser says, will be "selecting people that are worthy." Despite a hasty process, "the first hires definitely are world-class superstars," says George Sawatzky, a physicist at the University of British Columbia who serves on the IBS selection committee. The IBS is modeled on Germany's Max Planck Society and Japan's RIKEN, although it is more hierarchical, with just one director per center. The first 10 centers are in biology, chemistry, physics, and math. The IBS plans to set up 25 centers by mid-2013.

About half of all the centers will be in Daejeon, a growing science city some 150 km from Seoul, and will be split between IBS headquarters and KAIST, formerly known as the Korean Advanced Institute of Science and Technology. The others will be scattered around the country, mostly on university campuses. "This prevents too much concentration of research centers in one part of the country," says IBS president Se-Jung Oh, a condensed-matter physicist. The IBS centers will each have 50 researchers on average, including graduate students and postdocs, senior researchers, and technicians. The IBS aims for a total of about 2500 researchers at full capacity.

So far, the director selection process has been open to all disciplines. But future calls for applications may specify

IBS

President Myung-bak Lee of South Korea speaks at the 17 May inauguration of the Institute for Basic Science, a well-funded initiative to catapult the country into the major leagues of fundamental research.

fields, such as climate change and scientific computing, that an advisory committee identifies "as areas in which Korea is not at the forefront, but which are important," says Oh.

In keeping with the aim to internationalize the country's science community, the IBS is looking to hire 30% of its scientific personnel from abroad. Three of the first 10 directors are returning to Korea from the US. In the current hiring round, Oh says, "about half the candidates are not of Korean background." The IBS is not permitting its hires to have joint appointments at other institutions.

Cultural shift

Setting up an IBS center is "quite a big job," says Tae Won Noh, director of a center that is getting started at Seoul National University. Noh is seeking scientists to join his center, which, he says, will have up to six group leaders focusing on different aspects of strongly correlated electronic systems. He is also working to convince his university to erect a building for his center and two others—in biology and chemistry—on the campus. Noh says he hopes to establish synergies with the physics department, where he is a professor. He plans, for example, to allow access to his center's experimental equipment and to invite physics faculty to attend IBS seminars. As a center director, Noh will oversee a budget of about $10 million a year. Group leaders will each get $1–1.5 million annually, he says. But, he notes, IBS researchers will not be allowed to compete for other federal funds.

Despite its promise, the IBS has come in for some criticism. Mostly, says Noh, people in disciplines not encompassed by the IBS worry that the new initiative will take money away from them. "There has been a healthy debate," says Oh, who argues that the IBS is funded with new money. "[The] Korean government spends about $15 billion per year for R&D, and the budget has been increasing by close to 10% for the past five years. The new money should be enough for the IBS investment." Moreover, he says, IBS researchers at universities will be paid by the IBS, not out of the university budget.

The IBS is the crown jewel of the government's broader plan for an international science and business belt (ISBB) in Daejeon. A rare-isotope accelerator—dubbed KoRIA—is part of the ISBB plan. "This is a good candidate for a world-leading facility," says its director, Sun-Kee Kim. "It will be the largest facility for basic research in Korea." The IBS will oversee KoRIA, for which a design is supposed to be finalized next year and the facility built by 2017. Eventually, Oh says, the ISBB will house incubators for startup companies.

New research institutions such as the IBS are springing up around the world. Others have been or are being started in, for example, China, Japan, Russia, and Saudi Arabia (see PHYSICS TODAY, November 2009, page 24). "It's interesting that talent is shifting to developing countries," says Oh.

"I think it is mainly an effort to demonstrate a huge interest in high-level intellectual activities," says Sawatzky. "It's an advertisement for a country that is advancing from a primary interest in short-term economic gain to contributing to the international intellectual challenges aimed at increasing the quality of life in the more distant future."

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