



Fresh horizons South Korea

For the Republic of Korea (South Korea), years of rapid economic growth came at a price. In 1997, the unrestricted lending by Korean banks helped to trigger a cash crisis that was only resolved when the International Monetary Fund agreed to bail the country out to the tune of US\$58 billion. A major factor behind the crisis was the country's dependence on — and overinvestment in — a few key industries, notably the slumping memory-chip market.

Now back on its feet, South Korea is pursuing a policy of tax incentives to spur the growth of high-tech businesses in a wide variety of fields including biotechnology, and is ploughing funds into scientific research in an effort to reinvigorate academia. To aid this transformation, the government, universities and industry are all wooing foreign researchers to gain valuable overseas expertise.

"We are trying to prepare for the future," says Kwan Rim, chairman of the Samsung Advanced Institute of Technology (SAIT) in Suwon. Set up in 1987, the institute is now a cornerstone in Samsung's plans to diversify from its core electronics business. Although 40% of SAIT's 850 researchers are working in digital- and telecommunications-related areas, the organization is confidently building up research programmes in biotechnology and fuel cells.

Petrochemicals, another of South Korea's core industries, is also attempting to diversify, with both LG Chem in Taejeon and Isu Chemical in Seoul seeking fresh markets in biotechnology and drug discovery. But it is a slow process. SAIT's DNA chips, for example, have yet to prove themselves in the Korean market, and LG Chem's new therapeutics are still tied up in clinical trials.

Foreigners, or Koreans who have trained abroad, are seen by many as key to the success of these initiatives. "Pharma is new to us, so we must depend on foreign expertise," says Jong-Kee Yeo, president of LG Chem's Research Park. In an effort to kick-start its biotech

ambitions, LG Chem has opened facilities in the United States, including a site in San Diego that carries out collaborative research with US companies.

This thirst for skilled workers is opening up some reasonably lucrative opportunities, particularly for Korean scientists who have trained abroad. Having gained a taste for the lifestyle and wages offered by the West, many Koreans seem slightly reluctant to return home. "We used to ask: 'Wouldn't it be nice to be in your motherland?'. But that doesn't work any more,"

Korea needs foreign expertise if it is to crack new markets, according to Jong-Kee Yeo.



Setting a precedent

Success in biotechnology is not new to South Korea. Macrogen, based in Seoul, made its money from DNA sequencing. Founded as a laboratory venture in 1983 by Jeong-Sun Seo at Seoul National University, Macrogen had plenty of time to develop before it became a company in 1997. Its success hinged on price — it cut the cost of sequencing from US\$15 per read to \$5, which it claims is the lowest in the world. "Our timing was very good," says Seo. The company collared \$40 million when it was listed on Korea's stock exchange and is now

moving into a range of undertakings including a Mongolian genome project, a Korean single nucleotide polymorphism project, creation of knockout mouse models, and DNA-chip production. Younger but also on the rise is Bioneer, a venture founded in 1992. It produces artificial nucleotide sequences often used to make DNA. "These will accelerate genomic studies," says founder and president Han-Oh Park. Using devices of its own design, Bioneer has created its own nucleotide factory, which it claims is much faster than those of its competitors.

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says Yeo. Instead, LG Chem, Samsung and others are forced to match US salaries, which is especially generous considering South Korea's low taxation rates. To attract foreign researchers, SAIT has built living quarters, fitness facilities and arranged for English-speaking doctors to be available.

Korean companies are also seeking expertise from other sources. Both LG Chem and SAIT plan to more than double, to 50% and 25%, respectively, the amount of research that they outsource to academic researchers in or outside Korea. "We want to gain speed by using the vast reservoirs of talent outside the company," says Rim.

The story is similar at South Korea's academic institutions. The Korea Advanced Institute of Science and Technology (KAIST) in Taejon, for example, has recruited 27 foreign faculty members to either full-time or visiting positions this year. "They are paid on a different scale, which puts them at or near the salary at their home institution," says KAIST dean of academic affairs Hai-Woong Lee.

This spring, the education ministry also launched a programme to attract foreigners to its universities. In September its first batch of 100 foreign faculty members, including some Koreans who have more than five years' experience abroad, arrived to teach biotechnology and information technology. Sixty-five of the researchers headed for the prestigious Seoul National University. Their salaries, which were negotiated based on their previous position, created a stir as some were as high as US\$100,000 — roughly three times the average salary of a Korean university researcher.

LINGUISTIC LARGESSE

To make foreign researchers feel at home, many institutions are increasingly emphasizing English. Privately run Pohang University of Science and Technology, for instance, says that it wants all of its graduate programmes to be taught in English by 2005.

Such efforts have started to take hold, says Ewan Stewart, a British physicist now at KAIST. Before coming to KAIST, Stewart spent several years in Japan. "Korea seems much more open to foreign researchers, particularly in terms of faculty positions," he says.

But day-to-day living, especially with a family in tow, can be difficult. In Taejon, a two-hour bus ride south from Seoul and home to LG Chem and KAIST, English is not widely spoken. Communication problems can also make teaching students difficult, says Stewart. "Some undergraduates have great difficulty in lectures and have to rely on my lecture notes on the web."

Many South Korean researchers are nevertheless keen to emphasize the elements of their system that resemble the United States. And there is little doubt that the country's research community has aspects that set it apart from other Asian countries, notably Japan.

One factor is the emphasis on youth rather than a seniority-based hierarchy. "We ensure youth is represented when choosing reviewers," says Chong Shik Chin, director general of the Korea Science and Engineering Foundation in Taejon. At 61, Chin is a little embarrassed at being the oldest person in the organization. The average age of grant-proposal reviewers is now just under 40, he says.

Industry also has a youthful vigour. "Three years ago we abolished the seniority system," says Rim, adding that the average age of SAIT's researchers is under 40. Efforts are also being made to level the playing field for women (see "Equal opportunities", below).

South Korea is once more a dynamic, fast-moving society and offers a range of opportunities for foreign researchers. If it can maintain its overwhelming energy and build on its successes (see "Setting a precedent", left), it is likely that it will manage to carve out a strong niche in its chosen global markets. ■

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Korea Advanced Institute of Science and Technology

♦ www.kaist.edu

Korea Science and Engineering Foundation

♦ www.kosef.re.kr/global

Seoul National University

♦ www.snu.ac.kr/engsnu

Samsung Advanced Institute of Technology

♦ www.sait.samsung.co.kr/sait/src/saitEnIndex.html

LG Chem

♦ www.lgchem.com

Equal opportunities

Last month, the South Korean government passed a law aimed at improving prospects for women scientists. The science and technology ministry must now lay down periodic plans to train and fund women in research. The law also requires the education ministry to produce a plan to recruit women to fields of science more actively.

The Korea Science and Engineering Foundation in Taejon already has several funding schemes specifically for women, but Chong Shik Chin, director general of the foundation, agrees that in general they are not sufficient to maintain a career. "We all agree that it is a long-term problem that needs to be faced," he says.

There are some positive signs, though. Of the 19 centres set up under South Korea's 21st Century Frontier R&D Program — 10-year programmes in which

researchers form teams focused on specific fields and then turn the results into commercial products — two are directed by women. One is Hyangsook Yoo, who heads the Center for Functional Analysis of the Human Genome. The centre has six females among its 39 team leaders.

"It would be nice to have more women scientists, but we do not choose on the basis of gender," says Yoo. "If these training programmes work, after a few years, maybe we won't need such special attention." D.C.



Hyangsook Yoo is optimistic for the future of women scientists in South Korea.