Editorial

Building biotechnology in Okinawa

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Last fall I was invited to an international workshop with the aim of helping develop a research university in Okinawa, the Okinawa Institute of Science and Technology (OIST). It was an enlightening experience to observe the creation of a new knowledge infrastructure. Although I cannot comment on the workshop discussions, I will share some of my personal thoughts and observations.

To understand the development of a research university in Okinawa, it is necessary to first understand Okinawa. Historically a separate nation, Okinawa became a prefecture of Japan in 1879. Following the Second World War, Okinawa was under United States administration until 1972, when it was transferred to Japanese administration. It comprises less than 1% of Japan's landmass, but is home to more than 75% of Japan's US military bases. While under US administration, Okinawa's economy was largely comprised of direct and indirect revenues from the US military bases. Since the transfer to Japanese control, concerted efforts have been underway to diversify and develop an independent economy. The main industries are currently tourism, functional foods and information and communication industries. Okinawa's dependence on revenues from the US military bases has decreased, but unemployment remains high – twice the rate of any other prefecture – and *per capita* income is the lowest in Japan.

My first observation on arriving at OIST was its isolation. The institute was built into a dense forest at the top of a mountain, in wonderful harmony with nature. Yet, as I looked out at the rich forests, I wondered where all the supportive infrastructure was. Where were the office parks, incubator spaces and the cafes and restaurants where innovators could work and interact? It became immediately apparent that beyond building a state-of-the-art research institute, much effort would be needed to attract and retain complementary assets. If scientists seeking to develop innovations from OIST laboratories had to leave the area, or leave Okinawa, to develop them, then they might never return, or worse, not elect to initiate research in Okinawa.

Beyond simply having the necessary resources for development and commercialization of innovations, Okinawa and OIST also need a compelling pitch if they are to attract interest; given the numerous global locations to engage in research and development, what are compelling reasons to select Okinawa? The founders of OIST established it as an English-speaking institute – a decision which potentially places it as a gateway for Japanese seeking to reach outwards, and a gateway for foreigners seeking access to Japan markets and minds. They have also been strongly involved in supporting local schools, helping build an innovative mindset among the next generation of Okinawans.

I feel that more aggressive tactics should also be applied. Okinawa's unique situation – the relative abundance of foreign military bases and the weak economy – enable it to make special requests of the central government. I strongly encourage OIST and Okinawa to seek special status to bolster development. Just as Puerto Rico's strategic tax abatements led it to become

the dominant location for pharmaceutical manufacturing for the US market, Okinawa can employ policy measures unavailable to other prefectures to drive development. Reducing the tax burden for eligible start-ups and reducing payroll taxes for start-up employees are good ideas which have been implemented elsewhere, but Okinawa can also become a test-ground for greater innovation policies. Article 35 of Japan's Patent Law, similar to the US Bayh-Dole Act, grants ownership of employee inventions to the employer (including research institutes and universities). Although this automatic grant of ownership to universities has been successful in the leading American universities, an alternative model has been working very well in other countries. Some universities, such as Canada's University of Waterloo (home to more high-tech and knowledge-based spin-offs than any other Canadian school) opt to grant intellectual property ownership to the inventor. Although the university might lose millions of dollars in potential patent royalties, it is able to attract and retain leading researchers at lower cost and also gains all the spillover benefits from development and commercialization. By granting OIST a waiver from Article 35, the institute could attract global research leaders who seek to own their inventions. Venture capitalists and service providers could follow these researchers, helping develop a local supportive infrastructure at no direct cost.

The development of a new research university is a complex undertaking. Diverse interconnected and mutually dependent elements must be laid down, often with external support to sustain them until they can be self-sufficient. The leadership at OIST realizes the need for long-term thinking and sustained support. I look forward to following their progress.

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