

美國教育專刊報導韓國大學近十年急遽成長

駐韓代表處文化組

2004 年 8 月 06 日

韓國教育人的資源部長最近報導美國高等教育週刊 - 「The Chronicle of Higher Education」七月二十三日所刊登消息表示：韓國大學教育近十年急遽成長。

標題為「Asia's a New High-Tech Tiger」報導指出：以往十年世界科學界對韓國大學並未矚目，但是最近對韓國研究人員所發表之論文以及研究成果都相當驚訝。

此報導又表示：韓國大學目前訂定計畫，以二十年為目標，要成為尖端科技部門世界最強者。韓國政府並從一九九三年開始對研究部門投資二百多億韓元，將數千名大學畢業生赴美研習、促進大學改革及產學協力等。

具體而言：國立漢城大學、KAIST、浦項工學院三所，是研究中心之大學，自從韓國教育部集中支援後，大學的研究成績，日益猛進。

韓國政府集中支援優秀大學後，雖受到其他大學之反彈，但是目前以地方均衡發展層面上所實施的「加強地方大學革新力量事業」(NURI:New University for Regional Innovation)，緩和了此種趨勢，比如三星財團集中支援成均館大學、浦項製鐵支浦項工學院，以及產業支援部支援一百五十多大學研究中心等，透過產學協力合作，提高企業之生產性。

檢附美國「The Chronicle of Higher Education」週刊發表之原文如附帶檔

原始資料時間：7 月 24 日韓國教育網頁新聞等

附件：「The Chronicle of Higher Education」刊登之「Asia's a New High-Tech Tiger」專文

附件: Asia's New High-Tech Tiger

South Korea's ambitious, and expensive, effort to bolster university research is paying off

By ALAN BENDER

Seoul, South Korea

A decade ago South Korean universities were little noticed in the world of scientific research. Professors had adequate laboratory space and equipment, but few incentives to venture beyond basic research into the applied fields that could help stimulate the national economy.

Today the country's top research institutions are publishing scientific papers and producing patents at a breathtaking clip, and the international academic community is paying attention.

South Korea's universities have been the driving force behind the country's ambitious plan to become a high-technology powerhouse in the next 20 years. Since 1993, the government has invested more than \$20-billion dollars in research, sent thousands of graduate students and researchers to the United States to work on short-term projects, begun restructuring the higher-education system, and encouraged collaboration between industry and academe.

The results, so far, are impressive.

South Korea's most prestigious science university, the Korea Advanced Institute of Science and Technology, known as Kaist, in the research-oriented city of Taejeon, increased the number of patents it has secured from 171 in 1993 to 1,490 last year. The number of Kaist professors' scientific papers published in some of the world's top journals has more than doubled during that period, an indicator that their work is growing in significance. Annual investment in research and development has nearly quadrupled over the past decade, from \$26-million to \$96-million.

Last year the Satellite Technology Research Center at Kaist developed and launched, using a Russian rocket, South Korea's most ambitious science satellite, designed to survey the universe for hot galactic matter.

And in May Kaist named an American Nobel laureate as its next president, the first foreigner to head a public university here. He is expected to make more changes to improve the university's global competitiveness.

Other South Korean universities are also making news. Two scientists at Seoul National University stunned the world this year by successfully cloning a human embryo from stem cells.

"The difference between 15 years ago and now is like night and day," says Hong G. Im, an assistant professor in the department of mechanical engineering at the University of Michigan at Ann Arbor.

Mr. Im left South Korea 15 years ago to pursue a doctorate at Princeton University after obtaining a master's degree at Seoul National University. "Most of my colleagues would agree that the top Korean engineering schools, including Kaist, now have laboratory and classroom facilities that are as good as, if not better than, those in major U.S. institutions," he says. "With so many talented faculty members, well trained in the U.S., and students, I expect that Korea will soon become one of the major competitors to the U.S. in cutting-edge research."

The Plan

South Korea's new focus on research permeates even the enormous, drab government building that houses the Ministry of Education and Human Resources Development here, just 40 miles from the border with North Korea.

The building, which contains several federal departments, is ringed by a 15-foot-high iron fence and a cordon of hundreds of armed soldiers standing shoulder to shoulder. But tucked away in a small, brightly lit office on the 17th floor is Chung Bong Gun, director general of the Human Resources Development Bureau, radiating friendliness and enthusiasm.

Mr. Chung envisions different parts of the higher-education system playing specific roles in the country's technological development. The large research universities will continue to produce inventions with practical applications, he says, while two-year vocational colleges could help small factories and shops to develop production technology. The role of government will mainly be to provide money and direction.

That direction is pointed squarely at what has come to be known here as the six T's, or technologies: biotechnology, environmental technology, information technology, materials technology, nanotechnology, and space technology. The cloning of a human embryo may have grabbed world attention, but Mr. Chung and other officials here are more interested in discussing how universities can help the country develop more high-tech products.

Since 2001 the government has pumped nearly \$4-billion, about 44 percent of its research-and-development funds, into the six technologies, said Mr. Chung. Industry, which provides approximately 75 percent of all research-and-development money in South Korea, dedicates an even larger percentage to high technology.

South Korean universities are strongest right now in information technology. "Many of the next-generation growth engines are related to IT," says Park Chan Mo, president of Pohang University of Science and Technology, commonly known as Postech. Advances made by South Korean scientists in fiber optics, semiconductors and other areas could lead to new products, such as intelligent robots and mobile communications.

Government officials have said they hope the amount of money going into research and development will reach \$25-billion by 2007. That would equal 7 percent of the national budget. Spending on scientific research now amounts to 2.89 percent of South Korea's gross domestic product.

The Push

The rush of money into university research is just one part of the government's multipronged approach to technological development. Five years ago, the education ministry unveiled a \$1.2-billion, seven-year project to improve the training of scientists and researchers by sending graduate students abroad for short-term research projects, financing joint research projects with universities abroad, and supporting faculty exchanges. Known as Brain Korea 21, the project has had an enormous impact on universities here.

Brain Korea 21 is the first program to support master's and doctoral students "at a substantial level" and to allow universities to hire postdoctoral students and researchers, says Kim Kuh, director of the Brain Korea 21 Program at Seoul National University.

To avoid a brain drain, the South Korean education ministry is mainly supporting students for short study or research programs lasting from a few months to a year rather than for graduate-degree programs. Nearly all of the students are expected to return to their home institutions.

The education ministry also designed Brain Korea 21 to bring about reforms in South Korean universities' policies. To qualify for the program, many universities had to change their graduate-admissions systems so that they recruited most of their students from other institutions, to rectify the problem of intellectual inbreeding that was occurring at some top-notch universities.

They also had to recruit at least half of their faculty members with terminal degrees from other universities and put into place a system for reviewing professors' performance.

As a result of the Brain Korea 21 project, a number of South Korean universities have signed agreements with American and European universities to promote joint scientific research and student and faculty exchanges.

Kaist is particularly proud of its arrangement with the University of Michigan, in which more than a dozen Kaist doctoral students spent up to a year in Ann Arbor conducting research, and several Kaist professors spent their sabbatical there. More than 20 Michigan professors have visited Kaist to give seminars, review theses, and consult with students and faculty members. In general, far more South Koreans have traveled to the United States as part of the Brain Korea 21 program than Americans have gone to South Korea, but the next generation of the program, to begin in 2005 when the current program ends, is expected to fix this imbalance.

The Payoff

Brain Korea 21 has enabled more than 24,000 graduate students to study in the United States, and nearly 2,500 foreign scholars to visit South Korea, turning South Korean universities into truly international forums. About 80 percent of university professors in science and engineering here received their graduate degrees in the United States.

With the flood of research money, South Korea's universities have invested heavily in the newest scientific equipment. Kaist is building a \$180-million nano-fabrication facility that will be capable of producing atom-size particles for research and future commercial applications in small electronic products, such as cellphones and biomedical devices.

The most recent sign of South Korean higher education's growing prestige came in May, when Kaist named Robert B. Laughlin, an American Nobel Prize winner, as its next president.

"The appointment is an indication of how serious South Korea's leadership takes the need to be globally competitive in research and teaching that bears on future development in science and technology," said James F. Larson, director of testing and technology at the Fulbright Commission in Seoul and author of *The Telecommunications Revolution in Korea*.

Mr. Laughlin hinted that he will press for major shakeups, saying that South Korea's high-tech universities are "untenable in their present form." He has said that the country's universities need to become more competitive and rely less on government support.

The Price of Progress

Success has not come without strife, however.

The government has been criticized because much of its research-and-development money has gone to Kaist, Seoul National University, and Postech. Now, however, the government is spreading its largess to universities in the provinces. Mr. Chung, of the Ministry of Education and Human Resources Development, says the change in strategy is designed to ensure "a balanced national development."

The big-three research universities say they are willing to form cooperative arrangements with smaller, weaker universities, but argue that the progress made so far would be slowed or halted if the government tried to spread the money too thinly.

"Other universities blame us for creating a private club, but we more or less have to guide the Korean government," said Mr. Park, president of Postech, who speaks fluent English, has a doctorate from the

University of Maryland at College Park, and was chairman of the computer-science department at Catholic University of America in the 1980s.

Meanwhile, other institutions complain about a lack of cooperation among universities. Youn Dae Hee, dean of the college of engineering at Yonsei University, says that the distribution of government funds "is unfair," noting that three-quarters of South Korean universities are private, but they only receive one-quarter of government research-and-development funds.

One of the more controversial components of the government's research-and-development push is its use of the Science Citation Index, a bibliographic database of articles from 3,700 of the top science journals in the world. In South Korea, the numbers cited by universities and other bodies mainly refer to the number of scientific articles that appear in these journals.

The education ministry decided to use the Science Citation Index as a major criterion for receiving money from the Brain Korea 21 project. Many South Korean universities now proudly display on their Web sites and in their brochures the number of articles in SCI-recognized journals produced by their professors and researchers.

More than 23,000 articles by South Korean professors appeared last year in such journals, compared with fewer than 12,000 in 1998, says Henry Kim, sales manager at the Seoul office of Thompson Science, the company that manages the index.

But the index is a sore point with many professors. Jeong Ji Chai, a professor of radio-communications engineering at Korea University, says that universities have fixed quotas for the number of papers each professor must publish, and that they create great stress for professors who must publish while carrying full teaching loads. At Yonsei University, for example, professors must publish 12 papers cited in the Science Citation Index in five years.

Partnerships With Industry

The ties between industry and higher education are particularly close in South Korea, where some big companies even own universities.

The rising cost of production in South Korea and increased competition from China and other countries with low labor costs have forced South Korean industry to refocus its efforts on producing high-technology products that require large investments in research and development.

Samsung, in particular, is pouring huge sums of money into research and purchased a 600-year-old university, Sungkyunkwan University, in 1996, to develop stronger ties with university researchers.

Posco, a South Korean steel company, started Postech in 1986 and Postech Information Research Laboratories in 1991. The Ministry of Science and Technology has set up more than 150 so-called centers of excellence at universities and colleges throughout South Korea to promote collaboration between universities and industry.

Universities and companies are hoping that their unusually close partnerships will result in scientific and technological breakthroughs, whether they are new medications for diabetes based on stem-cell research or advances in cellphone technology. The South Korean government is betting money on it.

SOURCE: Chronicle reporting

<http://chronicle.com>

Section: International

Volume 50, Issue 46, Page A34

Copyright 2004 by The Chronicle of Higher Education