Bright Science City Dreams Face Sober Economic Realities

KEIHANNA—Sitting astride the boundaries of Osaka, Kyoto, and Nara prefectures, Kansai Science City, called Keihanna for short, is intended to be western Japan's answer to Tsukuba, the sprawling science burg northeast of Tokyo. But the recession is hitting Keihanna particularly hard. Whereas Tsukuba began as a cluster of national laboratories, sited there by government decree, Keihanna is counting heavily on attracting corporate labs. And companies right now are in no mood to invest in new research facilities.

Nothing embodies Keihanna's present dilemma so poignantly as the International Institute for Advanced Studies (IIAS), Keihanna's flagship institute. Designed at the height of the bubble economy of the late 1980s and funded by local prefectural governments and the private sector, IIAS is housed in a luxurious compound with exquisite seminar rooms, a community hall with a soaring roof and grand piano, visitors' residences (palatial by Japanese standards), and offices wired for electronic mail. The grounds are graced by ponds and streams and a traditional hut for the tea ceremony.

PHOTOS BY CAROLINE PARSONS/SYGMA

Waiting for scientists. Empty lots are common along Keihanna's main drag *(above)*. International Institute for Advanced Studies' opulent emptiness *(left)*.

Inspired by the Institute for Advanced Study in Princeton, New Jersey, IIAS's planners hope leading scholars from around the world will take up residence to do theoretical and philosophical work that will cross the boundaries between science and culture. The focus will be on the relation between mind and brain, the promotion of human security, and world peace, and, as the first such institute in Japan, it should bring an Asian perspective to its studies. Its director is physicist Minoru Oda, the former president of the Institute of Physical and Chemical Research (RIKEN).

But the institute's ambitious programs have been stalled by funding problems exacerbated by Japan's recession. All but two of the 26 offices intended for scholars-in-residence are empty. The handsome wood bookshelves in the library are bare. At lunchtime, the 10 or so administrative staffers huddle in one corner of the community hall, sitting at a table surrounded by space heaters so the heating system for the entire building doesn't have to be turned on.

The rest of Keihanna has a similar air of hosts at a lavish party waiting for guests to show up. The city's roads and sewers are nearly in place. Keihanna Plaza, opened in March 1993, is expected to be the core service facility, with its circular conference hall and meeting rooms, and about one third of the housing has been put up. But between the new construction stretch vast expanses of dirt lots, waiting for laboratories and researchers.

Only 25 research labs, opened by companies such as Canon, Matsushita, and Sumitomo Metal Industries, are scattered over the 150 square kilometers that fall within Keihanna's boundaries. A few other companies such as Kyocera and Bayer Pharmaceutical have labs under construction. The Advanced Institute of Science and Technology, Nara, a new national graduate school focusing on life sciences and information technology, and a few small private colleges are up and running.

Collaborations between the government and industry are also in evidence: The massive Advanced Telecommunications Research Institute International (ATR), a joint research institute supported by over 100 telecommunications and computer companies and the national government, was the city's first tenant, in 1989, and last fall the Research Institute of Innovative Technology for the Earth (RITE), funded by the Ministry of International Trade and Industry and private industry, opened its central research laboratory.

Work on these facilities began as much as 7 years ago, at the height of the bubble economy. But after the bubble burst, the influx of new facilities slowed to a trickle. Most of the 10 additional firms that had signed on to build labs have put their plans on hold, and one, Oki Electric Industry Co., just killed its Keihanna lab altogether. A company spokesperson says it had to rethink its research strategy given the recession.

Keihanna management is keeping a stiff upper lip. "It's true that it's difficult for private companies to open new facilities given present business conditions," says Mikio Kohzu, managing director of Kansai Research Institute, the foundation promoting Keihanna. Kohzu thinks momentum can be regained as Japan pulls out of its recession. But even if corporate spending on new research facilities rebounds with the economic recovery, it remains to be seen whether the interest in basic research that marked the economic boom of the late 1980s will survive through the slow-growth 1990s.

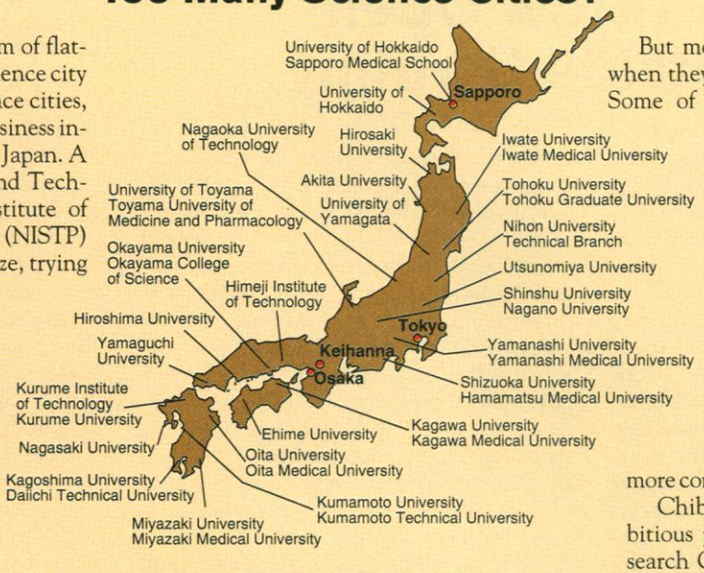
An equally important question is whether Keihanna will succeed in melding itself into a genuine community or remain a grab bag of isolated labs. The research under way runs from basic research into pharmaceuticals to development work on cellular telephones. While the work is admirably diverse, it is not clear what these efforts have in common. There is also a question of how freely corporate researchers can share information with those outside the company.

"There is a difference in information exchange that may result when the city is dominated by private companies as opposed to public institutions," says James Dearing, a professor of communications at Michigan State University who has studied cooperation among research groups at Tsukuba. As research moves closer to application, he says, private companies begin to worry about revealing what they are doing. "I'm somewhat pessimistic that the predominance of private labs will benefit the evolution of a science city," Dearing says of Keihanna.

Indeed, Keihanna's planners recognized that problem from the start and provided for an infrastructure to facilitate interaction among researchers, says Masakazu Okubo, professor emeritus of Osaka University and one of the key academics involved in the project from its early stages. The keystone that is meant to hold the community together is Keihanna Plaza, with its conference rooms, 1000-seat central auditorium, and first-class hotel with coffee shops and restaurants. An attached 13-story building houses rental research labs. Since its opening, Keihanna Plaza has hosted a steady stream of seminars, society meetings, and public lectures.

Too Many Science Cities?

If imitation is the sincerest form of flattery, the planners of Tsukuba science city should be proud: Regional science cities, parks, centers, and high-tech business incubators are springing up across Japan. A recent count by the Science and Technology Agency's National Institute of Science and Technology Policy (NISTP) found 140 of them, of varying size, trying to achieve locally what Tsukuba has accomplished on a national scale. But don't confuse quantity with quality, warns Kinji Gonda, an NISTP official who has been studying the role of science parks in regional development. "In Japan," he says, "there isn't a good example of a regional science park."



Spread too thin? 26 university-linked technopolises.

Successful science parks in other countries, says Gonda, typically rely on strong ties to universities as a source of innovation and as a spawning ground for new businesses. But officials promoting science cities in Japan can't count on this symbiosis: Universities do not traditionally have strong links to the community, and start-up companies are rare. Without the benefit of these natural links, local governments instead try to lure institutions with tax incentives from the national government. But there aren't enough corporate research facilities to provide a nucleus for every nascent science park—and even if a park does snare an industrial research lab, there is little hard evidence that it contributes much to the local economy or provides a boost to local industries.

A better catch for a would-be regional science park is a large-scale facility financed by the national government. Take, for example, the good fortune of the Harima Science Garden City, which was picked as the site of the Science and Technology Agency's $1-billion Super Photon ring-8 GeV synchrotron radiation facility. The project is expected to be sufficiently large and important to generate jobs and a lot of research activity by itself.

But most localities are on their own when they set out to build a science city. Some of them are pouring their own money into new research institutions that officials hope will serve as an anchor for the new park. Gifu Prefecture, for example, is betting on virtual reality, and is preparing to break ground soon on a $10-million Virtual Reality Techno Center. The prefecture hopes this center will help local industries move from robotics and computer-aided manufacturing to virtual reality in developing more competitive products and processes.

Chiba Prefecture has even more ambitious plans for its Kazusa DNA Research Center, which recently opened as the centerpiece of the prefecture's Kazusa Akadèmia Park. The prefecture chose biotechnology because of its growth potential, but institute director Mituru Takanami plans to start by mapping and sequencing cyanobacterium, blue-green photosynthetic cells, in the hope "of making more of a contribution" to science and the economy than could be expected from another generic biotech facility. The prefecture provides 75% of the center's annual budget of $20 million, which has attracted 21 scientists and a full complement of technicians, recruited and trained by the prefecture. Local officials hope that the center will also attract related high-tech industries and spin off technology to local industry. A prefectural official admits, however, that no local businesses that might benefit from its research have been identified to date.

What troubles Gonda is that these institutes have been chosen for their value as symbols of future economic health rather than because of any synergy with existing local businesses. As a result, he says, research funds are spread even thinner, and the community ends up with a high-cost "status symbol."

–D.N.

Okubo says what's needed now are more truly collaborative exchanges among the researchers in Keihanna. Although the initial aim of city planners is to lure the research facilities of established companies, Okubo would also like to see Keihanna become a technology resource for small and midsized enterprises throughout the region. He serves on a committee studying new ways to promote such collaborations. The committee hopes, for example, that the new Nara graduate school will play a key role.

Keihanna is making that process easier by offering rental labs that provide affordable space for existing companies or venture businesses to launch a research project quickly. But Okubo admits that university-industry cooperation is still weak in Japan. The environment for start-up businesses is even worse, and most of the rental labs stand vacant. "It's a difficult problem," he sighs.

A glimmer of hope, however, can be found in a discussion group formed by researchers from three Keihanna institutions all studying natural language. One of the organizers, Hitoshi Iida, head of the Interpreting Telecommunications Research Laboratory at ATR, says he frequently met people from Matsushita and the Nara graduate school at conferences but didn't bother to ask where they worked. "We finally realized we were all working in the same neighborhood," he says. Now as many as 30 people from the three institutes and occasional visitors from regional computer companies meet once a month to compare notes.

Although such discussions are natural for university professors, students, and those at ATR, they are unusual for corporate scientists. So it's not surprising that some companies have laid down ground rules. Noboru Wakami, a Matsushita manager who supervises the natural-language research group, says there are things his team can't discuss. "When we're all in the dark," he laughs, discussions on approaches and possible solutions can be very free. "But if original ideas occur to our researchers in that process, they'll keep their mouths shut," he says.

So far, however, the bigger problem is participation. With so few labs in place, few fields can boast of having a minimum mass of researchers. Wakami's colleague Kentaro Setsune, who is working on high-temperature superconductivity, says he'd like to join such a group. "But there is no one else here studying superconductivity," he laments. Like so many others, he's still waiting for Keihanna's scientists to show up.

–Dennis Normile